The Philosophy of Exercise Professional Education.

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Abstract:

Within both populist consciousness and government policy there is the belief that exercise is medicine. Accordingly, within political, academic, and practical contexts, exercise professionals are seen as important gatekeepers of knowledge for positive participation experiences. Yet, behind the optimistic 'exercise is medicine' symbolism, there is evidence that health professions founded on techno-rationalism and scientific evidence-bases are problematic in practice. This thesis therefore critically explores the paradigm underpinning exercise professional education and considers the possible impact of the 'exercise is medicine' concept on practice. Specifically, drawing upon debates in the philosophy of medicine, and using an Aristotelian analysis of educational materials, it is argued there is a growing biomedicalisation of exercise. As a result, it is suggested that contemporary exercise science illustrates issues of biomedical scientism which have previously been shown as problematic for medicine's professions. These include accusations of Gnosticism, thanatology, and a focus on the necrophilic, and hence, it is argued biomedicine is a possible factor in the growing recognition of iatrogenic (injurious) exercise participation. Accordingly, the proposition is made that there may be emerging dangers in the continued biomedicalisation of exercise. Based upon these arguments, this thesis proposes an alternative paradigm through a greater consideration of Aristotle's practical wisdom and Spinoza's concepts of perfection and joy. Consequently, the thesis provides an original contribution to professional practice through recommendations for both the development of exercise philosophy and exercise professional education. These include the need for recognising practical wisdom alongside theoretical knowledge in professional education, the shift of exercise professionals from a position of technician to coach, and for greater epistemic debate within the on-going evolution of exercise science.

Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

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Ever insurgent let me be,

Make me more daring than devout;

From sleek contentment let me be free,

And fill me with buoyant doubt

- Louis Untermeyer

Contents

Summary of synthesis:

This summary of synthesis is provided to illustrate the sequence of arguments within the thesis that leads to its conclusions. The intention is to allow the reader to follow the logical steps of the reasoning underpinning this thought experiment.

p1: The exercise paradigm is a philosophy for professional practice derived from a concept of exercise.

p2: the professional paradigm is constructed from a synthesis of the academic and educational epistemology for praxis.

p3: the current exercise paradigm is biomedical, i.e., based on a concept of Medicine encapsulated in the phrase 'Exercise is Medicine'.

p4: the current exercise paradigm is an epistemological synthesis of biological mechanism, materialism, reductionism, and positivism.

p5: the biomedical paradigm has been shown to be hazardous in Medicine, i.e., iatrogenic disease.

p6: reflecting observations in Medicine, there is an increasing incidence of reported iatrogenic exercise experiences.

P7: the iatrogenic exercise paradigm is due to a thanatological Gnostic scientism and a necrophilous professional praxis.

p8: an Aristotelian analysis of the epistemology of professional exercise demonstrates a dominance of *sophia* (theoretical wisdom) and lack of a *eudaimonic* sense of *phronesis* (practical wisdom).

p9: a Spinozean analysis demonstrates the exercise paradigm lacks engagement with its capability for *hilaritas* and *eudaimonic* possibility for perfection.

p10: an alternative biophilic paradigm may be created through the introduction of objectives for Aristotelian *eudaimonia* and Spinozean perfection.

p11: Exercise professionals require a re-balance of intellectual virtue through the introduction of *phronesis* into their educational epistemology.

p12: Exercise education should focus on developing virtuous practitioners (*phronimos*) through reflective practice, epistemic playfulness, and coaching skills.

p13: academic exercise needs to recognise its unique *arete* beyond both sport and medicine.

Introduction: Setting foundations.

> Every sort of expert knowledge and every inquiry, and similarly every action and undertaking, seems to seek some good.
>
> (Aristotle Nicomachean Ethics Book I 1094a)[1]

As Aristotle opens his *Nichomachean Ethics*, all human activity aims to achieve some perceived 'good'. Accordingly, the exercise professional aims to achieve through their practice a defined 'good'. Thus, ultimately, this thesis is a critical exploration as to what is considered a 'good' exercise professional.

At first glance the 'good' of an exercise professional would seem common sensical. Their objective is to teach and deliver exercise experiences. As Howley and Thompson (2016) state, an exercise professional is:

> An individual who provides exercise instruction and advice with the intention of developing fitness, health, and wellbeing. This includes the evaluation of an individual's fitness and health, exercise prescription, and support for the management of disease (p1).

And, within this conceptualisation, exercise is commonly considered a "physical activity in which the activity is purposefully undertaken with the aim of maintaining or improving physical fitness or health" (Faulkner & Taylor 2005 p4). Therefore, the 'good' of the exercise professional is the achievement of fitness or health for the participant through application of a recognised form of physical activity.

Yet, behind this simple definition lie assumptions that require a deeper conceptual consideration. Specifically, the questions arise as to how is the 'good' of exercise, and its goals of fitness, health, and wellbeing, currently constructed? And importantly, what is the impact of this conception of exercise on the practice of exercise professionals in delivering this 'good'?

[1] The translation used throughout is Rowe and Broadie (2002).

Statement of a problem.

This thesis will present a thought experiment utilising a framework of conceptual analysis to argue that the conception of 'good' exercise presented to exercise professionals during their education is derived from a biomedical science that can be demonstrated as problematic. [2] Specifically, it is hypothesised there is a dominant paradigm which constructs the 'good' of exercise through the concept of 'exercise is medicine'. As a result, there is an increasingly biological model of practice in which professionals are educated as laboratory technicians to deliver a mechanistic process of exercise prescription limited in humanistic possibility. The impact of this concept is the emergence of an exercise profession which defines its practice through a biomedicalized science of medicine. That is, the 'good' of exercise has become narrowly defined in biological terms for the professional which in turn creates an experience which is limited, and at worst injurious, for participants seeking a goal of wellbeing. Therefore, it is argued that if the paradigm of professional exercise becomes exclusively biomedical it is in danger of falling into an iatrogenic trap. Accordingly, this work develops philosophical debate on the nature of exercise professional education, and a critical examination of the 'good' of exercise it represents, through the fulfilment of three objectives:

1. To create a critical examination of the educational epistemology of Exercise professionals.
2. To explore the possible impact of the education's epistemic base on praxis.
3. To suggest an alternative framework for professional education.

Route Map:

It is recognised that the preceding statement of a problem is controversial. It stands as a direct challenge to an established exercise science which underpins an academically supported, politically influential, and economically robust academic domain and 'fitness industry'. However, the challenges will be purposefully presented, if not to comprehensively convince, to at least robustly defend the conclusions drawn and develop

[2] Thought experiments are defined via Irvine (1991) as "arguments concerning particular events or states of affairs of a hypothetical (often counterfactual) nature of the world around us" (p150). Thus, they are a consideration of possibilities which emerge through a structured method of exploration of data.

long overdue debate in the philosophy of sports and exercise. As Robergs *et al*. (2022) state "At one time, to attain a Ph.D. you had to challenge a paradigm and provide evidence to support the challenge" (p145). Thus, what follows accepts Robergs *et al*.'s (2022) academic trial. Yet, in good philosophical tradition, the following is not the creation of a universal truth, axiomatic proposition, nor empirical theory. It is an exploration of possibility; a thought experiment to explore alternate ways of conceiving the 'good' of exercise and the role of the exercise professional. Importantly, it is a purposeful attempt to create a dialectic in a field which appears to accept its current axiom that "exercise is good for everyone" without philosophical consideration.

To achieve its goals, the thesis is structured using a framework of conceptual analysis as applied in related health domains. Specifically, the work is structured through first identifying the professional issue, this is followed by a consideration of the concept of interest within this issue. The concept is then explored in relation to its impact on professional practice before a discussion is made of a feasible alternative approach.

Chapter 1: The problem of technology.

This chapter introduces the current direction of exercise development. The intention is to highlight the increasingly technological approach and to begin to illustrate the possible issues this may bring to professional education. Specifically, it is proposed that current research investment and populist considerations demonstrate an increasingly influential model of exercise based on scientific methods and mathematical modelling. This has implications for the 'good' of the exercise professional. However, whilst similar implications have been explored in the philosophy of related professional domains, e.g., medicine, nursing, and sports coaching, there has been limited discussion specific to exercise professions. Consequently, objectives are set to explore these issues.

Chapter 2: A discussion of methodology.

Whilst issues of personal considerations alongside philosophical and conceptual methodologies (as presented in appendices 1 and 2) are recognised, a defence is made for exploring professional education through an epistemological lens. Specifically, it is proposed that professions are constructed from epistemic foundations. Hence, the

educational epistemology (knowledge) presented to professionals creates an ontology (models of practice) which in turn determines axiological judgements in practice, i.e., the 'good'. Following this discussion, related research in nursing and coaching is used to defend the use of an Aristotelian tripartite framework for the analysis of exercise professional epistemology. This framework is then presented as the basis for the use of the method of conceptual analysis, more specifically conceptual re-engineering. Thus, the method created follows the basic intentions of an analytic methodology despite the acknowledgement of an 'armchair' process to the debate.

Chapter 3: The identification of exercise's educational concept.

In this first stage of a concept analysis, it is argued a dominant conception of exercise is identified as being encapsulated in the phrase 'exercise is medicine'. Specifically, it is argued that because engagement in exercise has demonstrated medicinal outcomes, i.e., increased health, there is a belief that the science for exercise should be the same science as medicine. Hence, the statement 'exercise is medicine' alludes to not only participation goals but also the epistemology, ontology, and axiology used to define and achieve its 'good', i.e., the paradigm of exercise science. Therefore, it is proposed that exercise science reflects the same paradigm as medicine's dominant biomedical model. This proposition is demonstrated through an analysis of professional texts and the content of an educational course which illustrates exercise professionals are taught the 'good' of their practice lies in achieving biomedical outcomes. The conclusion is therefore drawn that the paradigm which underpins the development of exercise professional practice is derived from the syllogism: exercise can be conceptualised as a medicine, medicine is a biomedical science, therefore exercise is a biomedical science. Accordingly, the 'good' of exercise is defined primarily in biomedical terms.

Chapter 4: A critical exploration of praxis.

Having demonstrated the biomedical paradigm underpinning both exercise science and professional education, critiques from the philosophy of medicine are utilised to consider the potential problems of biomedicine when applied to practice. Specifically, using Illich's (1974) notion of iatrogenic medicine, i.e., medicine which creates disease through its use, the argument is made that the current dominance of a biomedical paradigm may be a leading factor in iatrogenic and dangerous experiences of exercise. This line of reasoning is defended through a demonstration of issues of Gnosticism in exercise epistemology

derived from a Whiggish history, a focus on the thanatological (death) in ontology, and the emergence of a possible necrophilic and kalokagathic axiological stance in professional decision making. Thus, the argument is made that the 'good' of exercise is defined in terms that generate iatrogenic practices, i.e., exercise experiences that cause ill-health and injury.

Chapter 5: Re-engineering a concept.

Recognising the potential issues surrounding a concept of exercise defined in terms of biomedicine, the attempt is made to consider an alternative conceptualisation. This chapter therefore draws upon a Spinozean framework to consider the 'good' of exercise through a biophilic and existential lens. This is intended to create a dialectic with the preceding analysis which illustrated the necrophilic conceptualisation that dominates professional education. Specifically, drawing upon Spinoza's concept of perfection as a revision of Aristotle's *eudaimonia* (flourishing and wellbeing*)*, the argument presents a 'good' for exercise through the experience of joy. Thus, it presents a philosophy for exercise based on a holism for human flourishing as opposed to a goal of biomedical reductionism. Furthermore, the proposition is made that this 'good' can be achieved in practice through a consideration of playfulness within exercise experiences as opposed to a focus on the achievement of quantified biological variables. Thus, it is argued that the practices of exercise professionals can shift from a process of analysis-diagnosis-prescription to one of analysis-understanding-perfection.

Chapter 6: Recommendations for practice.

Finally, drawing upon previous literature in related health fields, the analysis undertaken in Chapter 3, and the discussion of a Spinozean revision of exercise's purpose, recommendations for practice are presented. Specifically, it is proposed that pedagogical changes are made in the teaching of professionals to allow for the development of a sense of Aristotle's *phronesis* (i.e., ethical wisdom) in practice and the incorporation of Spinoza's joy in the exercise experience. This position is contrasted with the earlier demonstration of exercise professionals as scientists. This shift is suggested as possible using reflective practices, Nguyen's (2022) notion of epistemic playfulness in the presentation of exercise science, and the Spinozean re-interpretation of the exercise professional role to a position of coach rather than technician.

Chapter 7: The limitations and future of an armchair exercise.

This chapter begins with a brief discussion of the major limitations that can be raised concerning the conclusions of this thesis. These are recognised as two-fold, with critiques emerging first from what might be termed a 'traditional research' perspective and second from professional spheres. In considering the former, a defence is made for thought experiments in science, and a detailed exploration of philosophical methodology is made in appendix 2. For the latter, recognition is made of the fact the thesis, in essence, represents a paradigm change. Hence, discussion is made of the resistance to change that could emerge from both academics and entrepreneurs. Specifically, the problems for implementing a new *telos* of exercise are suggested as being derived from the dominant academic culture, political considerations, and economic sustainability. The second half of the chapter presents ideas for avenues of future research. Specifically, proposals are made for the development of a 'unique' field of study termed Exercise philosophy. The key focus here is a continuation of the epistemic objectives of this thesis. Thus, a call is made for the consideration of topics such as epistemic cultures, virtue and vice epistemology, and the role of aesthetics in science. Additionally, the empirical limitations of the thesis' conclusions are considered. Ideas for possible qualitative methodologies for exploring Exercise praxis are presented. These include the recognition of methods such as diary and focus group discussions on experiences of the professional role.

Chapter 8: Concluding thoughts.

The outcome of this armchair thought experiment is the proposal there are three key issues at the root of exercise professional education which may prove problematic:

1. Through the attempts to 'copy' the science of medicine, exercise has aligned itself to the tenets of evidence-based practice (EBP) and is thus engaged in a form of limiting scientism in its research and evidence base.

2. In the education of exercise professionals there is a focus on theory and scientific methods as opposed to the development of ethical wisdom and practical experience.

3. The reduction of the exercise to a biological ‘good’ has dehumanized the exercise encounter. And it is through this dehumanization that poor ethical decision making by professionals has led to the growth in iatrogenic exercise.

The suggestion is made that through the development of a specific domain of exercise philosophy, the unique issues for the exercise professional these limitations pose can be explored. Importantly, the point is made that whilst exercise can be medicinal, the conceptualisation of its ‘good’ exclusively through a biomedical lens of ‘exercise is medicine’ may be prove the basis of an increasingly dangerous practice.

Notes on language, presentation, and writing style.

The objective of this section is to make explicit the assumptions upon which this thesis is grounded. One of the key reflections upon writing this work has been the observation that personal interpretation not only guides the choice of subject, but also the understanding of what can appear conceptually common sense. To begin a glossary of terminology is presented. This is followed by comments on the writing style and conventions used. The intention is to ensure a common ground of understanding for key terms that may be used in a variety of meaning within academic contexts. Furthermore, for a sense of completion, the personal journey from which this idea emerged is provided in appendix 1 along with a bracketing exercise. This appendix is not only to provide a background but also a basis for authenticity in the rhetoric. Its inclusion is a concession that Voltaire was correct when he wrote: “If one does not reflect, one thinks oneself master of everything; but when one does reflect, one realizes that one is master of nothing” (Voltaire 1764 p65).

It is acknowledged that debate could emerge concerning the nature of definitions and terminology used. Specifically, for terms such as 'exercise', 'science', and 'medicine' their exact boundary of definition can appear to shift. Consequently, this section provides the meaning of key terms as they are used within this work. These definitions also present the initial basis of assumptions and limitations to be explored throughout the thesis.

Exercise professional definitions:

An outcome of this work is a philosophically grounded 'definition' of the 'exercise professional'. Yet already this highlights the Quixotic nature of attempting to define the exercise professional. Furthermore, there is a need for clarification to differentiate between the exercise professional as conceived in this study and roles such as Physical Education teachers (PE), Military Physical Training Instructors (PTI), and other similar practitioners. This is achieved by stating that the term 'exercise professional' is used to identify professionals in the UK whose:

1. Professional roots evolved from the gymnasium (gyms) and fitness industries which emerged during the late 19th C physical health culture as opposed to the educational foundations of PE teachers or the military history of PTIs (see Sassatelli 2010, Smith-Maguire 2008).

2. Professional recognition, education, and practice is governed by the UK Register of Exercise Professionals (REPS) (www.exercise register.org) or through its recent 2020 merger with the Chartered institute for the Management of Sport and Physical Activity (CIMPSA). It is recognised that many exercise professionals also hold accreditation from sports organisations such as the UK Strength and Conditioning Association (UKSCA) for work focusing on athletic performance. However, a clear, though admittedly 'unnatural', distinction is made between sport and exercise. The exercise professional is considered to focus primarily on health objectives, as opposed to the sports performance and skill responsibilities of the strength coach or PE teacher. It is conceded that current policy on UK PE does suggest the need for recognising the importance of health. However, the structure of the compulsory

curricula in the UK still indicates a major emphasis on kinaesthetic development and athletic sports capability.

3. Employment is primarily derived from gyms, mobile personal training, and similar structured contexts. This could include 'outdoor' exercise activities such as park-based circuit training, and work-based activities such as office yoga and similar recent adaptations.[3] The specific populations within these contexts are considered a range of participants seeking health and lifestyle objectives. Consequently, it is not the focus to work with military, tactical, or uniformed services, or to work with athletic participants for whom physical conditioning is a fundamental requirement of their role.

Upon reflection, the term 'exercise professional' represents a contextual role rather than a distinct individual. For example, exercise professionals may simultaneously work with clients who seek weight-loss but for different objectives. One individual may have the objective of aesthetic wellbeing, a second the control of medical issues, whilst a third needs to meet a competitive sports demand. Therefore, it is the specific qualification and intention to undertake an exercise role for health objectives that underpins the definition of the term used here.

Physical activity:

In this work physical activity is defined as "a general term that refers to any movement of the body that results in energy expenditure above that of resting level" (Faulkner & Taylor 2005 p2). Thus, physical activity is considered an overarching term covering lifestyle function, sport, exercise, play, manual tasks and similar.

Exercise vs. Sport:

In current approaches to physical activity, the terms exercise and sport often are used interchangeably. For example, the UK organisation SportEngland reports on the nation's physical activity levels to indicate exercise participation. But this is undertaken whilst also playing a significant role in policy for sporting National Governing Bodies (NGBs). Furthermore, many universities still teach Sport & Exercise Science courses with little

[3] for example, see Corporate Personal Fitness based in Darlington, UK www.corporatepersonalfitness.com accessed 01/01/2022.

differentiation between the domains. However, the notion that sport is exercise and vice versa is not appropriate. Therefore:

exercise: "a subset of physical activity in which the activity is purposefully undertaken with **the aim of maintaining or improving physical fitness or health**" (Faulkner & Taylor 2005 p4 emphasis added).

sport: "a subset of physical activity which is **rule governed, structured and competitive** and involves gross motor movement characterised by physical strategy, prowess and chance" (Biddle and Mutrie 2001 p8 emphasis added).

It is again conceded that a stark differentiation is difficult and pragmatically 'unnatural'. Within contemporary participation, the distinction is blurred. Many sports-based activities, e.g., walking football, local amateur netball, and social club badminton participation, are also a means for exercise and achieving health goals. Similarly, activities promoted as exercise such as Crossfit™ include competitive elements as exemplified by the Crossfit Games™ and the challenge of the WOD (workout of the day)

Therefore, the terms 'exercise' and 'sport' are used to signify a differentiation in motivational intent. Exercise participation involves the *primary* motivation for health and wellbeing regardless of activity. By contrast, sport denotes a *primary* motivation to demonstrate skill in a competitive or performance context.

Fitness:

Fitness is defined as "a set of attributes that people have or achieve that relates to the ability to perform physical activity" (Caspersen *et al.* 1985 p129). However, it is noted that within exercise texts (e.g., Penn and Brown 2017, Stafford-Brown *et al.* 2016, Bray *et al*. 2016) students are often presented with different models of fitness based on 'health-related component' or 'skill-related component' perspectives. The former defines fitness in terms of such elements as muscular strength, flexibility, and endurance. Whilst the latter emphasises elements such as power, balance, and speed.

This would seem an unnecessary complication, and an unnatural one, when considering human movement. Any movement involves the intersection of all neuromuscular capability and skill; crossing the road must include an interplay of strength, stamina, flexibility, power, speed, endurance, agility, and balance. Therefore, Caspersen *et al.'s* (1985) umbrella definition is used. However, it is noted that the term 'attributes' within this definition appears 'physical' in nature. As a result, this definition is often interpreted without the inclusion of social, psychological, and/or cognitive attributes (for example see Penn and Brown 2017). Therefore, throughout this thesis, the use of the term 'fitness' will designate a purely physical concept and thus allow a differentiation from holistic terms such as health and wellbeing.

Scientific & Philosophical Definitions:

In academic terms it is these concepts which are the most difficult to define. There has been a long history of debate on their nature, and it is evident that the definitions will evolve as academia progresses. Therefore, the following should not be considered a *fait accompli*; they are merely the position taken for this thesis.

Paradigm:

There is no word with greater malleability and ambiguity in academia than paradigm. As conceded by Kuhn (1974), perpetrator of its contemporary use, it was originally used in representing twenty-two different concepts within their seminal publication. Accordingly, the term has now come to represent a range of features, from meta-narratives such as those of the positivists of the Vienna Circle and the more contemporary postmodernists, through to specific methods, for example dialectics and transformative-emancipation (Shannon-Baker 2016), and down to specific ontological 'micro-models' such as the physiological mitochondrial paradigm (Huertas *et. al.* 2019). [4] Thus, in using the term paradigm the danger of confusion is acknowledged.

[4] It is recognised that one of the underpinning foundations of postmodernism was the rejection of meta-narrative world views. However, in creating this stance key authors have introduced sets of meta-narrative; Foucault's notion of a societal Panopticon and Baudrillard's notion of Hyper-reality being examples. I make further comment on this in appendix 2: *an observation of tribalism?*

Therefore, here, the term ‘paradigm’ will be used in Kuhn’s (1974, 1996) original intention as the disciplinary matrix of a domain’s community. It is not intended to describe a single research method or theoretical model. Rather, paradigm is used to denote the shared elements of epistemology, methodology, functional meaning, and “relative unanimity of professional judgement” that characterise a particular domain (Kuhn 1974 p450). Consequently, when such phrases as ‘exercise paradigm’ are used, it is in reference to the domain’s combined philosophical, academic, methodological, and professional characteristics. What Kuhn (1974) refers to as the fields shared generalisations, heuristics, practices, values, and meanings. In considering professional practice, this perspective leads to the definition of a paradigm as a consensus on “the solution to a problem that serves as a model for other solutions” (Pirozelli 2020 p561). A paradigm is therefore a framework for solving professional problems. In contextual terms, when the exercise professional is presented with a need to implement an exercise intervention, it is from this paradigmatic disciplinary matrix that a solution is developed.

Science:

There is considerable debate on the exact nature and definition of ‘science’, especially in terms of whether there exists a specific scientific method (see McIntyre 2019). However, for simplicity, unless specified otherwise, the term will be used to denote a contemporary, populist definition. That is, a paradigm based on experimentation, laboratory procedures, and the ‘white coat’ scientist. In a more academic sense, the term denotes a metaphysics of materialist empiricism, reductionism, causal mechanism, and quantification of knowledge. And its methodology primarily utilizes the hypothetico-deductive methods assumed within contemporary physics, chemistry, and biology. Thus, the term is used synonymously with the notion of positivism below.

Scientism:

This concept will be used to define a philosophical position in line with the belief that science (as defined above) has evolved as the ‘true’ form of epistemology and the only means by which to apply knowledge to solve human problems (see de Rider, Peels, and van Woudenberg 2018, Sorell 2013). It is recognised there is debate as to the precise nature

of this position (e.g., see Mizrahi 2022). However, the use of the term is exemplified by Prof. Conrad Waddington, the influential British biologist and geneticist: "science by itself is able to provide mankind with a way of life which is …self-consistent and harmonious…So far as I can see, the scientific attitude of mind is the only one which is, at the present day adequate to do this" (Waddington 1941 p170).

Positivism:

This term is used to denote a methodological in which there is a singular reality which be understood through scientific reductionism without recourse to metaphysical explanation. As described by Mehta (2011) it is logical empirical process based on "unbiased, impersonal, unsympathetic observation and measurement" (p203). Therefore, a true description of external reality is discoverable through empirical scientific methods. Furthermore, in line with Platonic Idealism, the term expresses the stance there is a perfect 'state' within a concept. For example, human health can be defined in terms of normative mathematical parameters of function and structure. Thus, within a positivistic perspective of exercise, the reality of fitness, health, and wellbeing sits independent of phenomenological experience. As previously stated, 'positivism' is deemed synonymous with science as defined above.

Gnosticism & Gnostic

These terms are used to represent a specific relationship to science and scientism as defined above. Greater detail is given in chapter 4, however, to begin it is sufficient to state that these terms represent a position in which it is believed that only through an understanding of singular 'true' and universal knowledge can human flourishing occur. Thus, the acquisition of the 'true and only' methodology for the creation of knowledge is the means for existential salvation. In this instance the terms are used to represent a specific position in relation to scientism and scientific knowledge.

Epistemology, Ontology and Axiology:

As a means for a philosophical analysis of professional education these terms are considered discrete components of the process in line with the nature of philosophical domains which study these elements. It is conceded there are fields of philosophy which

continue to debate their exact nature. However, it is the general concept behind the titles which underpins their use here. Thus, throughout this work epistemology (epistemic etc.) is used to indicate knowledge. Ontology (ontological etc.) is used to represent the notion of theoretical and practical models used to understand a phenomenon. And, finally, axiology is used to denotes the ethical and aesthetic decision-making process.

Phenomenology and phenomenological:
These terms are used in a similar generic fashion to epistemology, ontology, and axiology. That is, it is recognised that writers such as Husserl, Heidegger, and Giorgi amongst many others have created considerable philosophical debate as to the exact nature of the terms and human experience. However, here these terms are used in an overarching conceptual manner. Consequently, phrases such as 'phenomenological experience' are used to represent the direct, conscious, and interpretative experiences of an individual. The intention of such terminology is to create a contrast to the mathematical, scientific, and normative perspective of positivistic and biomedical ontologies.

Arete and Telos:
These two terms are drawn from an Aristotelian emphasis. Thus, *arete* is used to designate the Aristotelian 'good' of an activity and is often used as means to indicate the virtuous outcome and excellence of an endeavour. On the other hand, *telos* is used as a term for the purpose of an activity. Accordingly, it may be suggested that the *telos* (purpose) of exercise is to achieve an *arete* (excellence) of wellbeing.

Praxis:
The term praxis is used as a term to indicate the cognitive process undertaken by a professional or practitioner as they apply the epistemological basis of their learning to their craft. Therefore, a professional's *praxis* is derived from their understanding of both the *arete* of exercise and their role, and their decisions on the *telos* of each exercise experience they create.

Medical Definitions.

The following definitions, where possible, are from texts presented to student exercise professionals. When definitions were not available within exercise professional education,

reference is made to sources deemed commonly used or accessible. This choice has been a purposeful activity. By using definitions from professional education, it provides a starting point for the exploration of the 'Exercise is Medicine' paradigm. Whilst they allow for a point of departure for debate later in this work, it is conceded that philosophical academics, medical students, and other health professionals may consider alternate definitions. However, these variations are considered specialist to their profession and may not be commonly presented to exercise professionals.

Health and Wellbeing:

Health is defined as "positive physical and emotional well-being with a high capacity for enjoying life and challenges and possessing adequate coping strategies in the face of difficulties" (Biddle & Mutrie 2001 p8). Whilst wellbeing is a state in which the individual is free from limitations in health from physical and mental disease (Bird, Smith & James 1998).

There is overlap between the two concepts and each is used as a defining factor within the other: positive health is not achieved without positive wellbeing, and vice versa. Therefore, the terms will be used interchangeably and to indicate both a physical and existential experience. Thus, these concepts are used as an antithesis to the physicalism inherent in the term 'fitness'. Consequently, the assumption is made that whilst an individual can be measurably 'fit' they may demonstrate this physical capability without experiencing either health or wellbeing.

Medicine:

Within the Merriam-Webster dictionary, medicine is defined as "a substance or preparation used in treating disease 2 a: the science and art dealing with the maintenance of health and the prevention, alleviation, or cure of disease b: the branch of medicine concerned with the nonsurgical treatment of disease".

Therefore, medicine will be understood as any form of intervention used either to prevent, remove, and/or reduce the effects of disease, and to maintain or return an individual to health. Hence, this definition informs the notion that if exercise is used to improve either fitness or health it is a medicine. As will become evident, this syllogism is the relationship

upon which the following thesis is founded. Additionally, it is made explicit that the term is used to represent Western medicine and its dominant paradigm.

Disease:

The term 'disease 'is used to describe any impediment that prevents an individual from achieving or maintaining health. As described in the Merriam Webster dictionary, disease is *"*an impairment of the normal state of the living animal or plant body or one of its parts that interrupts or modifies the performance of the vital functions". However, it is acknowledged that some contemporary definitions focus on a description similar to thefreedictionary.com's: "An abnormal condition of a part, organ, or system of an organism resulting from various causes, such as infection, inflammation, environmental factors, or genetic defect, and characterized by an identifiable group of signs, symptoms, or both." As will be discussed later, these definitions may arguably lead to a reductionist philosophy through a focus on physicalism and biology. Therefore, the former, generalised definition is intended.

Clinical:

The term clinical is defined within Merriam Webster via its etymology of pertaining to patient care as first used in 1780, that is: "involving or concerned with the direct observation and treatment of living patients*"*. [5] It could be argued that if disease is any impairment of normal functioning, then professional exercise practice is ultimately clinical; anyone seeking professional aid to participate in exercise perceives their current health state to be inadequate. Thus, all exercise could be deemed clinical as by definition it has therapeutic intentions. However, in this instance, the term 'clinical' will be reserved to indicate contexts in which exercise is used for GP referral intervention, under the guidance of medical professionals, or within medical team management and similar situations of diagnosed disease.

The following two terms are included only for a sense of completeness and as a means of signposting the direction of rhetoric, greater expansion and discussion in later chapters:

[5] http://www.etymonline.com/index.php?term=clinical

Medicalization:

This term represents the observation there is an increasing definition of social activities and experiences through the philosophical foundations of medicine. Thus, it is the recognition that human experience is increasingly defined through the paradigm of medical science, and phenomena become defined in terms of disease (Stegenga 2018a).

Biomedicine:

This term is used to designate a paradigm of medical practice which represents the human experience through a materialist philosophy of biological science, positivism, and mathematical modelling (Capra 1982). However, this will be expanded upon in greater detail in the following conceptual analysis of 'Exercise is Medicine'.

A note on writing style:

Recognising the need for clarity, the following conventions indicate the intention behind the use of specific forms of presentation. These conventions recognise that two core understandings may exist concerning the same concept. For example, the definition of medicine presented by the Merriam-Webster dictionary describes:

1. The notion of 'medicine as intervention.' That is the intervention (substance or preparation) given to an individual and its impact (treatment of the disease), and,

2. Medicine as a science or an art behind the choice or creation of the intervention.

To differentiate these ideas the following rules have been applied. 'Medicine' will refer to a paradigm and its philosophical attributes. That is, how Medicine is constructed and practiced epistemically, ontologically, and axiologically through a paradigm as defined previously. Whereas the use of the term 'medicine' designates an intervention. Hence, a Medical practitioner prescribes medicine based on the best evidence of Medicine. This system of capitalization is used throughout including Exercise and exercise, and Sport and sport. Thus, Exercise will refer to the paradigm presented by professional and academic Exercise organisations to understand and develop exercise participation and experiences.

Furthermore, there is a need for literary licence and freedom in authoring this thesis. It is acknowledged that grammatical and aesthetic dangers are possible as certain terms may be applied excessively in describing key ideas. Therefore, several concepts are considered interchangeable to maintain a sense of readability. For example, 'exercise professional' is also designated by 'exercise leader' or 'trainer' as required. However, an effort is purposefully made to avoid 'fitness professional/fitness leader/fitness trainer' and similar. Whilst these titles are in common use, they are not considered academically accurate for the purpose of this thesis. The term 'fitness', as previously stated, is defined through physicalism. And, as will become evident, this ontology forms a fundamental element of the rhetoric. Consequently, 'fitness' will be reserved for an emphasis on physiological, anatomical and/or biomechanical considerations. Similarly, the phrase 'exercise coach ' will not be used in a generic sense. For clarity, 'coach' will indicate the specific role of sports coach or for the ideology and philosophy of Coaching, i.e., as relating to paradigm for the development of personal performance.

A note on an anonym.

It is recognised there is a heavy emphasis on the work of the American College of Sports Medicine (ACSM). The ACSM is recognised as the oldest, and most influential of the Exercise organisations. In its own description, the ACSM website states: "We are the American College of Sports Medicine – with more than 50,000 members and certified professionals strong from ninety countries around the globe. Representing seventy occupations within the sports medicine field, ACSM is the only organization that offers a 360-degree view of the profession*".* [6] As a result, through its on-going academic development, this organisation's work has come to directly influence the Exercise on a global scale. Therefore, the stance of the ACSM provides guidance to the majority of practitioners, researchers, and students on key issues in Exercise science.

Resultantly, the anonym ACSM is often used to indicate the position of organisations and individuals who support the Exercise is Medicine™ project, the subsequent 'Exercise is Medicine' philosophy, and hence, align to the ACSM's Exercise paradigm. However, due to the critical nature of this work it must be made explicit that this is not an 'attack' on a single individual or organisation. It is recognised that the issues discussed have not been generated in isolation. Furthermore, the intention is not to belittle the major contributions made by the ACSM to global health and Exercise agendas. But, as Neville (2013) suggests, the ACSM's position is dominant in cultural discourse. And more recently this dominance is evident in such texts as Howley and Thompson's (2017) which states "throughout this book we've made updates as needed per 10th edition ACSM updates" (p xiii).

Thus, there is little evidence to suggest that the ACSM does not continue to be the major source of the paradigm underpinning other Exercise organisations and professional education. As will be made evident, the major Exercise governing bodies including REPS, CIMPSA, NASM, NPTI, NSCA, and ACE each appear to support, legitimise, and apply the ACSM's stance. Consequently, it is made explicit that where appropriate the term 'ACSM' designates an overarching stance in both Exercise science and practice unless stated otherwise.

[6] www.acsm.org/acsm-membership/about-us accessed 21/04/2021.

As will become apparent, the following thesis is a challenge to the biomedicalisation of professional Exercise, especially within its educational materials. Therefore, before the critical deconstruction of Exercise, it is important to make explicit that this is **not** a dismissal of scientific Exercise or Medicine. There is no intention to follow a line of 'anti-science' or postmodernist relativism in considering either metaphysics or epistemology. It is acknowledged that thanks in part to (bio)Medicine "never have people in the West lived so long, or been so healthy, and never have medical achievements been so great." (Porter 2006 p1). Thus, modern Western Medicine and its triumphs do not need to be debated. It is sufficient to state that since the turn of the 20th C. CE conditions which once ravaged the UK have been beaten by biomedical science. Furthermore, the application of pharmaceutical cures is only one part of a broader narrative of triumph over natural processes (Porter 2006). The growing list of routine surgeries, molecular and nanotechnologies, and the creation of genomic medicine illustrate how the use of (bio)Medicine has transformed previous notions of health and disease. Consequently, it must be emphasised that whilst critically exploring Medicine, the achievements of medicine are acknowledged.

Similarly, the progress of Exercise is not questioned in terms of scientific advancement and there is no contention that exercise can be medicinal. Therefore, there is no argument that Exercise professionals can have a positive effect on disease management (Saynor and Shepherd 2022). For example, Santa Mina *et al*. (2012) reported cancer patients with personal training supervision experienced greater positive outcomes to those in group-based exercise. Whilst Dvorák *et al.* (2021) demonstrated that in delivering exercise for obesity, "monitoring and individualisation by an exercise professional is needed to define the accurate dose effect" (p1). Thus, it is acknowledged there is evidence that "developing a solid understanding of exercise science empowers the trainer to evaluate and create effective exercise programmes" (Hough 2022 p1). However, what will become apparent is this thesis is a challenge to the possible dogmatism and scientism within the paradigm that currently dominates the creation of professional practice.

It is perhaps cliché to state that exercise has benefits for health. There is considerable evidence that physical activities undertaken as exercise can support the management of diseases including cognitive, cardiovascular, obesity, metabolic, and other issues (see Thompson 2019, Moore *et al*. 2016). Yet despite this understanding, the World Health Organisation has suggested that each year approximately 3.2 million deaths are attributable to insufficient physical activity, and over the next ten years approximately five hundred million cases of 'exercise preventable' diseases will occur.[7] Furthermore, surveys such as Sport England's *Active Lives 2021-22* report an overall lack of engagement with sufficient exercise for health across all sections of the population. [8]

Due to these observations, there has been a growing field of academics and industries working to create innovative technologies and strategies to improve the population's exercise participation. As will be described, these range from wearable equipment and digital apps through to the development of robot personal trainers. However, a critical examination of the headlines describing the work of this field suggests there may be limitations to this evolution of the field. Specifically, it can be suggested that a populist form of scientism underpins the objectives for health fulfilment through physical activity. Thus, the race for the perfected technology to answer the 'exercise ills' has emerged. But importantly, this scientism creates key questions as to the nature of exercise, the role of Exercise leaders, and in particular the educational needs of such professionals in an increasingly technological domain.

[7] World Health Organisation: Global status report on physical activity 2022. https://www.who.int/publications/i/item/9789240059153 accessed 01/11/22
[8] https://www.sportengland.org/research-and-data/data/active-lives accessed 23/07/23

The technology of exercise.

On March 25th, 2020, The Mail Online ran the headline "Good News for lazy joggers: Scientists develop ankle 'exoskeleton' that makes running 14 per cent easier than normal sports shoes". [9] Within the article, researcher Steve Collins stated, "People are much less likely to engage in physical activity when it's too hard and making things a little easier can lead them to do so much more of it". And, thus, in one simple comment, both the paradox of people's relationship to exercise and the quest for solutions from the imagination of Sci-Fi stories are captured: *'I do not have to be physically active to achieve the objectives of exercise, the technology can do it for me*!'. Consequently, the future of Exercise is a scientific utopia in which technology will save us from our own failings. And, importantly, behind such headlines lies the implication of a universal belief in the power of science to reveal and deliver the ideal exercise intervention for 'global' wellbeing.

The use of technology for promoting and supporting exercise is not a new phenomenon. Specialist equipment such as dumbbells and similar have been employed since the Ancient epochs. Yet, in the 21st CE, the tools for physical activity have moved beyond the simple means for increasing resistance to muscular contraction. And those interested in its development are not merely looking for a personal fitness edge. For example, the aforementioned exoskeleton is based on a rapidly growing body of experimentation exploring the capability of such equipment to support military, injury rehabilitation, and disability needs (e.g., Mudie *et al*. 2022, Kandilakis and Sasso-Lance 2021, Gorgey 2018, Zhang, Davies, and Xie 2013, Burdea *et al*. 2012, and Hidler *et al*. 2008).

Although this range of exercise technology varies from simple pedometers to the Apple Fitness+[2] and onto the exoskeletons, the industry is not just focused on wearables. One of the latest AI technologies is the 'smart exercise mirror'. Replicating the screen of an iPad or smart phone, these full-length mirrors create holographic-like images of exercise movements. The objective is for the mirror to act as a fitness instructor providing live classes or on-demand workouts. Furthermore, as reported in a 2022 *'which is best?*'

[9] Dailymail.co.uk/sciencetech/article-8152181/Good-news-lazy-joggers-Scientists-develop-ankle-exoskeleton-makes-running-easier.html accessed 20/05/2020.

review, GQ magazine illustrated that such equipment not only measures heart rate and other biostatistics but will…

> … get smarter over time too, helping you correct your form, reach personalised fitness goals, and intuitively know when it's time to put the ten-pound dumbbells down. Rammed with tech like Bluetooth connectivity, HD touchscreens, and even 3D sensors, they're kitted out to offer the best workout possible.[10]

Thus, the exerciser is exposed to a complete range of digital technology designed to teach and motivate in a manner replicating the instructions of an Exercise leader.

Additionally, the use of AI technologies to echo the instructions of a 'human instructor' has not been restricted to home or commercial gym use. In 2017, Gomez-Carmona and Casado-Mansilla (2017) explored the possibilities for creating workplace health promotion. During a week-long study examining the effectiveness of a smart mirror to improve wellbeing behaviours, their research suggested positive feedback from workplace users. And it was found that gamification and the measurement of performance improved the users' engagement and adherence. Accordingly, their conclusion called for more research to improve the methods of interaction and the means of attracting greater attention to the equipment. As the Mail Online article summarised, the outcome of this increased research, and subsequent investment in exercise technologies, is expected to improve health and motivate "Couch potatoes trying to get in shape".

However, the evolution of fitness technology is moving beyond the development of apps, holograms, and wearable equipment. There is now a growing objective for the creation of robotic and android exercise leaders. For example, Lotfi, Langensiepen, and Yahaya (2018) presented the use of a "robot exercise trainer" intended to "coach, assess, and motivate" (p1) their elderly participants. Whilst the researchers admitted their robot had limits in terms of interaction and capability, they stated these would have solutions. And hence, the technology "could be of great benefit to elderly users, providing them with a socially assistive robot that acted more like a mentor, coach, and companion" (p12). More recently Shao *et al.* (2019) advanced this field through an emotionally aware robot that

[10] https://www.gq-magazine.co.uk/fitness/gallery/best-workout-mirrors accessed 23/02/2022.

"[was] uniquely able to autonomously detect a user's affect and engagement as well as measure their heart rate to prevent overexertion" (p1). Again, the researchers demonstrated positive exercise outcomes and suggested that the human-robot interaction had been perceived as enjoyable by participants.

At present the use of robots in exercise contexts appears to be focused primarily on the elderly and older adults (Ruf, Lehmann and Misoch 2020a, 2020b). Unfortunately, there seems limited research looking at younger adult or children's populations, but, as suggested by the researchers, it is merely a matter of time and investment. Thus, it is not beyond any stretch of the imagination to begin to consider that the images presented on the smart mirror become replaced by a robot for all ages. And hence, whether it is the learning of exercise technique from holographic imagery, or the need for instruction and motivation from a robot companion, technology is available to support exercise needs.

Will science save us?

The power of this exercise science to inspire the imagination of participants, academics, and entrepreneurs is readily evident. Thus, there is an expected continual growth in technological research. For example, in 2020 the market for personal exercise equipment exceeded 10 billion USD[4]. However, based on current estimates, it is anticipated the 'fitness tracker' market alone will exceed $114 billion globally by 2028.[11] Exercise is big business for both scholars and entrepreneurs.

Yet, it is argued that these technological advancements imply a common philosophical assumption that may ultimately prove problematic. That is, behind the headlines lies a universal belief in the power of science to reveal the ideal exercise intervention for 'global' wellbeing. It is the emergence of Exercise scientism. However, this belief in science to redress such issues of engagement as those reported by organisations such as Sport England brings with it contestable philosophical notions as to the nature of exercise, its participants, and importantly its professionals.

[11] https://www.fortunebusinessinsights.com/fitness-tracker-market-103358 visited 01/05/2022.

First, there appears an assumption that the positive experience of exercise is reducible to a linear interaction which can be revealed in mathematical modelling. Accordingly, the totality of the exercise experience can be described through theoretical laws. This has both psychological and ontological implications. Specifically, this position assumes that the use of AI, robots, and similar technologies will eventually be developed to reply effectively to any communication; an exercise C3-PO that can translate the myriad forms of human communication. This technology will respond both appropriately and ethically to the situation to give the correct exercise instruction. In turn the exerciser will react to the given directions in an emotional, behavioural, and motivationally appropriate manner. In simple terms, the AI will choose a specific stimulus intended to elicit a 'correct 'response from the participant: if robot does (A) then participant will do (B); each will follow their 'programming'. This psychological ontology would appear to reflect the basic mechanistic tenants of Classical Behaviourism. It is Skinnerian conditioning in which behaviour is a linear pattern of stimulus-response causal chains (see Seligman 2019, Baum 1994). In simple terms, the assumption is that a binary computer code can reproduce the totality of experience within an exercise context. Therefore, all human knowledge and experience is reproducible through an algorithm.

Secondly, this ontology not only reduces human motivation to a series of conditioned outputs, but also the purpose of exercise to a mathematical biology; a process exemplified by the growing 'Quantified Self' movement. Lupton (2016) states the term first emerged in 2007, since which there has been an increased focus on the measurement of personal biology within Westernised societies. The impact of this biostatistical ontology is not only evident in the growth of equipment economics but also the emergence of associations such as the Quantified Self Institute and the Quantified Self.[12] These organisations promote self-knowledge through technology and encourage the analysis of personal biomedical data to control health. To the participants the objective is a scientific management of health and wellbeing through the "conversion of qualitative aspects of life into quantified data" via a process of "datafication" (Ruckstein and Schull 2017 p261).

Thus, it has become common for exercisers to measure physiological markers on a daily, if not more frequent basis. These include such biostatistics such as heart rate and body

[12] https://qsinstitute.com/about/what-is-quantified-self/ and quantifiedself.com/ accessed 01/072022

weight alongside more complex features such as lipid profiles, cortisol, and blood glucose. Furthermore, the Quantified Self Institute suggests that the 'Big Five for a Healthy Life' (exercise, nutrition, sleep, stress, and social interaction) should be continuously measured through biofeedback loops.[13] Accordingly, the organisation offers technological strategies for measuring the biological complexity of this 'Big Five' and provides mathematical targets for daily objectives to ensure optimal health. It is therefore suggested 'quantified' activities provide important opportunities for education on health, alongside an understanding of how wellbeing behaviour is made meaningful and sustainable (Hardey 2022).

However, this thesis argues that a philosophy which reduces exercise and health to biological functioning and mathematical relationships, whilst marketable, is problematic. It will be conceded there may be advantages to promoting exercise through biotechnology. But the argument is raised that such scientific advances do not grasp the full nature of what an exercise experience entails. For example, as early as 2009, Sailors raised concerns of the negative impact of exercise technology through the recognition of 'addictive' motivations and feelings of 'enforced' engagement (Sailors 2009). Whilst more recently, interaction with online tracking and 'Quantified Self' social media has been shown to increase incidents of psychological distress and disordered eating to meet the targets set via such groups (Raggatt *et al*. 2018). Thus, whilst there is no argument as to the power of science to make improvements on levels of activity, philosophical questions must be asked as to the ideological and ethical implications of such scientific implementation (Feyerabend 2011). In particular, can the 'good' of exercise be captured within a biological and mathematical ontology?

The exercise professional.

Specific to this thesis, the current approach to exercise raises further implications when considering the role of exercise professionals. According to Statista there were approximately 66,300 registered UK fitness instructors in 2021, and such professionals are often highlighted as a strategic workforce in governmental agendas (De Lyon, Neville, and Armour 2017). [14] Importantly, their understanding of exercise is fundamental for positive

[13] https://qsinstitute.com/about/our-focus/ accessed 01/07/2022.
[14] https://www.statista.com/statistics/319319/number-of-fitness-instructors-in-the-uk/ accessed 17/08/2022.

activity experiences. Hence their knowledge and praxis are key elements in fulfilling the UK's health objectives.

In considering fitness instructors much has been written on the importance of the qualitative exercise experience. Beyond the idea of exercise as a physical endeavour, there are existential considerations for the practitioner such as personal values and personal growth (Gavin 2015). For example, Melton *et al.* (2011) illustrated that female client perceptions of personal trainers and exercise experiences were based on emotional interaction, personal understanding, and the nature of the relationship. However, as described, within the industry there is a growing technological conceptualisation of exercise. And the headlines and direction of progress suggest an ontology of quantification is the goal. Thus, in considering the exercise professional, an increasingly technological approach raises questions such as: Is the positive exercise experience reducible to a mathematical model? Are the outcomes of the exercise experience fully encapsulated in biomathematics? Is professional effectiveness merely an ability to apply scientific instruction? Is the exercise professional merely a conscious 'robot' who delivers pre-defined technical instruction to elicit pre-determined biological responses? And, ultimately, can the successful exercise practitioner and their praxis be reduced to a binary algorithm to allow for a computer simulation?

A philosophy of exercise professionals.

Such critical questioning is not unprecedented. Previous literature has highlighted discrepancies between the academic ontology and the practical realities in the professions (Eraut 1994, Schön 1984). This has led to arguments that the educational epistemology presented to practitioners is limited and fails to comprehend the complete demands of the working context. Specifically, it has been highlighted that a focus on philosophical positivism and techno-rationality does not reflect the participant's experience nor the professional's practice in such domains as medicine (e.g., Miles 2017, Eastwood *et al.* 2017, and Kontopodis 2013), nursing (e.g., Durepos *et al.* 2018, Reed and Shearer 2017, and Slayter *et al.* 2016), physiotherapy (e.g., Nichols 2018), and kinesiology (e.g. Andrews 2008). Furthermore, accusations of scientism, a position in which the methodology of the natural sciences becomes revered, have emerged in the epistemic culture of the health professions (e.g., Marcum 2017, Miles 2009, Drummond and Standish 2007, Pratt 1989).

In each instance, the debate has arisen as to the role of existential considerations in the experiences of these activities. The consequence of such arguments is that health practitioners have suggested they receive insufficient knowledge for meeting professional objectives efficiently, effectively, and ethically. In health professions this would suggest a dangerous prospect and is indicative of the causes of iatrogenic medicine (Illich 1974). Hence, these observations have led to considerable philosophical exploration of the professional paradigms and their educational content. And, within professions such as nursing and physiotherapy, academics and practitioners alike have challenged this notion of scientism in their professional epistemic and ontological foundations (e.g., Bender *et al.* 2021, Bender 2018, Setchell *et al.* 2018).

Yet, such philosophical explorations are limited in the exercise professional domain. Whilst there is growth in research and technology, problems which may emerge in the professional application of such developments have had little deliberation. Recognising the previous issues in related health professions, this lack of exploration may lead to a divergence between research, education, and the realities of exercise professional practice. Stated explicitly, there are implications and iatrogenic dangers if the philosophy created through academic literature represents a 'contrary reality' to that experienced during exercise and the needs of the practitioner.

Consequently, a philosophy of the exercise professional is required to understand the possible impact of the growing scientific and technological concept of the exercise experience. Importantly, there is a need to consider the effect of any emergent scientism within exercise science alongside the issues for the professional application of such a paradigm. Therefore, reflecting previous examinations of health professions, an exploration of professional education is a necessary element of understanding the contemporary exercise experience. In summary, this study attempts a philosophical examination of the current education of exercise professionals and the possible effects of this epistemic base on praxis.

In summer 2021 I was asked to work for a company that delivered both L2 gym instructor and L3 personal trainer professional qualifications. At the time they were struggling to complete courses because of a substantial backlog in students taking practical examinations. Due to the 2020 pandemic, they had been forced to put a block on students doing any such assessments. This was further complicated by the interesting phenomena that during the lockdown a substantial number of people had decided that a role in Exercise was suitable to them. Before lockdown they worked out regularly, enjoyed the gym, and so, with time on their hands they saw an opportunity to do such things as deliver a circuit class in the park. I met marketing, accountancy, and teaching professionals all of whom had suddenly decided a career change, or an additional vocation was their calling, alongside mothers who decided to develop their skills so that they could provide group exercise with friends and other local mums. Their hopes were to be a 'local fitness champion' giving others a break from the challenges of lockdown and its subsequent mental health problems. Hence, the company had the pragmatic issue of people waiting for the required practical.

The practical assessments for both L2 and L3 have fundamental similarities. For the exam, the student brings a 'client', usually a friend or their partner. They then take them through an exercise experience. The basic structure consists of an approximately one-hour training session which is to include a warm-up, a cardiovascular component, resistance training techniques, a mobility/flexibility component and cool-down. In each the assessor will ask for exercises or exercise modes to be taught to the client by the student. The objective is for the student to demonstrate their knowledge of key exercises, how to teach their execution, and to present a motivational experience. As an assessor my task was to consider the student's competency in each section using a designated rubric.

I have assessed various editions of these qualifications since 2000, but both during and after this 2021 period, I observed what I perceived as a potentially dangerous shift in practice. Previously, my experiences of students demonstrating a 'hazardous approach' have generally been in the use of weight training equipment. Usually, its bad form, too heavy resistance, weights incorrectly racked, and so on. Simple things due to exam nerves

or lack of familiarity with the gym the assessment is taking place in. A quick comment and they realise their error. But this time, for the first I can remember, I had to step in and stop exams during the cardiovascular training section. Alarmingly, some students were about to put their client in genuine physical danger.

On each occasion this was due to the fact the student had been asked to teach either interval or fartlek training. As said before, students must demonstrate safe and effective use of cardiovascular equipment, e.g., treadmill, rowing machine, and stationary cycle, through coaching their client in either steady state or interval training. Alternatively, L3 students may be asked to instruct the client through a fartlek session. The intention is that the student demonstrates not only knowledge of the equipment and training modality but also can appropriately control client intensity and positive experience at higher levels of exertion. However, in my most recent experiences of assessment, it was during the interval and fartlek sessions that I had to terminate examinations for the safety of the client. The students began to ignore the experience of the client in a perceived need to fulfil the needs of the exercise modality, and therefore the assessment.

It is standard practice that during online courses students have access to videos showing how to teach each of the expected modalities. In this instance, a video for interval training was based on a session using a rowing machine. Notably, this is often a complex exercise for beginners, the unskilled, and those with movement concerns. However, this explained why several students chose this more difficult to control piece of equipment over the simpler treadmill or cycle, despite the inexperience of their client. In the video the individual was instructed to row at very high intensity for 20 seconds. Using a scale of 1 – 10, termed the rate of perceived exertion (RPE), students are taught to encourage the client to work at intensities of eight or above for this twenty second interval period. So, with ten being maximal, the expectations of effort are considerable. This was immediately followed by 40 seconds recovery in which the client is told to stop, before repeating the twenty-second high-intensity row. This pattern was suggested as being maintained for up to ten minutes of interval training. The fartlek training is described in a similar manner with the client working between various levels of intensity in a ‘random’ order, but always including this RPE of 8+ ‘sprint’ or ‘all out’ activity at some point.

What became obvious was that the students were fantastic at citing chapter and verse. Throughout all examination elements, from warm-up to cool-down, the students were very adept at re-creating the video instructions used by the online educational course. In 99% of cases I could not fault their instructions for push this, move that, or adjust the other. Yet, the one element many failed at, and in some cases creating a situation of genuine danger, was the ability to recognise the need for particulars. For many students there seemed a lack of appreciation of the dynamism and complexity needed in the exercise experience. Admittedly, many students knew the need for personalised resistance and intensity on the cardio machine, i.e., speed or incline. But for some, the recognition of a deviation from the set of instructions in the 'book' for this specific client was not considered, especially in the advanced forms of cardiovascular training. It was a case of, if the 'book' said (x) number of sets and reps was needed in weight training then that is what must be achieved. And in cardiovascular training if the 'book' said an intensity at a specific heart rate was needed then that is what must be experienced. The consequence of this epistemic process was that students arrived for their exam believing interval and fartlek training are defined by the inclusion of sprints, maximal, or 'all out' effort followed by an immediate stop and stand or sit still depending on the equipment used.

I will return to this point later as it best explored under my accusations of Gnosticism.[15] But the point I make is that this misunderstanding led to students attempting to push their clients to levels of physiological intensity often entirely unsuitable for their personal ability. They interpreted the interval in terms of 'all out' maximal effort to get above 8 on the RPE scale. They then were expecting to have their clients stop immediately. This meant putting the brakes on in terms of cross-trainers, cycles, or rowers, or, even more dangerously, jumping the feet to the sides of a still moving treadmill. And in this latter instance, the client would then be expected to jump back on to treadmill belt moving at a velocity sufficient for 8+ RPE. I stopped the sessions long before such stuntman antics. But the student's justification was those were the foundations of the modality's process.

To highlight one instance, a client stated they had blood pressure issues that were controlled by tablets and the physician had stated that exercise would help. They had turned up as the client for a personal trainer exam as they wanted to help their daughter

[15] See chapter 4.

become a trainer and at the same time learn some ideas for their own exercise. However, their daughter was intending to follow the script and at that point I had to step in. The impact of possible near maximal intensity followed by an immediate cessation of activity for an individual diagnosed with hypertension could have been disastrous, and certainly for a novice exerciser. Fortunately, this instance sticks in my memory as it felt like the most extreme case of 'process above person' I encountered. Unfortunately, this was not the only case in which students could have attempted to push client limits leading to injury if not cautioned against their actions. And, regrettably, these cases led to confrontations with students as they argued that they were merely repeating what was shown and taught, and so why was I terminating that section of their examination! I am sorry to say that many left very unhappy from an experience that could have been a fantastic learning opportunity if there was a not a recourse to *argumentum ab auctoriate* through 'textbook expertise' in the debates.

Yet on one hand I had to accept that technically they are quite correct. That is the nature of the praxis that emerges from the science. It is the paradigm they had learned as they understood the conception of the Exercise professional in the educational materials. It is evidence based, demonstrated in laboratories, and peer-review referenced in the textbook. It is the science of Exercise professional practice. The students are merely following the techniques for teaching such exercise experiences as provided by the experts in the 'book'. And the 'book' is derived from the academic guidance of the governing organisations. Both student and course are following the science as prescribed by Exercise's epistemic creators. Therefore, they were technically 'diligent students' and the course is correct according to the rules of the paradigm, they are model evidence-based Exercise professionals.

It is a case of theory before ethical wisdom.

My reflections have led to the hypothesis that the education of Exercise professionals has become based on a paradigm of scientific processes. Reflecting the earlier observations concerning the pathway for the future development of fitness technology, I would suggest the Exercise leader has become a techno-rational instructor. As I will demonstrate in this thesis, the education of Exercise professionals is based on the same scientism. Crucially, it creates technicians as opposed to leaders, whilst the successful praxis for an exercise

experience is phrased in biological as opposed to existential outcomes. And, as I explore later, in Aristotelian terms it is a case of epistemological *sophia* (theoretical wisdom) before *phronesis* (ethical wisdom).[16] Therefore, in creating Exercise professionals, the boxes need ticking in the application of theory, and the process of exercise participation is reduced to the structure of a scientific experiment. Hence, I will argue that reducing the exercise experience to a techno-rational process is a dangerous venture if the ethical implications of its epistemology are not examined.

Furthermore, due to the recent events, the danger can be compounded due to the challenges of online and distance learning. Many of the students I met had completed the online materials within a month. Their only epistemology was that presented via their course, only a rare few had purchased additional materials and fewer had gained 'hands-on' experience. As a result, there was limited means through which they could explore the nature of interaction between trainer and client beyond the provided materials. Consequently, there was limited recognition of the contextual nature of their epistemology. And, although perhaps not intended by the course creators, the epistemology within the books and videos was often taken as the 'truth' and 'limits' of the paradigm.

Thus, given the abbreviated teaching periods, it became apparent many who experienced a 'career epiphany' during lockdown had not considered the seriousness of this limitation. They had good knowledge of their own gym and exercise habits. Further, through the course materials, they had been able to examine their exercise experiences in the semantics of the academic literature and evidence-base. But the notion of Exercise leadership as an art of understanding another's experience was often minimal. Hence, this led me to believe that many students conceived the paradigm as a techno-rational, linear process. That is why, when undertaking the practical exams, their belief was that the successful professional was one able to follow the instructions and replicate the videos to the 'letter'.

But I would argue this is not just an issue of students making errors of judgement. This approach is an issue recognised within academic Exercise and I will frame this problem through the notion of iatrogenic Medicine later.[17] Nonetheless, specific to the point here, there are number of papers highlighting concerns that can emerge regarding interval

[16] See chapter 2.
[17] See chapter 4.

training, e.g., Ekkekakis *et al.* (2023), Ekkekakis and Tiller (2022), Boden et al. (2021), Chatfield et al. (2021), Tibana and de Sousa (2018), and Aune and Powers (2017). Yet, these debates are not made explicit in either populist media or the development of educational content. Therefore, I would argue that the problems I encountered are founded in the epistemology of the Exercise paradigm, they were not simply ill-prepared students. It may not be fair to blame the professional in all instances.

Having been through these experiences, I argue that the nature of Exercise professional epistemology promotes the virtues of *sophia* above and beyond the virtue of *phronesis.* And it is this metaphysical conceptualisation that is a major factor in the possible dangers of Exercise.

Chapter 2: A discussion of methodology.

> It is better to expose the crudities of one's model at the start, than to conceal a methodology in banal phrases…I do not ask any reader to swallow all this. The story told in what follows is of interest even if the methodology that led to it turns out to be silly.
>
> (Ian Hacking *The Emergence of Probability* p16).

In this chapter I intend to layout the basic methodological process which has guided the development of the thesis. As previously stated, there is a need to explore the paradigm through which exercise is delivered and the praxis created by the educational epistemology of Exercise leaders. Therefore, this chapter is in three sections which draw upon the methods of research in related health professions to create a rhetorical framework. First, I will argue that locating the thesis within an epistemological framework provides for a critical perspective of professional praxis. Specifically, I will demonstrate that professions are epistemic constructs. Second, an Aristotelian framework of intellectual virtue will be described to explore an epistemic framework for the thematic analysis of professional education. Third, I will introduce a method of analysing Exercise based on previous concept analysis approaches. As will be observed, this method allows not only for a means of exploration but also a structure to guide the discussion. The argument is made that through exploring the conception of Exercise an understanding of its paradigm and hence epistemology emerges. The methodological defence for this approach can be found in appendix 2.

> Virtually all self-conscious occupational groups apply [the term profession] to themselves at one time or another, either to flatter themselves or to persuade others of their importance.
>
> (Freidson 1970 p3).

This is a professional doctorate. Accordingly, its success is bounded by specific parameters. First, it is a means for the development of research by "experienced or developing professional practitioners…from a variety of professional settings". [18] Secondly, the successful thesis is not necessarily one which adds impact to theoretical construction or verification in a positivistic sense. Rather, the intention is an original academic engagement with the nature of praxis. Simply put, does the thesis improve understanding of the job? Finally, it is expected the discussion will draw upon a personal professional experience. This will become apparent via elements of ruminative discussion that will emerge throughout. However, taking these objectives into account, clearly the first challenge is defining a 'professional' and, by association, the term 'profession'.

There is limited space for exploring the contemporary discussions surrounding the evolution of the professions. A large body of literature already exists, and such work has become prominent due to the impact of technological advancements in the 21st C. (see for example Swystun 2020, Susskind and Susskind 2017, Barley *et al.* 2017, Bondi *et al.* 2011). Yet, based upon the objectives of the thesis, there is a need to conceptualise the term profession. More importantly, in this instance, there is a need to justify the centrality of epistemology as a means for exploring these phenomena.

A brief history of the 'modern' profession

The term profession derives its roots from social changes during the Middle Ages (Crook 2008). This epoch saw rising state control and an increased bureaucratization of social activity leading to a governance of knowledge, and the development of the first European Universities (Crook 2008). Emerging from Church schools, the early Universities created collectives of scholars with interests in practices such as law and theology; Bologna, founded in 1088, being suggested as the first. There also arose state funded institutions created to challenge the 'dominance' of the early Church establishments. For example, the

[18] www.glos.ac.uk accessed 12/10/21.

Holy Roman Emperor Frederick II assembled the University of Naples (1224) to provide an institution free from Papal influence, a later graduate of which would be the influential St. Thomas Aquinas.

Importantly, these sites also became central for the definition of the term profession. The Universities were not only intermediaries of knowledge but also the standards of practice within the three key roles of lawyer, minister, and physician. Resultantly, it was these institutes which created the embryonic framework for the modern profession (Crook 2008). As a result, the 'original' professionals were those University taught lawyers, ministers, and physicians deemed epistemically elite to the general trader and artisan. They had achieved a Higher Education. Thus, the early Universities set the central element of being deemed a professional as an epistemological journey. As John Securis, physician during the reign of Queen Elizabeth I (c.1560), stated:

> [there is an] intimate association between a sound moral character and a university education. Learned physic, [is] founded upon the study of "logike and natural philosophie" which properly could be obtained only through disciplined, Latinate, university study.
>
> (cited Cook 1994 p17).

Since their Medieval roots, the 'who and what' of the professions have evolved. In brief, after the initial professionalization of theologians, physicians and lawyers, roles such as bureaucrat and ambassador emerged with similar statuses. These 'professionalizations' were then followed in the early Modern period by public servants and administrators; in the late 19th C and early 20th C by science and technology-based roles; and finally, a position was reached in the late 20th C in which 'everyone' lobbied for a protected professional status (Crook, 2008, Watson and Watson 2008, Freidson 1970, Wilensky 1964). Even "journalists ceased to be hacks scribbling in Grub street, they joined the staff of The Times" (Crook 2008 p13). Resultantly, professionals are seen as an "essential characteristic" of modern society (Kurtz 2021).

Based upon this abundance of professionals, professionalism, and professions, it would seem such descriptors are easily conceivable (Dryud 2021). The words have become used with a sense of shared semantic familiarity. Furthermore, not only are they applied in their original University intentions, but also expanded to include virtually all occupational activities. Thus, today's application can range from professional photographers, hairstylists, and athletes to comedians, media influencers, and YouTubers. And, arguably,

this usage still maintains an echo of the early Universities' intentions, i.e., the objective of signifying a criterion beyond the lay practitioner or hobbyist. Hence, the inclusion of the adjective professional brings with it a sense of superiority and an essence relating to an advanced standard of practice: '*don't worry I am a professional!*'

However, the observation of the apparent universal professionalism has raised the concern surrounding the evolution of the professions. For example, Balthazard (2015) states:

> In its original meaning, the essence of being a professional was to have made a public commitment to a high standard of performance, to integrity, and to public service. . . Somehow, a second meaning of professional appeared which ironically turned things around and put economic gain first as the defining characteristic of professionalism (p1).

Hence, paradoxically, increasing professionalization may be leading to rising issues of 'de-professionalization'. The increased availability of Higher Education, and the advent of digital information, has created a situation in which consumers have fewer limits in choice of their epistemic source. The reliance on the judgement of an accredited professional is no longer necessary and access to elements of the once guarded University knowledge has become the 'life blood' of Google. This shift was perhaps first demonstrated in Medicine (Haug 1975). However, it has more recently become recognised in such diverse professions as university lecturing (Di Leo 2017), social work (Trappenburg and van Beek 2019), probation officers (May and Annison 2020) and police services (Kristjánsson, 2022). Furthermore, with growing economic concerns, the professional's knowledge can become a site of 'epistemic conflict' as practitioners and organisations compete to sell the 'next big answer'. Thus, the emerging 21st C. challenges to the professions are reflected in a growing body of literature illustrating their weakened position and status (see Susskind and Susskind 2017, Nichols 2017, and Balthazard 2015).

Again, there is insufficient capability to explore this line of discussion in detail. The critical discussion of the control of professional epistemology will be evident later. But, here, two important points are made:

1. The definition of the term professional used in this work is derived from the former University epistemic and service-based definition.

2. It can be argued that one of the significant issues for professional organisations is the challenge of de-professionalization. For example, within Exercise, it is suggested that 'unaccredited' social media is one of the major challenges to the status of Exercise professionals (Honary *et al*. 2019). Hence, as will be highlighted, the control of a legal professional standard is one driving force in the development of Exercise's epistemic base.

Professional is more than an economic title.

However, the terms profession and professional hold more than a reference to standards of performance or the economically division of professional from amateur (Dyrud 2021). There are clearly anomalies to the rule such as professional criminal, but the expectations of professional standards not only relate to a level of outcome but also ethical behaviour. And it is this latter expectation that causes the problematic understanding of the professional and professions within contemporary language. For example, though it may be deemed a hoped for ideal, it seems unrealistic to consider the professional comedian or athlete as being expected to hold the same ethical standards as the lawyer or doctor.

It is upon this differentiation that Balthazard (2015) suggests two contemporary constructions which they identify through the designations: professional[1] and professional[2]. The latter, professional[2], is a practitioner for whom their work is their source of livelihood. On the other hand, professional[1], indicates a practitioner whose title requires academic qualification and implies the acceptance of a designated epistemology, and a paradigm for practice. Therefore, whilst possibly involving economic transactions, the title of professional[1] can only be obtained through a unique set of qualifications designated by a governing and legally chartered organization. Thus, not only is the individual considered a professional but also a member of a profession. That is, a professional[1] is an individual who meets the epistemological, ethical, and paradigmatic standards of an occupation set by academic, governmental, and organizational stakeholders (Kurtz 2021). Accordingly,

throughout this work the term 'professional' will be used synonymously with Balthazard's (2015) notion of professional[1]: an individual bound by the profession's accredited paradigm built from the epistemological basis of its practice.

Professionals are epistemic constructions.

The proposed epistemic basis of a profession is defended through Wilensky's (1964) model of the evolution of professions (Swystun 2020, Wilensky 1964). Specifically, Wilensky (1964) suggested a five-stage process through which an occupation or trade becomes a recognized profession:

1. A social problem is recognized, and a set of practitioners emerges with the specialist knowledge to solve the problem.
2. Based on the experiences of early practitioners, guild-based schools emerge through which the specialist knowledge is accumulated, refined, and formalized.
3. Professional associations arise which function as gatekeepers to the profession's specialist knowledge. As a result, access to the knowledge-base and the recognition as a qualified member of the profession are strictly controlled.
4. The professional organizations create jurisdictional and legal lines of status. Through Royal or governmental charters, a set of titles within a profession become protected statuses. Therefore, the awarding of a specific title can only be achieved through recognition by the association.
5. Finally, codes of conduct, and ethics are developed to create a self-regulating and semi-autonomous legal body of control over the professional and their practice.

It is recognized there has been debate as to the accuracy of Wilensky's (1964) original model. For example, Swystun (2020) suggests that due to current social, technological, political, and economic conditions, it should be revised to include greater recognition of the previously described professional devolution. Yet despite such considerations, the 'basic skeleton' of the model appears accepted, i.e., a profession emerges to meet a problem via specialised knowledge. Furthermore, as will be argued, the continuing

development and protection of authoritative epistemologies is how professions meet the challenges of devolution and de-professionalisation (e.g., evidence-based practice EBP).

A note on the Exercise professional.

Within the Exercise occupations the 'Wilensky process' would appear readily observable. In the late 19th C., there emerged a health crisis in both the UK and the North American continent (Budd 1997). Although militaristic in foundation, this led to the emergence of a physical culture with the development of the first modern gymnasiums and early fitness industry. This period also created the first 'celebrity' experts and entrepreneurs, individuals that might be considered the embryonic template for today's social media influencer. For example, Eugene Sandow, Bernard McFadden, and Alan Calvert all emerged prior to World War I and developed large followings in Europe and the USA via their publications. In the UK Sandow was particularly influential being recognized as special advisor and consultant to King George V (Chapman 2006).

During the inter-wars years further fitness 'influencers' such as Bob Hoffman, Jack Lalanne, and Joe Weider became known. Building on the work of the earlier trainers, and through the changing political, technological, and social structure, these later influencers eventually developed global recognition. And through their media empires, such individuals arguably did more than any other to expand the reach of fitness knowledge. The echo of their influence, especially Joe Weider, is evident in their creation of fitness celebrities such as Arnold Schwarzenegger whose fame popularised gyms, weight training, and physical aesthetics. Similarly, TV pioneer Jack LaLanne's fitness series, which began in 1951 and ended in 1985, was the catalyst for such personalities as the UK's GMTV Mr Motivator, BBC's 'Green Goddess', and more recently Joe Wicks. Furthermore, Hoffman's York Barbell (founded in 1932) and the Weider (founded in 1936) companies still play a leading role in the fitness industry of the 21st C.

Importantly, the knowledge of these pioneers formed the original epistemic basis of the Exercise professional. Many elements, especially in terms of training methodology, are still taught in contemporary Exercise courses. However, this knowledge base can be suggested as being first formally collated by the American College of Sports Medicine (ACSM) in the 1950s. The ACSM was officially founded in 1954 and became the first regulating body through its publication of the *Exercise Programme Directors Certification* in 1975 and the ACSM's *Guidelines for Graded Exercise Testing and Exercise*

Prescription (now in its 11th edition). These Exercise professional publications were then expanded upon in 1996 through the creation of the ACSM's Alliance of Health and Fitness Professionals membership. Accordingly, Exercise leaders were finally presented with a means for professional recognition alongside codes of qualification and ethical conduct. Hence, as described by Wilensky (1964), the ACSM collated the epistemology of the early practitioners to create a recognized Exercise profession.

Within the UK this professionalization was replicated by the Register of Exercise Professionals (REPS) in 2002, and on a European scale by the European Register of Exercise Professionals (EREPS) in 2007. The most recent UK 'evolution' has been the combination of CIMSPA and REPS to form a professional exercise and fitness directory in 2020. Furthermore, there are now other professional organisations vying for recognition as key gatekeepers. Though their work is ultimately derived from the guidance of the ACSM, each of the alternate providers present their individual interpretation of the knowledge base, certification, legal status, and ethical standards. For example, in the UK, Exercise professionals can now also obtain personal training accreditation from the U.S. based National Academy of Sports Medicine (NASM) and the National Strength & Conditioning Association (NSCA).

The emergence of alternate providers may signpost an avenue for exploration via economics or critical sociology as the differences appear semantic rather than epistemic. But, regardless of the specific organisation, the key point is that a professional is an individual who applies the specialist paradigm, determined by their governing association. Therefore, whether ACSM, NASM, NSCA or REPS, the governing organization determines the epistemic content and nature of qualification required for accreditation. Thus, in conclusion, the Exercise professional, in line with their historical University predecessors, is intended to be of a higher standard of epistemic consciousness than the 'hobbyist' practitioner.

A further defence for the centralization of epistemology is the distinctive nature of the Exercise professional's practice. Exercise professionals do not merely deliver a service, they also function as educational intermediaries between the Exercise paradigm and their participants (Donaghue and Allen 2015). The objective of an Exercise leader is not just the presentation of activity. The role sits in a network of interventions and objectives for physical, health, and lifestyle change. They are expected to help the client navigate the

considerable wealth of information they experience from the health and fitness industry, whether academic or commercial. Simply stated, whereas a plumber may fix the leak, they do not teach customers the 'science' of the tasks. Exercise professionals, on the other hand, teach the 'science' of diet, training, and other goals with an objective of client autonomy for a healthy lifestyle. As neatly encapsulated in the title of trainer Ed Thornton's (2001) autobiography *It's More than Just Making Them Sweat*. Thus, they do not simply apply the epistemology, they are active in developing another's understanding and implementation of its praxis.

Resultantly, the nature of epistemology within Exercise becomes the foundation of the education process, the professional praxis, and the paradigm for ethical decision making. Therefore, in conclusion, the Exercise professions are epistemic constructions. And, importantly, the epistemology that is presented during professional education is key to understanding the profession.

A framework of professional knowledge

As stated, a profession is derived from a knowledge base. In more accurate terms, if knowledge is defined as true and justified belief, then professional organisations can be described as epistemological filters. Through their epistemic stewardship they determine what is believable and justifiable for practice. Therefore, the concluding synthesis is to propose a model of professional praxis based on the following model:

Professional epistemology precedes ontology which in turn precedes axiology.

(E-O-A)

In this instance epistemology is used as a term to indicate the nature of knowledge which is specialist to the given profession. It is the foundation of the epistemic culture and the profession's paradigm. However, it is not merely a description of facts or knowing 'what', it also contains the necessary means for interpretation, i.e., justification of belief, from which future action is devised, a knowing 'how'.

Ontology is used to designate the models of understanding for practice generated by the professional epistemology. For example, if the Exercise student were taught the basis of

practice through only a knowledge of biochemistry and diet, they would come to see the problems of their client through such lenses, i.e., if one only has a hammer, they see the world as a nail. Thus, the epistemology generates the ontology of the exercise experience for the professional. It is conceded that individuals often enter professional education with prior exercises experiences. But the 'genuine' ontological models for practice are not understood until they have encountered the 'true' epistemic content derived from the profession. This creates the ontological reality of the Exercise profession: this is how the professional epistemology allows for an expected understanding of the situation and the actions for praxis.

Finally, axiology is considered the application of the epistemology through the lens of the ontology, and thus is synonymous with praxis. Specifically, it is the term used for the decision-making process as the Exercise leader employs their professional knowledge. This is considered axiological as it demands an ethical decision; it is praxis based on a value judgement of what is good or bad in a situation. Thus, the term axiology is used to represent the epistemic process for practical action that includes the contextual and ethical decision making.

Understanding contemporary professional epistemology in Exercise.

This discussion, in particular the introduction of the Aristotelian model, is presented here through a sense of narrative. The following arguments sit more naturally at this point as a means for understanding professional epistemology as conceived in this work. However, it is emphasized this Aristotelian framework will be the means for the later conceptual analysis of Exercise. Thus, the following will be recognised as threads which underpin the thesis. Specifically, the propositions are summarised as:

1. The understanding of professional epistemology is inadequately described if bounded within a positivistic techno-rational framework.

2. Neo-Aristotelean interpretations of the notion of intellectual virtues (*episteme, techne, phronesis*) provide a foundation for critically exploring contemporary professional knowledge.

The 'trap' of a techno-rational approach

> When a practitioner sets a problem, he chooses what he will treat as the "things" of the situation. He decides what he will attend to and what he will ignore. He names the objects of this attention and frames them in an appropriate context which sets the direction for action.
> Schön (1984) p185

Hence, previous academic discussion has focused on trying to capture the nature of this praxis. Here it is argued praxis can be described in the relationship that epistemology precedes ontology which then guides axiological judgements (E-O-A).

However, the proposed E-O-A model may be accused of a reduction to the dominant positivistic instrumentalism which underpinned the study and teaching of praxis following World War II (Kinsella and Pitman 2012, Schön 1984). This perspective describes the professional paradigm as the application of epistemology in a manner that is testable, replicable, and objective. Importantly, the problems faced by the professional are considered invariant and unambiguous (Dunne 2011). Each professional encounter is unchanging in its demands and merely requires the professional to recognise what form of encounter they are experiencing so they can determine the correct solution. For example, for clients seeking weight-loss the answer may be an identical need for caloric deficit.

This paradigm has been suggested as underpinning the pedagogical process within current HE and professional education. Techno-rationality allows for the standardization of the educational process and ensures that professional standards are predictable and replicable. Furthermore, it is argued that an empirically derived, linear, and mechanistic praxis provides a sound base from which novice professionals can develop confidence: it is efficient to follow the tried and tested instructions. Thus, the claims for the efficacy of a professional epistemology can be "grounded in prior claims for the [scientific] rigour of the knowledge" (Dunne 2011 p15).

Additionally, a techno-rational praxis supports the philosophical objectives of academic research. Epistemologically the relationship between theory and practice is deemed as circular. It is a relationship in which "researchers offer theories and techniques applicable to practice problems, and practitioners, in return, give researchers new problems to work on and practical tests of the utility of research results" (Schön 1984 p186). Consequently,

the starting point is the researcher's scientific analyses of the problem and the production of a knowledge base from which the practitioner can then act. And, this paradigm, as will be demonstrated later, is the foundation of Exercise, its current pedagogy, and its approach to evidence-based practice (EBP). Hence it is conceded the previous E-O-A proposition appears to echo this linearity.

The problems of techno-rationality.

However, it is argued that the scientific instrumentality which underpins the techno-rational process is problematic (Kinsella and Pitman 2012, Bondi *et al*. 2011, Schön 1984). For example, Schön (1984) states that as early as 1972 professionals were aware that their practice was not reducible to scientifically controlled processes. Specifically, whilst the education of professionals focused on invariant and normative curriculums, experiences of practice were inevitably the opposite. Therefore, it was acknowledged theory could help provide solutions for known problems, but the work of professionals usually involves the finding of problems. For instance, using the previous weight-loss case, the science would provide the idea of caloric restriction. That is, the science of a techno-rational instrumentality assumes that caloric restriction would be the only intervention needed regardless of life-history, circumstances, and similar personal factors. The excess weight is therefore a known problem with a known solution. Yet the successful implementation of such an intervention would be unique to every individual..

Consequently, professional work may not be problem solving but problem finding (Schön 1984) Effective practitioners find problems that are unique, contextual, or can arise in action as opposed to solving the problem through a techno-rational 'preconceived' solution. And it is this element that is deemed missing from the understanding of professional praxis. As reported, professionals within a techno-rational framework experienced that "not only could [they] not work on the most important problems but that [they] could not practice in the real world at all" (Schön 1984 p189). Hence, the 'appliance of science' has been demonstrated as problematic (see, Fullagar *et al.* 2019, Bondi *et al*. 2011, Polkinghorne 2004, Benner 2001, Eraut 1994, Schön 1987).

In particular, the conceptualisation of professional practice as a mechanistic set of 'one-size-fits all' instructions have been shown to be often ineffective. Rather, it is proposed praxis should be derived from a contextual, dynamic interaction between the professional's knowledge and experience, alongside an ethical value based on a shared understanding of the customer, client, or problem. As Schön (1987) sums up: "In the swampy lowland [of practice], messy, confusing problems defy technical solution" (p3).

Beyond a techno-rational application of epistemology.

To present alternatives to techno-rationalism, the academic discussion can be summarised as focusing on the difference between knowing 'that' and knowing 'how' (Benner 2001). Specifically, the distinction between a fact (knowing that) and the skill of implementing that fact (knowing how). In a similar fashion to skills such as juggling and swimming, it has been argued that the professional knowing 'how' cannot be accounted for through simply knowing the 'that' of the theoretical science explaining the activity (Benner 2001). The activity could be modelled 'scientifically' but its performance includes elements not readily available to such analysis. Thus, expertise in a profession is conceived of as a synthesis of different epistemic forms, not merely the collation of scientific facts into a technical method. It is a praxis created through experiential learning, personal values, contextual meanings, socially communicated symbols, performative skill, and an interpretation of the scientific base.

Due to this conceptualisation of praxis, a variety of ideas as to the nature of the expert professional's knowledge beyond 'that' and 'how' have been presented. Such examples include Dewey's (1938) conception of professional artistry; Polyanyi's (1958) consideration of tacit knowledge and the expert's 'connoisseurship'; Schön's (1984) depiction of reflection 'in' vs reflection 'on' action; Epstein and Hundert's (2002) professional competence; and Pickering's (2010) discussion of 'science as practice' vs 'science as knowledge'. And, similarly, Knorr-Centina's (1999) explanation of epistemic cultures, alongside the growing body of literature in the field of social epistemology (see Fricker *et al.* 2020), can be suggested as exploring the mechanisms by which a shared methodology generate contextual approaches to practice.

However, whilst such work recognises professional knowledge is not a monolith of 'facts and figures', such descriptions fail to provide a framework for epistemic analysis. There is a description of expertise, but not an exploration of the nature of epistemology from which such axiological decision making is derived. For example, in Schön's (1984) description of reflective practices, what are the epistemic foundations upon which reflection should be made? Furthermore, what epistemic frameworks can capture the nature of practice beyond a reduction to a techno-rational generalisability?

One avenue of exploration has been the re-emergence of interest in the concept of wisdom as it pertains to professional practice (see Kinsella and Pitman 2012, Bondi *et al*. 2011, Sternberg and Jordan 2005, Polkinghorne 2004, Sternberg 1990). It is admitted that the exact nature of wisdom is elusive but the common ground between definitions lies in the perception that wisdom represents a judgement based not only on fact but also values, virtue, and meaning. However, it has been suggested that over the past two hundred years the growth in instrumentality within professional practice has led to a slow loss of this element within praxis (Kinsella, and Pitman 2012). As a result, one framework utilized to challenge techno-rationality and re-introduce professional wisdom has been a re-interpretation of Aristotle's notion of intellectual virtues and specifically the concept of *phronesis* (Kinsella, and Pitman 2012).

The re-appraisal of Aristotle's ideas is evident in professions as varied as nursing (Jenkins, Kinsella, and DeLuca 2019), the police service (Kristjánsson 2022), business leadership, (Allen *et al*. 2022) and engineering (Frigo *et al.* 2021). However, importantly with regards to this thesis, this model has been applied to the fields of sports coaching (e.g., Jones and Hemmestad 2021, Kosma and Buchanan 2018, Barker-Ruchti *et al*. 2014, Hemmestad, Jones and Standal 2010, Standal and Hemmestad 2011) and physical education (Backman and Barker 2020, Lyngstad, Bjerke and Lagestad 2019, Eisner 2002). As Jones and Hemmestad (2021) argue, within Sport coaching there still emerges concerns that the dominant mechanistic discourse underpinning professional education does not meet the needs of practitioners. Consequently, Aristotle's differentiation of *sophia* and *phronesis* is presented as means that is "better able to take account of the social intuition and complexity of coaching" (Jones and Hemmestad 2021 p2). Therefore, through familial association, this Aristotelian concept may be similarly appropriate for exploring the foundations of the Exercise professional (Gray *et al.* 2014a)

Overview of Aristotelian professional knowledge.

As Coulter (1994) states, the history of Science and Medicine has been a battle between Plato and Aristotle. And although, Stephen J. Gould (1981/1996) remarked in *The Mismeasure of Man:* 'Plato dies hard', it is Aristotle's works which appear to be of growing relevance to modern health professions, in particular sports coaching and similar fields (e.g., Trothen 2022, Rivari and Heikkinen 2022, Jones and Hemmesatd 2021, Van Zyl 2018, Hardman and Jones 2010, Hemmestad *et al*. 2010, McNamee 1998). However, it is conceded that the volume of work discussing both philosophers is considerable and beyond the scope here to present nothing more than a superficial Aristotelian description. Thus, when considering the application of Aristotle's ideas to professional knowledge, it is confessed that the notions are simplistic descriptions.

Arete and virtue.

To understand the Aristotelian perspective, a useful starting point is the recognition that within Ancient Greece the central existential question was based around the concept of *arete*, translated as virtue. However, this notion is not merely an ethical labelling, *arete* is the essence that makes a 'thing' fulfil its purpose. Whether a cat, mouse, or ship, or a skill such as building or exercising: "the virtue of a thing or activity is the ultimate form of that thing or activity" (Eikeland 2008 p53). Thus, all things can achieve an excellence of functioning. And accordingly, the existential purpose for humans is to seek *arete* in their activities and being.

As a concept human *arete* changed throughout Ancient Greek history. Within the Homeric age, the belief was that military and gymnastic pursuits led to virtue (Lunt & Dyreson 2014). The concept was therefore exemplified through Homeric heroes such as Achilles and Hercules. Yet, such excellence was considered 'genderless', with Penelope, wife of Odysseus, being similarly described in Homer's verses (Lunt and Dyreson 2014). However, the achievements of Alexander the Great brought a period of relative peace and an epoch ideal for reflection on skills beyond the battlefield. Due to this, the Hellenic age saw the emergence of competing philosophies such as Cynicism, Stoicism, Epicureanism and Pyrrhonian Skepticism, alongside the works of those such as Socrates, Plato, and Aristotle. Importantly, these schools of thought created a shift in the notion of human

arete. Specifically, it became conceptualised as an excellence of moral and epistemic values as opposed to merely 'warrior' qualities (Lunt & Dyreson 2014). As a result, *arete* could only be achieved by the philosophically educated as opposed to those with merely military talent (Ferngren & Amundsen 1985). Consequently, within Aristotle's works excellence is found in the intellectual *arete* or virtues.

To Aristotle, an intellectual virtue is a skill, habit, or inclination for behaving in a certain manner. These were termed *hexis*, and the key element to Aristotle's model is that each of these contains the possibility of *arete* (Eikeland 2008). Therefore, unlike the earlier considerations of Platonic idealism, Aristotle's conception of *arete* involves action not merely philosophical reasoning (*logos*) (Eikeland 2008). And the excellent individual is one who has the habit of applying knowledge for the purpose of *arete* in all actions. Resultantly, the outcome of an activity may be a 'win or loss', yet, through a process of attempting virtuous action, *arete* can be achieved through the intentions of the individual. As Aristotle describes in the *Nicomachean Ethics*, an individual's excellence, and virtue "will be the disposition whereby he becomes a good human being and from which he will perform his function well" (Book II, 1106a22).

More detail is provided later, but Aristotle's epistemology states that to achieve *arete* requires the application of two forms of knowledge. Specifically, to demonstrate the excellent 'disposition' the individual must act towards an objective (*telos*) with <u>both</u> a rational prescription (*sophia*) and wisdom (*phronesis*).

> Excellence, then, is a disposition issuing in decisions…this being determined by rational prescription and in the way in which the wise person would determine it.
>
> (Aristotle *Nicomachean Ethics* Book II 1107a1)

In this conception, the rational prescription or *sophia* is synonymous with 'fact', axioms, technical knowledge, academic theory and similar. Furthermore, this is described as a construct of both the virtues of *episteme* (scientific and invariant facts) and *techne* (practical craft/technical skill). Whilst the second is *phronesis* defined in terms of practical wisdom, judgement, and prudence. Thus, an 'excellent' action is a balance of these three intellectual virtues. In terms of praxis, these intellectual virtues determine the knowing

'that', knowing 'how', and additionally the knowing 'why' individuals apply their reasoning (*logos*) to achieve the *arete* (excellence) of an activity.

Aristotle's *arete* therefore reflects his doctrine of the mean (Urmson 1988). This position is often described as when both action and emotion are exhibited in a proper manner relative to the situation. In simplistic terms, if an individual is in danger and they fail to act or respond emotionally to the danger they are seen as deficient. However, if not in danger yet the individual acts as though they are, this is deemed to be acting excessively. To Aristotle the *phronimos* (wise person) learns to act with a character that balances both action and emotion appropriate to the moment (Urmson 1988). And, accordingly, the 'wise' professional demonstrates this equilibrium in their intellectual capabilities.

Unsurprisingly, there has been considerable discussion of Aristotle's virtue ethics and the consideration of the doctrine of the mean (see Van Zyl 2018, Urmson 1988, Oksenberg Rorty 1980). And, within Sports and Coaching philosophy such ethical discussions have been developed (e.g., Hardman and Jones 2010, McNamee 2010). However, whilst acknowledging Aristotle's notion of an ethical mean in achieving virtuous action, the focus of this work is epistemological. Consequently, the intention is not to explore the idea of professional ethics in isolation, but rather the principles by which Exercise professionals are taught the nature of the 'virtuous' professional character (*phronimos*). Specifically, what is the epistemic content through which Exercise defines its virtuous *arete*?

Aristotelian eudaimonic praxis.

The relationship of Aristotle's notion of a *phronimos* to professional practice is thus evident. As described, professionals are expected to apply their knowledge in a manner that conforms to both the standards of the profession. Therefore, the profession's ethos can be considered an expression of its Aristotelian *arete*. However, when considering professional epistemology through the Aristotelian lens, the notion of *arete* runs deeper than merely the skilful application of craft to create a material product.

Aristotle argued that *arete* was not found in the output from an activity. That is, the teleological purpose of a profession is not merely the 'product'. For example, the construction of a chair runs deeper than merely making something to sit on, it has aesthetic

and ergonomic qualities not just function. Thus, Aristotle stated that the purpose in striving for human *arete* is to be found in achieving *eudaimonia*, a concept translated as sense of happiness and fulfilment (Nussbaum 2001). Yet, this is a deeper experience than an emotion or attitude. It is a sense of wisdom, wellbeing, and meaning that comes with knowing that, regardless of outcome, the best possible action was taken. On a darker note, it could be argued *eudaimonia* can only be achieved on the death bed; the point at which someone can state, regardless of the misfortunes of life and their own shortcomings, they always tried to be the best they could be. However, in an everyday sense, there is the notion that all action brings *eudaimonic* opportunity. Consequently, for Aristotle, existential wellbeing can be cultivated through seeking *arete* in all activity. By pursuing *arete* (excellence) through virtuous action (mean of intellectual virtues) a sense of *eudaimonia* (the 'good' life) emerges.

Plainly stated, by doing the best job possible in each situation the individual can achieve a better sense of satisfaction. It is, therefore, beyond going through the motions (*habitus*). It is engagement with a task through the employment of the professional's triad of intellectual virtue. Importantly, within Aristotelian philosophy this striving for *arete* impacts not only on the *eudaimonia* of the actor but provides for a deeper connection in social and political spheres. Hence, the virtuous professional provides the *eudaimonic* experience for not only themselves but their customer and the wider community. As Louis Armstrong sang: "when you're smiling, the whole world smiles with you".

Professional intellectual virtue.

For the professional, the key to achieving *eudaimonia* is an *arete* based on a proper application of intellectual virtues. And, as previously mentioned, in making this argument Aristotle proposes an epistemology comprised of three intellectual virtues, two forming the basis of *sophia,* and the third being *phronesis* (Eikeland 2008). Therefore, within professional *sophia*, the first virtue is *episteme*. This is the foundation of the 'scientific facts' arising from the theoretical understanding of the profession. Thus, knowledge within the *episteme* can be considered invariant and constant. For example, in terms of Exercise, a trainer may know the gross anatomy of muscle and the guidelines on how many press-ups have been experimentally determined as most effective for muscular hypertrophy. The

second virtue of *sophia* is termed *techne*. This is the skilled 'art' or craft and technical 'know how' to achieve the objectives of the profession (Polkinghorne 2004). Extending the *episteme* press-up example above, the trainer will have the skill to instruct the exerciser in safely and effectively making the correct press-up movement. Thus, combined, *episteme* and *techne* are suggested as synonymous with the previous notions of 'knowing that' and 'knowing how' in professional knowledge models (Flyvbjerg 2001).

However, according to Aristotle, whilst these virtues may achieve some unintended good, they do not fulfil virtuous action if applied alone. To achieve *arete* requires the third intellectual virtue *phronesis* interpreted as practical wisdom, judgement, or prudence. *Phronesis* is defined by Aristotle as "a state of grasping the truth, involving reason, concerned with action about what is good or bad for a human being" (cited Jenkins *et al* 2019 p1). Thus, within professional knowledge *episteme* and *techne* can be used for both positive and negative ends depending on the ethical judgement of the practitioner. But *arete* can only be achieved via a purposeful and wilful consideration of *phronesis* delivered with enjoyment (Eikelund 2008). By including this latter element of purposeful enjoyment Aristotle argues *phronesis* must be an active choice as no-one "would call a man just if he did not **like** acting justly" (cited Eikelund 2008 p63 emphasis in original)

Consequently, *phronesis* is not a form of invariant *sophia*, it involves axiological judgement in a *eudaimonic* sense. Specifically, *phronesis* is beyond a Kantian deontological 'what should be done', it is a judgement based on 'is this what a good (virtuous) professional would do?' (McNamee 2010, Sellman 2009). For example, the Exercise professional may know the *episteme* states (x) repetitions of an exercise will create hypertrophy, and the *techne* describes the ideal technique for the optimal outcome. But *phronesis* asks would a good trainer prescribe them now, for this person, at this time, and for their fitness objective? Hence, *phronesis* determines whether the undertaking of an action will fulfil both *arete* and *eudaimonia*. And, importantly, in a precognition of future professional concerns, Aristotle summarised professional epistemology thus:

> It doesn't appear that people become medical experts, either, from written texts. It is certainly true that these texts try to say not only what the forms of treatment are, but even how patients might be cured, and how one should treat each type of patient, distinguishing the

> various conditions; and these texts are thought to be beneficial to those with experience, but useless to those without expert knowledge.
> (Aristotle *Nichomachean Ethics* Book X 1181b1)

Consequently, foreseeing such ideas as Polanyi's tacit knowledge, Aristotle argued that professional knowledge cannot be learned from a book. Science (*episteme*) must be blended with technical expertise (*techne*) and practical wisdom (*phronesis*). Accordingly, the *phronimos* (expert) achieves *arete* (excellence) and provides for *eudaimonia* through the development of practical wisdom (*phronesis*) to guide their technical wisdom (*sophia*).

A modern conception of phronesis in Exercise: Eikeland's interpretation.

Similar tripartite models of professional knowledge have emerged in related fields of research. For example, Côté and Gilbert (2009) proposed that successful Sports coaches demonstrate an integration of professional, interpersonal, and intrapersonal knowledge. However, as stated, it is the specific Aristotelian framework that has experienced a particular resurgence. This is most evident in what Polkinghorne (2004) defines as practices of care such as nursing and teaching:

> [i.e., professions] in which practitioner and person served are engaged in a face-to-face-interaction. The aim of these practices is the betterment of the individuals served, and the means for achieving this aim incudes a caring relationship and skilled and knowledgeable actions. (p1)

Equally Polkinghorne's (2004) description can be applied to Exercise and hence there is a precedent for an Aristotelian philosophy of this field. However, Eikeland (2008) provides a contemporary interpretation of intellectual virtue more appropriate for exploring Exercise. In particular, Eikeland (2008) suggests that a profession's paradigm contains four epistemic forms. Though *phronesis* maintains its original definition, he proposes modern *sophia* is better described via the concepts of *covering laws* and *statistical generalisations* which combine to form the virtue of *episteme,* whilst *techne* is argued as better conceived of through a virtue of *standards*.

In describing *episteme*, Eikeland (2008) states c*overing laws* are those facts, models, and theories derived from scientific analysis. They are explanatory assumptions that allow the

professional to describe, predict, and control the consequences of actions. This is synonymous with the original Aristotelian *episteme*. However, Eikeland (2008) proposes a modern second element of *episteme* termed *statistical generalisations*. As the name suggests, these are statistically derived facts found in distribution curves and other mathematical analyses. Thus, such data not only forecasts an outcome but also the generation of normative ranges and similar generalizable predictions. Importantly, this contemporary extension of *episteme* allows for inductive generalisations often regarded in the same manner as *covering laws* in praxis. For example, within Exercise such activities as body composition measurement provide ranges of normative expectations based on age, gender, and other variables. Although natural variation between the statistical average and the individual is acknowledged, it is a 'law' within health *episteme* that the individual's score should fall in the expected range.

Finally, Eikeland's (2008) third virtue of *sophia* is a *techne* termed as *standards*. This final epistemic form is still the method by which a professional applies their practice, however, it is made explicit this is not an 'average', 'subjective', or 'normal' level of performance. It is a *techne* based on idealism. Therefore, Eikeland's (2008) *standards* are the definitions by which a profession determines what it is to be or do something. This epistemic knowledge is the foundation of expected *techne* as laid down by the paradigm of a professional organisation. As a result, *standards* change if the *arete* of a profession evolves. Eikeland (2008) uses the example of producing a grand piano. However, Exercise has no such tangible or material product. Therefore, this is interpreted that as Exercise science's understanding of programming and delivery develops so too will the skills of the professional evolve to implement the new *standards*.

Professional knowledge as a paradigm

In summary, Eikeland (2008) provides allows a more contemporary consideration of Exercise professionals through the epistemological model of *sophia,* being *episteme* (*covering laws* and *statistical generalisation*), and *techne* (*standards*), combined with *phronesis*. Consequently, an Aristotelian framework provides a concept of professional knowledge beyond the epistemic task of accumulating of facts and practical techniques. It is a synthesis of academic and experiential learning in which the "episteme, techne, and phronesis dance together" (Higgs, 2012 p77).

Accordingly, this leads to the proposition that a profession can be conceived of as a paradigm. That is professional knowledge is a disciplinary matrix that contains a "relative unanimity of professional judgement" (Kuhn 1974 p450). And so, Aristotle's intellectual virtues become a thematic structure through which to consider this judgement, and hence the epistemic foundations of the profession.

This is not an original observation. McEwen (2014) uses the term metaparadigm to encapsulate the philosophical orientation of nursing. They describe how earlier research had examined the central epistemic concepts of nursing to differentiate the domain from other health professions. Accordingly, the metaparadigm, being a summary of "the intellectual and social missions of the discipline and [places] boundaries on the subject matter of that discipline", described the parameters which guided both nursing practice and research (McEwen 2014 p41). Therefore, the use of the term paradigm is considered synonymous with McEwen's metaparadigm. They are the shared set of generalisations, heuristics, methodologies, and values used for problem solving in a given discipline.

Conclusion

In conclusion, within this thesis professional epistemology is based on a neo-Aristotelian model. This framework is based on three intellectual virtues that the professional must consider in achieving excellence (*arete*). First, the *episteme* is derived from an understanding of a profession's *covering laws* and *statistical generalisation*. Second, the *standards* of *techne* must be achieved to fulfil the profession's objectives. And finally, the professional must master the judgement of *phronesis*. That is, the professional must learn how to apply their *episteme* and *techne* in a manner that achieves the *arete* for the unique situation. However, this *arete* is not necessarily the good of the 'product' but rather the good of the outcome in terms of *eudaimonia*. Thus, in combination, these intellectual virtues describe the paradigm of a profession as below:

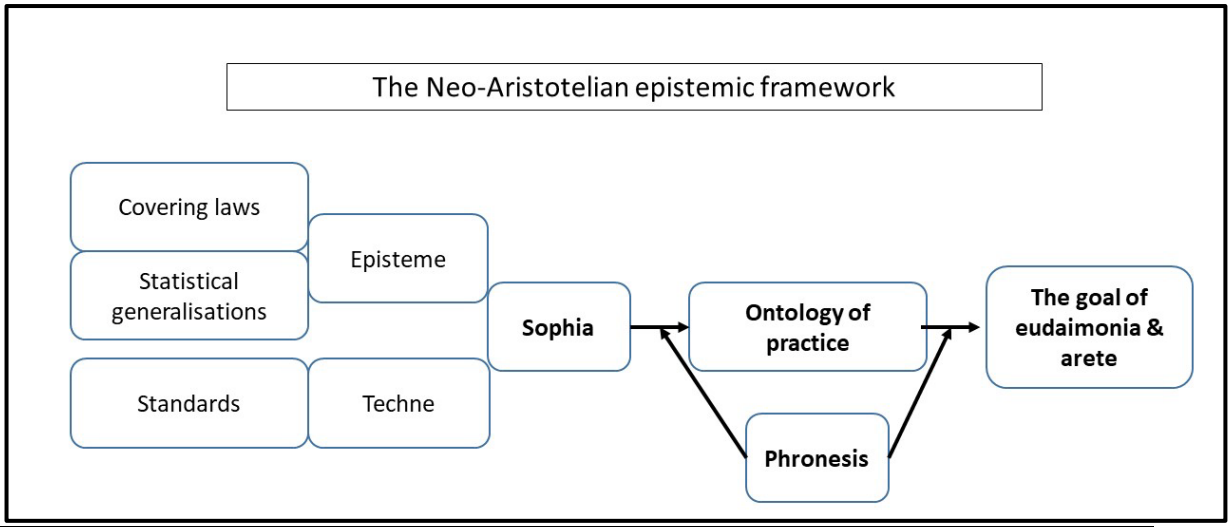
The Neo-Aristotelian epistemic framework
Covering laws
Statistical generalisations
Episteme
Standards
Techne
Sophia
Ontology of practice
Phronesis
The goal of eudaimonia & arete

Figure 1

As demonstrated, a profession is the synthesis of a shared set of intellectual virtues used for solving a social problem. Accordingly, professional governing organisations control the epistemology of praxis; they determine what is epistemologically virtuous for the professional. In turn, this creates the paradigm by which professionals work. Thus, a profession is an epistemology which is formalized into a paradigm.

However, in professional terms, this paradigm also generates the 'public' concept of the profession, i.e., how we describe the profession is an expression of what we expect them to know and how they should act. As McEwen (2014) states, the paradigm determines the boundaries of knowledge, action, and social objectives for a specific discipline. This is important in considering Exercise because it not only generates the practitioner's *arete*, but the paradigm also defines the participant's concept of the exercise experience. That is, the paradigm creates the concept as to what is, and what is not, both Exercise and exercise.

Using the preceding argument, this thesis can be located within a methodological framework best termed *conceptualist* (Jackson and Jackson 2012).[19] To be precise, the work focuses on exploring and deconstructing the conception of a profession's paradigm. Specifically, what epistemic virtues an Exercise professional is expected to know. For many, such conceptual exploration is the key task of philosophy, especially within professional considerations (e.g., Paley 2021, Risjord 2010, Rodgers and Knafl 2000, Passmore 1970, Walker and Avant 1983, Wilson 1963). But, as expected, this methodological 'location' brings with it debate.

Therefore, it is explicitly stated there is no intention to engage with conceptualist arguments on meta-philosophies, the nature of universals, the notion of modality theories, nor to be drawn into the academic debates within linguistics (see De Florio and Giordani 2018, Crowther 2006, Katz and Postal 1991 Flew 1971, Emmet 1968). Similarly, the Popperian debate concerning the classification of individual or general concepts, and the consideration of the Schools of realism, nominalism and conceptualism are acknowledged (see Popper and Hansen 2014, Bengson *et al*. 2011, Toulmin 1972). But these avenues of

[19] Again, critical discussion is provided in appendix 2 concerning this position and the use of conceptual analysis as a method.

debate are not deemed necessary at this stage. Rather, the simple argument is that by drawing upon the philosophical methods of conceptual analysis, an original exploration of Exercise epistemology can be achieved.

Concepts and conceptualism.

A concept is considered the amalgamation of experience, knowledge, and behavioural intention into a mental image that directs action towards a specific phenomenon. As Berenskoetter (2017) summarises, concepts are heuristic frameworks which "help us to grasp the world epistemologically and gives an ontology we can relate to" (p154). Resultantly, concepts are the accumulation and description of the profession's epistemic foundations: the paradigm.

Importantly, concepts involve both categorisation and judgement. For example, Wilson (1973) describes a conceptual question as 'is a whale a fish?' Hence, there is an issue of classification. What criteria does the concept 'fish' describe and therefore what must a whale demonstrate to meet the criteria if it is to be a fish? More precisely, what sufficient and necessary conditions should phenomena meet to achieve the inclusion conceptual criteria? Additionally, once the whale is classified questions as to the ideological, axiological, and ethical consequences then emerge: how should we treat this creature? Therefore, the action of conceptualisation is not merely a factual project or theoretical model, it involves axiological judgement and the determination of the means of interaction.

This interpretation is extended by Sullivan and Pannier (2014) who suggest that a 'universal concept' (e.g., exercise), contains two forms of conceptual essence. First, a species essence, i.e., how a 'thing' can be deemed to fulfil a conceptual classification. For example, what is an exercise? Thus, the species essence answers the question: at what point does walking shift from simple activity to become exercise participation? Secondly, a concept holds an instantiated essence. This Sullivan and Pannier (2014) describe as the way of judgement between members of a species. And, as such this notion has important implications for understanding professional praxis.

Within Exercise, the species essence is the way through which an activity is deemed to represent the concept of exercise. For example, both press-ups and squats can be conceived of as exercises (species essence). But within a specific situation, a professional decides as to whether press-ups or squats fulfil the concept of exercise most effectively, i.e., which is best for the objective of improving wellbeing in that context (instantiated essence). Therefore, the paradigm of Exercise provides not only the concept for recognising the species of an activity but also the instantiated 'good' of a concept in each moment.

As a result, Exercise is a 'universal conception' of those elements, both species and instantiated, which govern academic and professional practice. That is, these elements encapsulate the rules for action in its Kuhnian disciplinary matrix. The concept is therefore the professional identity and ethos of praxis. Consequently, to understand the professional paradigm, an examination of its current conception can demonstrate what epistemology is currently being used to describe and judge the exercise experience and its professionals.

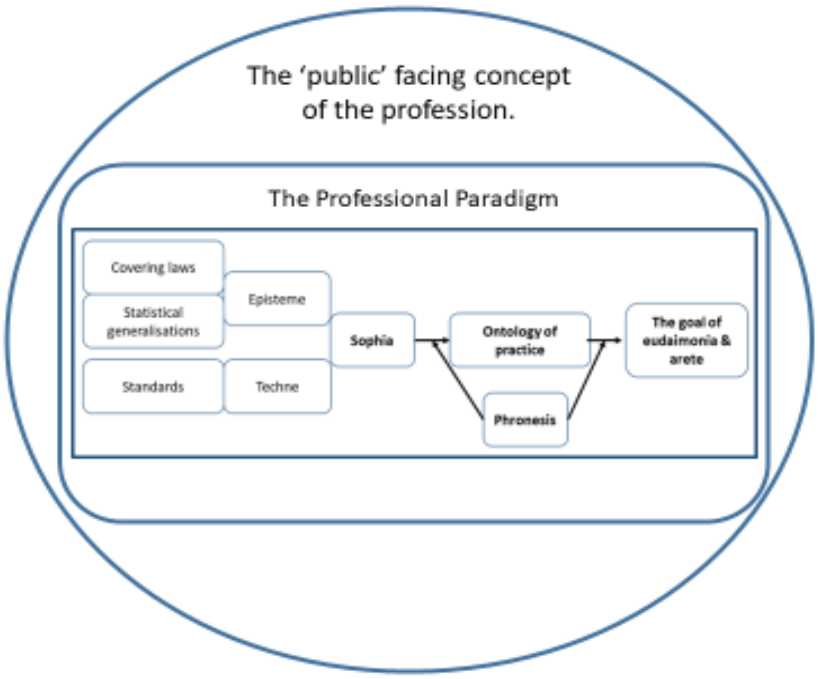

Figure 2

Conceptual analysis.

The argument thus far has demonstrated that the central element of a profession is its epistemology; a synthesis of its *episteme, techne*, and *phronesis*. From these intellectual virtues emerges a paradigm for action. And hence, this bounded disciplinary matrix creates the concept of the profession and its practice. This leads to the argument that in this instance an appropriate method is that of concept analysis, i.e., a backward engineering of a professional epistemology.

The basis of conceptual analysis can be summarised through the infamous late-night sports debate: who is the Greatest of All Time (GOAT)? During such conversations participants are not merely debating the merits of various athletes but also considering how to conceptualise the GOAT through what is technically concept analysis. As Lemoine (2013) describes "the core idea is that conceptual analysis consists of an attempt to evaluate a set of definitional criteria and exceptions against a set of given cases, while drawing up counter cases." (p310). Thus, as a philosophical method, concept analysis is a means by which to explore the sufficient and necessary characteristics of a concept. Specifically, how both the species and instantiated essences are understood, the heuristic meanings of the concept, and the possible impact on action (Berenskoetter 2017, Morse *et al.* 1996, Morse 1995).

Within academic philosophy, this methodology is often considered the 'original' philosophical method (O'Brien 2017, Overgaard *et al*. 2013). However, whilst elements of traditional armchair philosophizing still have a role, systematic conceptual methods have been developed through the influence of Analytic philosophy (see D'Oro and Overgaard 2017). And, in terms of research examining the professions, the use of Analytic methods has been particularly evident within health-based professions, most explicitly nursing (Rodgers and Knafl 2000). For example, Rodgers (2021) has stated:

> advancing the science of nursing requires a variety of forms of inquiry and also a clear understanding what constitutes nursing as a discipline. Neither of these is possible without meaningful conceptual work (p1).

Hence, within nursing, it is seen as a key research approach to guiding effective and ethical delivery. Accordingly, a recent review by Rodgers, Jacelon and Knafl (2018) found 3,489

articles and over 604 concepts had been explored within nursing practice. The rationale provided for this body of literature is based on the understanding that such research develops not only theory but practice. Consequently, it is suggested as both a practical and educational necessity in the profession's progress. Furthermore, the profession's graduate programs often require a concept analysis project for successful qualification (Schiller 2018, Rodger, Jacelon, and Knafl 2018).

Although it is recognised that conceptual analysis does not explicitly fall within Exercise education, replacing the term 'nursing 'with 'Exercise professional', Rodger's (2021) defence meaningfully becomes: *Advancing the science of Exercise professionals requires a variety of forms of inquiry and also a clear understanding what constitutes Exercise as a discipline. Neither of these is possible without meaningful conceptual work.* Therefore, based on the apparent success of nursing research, what follows is an adaptation of these methods.

Methods of conceptual analysis.

It is clear conceptual analysis has a complex history and there are currently several different approaches (e.g., Rodgers 2021, Nuoppenen 2010). However, in brief, concept analysis is suggested as being first systematised in Wilson's (1963) *Thinking with Concepts* publication. Wilson (1963) originally proposed an 11-step process; however, this method was developed into an 8-step process for nursing in the 1970's by Walker and Avant (Paley 2021). Although Walker and Avant (1983) is the most cited method, there have been a considerable number of adaptations including Rodgers and Knafl (1989), Morse (1995), Schwartz-Barcott and Kim (2000), Hupcey and Penrod (2005) and Meleis (2012).

As demonstrated by Hupcey *et al.* (1996) the development of the Wilson approach has been an evolutionary process. Consequently, the variants have emerged based on 'fit for purpose' differences in the analysis being undertaken. However, despite variation in terminology, each draws upon the framework first described by Wilson. That is:

1. A concept is identified.
2. Data is collected as to the concept's meaning and a definition/exemplar is presented after consideration of contradictory cases.
3. The impact of this exemplar case is considered in terms of professional praxis.
4. Recommendations for professional development are made.

And it is this basic 'universal' framework which will underpin the following exploration.

Conceptual re-engineering.

> Hitherto one has generally trusted one's concepts as if they were a wonderful dowry from some sort of wonderland: but they are, after all, the inheritance from our most remote, most foolish as well as most intelligent ancestors. ...What is needed above all is an absolute skepticism toward all inherited concepts.
>
> (Nietzsche 1901/68, section 409)

Previously Morse (1995) identified six different objectives for a concept analysis: development, delineation, comparison, clarification, correction, and identification. However, more recently, this has been simplified through the recognition that fundamentally each fall into one of two categories, either:

1. An attempt to identify the 'true definition' of the concept (descriptivist) in an idealist sense. Or,

2. A process of pragmatic evaluation (revisionist) in recognition of Nietzsche's cited scepticism (Nado 2021, Cappelen 2018, Nuoppenen 2010).

Within the field of Sport and Exercise philosophy it is evident the focus has been on descriptivist rather than revisionist approaches. For example, Morgan's (2019) recent paper highlights the efforts to find the 'true' essence of both games and sports. Arguing against the normative approaches of recent attempts, Morgan states that greater justice should be done to the Sports contexts that impact on concepts. But, despite seemingly an argument against idealism, the paper demonstrates a descriptive analysis as opposed to pragmatic revisionism. This descriptivism is further evident in the contents of key Sports texts such as Torres (2014) and McNamee and Morgan (2017) whose collections contain a disproportionate emphasis on defining concepts as opposed to exploring revisions for

practice. The focus is on defining the species essence of a concept as opposed to its utility for professional praxis or participant experience.

Similarly, within Exercise, Dasso (2019) differentiates the concepts of exercise and physical activity. Recognising that inactivity is a leading risk for disease, they argue that unambiguous language was needed to differentiate between mere active movement and exercise. Using the method of Walker and Avant (1983), they present a precise conceptual definition to allow an understanding of what is meant when health professionals use the term exercise. And again, Thojampa *et al*. (2020) used Walker and Avant's (1983) method to deconstruct the concept of self-efficacy in older exercising adults. The results of their exploration illustrated differences in antecedents for confidence compared to Bandura's original theoretical model. As a result, Thojampa *et al*. (2020) suggested additions to variables in the development and evaluation of interventions. It could be argued this case sits within revisionism as 'new' factors in the concept of self-efficacy are presented. But, again, the findings are not considered in terms of implementation, only at the level of theoretical and definitional discussion.

Therefore, whilst concept analysis is evident in Exercise, the approach appears descriptivist with a focus on identifying the species essence of a concept. The objective here is to shift from this definitional approach. There is no intention to only describe Exercise through its conceived sufficient and necessary conditions, but rather to extend the analysis for a revisionism. Resultantly, the debate will focus on the conceptual professional as opposed to the description of Exercise in isolation of its pragmatic objectives. Accordingly, this methodology creates a method of conceptual engineering, or more precisely conceptual re-engineering as described by Chalmers (2020).

As Chalmers (2020) discusses, conceptual re-engineering sits within the broader category of conceptual engineering methods. However, rather than creating 'new' concepts, re-engineering explores an 'old' concept to be "[cleaned up] to make it more natural and powerful, [modified] so it can better play explanatory roles and distinguish concepts that play different roles" (p12). Thus, reiterating Nietzsche's scepticism, conceptual engineering draws upon the following:

1. A concept C has an accepted meaning, but this is only one of similar meanings the concept might have.

2. It is only by chance, fate, or human decision that C has the accepted meaning and not one of its other possibilities.
3. There is no reason to believe the current conception of C is the most effective.
4. When a professional act they need the best possible meaning of C. For example, if the professional does not present exercise in an appropriate manner, then the client is less likely to participate.
5. Therefore, there is a need to critically evaluate the current C and examine the alternative possibilities C could possess.

(adapted from Cappelen 2018 p5)

Accordingly, the current concept of Exercise has been created as much by fate, luck, fashion, economics, and other forces than by science and academia. Therefore, there is a need to explore alternatives and ask is current Exercise the best paradigm it can represent?

To achieve pragmatic revisionism Chalmers (2020) describes a three-stage method of conceptual re-engineering. This begins with an initial design stage in which a concept is identified, described, and exemplar cases presented. An implementation stage is then undertaken in which the concept is considered *in vivo*. And finally, an evaluation stage determines how well the concept fits for 'real world' problem-solving. Resultantly, it is argued here that this method allows for the paradigm to be described, the impact of its implementation recognised, and an evaluation made of the appropriateness for practice.

Synthesis of method.

Amalgamating the previous models of conceptual analysis based on Wilson and the objectives of conceptual re-engineering as described by Chalmers (2020), the following are considered the stages indicative of the method used in this thesis:

1. A concept is identified.
2. Data is collected as to the current use and meaning of the concept.
3. A descriptive exemplar is created.
4. A critical analysis of the exemplar presents contradictory considerations.
5. The implications of the current conception for practice are discussed.
6. Alternative conceptions are explored.
7. A synthesis of findings provides for recommendations for practice.

Therefore, in creating a specific method for exploring Exercise's epistemology, the resultant process will follow the stages of:

1. The concept of Exercise describing professional education and its epistemology will be identified. This concept will form the basis of defining the paradigm of professional practice from which professional praxis can be discussed.
2. Using the identified paradigm, the identification of its epistemological basis will be achieved via the thematic analysis of three educational sources: textbooks, and course materials, alongside supporting academic peer-reviewed literature. This follows the literature-based methods evident in previous methods such as Walker and Avant (1983) and Rodgers and Knafl (2000).
3. Using the thematic model of the professional epistemology generated in Chapter 4, the impact on praxis of the professional paradigm will be explored. This is intended to consider the nature of implementation as described by Chalmers (2020).
4. An alternative, or rather re-engineered, Exercise paradigm will then be discussed. This is intended as a counter example to generate debate and highlight evidence of 'weakness' in the original concept.
5. Finally, through a synthesis of possibilities, recommendations for the education of Exercise professionals will be presented.

For the methods of Walker and Avant (1983), Rodgers and Knapfl (2000), and Chalmers (2020), the initial step is to identify the concept of interest. In this instance, this would appear a straightforward process. There are numerous texts presenting a 'definition' of exercise. And, as with previous research, it seems a case of extrapolating the commonality of these definitions to recognise the Exercise concept.

However, this would become a meaningless oversimplification. To begin, there is no consensus as to the definition (e.g., see Winter and Fowler 2009). Furthermore, although exercise definitions are debated, the explorations of its conception are limited. To date the attempts of Dasso (2019) and Thojampa *et al*. (2020) are rare cases. And, as described, these analyses are descriptive and insufficient for understanding professional practice.

Therefore, what follows is the proposal of a concept developed from the content of literature surrounding the field. Specifically, this chapter will demonstrate the dominant epistemology of Exercise can be expressed through the concept 'Exercise is Medicine' and its professional construction can be summarised through the syllogism:

1. Exercise is currently conceptualised as Medicine,
2. Medicine is biomedical in paradigm,
3. Therefore, Exercise as a paradigm is Biomedicine.

According to Faulkner and Taylor (2005): "[exercise is] a subset of physical activity in which the activity is purposefully undertaken with the aim of maintaining or improving fitness or health" (Faulkner and Taylor 2005 p4). And, in terms of conceptualisation, this definition appears supported by Dasso (2019) who suggested that exercise is differentiated from 'mere activity' by its planned, structured, repetitive, and purposeful nature. Therefore, Exercise can be seen as a paradigm which encapsulates how to plan, structure, and deliver physical activity for health objectives. Furthermore, this would appear to meet Wilson's (1963) conceptual challenge by answering the question in the form of 'Is X a Y?' That is, the physical activity of doing a press-up is an exercise if it is done purposefully to improve fitness and health in a planned, structured, and consistently repetitive manner.

But from a professional perspective this conceptual recognition is inadequate. Whilst definitional approaches provide insight into the species essence, such definitions present limited understanding of the instantiated essence (Sullivan and Pannier 2014). That is, how does the paradigm determine the solution to fulfil the demands of a context? As encapsulated in Chisholm's (1978) description of epistemic preferability: at any given moment there is a need to judge one conceptualisation as preferable to another, so that "p is epistemically preferable to q for S at t" (p254). Hence, should it be press-up or squat?

Consequently, this line of thought raises the questions lacking in Exercise philosophy:

1. According to Exercise how should the professional plan, structure, make purposeful, and create the consistency of, activity?
2. What are the epistemic foundations used to achieve these ends? and, therefore,
3. How is Exercise described to its practitioners, participants, students, and academics?

It is conceded that a limitation of this thesis is that if exercise is undefined, then by association, Exercise cannot be an agreed concept; any conceptual analysis is already built upon shifting sands. As a result, it appears impossible to state what precisely Exercise epistemology is an epistemology of. This critique is noted. But in this instance the objective is not to create a universal. There is no idealist objective. Rather, the task is to

explore a concept in a manner that enables philosophical debate on a paradigm. It is armchair rumination in the lineage of Nietzschean conceptual scepticism. Consequently, the following will demonstrate that through the axiom 'exercise is medicine', Exercise epistemology can be understood through the concept 'Exercise is Medicine'.

exercise is medicine.

> Lack of activity destroys the good condition of every human being, while movement and methodical physical exercise save it and preserve it.
>
> Plato, philosopher, and possible founder of contemporary Western political philosophy. (c.428-348 BCE)

> Nothing lifts me out of a bad mood better than a hard workout on my treadmill. It never fails. Exercise is nothing short of a miracle.
>
> Cher, singer, and actor. (1946-present)

> Perhaps the greatest potential benefit of exercise is its ability to preserve functional capacity, freedom and independence.
>
> American College of Sports Medicine, leaders in exercise education (Durstine et. al.2009)

To state that exercise is a fundamental activity for human wellbeing has become a tired platitude. The stance of exercise as a practice of medicinal importance has been emphasized by the entire spectrum of social influencer from philosopher to pop star, academic to actor. In 21st CE Western society the number of voices and quantity of media espousing the message 'exercise is medicine' has risen to a cacophony. And this premise is supported by an ever-growing volume of academic literature. For example, the Scimago Journal and Country Rank lists 125 academic and peer-reviewed journals related to Sport and Exercise. [20] A database search of Google Scholar using the Boolean search "exercise+is+medicine" generates 2,950,000 hits, whilst the same search protocol on the medical database PubMed[21] indicates 162,865 publications. [22]

However, exercise is not only promoted for maintaining current health, but also presented as providing a curative function. As the UK NHS states: "exercise is the **miracle cure** we've always had, but for too long we've neglected to take our recommended

[20] Scimagojr.com accessed 02/09/2020.
[21] www.ncbi.nlm.nih.gov/pubmed searched 24/05/2022.
[22] Google scholar searched 15/01/2023.

dose"[23](emphasis added). Whilst, in similar vein, the recently initiated academic journal *Frontiers in Sport and Active Living* opens its premier article with the statement "a [health] pill exists with many pharmacological effects: Physical Activity: i.e., Sports and Active Living" (Millet and Guilianotti 2019 p1). [24]

In modern professional terms, the exercise/medicine relationship was arguably formalized in 2009 when Dr Robert Sallis, then CEO of the ASCM, challenged both Exercise and Medicine with the question: "Why does this fitness world seldom intersect with the health care world?" (Sallis 2009 p4). The question was asked as the ACSM launched the Exercise is Medicine™ (EIM™) project. This project, first conceived in 2007, intended to make physicians aware of the role exercise prescription could play in patient health. The objective being that physicians would prescribe exercise as opposed to a reliance on pharmaceutical and other 'traditional' medicines (Berryman 2010).

Through this 'exercise as cure' perspective, UK Exercise governing organisations have created similar projects such as GP referral schemes to guide NHS patients into exercise, and more recently the 2018 'Moving Medicine'. [25] Developed by Public Health England, the British Association of Sport and Exercise Medicine (BASEM), and SportEngland, this latter project provides an online tool for physicians. The objective is to create access to resources for exercise prescription alongside guidelines for discussing exercise with patients, especially those with chronic conditions. Commenting on this initiative, the Rt. Hon. Matt Hancock MP, at the time Secretary of State for Health and Social Care, echoed the EIM™ stating: "I am delighted to launch this brilliant web tool for healthcare professionals – I hope it will help pave the way for a culture shift in medicine where referrals for exercise are just as common as prescriptions for medication".[26] Therefore, exercise as a 'drug 'of choice has become further cemented within political and populist consciences.

Correspondingly, there is considerable academic literature examining the impact of exercise on conditions ranging from broad categories such as chronic disease (e.g., Anderson and Durstine 2019) and mental health (e.g., Pascoe *et al.* 2020), to specific issues such as fatty liver (e.g., van der Windt *et al.* 2018) and Alzheimer's (e.g., Valenzuela *et*

[23] www.nhs.uk/live-well/exercise/exercise-health-benefits/ accessed 01/09/2020.
[24] The synonymity between sport and exercise is noted.
[25] National Quality Assurance Framework (DoH 2001) available at https://webarchive.nationalarchives.gov.uk/20111015042440/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4079009.pdf
[26] Movingmedicine.ac.uk accessed 18/05/21.

al. 2020). Attempting to summarise the data, Pedersen and Saltin (2015) collated evidence for the effectiveness of exercise in managing twenty-six chronic diseases. Whilst the ACSM's *Exercise Management for Persons with Chronic Diseases and Disabilities* is in its fourth edition (2016) and the *Guidelines for Exercise Testing and Prescription* its eleventh (2021) as the organisation attempts to collate this growing knowledge base.

The outcome of such research, professional perspectives, and interventions is the analogy in which doing exercise is synonymous with 'taking one's medicine'. As a result, to many, the assumption is that exercise can be promoted as a magic bullet for personal wellbeing and a panacea for public health issues (Millet and Guilianotti 2019, Beedie *et al*. 2016). A stance which appears both axiomatic and dogmatic in academic and populist thinking.

Thus, the proposition can be made that exercise is conceptualised as medicine.

exercise is medicine but also Exercise is Medicine.

There is no debate that exercise can be good for health. The evidence cannot be denied that appropriate forms of physical activity improve wellbeing. But, beyond the concept of exercise as a medicine, it can also be argued that Exercise has become conceptualised as Medicine. That is, professional Exercise organisations now conceptualise their paradigm and epistemology in the same terms as those of Medicine.

As Wilenksy (1964) illustrates, when a profession evolves from a group of specialist practitioners to a professional organisation, there is a process of epistemic formalization. This process is one in which the knowledge base becomes prescribed within a governed educational framework. The argument here is that the formalization of professional Exercise has involved an epistemic configuration to the paradigm of Medicine. In recognising exercise as a medicine, the epistemology, methodology, and heuristic frameworks underpinning Exercise have come to 'ape' those of contemporary Medicine.

This position is initially supported via the small body of literature exploring the historical development of Exercise. The suggestion that the evolution of Exercise to a paradigm of Medicine is both a natural inevitability and desired objective will be considered in detail later. However, in brief, academics such as Shepherd (2018), Becker (2015), Tipton (2014), Carter (2012) and Berryman (2010, 1992) have described the historical relationship between the domains of Medicine and Exercise. Within this literature,

fluctuations in the relationship are described through the changing ontologies, shifts in methodology, and the political and social contexts surrounding Medicine as opposed to a unique Exercise field. As a result, Exercise is presented as epistemologically 'subservient' to Medicine. Thus, regardless of perceived causative factors explored, each narrative culminates with modern Exercise (re)aligning itself to Medicine.

What is Medicine?

To suggest an X is a Y, there is a need to begin with what is Y? Accordingly, if Exercise is to be conceptualised as Medicine, then there must be clarification as to what is Medicine. To achieve this a brief history of Western Medicine is presented. It is conceded this is a superficial description and adds little to the histographies of either domain. However, based upon the recognition of key shifts in Medicine's history as described by Jewson (2009), Bergdolt (2008), Porter (2006, 1999), and Capra (1982), it provides for a critical exploration of the 'Exercise is Medicine' relationship.

Additionally, it is conceded there is semantic licence within the discussion. The practice of Medicine is heterogenous and not a unitary profession as the following may appear to suggest. It is recognised there are numerous roles under the umbrella term ranging from pharmacists to psychologists, and dieticians to consultants and surgeons. This simplification is conceded. Yet, the overall objective is to create a means for the comparative exploration of the current paradigms of Exercise and Medicine. As will be argued, although variation clearly occurs in role specific *sophia* and action, the professional 'status' is based upon a shared understanding of epistemology. Therefore, what is presented is the historical emergence of a dominant Western paradigm of Medicine: biomedicine (Monaghan and Bury 2022).

A potted history.

Modern Western Medicine first emerged within the Hellenic Greek, Greco-Roman and Medieval epochs. During these periods Medicine was primarily a holistic practice founded upon a humoral theory of balance within the *physis* (life force). Hence the term physician. Accordingly, the epistemology was a combination of Aristotelian and Neo-Platonic philosophy, alongside herb-lore and the wisdom of such 'masters' as Hippocrates,

Herodicus, and Galen (Bergdolt 2008, Capra 1982). And the ‘healing’ paradigm was based on the restoration to a natural balance through factual knowledge, practical action, and humanistic spirituality. Thus, arising from learned aphorisms, and the use of empirical 'folklore', Medicine was an inter-relationship of the communal, spiritual, and physical. Importantly, within this perspective, physical activity was a recognised element in Medicine’s paradigm. As recorded, Ancient, Galenic, and Medieval practitioners utilized ‘exercise’ as a fundamental method in Medicine’s ‘toolbox’ (Berryman 2012 and 2010, Bergdolt 2008).

However, geo-political and religious shifts at the end of the Middle-Ages led to a major re-appraisal of philosophy. Importantly, challenges to the dominant Scholasticism created an embryonic positivism from which the modern methodology evolved. Hence, the period saw the emergence of Descartes' considerations of mathematical biology and dualism, Bacon's 'new scientific method', Newtonian physics, and similar metaphysical impacts. The result was that, by the middle of the 20thCE Western Medicine shifted to an epistemology based almost exclusively on the concept of biomedical mathematics and physiology (Jewson 2009, Williams 2003, Foss & Rothenberg 1987).

The history of this paradigmatic development is summarized in Jewson’s (2009) Medical cosmologies:

> Medical cosmologies are basically metaphysical attempts to circumscribe and define systematically the essential nature of the universe of medical discourse as a whole. They are conceptual structures which constitute the frame of reference within which all questions are posed and all answers are offered.
>
> (Jewson 2009 p622).

Therefore, here, the term cosmology is interpreted as being synonymous with the notion of a professional paradigm. And, in describing the historical emergence of 21stC.CE. Medicine, Jewson (2009) suggests that there have been three epistemological (paradigmatic) epochs of Medical cosmology. The first is termed "Bedside Manner” and is identical with the Ancient Greek paradigm. Although eclectic in practice, and results, this cosmology drew upon the shared holistic understanding of the inter-relationship between environment, mind, body, and spirituality.

The second cosmology is described as emerging from the 18th C. CE hospital systems. Hence, the label "Hospital Medicine". The key epistemic forces for this shift were the development of methods of internal investigation, statistical analysis, and the emergence of specialized study. However, it is suggested that one of the most crucial factors was Descartes' dualism from which arose the consideration that organisms could be conceived of in strictly biological and materialist terms (Joubert 2014, Mehta 2011, Kriel 2003, Switankowsky 2000, ten Have *et al*. 1990, Gold 1985). Importantly, Descartes' metaphysics 'demythologised' the human body allowing Medicine to use dissection as a primary tool for epistemology (Mehta 2011, Leder 1992). This generated considerable progress in understanding a previously 'hidden' *episteme* of anatomy and physiology. Hence, there began a shift from professionals requiring an understanding of a patient's experience towards that of 'scientific' biology. And, crucially, within the Hospital cosmology, disease became seen as a phenomenon 'external' to the patient (Jewson 2009).

Significantly, these changes illustrate why a dissociation between exercise and medicine, and correspondingly Exercise and Medicine, occurred. The metaphysical concepts which underpinned exercise's previous inclusion in the Medical epistemic 'toolbox' were discarded due to the Enlightenment's science. In light of Medicine's scientific advancement, physical activity was limited when compared to the 'power 'of biological technologies to understand disease.

Today, Medicine utilises what Jewson (2009) terms the "Laboratory" cosmology. It is a paradigm founded upon laboratory-based techniques for physio-chemical function, microscopic examinations, and scientific experimentation. As Jewson (2009) concludes, the conceptualisation of Medicine is no longer holistic but dualistically biomedical. The patient has been 'removed' and in their place, now an organism conceptualised in biological norms and materialist reductionism. Thus, the concept of Medicine is now encapsulated in the paradigm of biomedicine.

Medicine is biomedicine.

> biomedicine is deeply embedded in the current global order, and hence is tied directly or indirectly to all of the goods and ills of that order.
>
> Philosophy of Biomedicine (Stanford Encyclopedia of Philosophy)

In brief, biomedicine represents a paradigm which conceptualises the human being through an ontology of a biological machine. Accordingly, health is defined as a state of flawless mechanical functioning of organic material (Kriel 2003). And epistemologically it is a paradigm grounded in positivistic mathematical certainty and the metaphysics of the natural sciences (Dahnke and Dreher 2016).

It is acknowledged that there may be opposition to the argument biomedicine is still the dominant 'force' in Medicine. These disputes have emerged through criticism of positivism and 'dehumanised' techno-rationality not only from academics (e.g., Foucault 1973 and Illich 1974), but also Medicine's practitioners (e.g., Pellegrino & Thomasma 1981 and Engel 1977). Thus, challenges within Medicine's epistemology and its biomedical praxis, may be seen as a test of biomedicine's sovereignty (Thompson and Upshar 2018, Marcum 2017).

By way of example, recent philosophical considerations have led to alternative ontologies such as personalised, evolutionary, values-based, and narrative practices, alongside such fields as complementary & alternative medicines (CAM) (Thompson and Upshar 2018, Zaharias 2018). Perhaps most influential of these new ontologies is the biopsychosocial model. Bolton and Gillett (2019) suggest this was first formalised by Engel's (1977) paper *The Need for a New Medical Model*. In brief, it represents an attempt at holism involving the recognition of biological, social, and psychological factors in the experience of health. And, since its inception, the biopsychosocial model "has claim to be the overarching framework for contemporary healthcare." (Bolton and Gillette 2019 p1). However, regardless of specifics, in commonality each of these re-conceptualisations argue for a challenge to (bio)Medicine.

Yet, despite the rhetoric, a critical reading of the new approaches suggests they are merely the biomedical paradigm 'repackaged' (e.g., Jureidini and McHenry 2020, Nairn 2012, Bluhm and Borgerson 2011, Hjørland 2011, Howick 2011, Ghaemi 2011, Kontos 2011,

Marcum 2010). For example, it is argued the biopsychosocial model may refer to social and psychological elements, yet it still "[shares] to some extent the biomedical model's ontological commitment to physicalism and materialism" (Marcum 2010 p11). Furthermore, advocates of the biopsychosocial model, e.g., Wade and Halligan (2017), admit it was not proffered as a replacement for biomedicine, merely an extension. Mind and body are still ontologically differentiated. Therefore, whilst the terminology and technology may have changed, the paradigm of a Cartesian biological machine is still underpinning Medicine (see Monaghan and Bury 2022).

In simplistic terms, the new frameworks merely extend the biological explanation to include social and psychological factors that impact on this biology. Additionally, the progress of AI has further cemented biomedicine's dominion through such developments as molecular biology, genomics, nanotechnology, and pharmacogenomics (Clarke *et al*. 2021). Hence, although Medicine has been refined to incorporate humanism, the inclusion of genetic programming, personalized medicine, and new quantum explorations, have kept the epistemology rooted in a 17th century mechanical metaphysics (Krieger 2011, Varela, Ruiz-Esteban & De Juan 2010).

However, the dominance of (bio)Medicine extends beyond an ontology for praxis (Jureidini and McHenry 2020). The influence of biomedical politics, and subsequent economic interests, on professional practice are evident. For example, Loughlin, Lewith, and Falkneberg (2013) state:

> many clinicians implicitly assume an account of medical knowledge that is at odds with how they actually practice medicine and which actually risks undermining crucial components of medical knowledge (p133)
>
> before stating that:
>
> clinicians have been disparaged for failing to 'bend a knee 'at certain identified scientific altars and have been compared to irrational defenders of creationism. (p133).

As a result, physicians recognise their 'responsibility' to the biomedical model both professionally and politically.

More recently these observations have been echoed in practitioner commentaries such as O'Mahony (2019) and Miles (2018) alongside philosophical texts such as Broadbent (2019), Stegenga (2018a, b) and Marcum (2017), and the experiences of patients (Neilson 2020). Therefore, despite the emergence of critical professional approaches the tenets of the biomedical model remain the central paradigm in Medicine. As Miles (2018) states "[statistical] epidemiology, biostatistics, and science-based grading methodologies… remain the order of the day" (p4).

The biomedical model defined.

> In this model, the patient is reduced to a physical body composed of separate body parts that occupy a machine-world. The physician's emotionally detached concern is to identify the patient's diseased body part and to treat or replace it, using the latest scientific and technological advances in medical knowledge sanctioned by the medical community. The outcome of the intervention is to cure the patient.
>
> (Marcum 2010 p10)

How this model for cure emerged to dominate contemporary Medical practice has been the subject of a considerable volume of academic literature (e.g., see Garber and Roux 2013, Lowy 2011, Marcum 2010, Jewson 2009, Bergdolt 2008, Quirke and Gaudilliere 2008, Porter 2006, Sargent 2005, Foss 2002, Porter 1999, Conrad *et al.* 1995, Capra 1982). However, its tenets can be summarised via four assumptions (Williams 2003):

1. *Disease is defined as a deviation from a statistical norm and measurable biological function*. Through scientific methods, Medicine applies mathematical precision to the processes of diagnosis and prescription (Karahan and Karaagaoglu 2021, Capra 1982). In this paradigm disease is conceptualised as a deviation from normal functioning, and healing is therefore a process of 'curing' through a return to the expected norm in each 'cog' of the biological machine. This approach is exemplified in Boorse's (1977) biostatistical theory which defines health as a mathematical sum of biological functioning. And although challenged for its pragmatics, this theory typifies the biostatistics and biomathematics which dominate Medicine (Doust, Walker, and Rogers 2017). As Vincze and Vincze-Tizsay (2022) state: "practically every mathematical procedure that is useful

in physics, chemistry, engineering, and economics has also found an important application in the life sciences" (p18). Importantly, therefore…

2. *Each defined disease is an 'individual entity'*. If human functioning is explainable by a unique set of biostatistical norms, then so too is disease. Thus, diseases are categorical through a process of scientific nosology. This then allows for each individual disease to be isolated and diagnosed by a relationship to their unique aetiologies and symptoms. And, in terms of ontology, this categorisation allows the reductionism of Medical problems to smaller and smaller biological units: from organ to cell to molecule (Kriel 2003). As a result, the experience of disease is generic regardless of context, and can be considered in isolation as an independent factor in the individual's health. Based on this...

3. *Medicine is a neutral science*. Through its bio-mathematical roots the basis of Medicine is objectivity. Biomedicine is a positivistic epistemology, and its foundations assume that fact can be differentiated from value. In particular, a statistical ontology conceptualises individuals as aggregates of populations, and variations in cases are considered as artefacts in data. There is no regard (or need) for the metaphysics of phenomenology and similar existential considerations. Hence, narratives of disease are either disregarded, or perceived as secondary, to the undertaking of objective physical diagnosis (Engelhardt and Jotterand 2011, Svenaeus 2001, Lachmund 1998). Furthermore, ethically, the axiology of praxis is reduced to the findings of the scientific base as opposed to personal values. Consequently, the objectives of Medicine are maintained without recourse to unsubstantiated metaphysical considerations (Broadbent 2019). Thus finally…

4. *The 'neutral science' supports an ontological foundation of mind-body dualism* (Freund, McGuire & Podhurst 2003). Importantly, biomedicine allows the physical body to be examined independently of the mind. As a result, diseases of the body are presented as objectively different to those of the mind. Furthermore, ontologically, the body is itself a set of 'compartments', each of which has its unique considerations, e.g., the neuro-muscular, cardiovascular, and endocrine systems. Therefore, each can be understood in terms of their independent biostatistical functioning. Thus, through a biological machine metaphor, the body is seen as "something physicians [can] observe, manipulate, transform and improve." (Freund *et. al*. 2003 p221). Hence, the body is rationalised as an object for discipline, control, and perfection independent of the mind.

This biomedical model is presented as the foundation of Medicine's success. Through it Medicine has become a paradigm which has shaken off the 'magical' and 'superstitious' to stand alongside the natural sciences in epistemic status (Arney and Bergen 1984). Once considered the domain of charlatans and quacks, it has emerged as the premier science in determining social policy, technological advancement, and day-to-day living the 21st C. CE (Stegenga 2018a, Porter 2006). It no longer relies on speculative and experiential claims. Furthermore, as first proposed by Claude Bernard in his *Introduction a la Medecine experimentale* (1865) and later through Abraham Flexner's 1910 report, scientific education has removed the use of a physician's bedside and observational skills (Marcum 2010, Porter 2006). Instead, Medicine embraced science to create patho-physiological explanations of disease which allow for biotechnologies of curing.

Evidence based Medicine (EBM/EBP)

In the semantics of this thesis, the problem arises that the previous explanation is technically an ontological description. That is, it describes the model used to guide practice in both academic and professional contexts. Consequently, there is a need to consider the epistemic base which supports this ontology, and which therefore creates professional praxis. In terms of biomedicine, Medicine's epistemology can be summarised through a methodology termed evidence-based medicine (EBM), or as will be used throughout, the alternative label of evidence-based practice (EBP).

There is an old joke which asks if Medicine is now based on evidence, what was it based on before? This quip captures the crux of EBP which arose as a reaction to the proposed 'dangers' of personal experience, expert wisdom, and observational evidence (Horwitz *et al.* 2017). Although its roots can be traced back to the beginnings of mathematical physiology in the 18th C. CE, in its modern form it emerged in the latter 20th C. CE (Thompson and Upshur 2018). The objective of EBP is to recognise effective practices from those that are useless or dangerous. As with much academia there are several conceptions of this methodology (see Straus *et al.* 2018, Solomon 2015, Howick 2011). However, the EBP movement is founded on an important professional axiom: if knowledge is a justified and true belief, then Medicine should be a justified and true belief

as to the best practice of medicine. Hence, the introduction of EBP was a process for justifying the epistemology of praxis. As a result, EBP can be presented as an epistemic project through which Medicine's professional paradigm is developed. Thus:

> Evidence based medicine… is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.
> (Sackett 1997 p3).

As shown in figure 3, the cardinal principle of EBP is the hierarchy of evidence through which to guide professional practice. (Miles 2018). In summary the highest form of evidence is derived from randomised controlled trials (RCTs) and, in line with statistical considerations, the meta-analyses of systematic reviews of multiple RCTs. Accordingly, the lower down the epistemic hierarchy the order of evidence, the 'weaker' the justification for its use in professional activity.

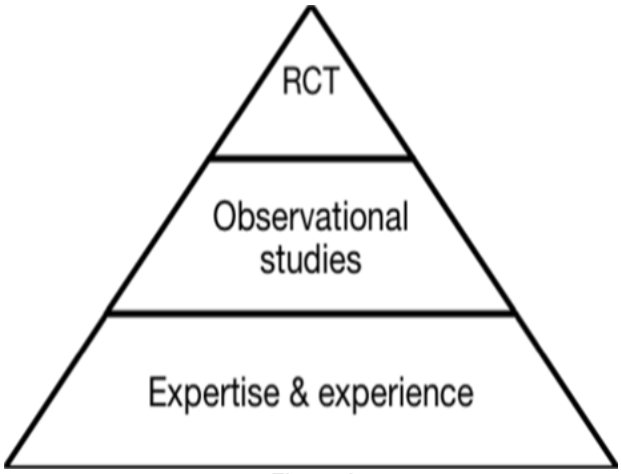

Figure 3

This approach to professional epistemology is considered a key factor in the Medicine's continuing successes. For example, the implementation of EBP has led to demonstrable benefits for myocardial infarction, stroke, HIV, hepatitis C and cancers (Horwitz *et al.* (2018). Consequently, these achievements are cited for the use of a biomedical paradigm in which the professional can utilise precise guidelines for each disease according to a positivistic EBP evidence-base (Miles 2018).

Impact on professional practice.

Historically it is impossible to pinpoint a single causal factor for an event. However, in the development of EBP, the impact of Flexnor's 1910 report is repeatedly given as the key reason (Marcum 2019, Duffy 2011). Undertaken by Abraham Flexnor of the Hopkins Circle, his report demonstrated the education of Medicine at the turn of the 20th CE was

haphazard and lacking in a scientific evidence-base. From this Flexnor argued for the stricter alignment to scientific standards and a greater inclusion of laboratory skills for physicians. Resultantly, the report centralised the need for scientific research as the foundation for both education and practice. Hence, "the Flexner Report set [Western] medicine on a course that was fuelled by the energy of scientific discovery. Those discoveries have immeasurably improved the lives of all human beings (Duffy 2011 p274).

In terms of epistemic impact, this epistemology shifted the focus of praxis to a clinical decision-making based on biological methodology, i.e., Jewson's (2009) laboratory cosmology. As Marcum (2019) describes, practitioners learned to approach their work through a hypothetico-deductive line of inquiry. The clinician collects the objective biostatistics from the patient, formulates a hypothesis, and then uses the 'laboratory' to undertake a deductive diagnosis (Marcum 2019). Thus, beginning with a hypothesis derived from patient data, the physician utilizes a process of systematically greater biomedical reductionism at each stage to assess their clinical theory. Having isolated the causal factor, an intervention can then be applied based on the EBP evidence-base.

Importantly, this hypothetico-deductive process removes the primacy or reliance on professional intuition and subjective interpretation. The expertise of the physician now lies in understanding the scientific process and a capability for recognising shifts in data. Due to the self-correcting, scientific, techno-rational process, it is expected that 'erroneous' judgement can be quickly recognised, and efficacy maintained. The objective is for Medicine to "perfect" its methodology. It has mechanised the means of intervention and minimised the variance in decision making due to an epistemology of biomedical positivism.

An Aristotelian interpretation

Through an Aristotelian lens the *episteme* of the physician is derived from the need for an understanding of biological universals and invariant data-object relationships. This knowledge base is focused on ensuring the accuracy of *covering laws* and the emergent *statistical generalisations* from the EBP derived epidemiology. And, in turn, the practitioner must be able to align the *episteme* to the patient data. This creates a *techne* based on the *standards* of understanding the required laboratory processes and data analytic techniques. Hence, the physician is a technician knowing what test is needed at

each stage of diagnosis, alongside recognising the appropriate intervention for the unique biological demands of the case. The *arete* of the physician's intervention is therefore measurable in normative, biostatistical terms.

Within this position, the application of *phronesis* is difficult to determine. Biomedicine's success has been suggested as being based on a scientific process that has removed metaphysical considerations from a materialist reality. Thus, *eudaimonia* and an *arete* beyond the notion of perfect biological functioning are dismissed. Yet, it would be naïve to suggest that modern practitioners do not seek wellbeing nor work without an ethical framework. Every professional, by nature, is working towards a valued objective and towards a perceived good. Consequently, the notion of *phronesis* as a praxis towards a 'good' must be in effect.

Therefore, the proposition is made that *phronesis* has shifted from its original notion of seeking *eudaimonia* and an existential *arete*. Instead, biomedicine has created a professional *arete* based on scientific skill, academic *episteme*, and laboratory-based *techne*. Accordingly, its axiology is a framework of role-oughts and an ethics of epistemic deontology (Altschul 2014). That is, regardless of particulars, values, and phenomenology, praxis is delivered through an EBP of universally standardised practice: "the straightforward application of context free propositional knowledge" (Rolfe 2001 p23).

As a result, the deontological approach to epistemology and professional codes of conduct 'strictly' dictates the expectations of praxis. Effectively, this removes the metaphysical issues of an Aristotelian concept of virtue and value-laden *phronesis* from praxis. Hence, professional *arete* is recorded in biostatistical outcomes.

In summary…

In summary, Medicine is based on an epistemology of positivistic biology. Consequently, the paradigm can be summarised through the following:

1. Health is defined in terms of statistical parameters of normative biological functioning.
2. Normative functioning is described in terms of measurement in differentiated biological units. And therefore, disease' is reducible to the impaired functioning of a specific variable in each unit.
3. Analysis of health is a hypothetico-deductive process that uses the EBP epistemology to compare the functioning of a variable to an expected norm.
4. Expertise is defined through the practitioner's laboratory skill and deontological epistemology to achieve an appropriate diagnosis for the fulfilment of a biological objective.
5. Philosophically this paradigm is encapsulated through the terms: scientism, mechanism, physicalism, and reductionism.
6. This creates the perception of a consistent, effective, and successful Medicine.

Within an Aristotelian framework, the paradigm can be described as:

1. Both *arete* and *eudaimonia* are reconfigured in terms of biological functioning.
2. The virtue of epistemology is derived from the 'prudent' application of *episteme* in the form of *causal laws* and *statistical generalisations* through a *techne* of diagnostic and scientific *standards.*
3. The values underpinning *phronesis* and the axiological judgement of 'good' have materialist and physical foundations.
4. The *arete* of craft is found in the *techne* of analysis-diagnosis-prescription.

Exercise becomes (Bio)Medicine

Having defined Medicine, the proposition is that Exercise has become a paradigm which replicates biomedicine via a belief in a conceptual relationship between the two domains (Halperin *et al*. 2018). Furthermore, the Exercise professional also reflects a 'laboratory cosmological' *techne* of analysis-diagnosis-prescription, whilst their *arete* is described in the same scientific skills of the biomedical physician. Consequently, this section will demonstrate that Exercise can now be summarised in the terms, physicalism, mechanism, reductionism, and scientism.

It is acknowledged that this task has been partially undertaken in previous supporting work (Gray 2019, Gray, Smith, and James 2014 a,b). This is therefore an expansion and re-interpretation of previously submitted literature review and publications in 2019 and 2014.[27] And, in terms of structure, the following is presented in the same descriptive approach as the previous account of biomedicine. Methodologically this maintains the conceptual analytic process of stating 'what is' before the debate of 'what could be otherwise'.

To provide a defence of the 'Exercise is (bio)Medicine' thesis, the conceptual analysis is split into two elements: academic and professional. In terms of the academic conception, I present three arguments. First, I will provide a brief historical description illustrating the emergence of Exercise's biomedical concept. Second, I will demonstrate the dominance of biological physicalism and reductionism in Exercise. Following this, I argue that academia conceptualises Exercise through the EBP epistemology, before describing the praxis in the biomedical terms of analysis-diagnosis-prescription. Finally, I discuss this academic concept through the Aristotelian framework. After the demonstration of the academic 'Exercise is (bio)Medicine' concept, I draw upon an analysis of textbooks and course content to demonstrate the biomedical foundation of Exercise education. This narrative structure assumes that the epistemology of academia advises Exercise organisations, which in turn create the educational programmes.

[27] presented in Appendices 3, 4 and 5

Academic Exercise becomes biomedicine.

Within their history of 'Exercise is Medicine', Berryman (2010) explains that exercise was a key element in early approaches to pre-scientific Medicine. However, as previously described, the emergence of science during the Enlightenment led to a divergence between the domains. And it was not until the advent of a scientific Exercise the two academic disciplines began to form the relationship illustrated in 21st CE literature.

Scientific Exercise, and its relationship to Medicine, emerged in its contemporary form in the late 19th C. CE (Hargreaves 2021). Early Exercise organisations were formed in response to health concerns, including the American Association for the Advancement of Physical education founded in 1885, The Laboratory for Theory of Gymnastics in Copenhagen in 1909, and the German Committee for the Scientific Investigation of Sports and Physical Exercise in 1912 (Hargreaves 2021, Shephard 2018). This was followed by major advancement in the Medical research laboratories of the 1920's and 30's. For example, A.V. Hill won a Nobel Prize for work on the muscular system, whilst Krogh and Lindhard were awarded the same honorary for studies on cardio-respiratory exercises (Hargreaves 2021). In North America, centres such as the Harvard Fatigue Laboratory and the University of Illinois T.K. Cureton's Fitness Laboratory, embraced the same Medical paradigm and demonstrated the positive effects of exercise not only in physiological but also epidemiological research (Hargreaves 2021, Berryman 2010).

These pioneering institutes took the scientific Medicine of the late 19th C.CE and applied it to the exercise experience. Many concepts recognisable in today's Exercise such as VO2max, EPOC and RMR were developed, alongside the understanding of responses to exercise in specific physiological structures (see Tipton 2014). Additionally, work by physicians such as Keys, Bohnenkamp, Ernst, and Behnke developed quantitative methods for anthropometrics, body density, and body composition (Shepherd 2018). Consequently, it became possible to begin to explain the exercise experience through the same concepts of mechanism, physicalism, and reductionism as Medicine.

Immediately after World War II, there was an increase in the scientific formulation of human activity (Booth 1988). In terms of exercise, the fundamental tenets of cardiovascular and neuromuscular training were laid down by researchers such as De Lorne and Watkins, and Ken Cooper of the Cooper Institute. Importantly for contemporary

Exercise science, the emergent understanding of DNA created advances in molecular and genetic physiology. As a result, a linear process was modelled that began with the exercise stimulus and described its impact through increments of increasing biological reductionism 'down' to the final objective of a shift in the functioning of the cell DNA (Booth 1988).

Alongside the understanding of exercise's biological impact, the period also saw the growing importance of epidemiological approaches to understanding the relationship between health and physical activity. Again, although there were earlier uses of biomedical measurement, the post WWII years saw a rapid increase in the determination of epidemiological and statistical fitness norms:

> The developments of fitness test batteries started in the United States after the publication of Kraus in comparing fitness results of American children with European age peers in the 1950s. The relative inability of American youth to meet minimal standards of muscular strength and flexibility, led to the founding of the President's Council on Physical Fitness and Sports (PCPFS) in 1956. Together with the American Alliance for Health. Physical Education. Recreation and Dance (AAHPERD) a Youth Fitness Test was published in 1958.
>
> (Kemper and Van Mechelen 1996 p204).

At the same time Morris *et al.* (1953) demonstrated the difference in cardiovascular disease rates between London bus conductors and their drivers. This 'classic' study presented evidence of the correlation between physical activity and the incidence of cardiac death; the more active conductors were shown to experience lower levels of disease than the less active drivers. As a result, cardiovascular fitness became a key biomarker of all-cause mortality and a foundation of measurement in exercise epidemiology (Hargreaves 2021).

The resultant scientific Exercise highlighted methods for the quantification of physical capability and the development of biostatistical norms in determining health status. And through this the exercise participant became represented in an ontology of a quantified biological self. Consequently, when political calls for scientific reform within social policy emerged during the 1960's Cold War, a paradigm shift occurred in Exercise that drew upon its rapidly growing biomedical epistemology (Berryman 2010, Anderson 2002). From this emerged such organisations as the American College of Sports Medicine (ACSM), the escalation of peer reviewed Exercise journals, and an increasingly techno-

rational approach to both Exercise and P.E. in policy and practice. Thus, it was this period which created the seeds for a biomedical 'Exercise is Medicine' paradigm (Hargreaves 2021, Viru 2017).

Finally, the 1970's saw the "rekindling" of the professional inter-relationship between both exercise and medicine, and Exercise and Medicine (Berryman 1992). Through such phenomena as the Jim Fixx jogging boom, Jane Fonda's aerobics videos, and Arnold Schwarzenegger's 'Pumping Iron' documentary, an explosion in the fitness industry occurred. Simultaneously, within academic Exercise there was a growing integration of the scientific methodology to justify the populist trends. Hence, Exercise began to share a common epistemic focus and language with Medicine. This became evident through the growing inclusion of terms such as exercise prescription, exercise intolerance, and the dose-response relationship of exercise within Exercise literature.

Exercise's 'final return' to Medicine occurred at a meeting on November 5th, 2007, in Washington, D.C. USA (Berryman 2010). Sponsored by the ACSM and the American Medical Association (AMA), this discussion led to the EIM™ health initiative, and work began in earnest to ensure that exercise would become recognised as a "wonder drug" (Berryman 2010 p6). Furthermore, Dr Robert Sallis, then CEO of the ACSM, challenged the domains of Exercise and Medicine to 'reconcile' their differences and stated "it is clear to me that we must begin to merge the fitness industry with the healthcare industry if we are going to improve world health" (Sallis 2009 p4). Thus, as Berryman (2010) concludes:

> Finally, the publication of the ACSM's Exercise is Medicine: A Clinician's Guide to Exercise Prescription in 2009, brings us back to a point where we were hundreds of years ago when prescribing lifestyle modification was a regular and expected duty of one's physician. (p6).

Therefore, Exercise has finally returned to a rightful position in Medicine's and society's consciousness. The conclusion is this was achieved when Exercise, both academically and professionally, adopted Medicine's paradigm.

Similar historical narratives are expressed in the development of related sub-disciplines such as Sports and Exercise physiology (Hargreaves 2021, Buskirk and Tipton 1997) and biomechanics (Wilkerson 1997). The latter of which is suggested as evolving from "the black-box approach – an approach in which the effects were studied with little or no regard

for their underlying causes – to the pursuit of solution and universal truths" (Wilkerson 1997 p350). Therefore, not only was Exercise reconsidered in terms of its medicinal capabilities, but the biomedical paradigm has provided a justification for the scientific legitimation of its conceptual definition, academic research, and practical efficacy (Hargreaves 2021).

Accordingly, the history of Exercise echoes Jewson's (2009) cosmological development of Medicine. From the initial position of a 'bedside' cosmology, Exercise has evolved into a science based on the specialist skills of laboratory and academic researchers. As described in the ACSM's (2022) sixth edition of the *Resources for the Personal Trainer,* the text provides "critical techniques to evaluate a client both in the field and in the laboratory" (pvi). Hence, through the academia of organisations such as the ACSM, Exercise is described in a manner that meets the scientific expectations of biomedical Medicine:

> [the] ACSM promotes and integrates scientific research, education and practical applications of sports medicine and exercise science to maintain and enhance physical performance, fitness, health and quality of life.
>
> (ACSM 2018 p25).

The dominance of biology.

Based on this epistemic description, it is proposed Exercise now echoes the same the biological paradigm as Medicine. By way of example, a Google Scholar search using the Boolean term "the effects of exercise" restricted to publications from 2018 onwards provided 17,800 results. [28] An initial overview of papers sorted by relevance illustrates the primacy of physiology in the understanding of impact and mechanisms. The first three citations were Swift *et al*. (2018) *The effects of exercise and physical activity on weight loss and maintenance,* Andrade *et al*. (2020) *What we already know about the effects of exercise in patients with fibromyalgia: An umbrella review*, and Muscella *et al*. (2020) *The effects of exercise training on lipid metabolism and coronary heart disease.* In total, ten papers were presented on the first search screen, each of which describe the effects of exercise through measurable biological variables. Examining the titles, two contain the term weight loss, two focus on cardiovascular physiology, and two describe markers of

[28] "the effects of exercise" undertaken 21/07/2022.

mood. The remaining titles highlight the previously mentioned fibromyalgia, as well as rheumatoid arthritis, gut permeability, and inflammatory profiles.

This biological reductionism is echoed in Hargreaves' (2021) discussion of Exercise's emerging insights. Taking a historical approach, Hargreaves (2021) demonstrates that Exercise is exploring the same technological, genetic, and personal molecular advancements as Medicine:

> The application of molecular biology techniques and "omics" approaches to questions in exercise biology has opened new lines of investigation to better understand the beneficial effects of exercise and, in so doing, inform the optimization of exercise regimens and the identification of novel therapeutic strategies to enhance health and well-being.
>
> (Hargreaves 2021 p1).

Consequently, it becomes apparent that Exercise increasingly creates its epistemology in terms of biology. Whether that be measurable weight-loss, reduction in cholesterol, or the reduction in pain scales. Ontologically, the exercise participant becomes reducible to physiological factors. Therefore, in seeking *arete*, it is these outcomes that determine the success of the exercise intervention.

It is accepted that this can be challenged for its simplicity. First, a simple literature search does not identify research using qualitative methodologies which are 'traditionally' critical of positivistic, materialistic, and biomedical ontologies. And secondly, there is no isolation of research examining psychological factors such as mood, anxiety, and similar emotive factors (Faulkner and Taylor 2005). In these areas it is recognised there are several academic schools that would argue such factors are not reducible to physicalist variables (e.g., Ronkainen and Nesti 2018).

In considering the first challenge, a Google Scholar search using the same Boolean search term of "the effects of exercise" but with the additional stipulation of '+qualitative' provides 4,770 results. [29] In this instance the top results were Vivodtzev and Taylor's (2021) *Cardiac, autonomic and cardiometabolic impact of exercise training in spinal cord injury: A qualitative review*, Alonso Perez *et al*. (2021) *An up-date of the muscle*

[29] "the effects of exercise" +qualitative undertaken 21/07/2022.

strengthening exercise effectiveness in postmenopausal women with osteoporosis: a qualitative systematic review, and Chen, Gao, and Li (2019) *Effects of exercise training on cardiovascular risk factors in kidney transplant recipients: a systematic review and meta-analysis.* As a result, again the biomedicalization thesis is upheld. To begin, the biological language is apparent, and each demonstrates mechanism, reductionism, and physicalism to isolate a specific physiological variable.

It is also noted the term qualitative in these instances does not represent a method of phenomenology or similar metaphysics. Rather, it is indicative of a presentation style which draws upon a descriptive rather than statistical meta-analysis. In these papers, the term is used to indicate that the review is not presented in mathematical terms. Yet, the literature represents the exercise experience through an ontology of physiological outcomes. Additionally, their data collection maintains an EBP hierarchy of evidence by only including studies which demonstrated the scientific methodology. Therefore, despite the recognition of a qualitative methodology in name, the positivism of the biomedical paradigm is still epistemically dominant.

In considering the challenge of psychology, it is acknowledged there is considerable literature exploring the efficacy of exercise on mental health. Therefore, it would appear logical to assume that such work could contain a methodological shift from positivism to the inclusion of alternative metaphysical considerations. Using a Google Scholar search once more, the terms "the effects of exercise" with the inclusion of '+mental health' provided 11,000 results [30]. However, again, most results are based on scientific methodologies and the use of the RCT as a 'gold standard' in a dualistic ontology (e.g., Smith and Merwin 2021, Arent *et al*. 2020, Rowley *et al*. 2018). Consequently, in line with critiques of alternative Medicine, e.g., the biopsychosocial model, the pattern emerges that the baseline for the exercise/mental health relationship remains a biological physicalism.

Furthermore, there is a growing body of literature examining this relationship through neurobiology, e.g., Forteza *et al*. (2021), Heinze *et al*. (2021), Stubbs and Schuch (2019), Budde and Wegner (2018). Early research on the benefits of exercise for mental health

[30] the effects of exercise" +mental health undertaken 21/07/2022.

proposed both physiological and psychological mechanisms (Peluso and De Andrade2005, Paluska and Schwenk 2000). However, whilst this 'holism' is still implied within some Exercise texts (e.g., Weinberg and Gould 2019, Anshel 2014), there is a growing biomedicalization of this field. For example, Stone (2018) attempted to correlate self-efficacy with the neuro-chemicals dopamine, serotonin, oxytocin, endorphins, and cortisol.

This biological interpretation of cognitive constructs and their relationship to the endocrine system is not novel. Historically, it is the basis of psychiatry (e.g., Menninger 1936). However, recent advances in neuroscience have allowed for the exercise experience to be explored through similar methods. This physicalism is encapsulated by Chan *et al's* (2019) exploration of the neurological effects of exercise which concluded "the importance of neuroplasticity in integrating psychological and neurophysiological theories has been proposed and future investigations incorporating various neuroimaging techniques are warranted" (p118).

This biomedicalization has led to the emergence of a new conceptual methodology in Exercise termed 'neurorecreation' (Pakis 2020). Exploring the neuroscience/recreation relationship, the field utilises the biometric measurement of emotion to explore physical activity experiences. The implication is that, whilst the experience may 'feel' subjective, the biomedical paradigm will allow neuroscience to eventually reduce 'meaning' to a physicalist and mathematical heuristic. And so, "these explanations also theorize that using neuroscientific measures can provide an alternative method of measuring, understanding, designing, and optimizing experiences offered in a recreational context" (Pakis 2020 p1).

Accordingly, the results are the basis of algorithms designed to personalize the experiences in technology such as the previously described smart mirrors and robotic trainers. Consequently, at its roots, the academic Exercise increasingly reflects the biostatistics of Medicine. And its epistemology is based on the dualistic physicalism of biological mechanisms.

Evidence based Exercise.

> Due to our ever-changing understanding of human physiology and the increased presence of exercise science in medical and allied health science fields, the incorporation of evidence-based practice into our discipline is now a necessity.
>
> (Amonette, English and Kraemer 2016 pxi)

Alongside the use of Medicine's research paradigm, there is now the growing academic expectation that professional Exercise will embrace the tenets of EBP and its epistemic process.

For example, Zenko and Ekkekakis (2015) explored trainer's knowledge of the ACSM's guidelines for exercise prescription. The rationale being that EBP guidelines on "the dose of physical activity" (p1422) are fundamental for successful exercise. However, their findings suggested that although professionals regarded their knowledge as sufficient, the data showed they had lower than expected understanding of the official recommendations. Furthermore, it was highlighted that the professionals had limited understanding of such topics as metabolic pathways, physiological ranges, and other markers of biological functioning. This lack of biomedical knowledge was deemed detrimental to praxis as "professionals should be cognizant of the dynamic and continually evolving nature of scientific evidence and, therefore, should seek to update their knowledge by pursuing meaningful continuing education opportunities" (Zenko and Ekkekakis 2015 p1430).

Similarly, Bennie *et al*. (2017a) surveyed over nine thousand Exercise professionals. Their findings suggested that few respondents were users of 'high-quality epistemic sources' and less than 50% of professionals regularly referred to the scientific literature base. Defined as peer-reviewed empirical research in line with EBP hierarchical expectations, Bennie *et al*. (2017a) argued that trainers needed to shift their epistemic base to accommodate such academic sources. Hence, they propose this epistemic shift would "elevate the use of fitness professionals as a service to improve population physical activity adherence [which] has been largely overlooked" (p9). The implication being that Exercise professionals are 'failing' due to a lack of epistemology based on the paradigmatic expectations of academia. Similar concerns have been raised regarding the nutritional advice given by Exercise professionals to clients (Romanchik-Cerpovicz *et al.* 2022, McKean *et al*. 2019, McKean *et al*. 2015). Thus, according to Hargreaves (2021),

the implementation of the biomedical paradigm allows the Exercise profession to undertake the safe prescription of personalised and efficient exercise doses.

As a result of such perspectives there is a growing argument for the inclusion of EBP in Exercise praxis. For example, Amonette *et al*. (2016), Arnold and Schilling (2017), and Armstrong and Kraemer (2016), propose that Exercise practitioners utilize the EBP as their primary paradigm and their interventions should be based on "the gold standard" of scientific evidence. Accordingly, Arnold and Schilling (2017) present chapters entitled "*Clinical (Therapeutic) Trials*" and "*Epidemiological Methods in Sport and Exercise*". And, although Armstrong and Kraemer (2016) state that the notion of 'evidence' may vary from one profession to another, they define this variety as a need for different meta-analyses or individual research studies. As they describe "for example, if a meta-analysis does not exist for a rehabilitation program following suprascapular nerve decompression surgery, individual research studies and case reports must be reviewed to edify the decision." (p10)

More recently, the text: *Advanced Personal Training: Science to Practice* (2022) edited by Hough and Schoenfield promotes the same methodology. Suggested as "essential for fitness instructors, personal trainers, and exercise students" (preface), the book opens with a chapter describing the centrality of EBP. As with previous texts, it argues that professionals need to understand and apply the hierarchy of evidence. Throughout, the implication is that an Exercise professional should be knowledgeable in 'advanced' research skills for interpreting and critiquing academic literature. By way of demonstration, after discussing EBP, Hough and Schoenfield (2022) present systematic literature reviews on key topics in Exercise practice. Their objective being to provide an effective epistemology for praxis based on guidelines from an EBP methodology.

The implementation of academic EBP skills in professional Exercise has been further endorsed by Jolley, *et al.* (2022). Drawing upon findings such as Zenko and Ekkekakis (2015) and Bennie *et al.* (2017a), they delivered a six-week critical skills course. The structure mimicked a 'traditional' academic methods course with modules covering: "argument structure, counter arguments and fallacious arguments, cognitive biases, confidence and expertise, the scientific method, and how to find and identify evidence-

based information" (p46). On completion of the course, it was stated that Exercise professionals had a greater understanding of misconceptions in their knowledge and a better appreciation of scientific EBP. Therefore, Jolley *et al.* (2022) concluded that: "professional development should look to embed the skills of critical thinking" (p51).

This is interpreted as a part of an increasing call for embedding academic research methodology within Exercise praxis. Thus, as with (bio)Medicine, professional effectiveness is defined as a skill of research methods and capability for judgement on the nature of the academic epistemology. As the NASM states: "A new form of exercise may allegedly produce significant results but, if it is not supported by scientific research, it becomes a questionable trend."(McGill and Montel 2017 p8). Therefore, the professional needs the epistemic skills to interpret scientific materials and "EBP is currently the best approach to make decisions related to health, fitness and performance" (Balachandran and Schoenfeld 2022 p17).

In conclusion, according to the academic concept, Exercise praxis begins with an interpretation of expertise based on the methodology of science. And its application attempts to remove the variance in decision-making via EBP. Therefore, in terms of epistemology, Exercise can be summarised as a biological paradigm based on:

1. The belief that academic knowledge is deemed of higher importance and value than expert opinion and experience.
2. The assertion that randomised control trials (RCT) are the most valuable sources of practice knowledge.
3. The belief that, through RCT and academic analysis, practice can be defined through mathematical means.
4. The belief that professional practice can be standardised regardless of context and draw on empirical means for validation.

The academic model of professional knowledge: analysis–diagnosis–prescription.

Finally, within the academic literature, Exercise's biomedicalization is reflected in the models describing the professional epistemology. Built on the demands for an EBP, professional knowledge is consistently presented as a tripartite epistemology reflective of the Aristotelian virtues:

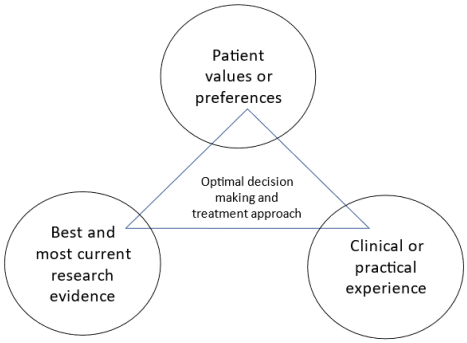

Figure 4

Adapted from Amonette *et al.* (2016) p11

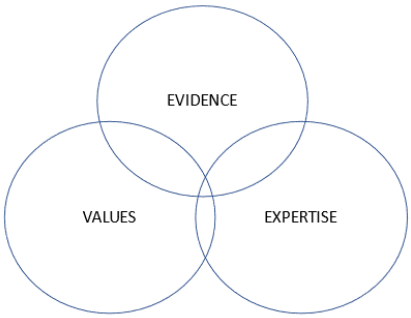

Figure 5

Adapted from Hough and Schoenfeld (2022) p7.

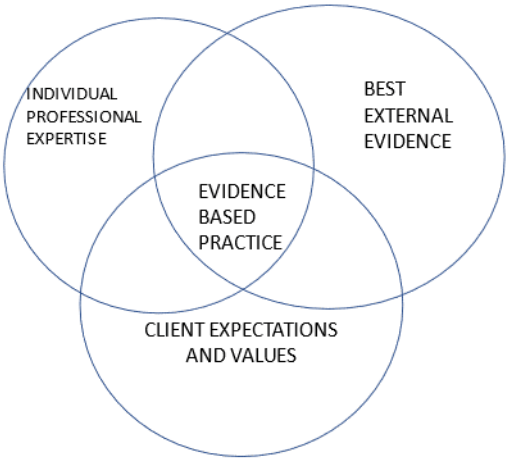

Figure 6

Adapted from NASM (2017) p3.

Each of these models provides a similarity of definition. Firstly, the construct of 'Evidence' refers directly to the EBP epistemological hierarchy and is described as the consideration of scientific evidence. Accordingly, this epistemic demand is expected to be fulfilled through engagement with peer-reviewed journals and similar academic sources. Secondly, the notion of 'Expertise' or 'experience' is described in terms of an epistemic skill. Although this knowledge may appear reflective of the notion of an 'art' in *techne*,

the cited models suggest it is techno-rational in nature. Hence, it is the epistemic ability to recognise the required evidence-base, make appropriate EBP decisions, justify the risk-benefit ratio, and deliver an exercise experience that recognises the client's status. Thus, 'Expertise' is described in terms of the praxis: analysis-diagnosis-prescription. The client is 'expertly' analysed for data to create a 'fitness' diagnosis, and then the exercise evidentially prescribed. Furthermore, this epistemic skill involves the experience to recognise appropriately supported ideas and 'sift' through media trends to find the scientific 'truth'.

Finally, 'Client Values and Expectations' are described in terms of the client's preferences, goals, and objectives. Within the literature this is an ambiguous term. For example, at the end of each their systematic reviews, Hough and Schoenfeld (2022) remind their reader these factors must always be considered. This epistemic category would therefore seem to imply the notion of ethics and *phronesis*. Yet, how this is achieved is not discussed and the epistemic content required to fulfil this element of praxis is not made explicit. However, as will be evident in the later analysis of educational material, it is apparent the concepts of values, goals, and expectations are considered reducible to mathematical variables during the analysis for exercise prescription. And so, the category of 'Client Values and Expectations' appears to indicate the epistemic skill of translating the 'client' into the techno-rational guidelines of the EBP. Therefore, whilst, the ethical values of *phronesis* may be implied the category's title, there appears a maintenance of the axiological scientism inherent in biomedicine.

Thus, in summary the shared foundations of the tripartite model substantiate the E-O-A process. The starting point is described as the epistemology of EBP, and the expertise of the practitioner is defined as understanding the scientific relevant evidence-base for application to the individual client's goals. Furthermore, in line with Medicine, the models of Exercise epistemology illustrate a biomedical praxis of analysis – diagnosis – prescription.

An Aristotelian interpretation

Through an Aristotelian lens this academic paradigm reflects the same emphasis on intellectual virtues as Medicine. The *arete* of the Exercise professional is derived from the ability to utilise an *episteme* of *covering laws* and *statistical generalisations*; the objective being to describe a praxis based on an *episteme* of 'hard evidence'. This then allows an Exercise leader to align the data to a specific intervention (Hough and Schoenfeld 2022). Accordingly, *techne* becomes described in *standards* aligned to a 'laboratory cosmology' following the praxis of analysis-diagnosis-prescription.

It is acknowledged that academic literature suggests professional praxis is an amalgamation of both EBP and experience However, the notion of experience is described in terms of a *techne* for data interpretation and literature reviewing for a given situation. Therefore, the 'advanced' Exercise professional utilises *techne* in the same *standards* as Medicine. That is, biomedical science is the 'prime mover', and experience should be subservient to the conventions of the academic evidence-base (Hough and Schoenfield 2022, Amonette *et al*. 2016). As a result, academia emphasises the biomedical *standards* within practitioner *techne*, as cited in the preface of Hough and Schoenfeld (2022):

> I use sports science to support what I do. Finding out about new research makes me so passionate about my work and allows me to project the importance of physical activity to the public with confidence and, most importantly with hard evidence…We have measured the body composition of my clients using the Bod Pod, which is just one example of how sports science principles that are usually applied with athletes can be used with personal training clients. Using detailed assessments, research, and [the author's academic] expertise has helped me to optimise training programmes that have achieved outstanding results for my clients":

Thus, the *standards* of practice require data analysis, biomedical understanding of the data's interpretation, and the means for translating the data into an exercise programme. In Aristotelian terms this emphasises an expertise through *sophia.*

Again, it is noted that the intellectual virtue of *phronesis* is not made explicit. Therefore, it is proposed ethical decision making follows the biomedical conception of axiology. Specifically, due to an *arete* defined through biological measurement, it appears

deontological in nature. Through the *techne* of hypothetico-deductive *standards*, judgement is based on the outcome of data analysis and the profession's codes of conduct. Hence, although the previously presented epistemic models suggest a unique consideration of client values, the Exercise paradigm translates the encounter into prescribed forms of data, interaction, and intervention.

This academic paradigm of the 'practitioner as scientist' has created an ethical ought in which Exercise professionals should undertake continual engagement with the growing EBP evidence-base (Jolley, *et al.* 2022, Bennie *et al.* 2017a and Zenko and Ekkekakis 2015). And the expectation is that the professional must ethically maintain their engagement with the profession's epistemology. As a result, the *phronimos* is one who continues to obtain, interpret, and utilize the best *episteme* and *techne* for professional action. Once again this highlights the expectations that *phronesis* and ethical praxis are defined in terms of *sophia*. As a result, academic Exercise's axiology demonstrates biomedicine's deontological approach to achieving *arete* through scientism and mechanism.

Summary of academic paradigm

The academic Exercise paradigm is best summarised in the New Yorker headline: *A Pill To Make Exercise Obsolete: what if a drug could give you all the benefits of a workout*?[31] It is perhaps an inevitability that as Exercise integrates molecular and genetic science into its methodologies such pharmaceutical technology would emerge. And as the article concludes, the impact of such a paradigm would mean:

> In the coming years, as research provides us with new ways of understanding and quantifying physical activity, our relationship with exercise will surely change. A morning jog will be reclassified as a good source of beneficial chemicals; sports may be redesigned to optimize their molecular outcomes.

And, beyond the imaginative popular media, research into bioactive compounds which mimic exercise benefits is a rapidly growing field (e.g., ElMelgie 2022, Gubert and

[31] Nicola Twilley, November 6, 2017, issue https://www.newyorker.com/magazine/2017/11/06/a-pill-to-make-exercise-obsolete. Accessed 20/06/2022.

Hannan 2021, Lv, Zhang, and Chen 2021, Fan and Evans 2017, Li and Laher 2017, Li and Laher 2015). Importantly, such ideas demonstrate the current paradigm underpinning academic Exercise. Despite voices 'bemoaning' the reductionism of exercise experiences to a pill, (e.g., Hawley, Joyner and Green 2021, Hargreaves 2021, Loland 2017), it is evident the direction of Exercise's epistemological evolution is biomedical.

In conclusion, the *arete* expressed in academic Exercise is derived from biomedicine. This excellence is achieved through a biomedicalized epistemology. The *telos* of exercise is defined through the activation of biochemical, molecular, and genetic signalling pathways. As a result, the professional is the prescriber of a 'pharmaceutical' created for a specific dose of biological activity calculated from the EBP evidence base. Accordingly, praxis follows the analysis-diagnosis-prescription of (bio)Medicine. In simple terms, academia constructs the exercise experience through a lens of biological physicalism, reductionism, mechanism, and scientism. Therefore, Exercise is Medicine.

Professional Exercise becomes biomedicine.

As Hargreaves (2021) describes, due to advances in molecular biology, Exercise science now echoes the paradigm of personalised Medicine. Exercise can obtain personal biological data and predict the individual's response to exercise based upon their genetic profile. Then, following precision Medicine, its interventions can fulfil Hippocrates' wisdom for everyone to receive their right amount of exercise and nourishment.

However, the challenge arises as to whether the preceding descriptions are sufficient evidence that professionally 'Exercise is Medicine', i.e., if the professional paradigm is an extension of the academic concept. As stated, within related health domains a disconnect has been demonstrated between the academic and the professional paradigms (e.g., Fullagar *et al.* 2019, Bondi *et al*. 2011, Polkinghorne 2004, Benner 2001, Eraut 1994, Schön 1987). Therefore, the possibility of a conceptual distinction between academic and professional Exercise requires investigation, specifically, the question does the professional paradigm exhibit biomedical scientism, mechanism, physicalism, and reductionism?

Critical consideration of the academic conceptualisation of Exercise.

To begin, the assumption that the academic paradigm should directly apply to the professional domain is questionable. First, as cited, there is body of literature arguing for the use of EBP in praxis. But it must be noted these arguments emerge from academic literature not professional materials. The authors are employed in H.E. and similar research organisations hence they are in positions which need to publish and prioritise academic materials. As a result, their epistemic objectives are biased towards the generation of Eikeland's (2008) description of *episteme*. Consequently, research may have limited interest in professional development, i.e., *techne*, as such work is of lesser value for exercises such as the UK university league. Therefore, such materials have the primary objectives of knowing 'that' as opposed to knowing 'how', and texts may emerge in isolation from the practices of professionals. Hence, the limited impact on, or interest for, the Exercise leader's epistemology (Bennie *et al*. 2017a).

Secondly, modern Exercise is a relatively new domain. As a result, the academic 'pretension' to conceptualise Exercise as Medicine may be a case of emerging scholars attempting to gain status within a congested academic world. A similar historical narrative is described in the development of kinesiology as it emerged from what was perceived as the academically limited domain of P.E. during the 1960's (Anderson 2002). It was the creation of a scientific praxis that eventually justified its recognition despite this shift being suggested as problematic for professional implementation (e.g., Lyngstad, *et al*. 2019, McKay *et al.* 1990). Likewise, the biomedicalization of Exercise may reflect the Whiggish aspirations of academics as opposed to practical necessity. As Petersen and de Bere (2006) state:

> "Official histories written by members of the profession itself tend to be stories of continuity and inexorable progress involving great feats and heroic figures. The past is portrayed as leading inevitably to the present. Such histories, like those written by victors of battles tend to confirm the rightness of the present; to show that things could not or should not be otherwise."
>
> (Petersen and de Bere 2006 p112)

Whiggish triumphalism will be discussed in more detail later, but the challenge is that Exercise's claim for its relationship with Medicine may only reflect an academic

perception. Suggesting that Exercise has come to embrace the epistemology of biomedicine may not be accurate in the professional paradigm, consequently, there is a need to explore the concept of Exercise through a professional epistemic lens. As a result, an analysis of Exercise's educational epistemology is presented as the starting point for fulfilling this objective.

Conceptualisation of the Exercise professional paradigm

According to Wilensky's (1964) model, once a profession has become organised its epistemology is under the governance of the official professional bodies. As discussed, this epistemic base is built upon the academic research that explores the praxis. Professional praxis is therefore understood to be the accumulation of professional knowledge for the analysis of a situation and the creation of action.[32] Hence E-O-A. And, in terms of Exercise, the epistemology of biomedicine is evident throughout the academic literature base (Gray 2019). Yet, the question arises as to how influential the academic paradigm is on the education of the Exercise professional and hence the conception of a profession.

In considering the educational materials of Exercise, such epistemic sources could be considered in broad terms. As Jolley *et al*. (2020), Bennie *et al*. (2017), and Zenko and Ekkekakis (2015) state, practitioners obtain epistemic guidance from a range including academic, populist, social media, and anecdotal resources. But, to maintain a focus on the 'official' professional paradigm, the two major sources created by the accrediting organisations will be examined through a thematic mapping process.

First, the major Exercise organisations (e.g., ACSM, NASM, and similar) each produce textbooks. These are intended to teach the paradigm during qualification and function as a source of support once the practitioner is qualified. Second, the lecture materials

[32] It is recognised this raises the challenge that practitioners are pragmatists as opposed to the implied 'ideologues. However, it is argued that the profession is a gatekeeper of epistemology and 'creator' of the accepted professional paradigm. Therefore, the professional organization deems what is relevant pragmatically, i.e., what is the paradigm. This would seem fundamentally an ideological approach to epistemology as opposed to an undoctrinaire pragmatism. The professional may be pragmatic in choosing what to do in a specific situation, but the profession's paradigm dictates the boundaries of epistemic choice. As highlighted in the discussion on Medicine, medical practitioners 'bend the knee' to the biomedical ideology underpinning the ethics and conduct of their profession. Whilst evidence of this is, yet, limited in Exercise (Gray 2019), the argument is made that professionals will be educated to consider the profession's paradigm through its ideology.

delivered on accrediting qualifications are fundamental in presenting the Exercise paradigm to novice practitioners; what is taught in the classroom becomes the idea applied in practice. And, as suggested, for many individuals this may be their first experience of the profession's 'official' paradigm. Thus, course structure and content will determine their professional conceptualisation of Exercise.

Methodologically, each of these mapping projects follows a 'traditional' concept analysis (i.e., Walker and Avant 1983, Rodgers and Knapfl 2000, and Chalmers 2020). However, the method has been modified to acknowledge the challenge of representing the professional paradigm as opposed to a singular term (e.g., Dasso 2019). For that reason, the exploration will use the thematic lens of biomedicine. This involves a deductive approach aligning the educational content to the biomedical themes of scientism, reductionism, physicalism, and mechanism. Additionally, the neo-Aristotelian framework of *episteme* (*covering laws* and *statistical generalisation*), *techne* (*standards*), and *phronesis (ethics/humanistic values)* will be applied to examine the nature of the *arete* of the exercise experience and the practitioner's role. As a result, both mapping projects are intended as structural descriptions of the epistemic base of Exercise and a means for comparison to the biomedical paradigm.

Epistemic mapping 1: professional textbooks

This section is an updated replication of Gray, Smith, and James (2014a). Using an Aristotelian framework, they analysed the content of the ACE (2003), ACSM (2014), REPS (Coulson 2007), NSCA (2012), and NASM (2012) textbooks. This was undertaken based on the observation that due to a lack of regulation for professional accreditation within the UK, any individual could utilize the knowledge in these books and market themselves as a personal trainer. Thus, theoretically, the use of the texts may not only provide support for professional education but also the means of praxis for self-taught individuals.

The methodology they employed was a thematic analysis which equated *episteme* with scientific knowledge, *techne* with technical knowledge, and psychology & motivation with *phronesis*. Using this approach, the subject content of each text was calculated as

percentage of the overall epistemology (see table 1). This analysis then allowed for an interpretation of the emphasis placed on each intellectual virtue in the professional paradigm.

Core Text	% on Technical Knowledge	% on Scientific knowledge	% on Psych and motivation
ACE (Green, 2003)	49	35	15
ACSM (ACSM, 2014)	59	29	12
REPS (COULSON, 2013a and 2013b)	63	33	4
NSCA (Coburn and Malek, 2012)	53	40	7
NASM (Clark et al., 2012)	61	35	4
Mean % of the 5 texts	**53**	**39**	**9**

Table 1 adapted from Gray, Smith, and James (2014a) p42.

As Gray *et al*. (2014a) demonstrated, the findings illustrate an emphasis on a biomedical *episteme* for a mechanical *techne*, i.e., analysis-diagnosis-prescription. An argument that was used for the basis of Gray, Smith, and James (2014b).

Furthermore, Gray *et al*. (2014a) argued that an existential interpretation of Aristotelian *phronesis* is missing from the discussion. Based on a paradigm of biomedicine the inclusion of psychological materials is part of a techno-rational process. Echoing the approach of Medicine, such psychological content allows for the appropriate diagnosis of the client before a technical skill prescription for improvement of capability. Consequently "…scientific data is presented on the recommended number of training sessions, length of time of each session, number of exercises and level of intensity experienced in a particular training modality. Psychologically, skills are [then] presented to allow the trainer to "empower individuals to live a healthy lifestyle" (Gray *et al*. 2014a p43).

Therefore, psychological constructs are conceived in a manner for a successful diagnostic assessment and techno-rational intervention. This approach is encapsulated by Downey (2017) who stated that the role of "behaviour theory" in Exercise was the means to…

> …[identify] key variables, known as constructs, that impact/predict behavioural outcomes… [and therefore] …trainers are advised to familiarize themselves with common frameworks…Understanding each theory enables a trainer, at the initial screening, to identify what constructs are most relevant to a specific client.
>
> (Downey 2017 p25).

Consequently, Gray *et al.* (2014a) demonstrated a biomedicalized professional Exercise. Accordingly, their conclusions suggest experiences of exercise are created through a praxis of client analysis, diagnostic application of the EBP, and the hypothetico-deductive process for prescription.

However, such texts have been updated and, accordingly, this interpretation may be dated. The ACSM's *Resources for the Personal Trainer* is now in its 6th edition (2022), the NASM's *Essentials of Personal Fitness Training* is in a 7th edition (2022), and the NSCA's *Essentials of Personal Training* in a 3rd edition (2022). Furthermore, the 2018 UKActive *Raising the Bar* survey, undertaken by CIMSPA, highlighted actions for upgrading Exercise education. [33] Consequently, recognising possible shifts in epistemology, what follows is a replication of Gray *et al.* (2014a), using the latest editions of available texts.[34].

Updating Gray et al. (2014).

The findings of the new analysis are summarised in table 2 below.[35] The section titles within the full analysis were derived from the ACSM (2022) structure to allow a comparison across the books. Using the same Aristotelian framework of Gray *et al.* (2014a) the epistemic breakdown of intellectual virtues within the latest editions available can be suggested as:

[33] https://www.ukactive.com/wp-content/uploads/2018/09/FFT_Raising_The_Bar_2018.pdf accessed 01/08/2022.
[34] Unfortunately, ACE and Coulson updates were not available at the time of writing.
[35] See appendix 3 for complete analysis.

	Science (episteme)	Technique (techne/craft skills)	Psychology (phronesis: motivation etc. + ethics)
ACSM (2022)	25.9%	53.2%	14.9%
NSCA (2022)	18%	74.8%	7.2%
NASM (2022)	27%	55.8%	9.5%
Mean %	**23.6%**	**61.3%**	**10.5%**

Table 2: summary of intellectual virtues in latest 2022 text editions.

As in Gray *et al.* (2014a), categorical licence was taken to calculate each section. It is conceded that an overlap of content in each intellectual virtue can exist within the text's structure. For example, it was assumed that the main emphasis of chapters concerning exercise programming were the *standards* of *techne*. But it is acknowledged that comments may also be made on psychological, ethical, or *statistical generalisations* to support decision making. However, the defence is made that the totals reflect the overall balance of intellectual virtues within the presented epistemology. The intention is to consider the emphasis of each epistemic element and thus the nature of the paradigm. And, importantly, the 2022 mapping supports the findings of Gray *et al*. (2014a). The emphasis is again placed on a biomedicine of knowing 'how' based on a knowing 'that'.

To begin, it is noted that each of the new editions highlights their growing development of a scientific, medical, and EBP process for the education of Exercise professionals. In the ACSM (2022):

> This edition has expanded on the previous edition in that content was updated with the latest scientific evidence, the functional movement assessments were integrated into the chapter on client fitness assessments, and the chapter on special populations was expanded into two chapters to individually cover apparently, healthy populations across the lifespan and populations with metabolic/cardiovascular disease risks factors.
>
> (ACSM 2022 pv).

Similarly, the NSCA (2022) states that their third edition is "the definitive reference for current and aspiring personal trainers. This comprehensive book continues its legacy to provide the most accurate and reliable information with clear explanations of supporting scientific evidence and practical applications related to personal training." (pvii). Whilst the NASM (2022) suggests "The seventh edition of NASM Essentials of Personal Fitness

Training has been updated with the most current evidence, strategies, and training techniques designed to equip fitness professional with the necessary skills to optimize human potential and performance" (pvi).

As evidenced, each text emphasises an increased scientific content and the implication of EBP for its techno-rational application. This is exemplified in the updated content of the NSCA. In 2012, *techne* was deemed 53% of the text's content, whereas the 2022 edition demonstrates approximately 75%. This is due to expanded sections providing *statistical generalisations* and instructions for an improved fitness testing, and diagnosis. Specifically, there are now twenty-five pages describing tests for normative performance targets in physical variables including such reductionist and specialised exercises as the bench press movement (see NSCA 2022 p245). Thus, the practitioner is provided increased *techne* skills to diagnose fitness testing data and engage with the *episteme* in prescribing exercise for specific disease management: "Multiple fitness testing protocols and norms for each component of fitness are all presented with detailed, yet easy to follow instructions, equipping personal trainers with modern, research-backed applications of client assessment and exercise prescription" (NSCA 2022 pvii). As a result, this observation can be interpreted as further embedding the praxis of analysis-diagnosis-prescription. It promotes a biomedical assessment from which a personal exercise need is diagnosed for an effective prescription.

Interestingly, whilst the ACSM and the NSCA demonstrate little shift in psychological (ethical) content, the NASM appears to have doubled this area from 4% in 2014 to 9.5% in 2022. However, on deeper analysis, it is evident this is a theoretical expansion of the biomedical epistemology as described by Gray *et al*. (2014a). The emphasis is on a *techne* of behavioural techniques to be applied by the trainer. The intention is to "help [clients] with self-regulatory issues to assist in exercise adoption and adherence." (NASM 2022 p85). And hence the client's 'psychology' is considered a 'trainable' component no different to strength or stamina.

The same ontology to psychology is evident in Hough and Schoenfeld's (2022) updated version of Hough and Penn's (2017) *Advanced Personal Training*. Authored by Mendoza and Fundaro (2022) the updated chapter has been re-titled 'Helping clients to change' and opens with the recognition that the 2018 *Raising the Bar* survey identified 74% of Exercise professionals reported they lacked behaviour change skills. The chapter then provides

details of several specific psychological theories and constructs that could be applied to develop this epistemic gap. This includes an expanded section on motivational interviewing (MI) techniques with the rationale that "a range of scientific literature supports the use of [motivational interviewing] in helping clients" (p29). Hence, again, the process reflects a theoretically driven techno-rationalism. And the recommended *techne* for improving psychological engagement follows the biomedical process of analysis-diagnosis-prescription.

Finally, the axiological content of the texts is implied in the same deontological manner as Medicine. Ethical considerations are described through organisational codes of conduct and the epistemic boundaries of the professional role. For example, each text emphasises the boundaries and limits of nutritional and medical advice to which professionals must legally abide. Consequently, axiological judgement is built upon structural legality as opposed to *phronesis* in an Aristotelian *eudaimonic* sense. And the *arete* of the professional is based primarily on the ability to achieve measurable outcomes through role standardised practices. Thus, in each textbook, axiology is encapsulated in an adherence to legal standards and organisational expectations. It is an axiology of *arete* based on *sophia* as opposed to *phronesis*.

In conclusion, the professional textbooks reflect the same epistemic culture as Exercise academia and in (bio)Medicine. Drawing on a biomedical paradigm, professionals are provided with a scientific *episteme* that generates, via EBP, a *techne* of techno-rational skill. Thus, decisions within this practice are deemed appropriate if supported by the evidence-base and if they sit within the deontological guidelines of EBP and the professional organisation. Consequently, within the professional textbooks, Exercise follows the biomedical paradigm of Medicine.

Epistemic mapping 2: qualification course work.

As an on-going project, CIMSPA has been accumulating the demands of all Exercise roles into a professional standards library.[36] Within this database the scope, accreditation, and competencies for roles ranging from assistant swim coaches to gym instructors and through to Tai Chi teachers have been identified. In Wilensky's (1964) terms, CIMPSA can be described as cataloguing the problems that forms of professional have evolved to answer, along with the competencies needed to solve them. Higher Education and organisations such as the ACSM thus have become the gatekeepers of the epistemology for these professions. Consequently, the examination of the epistemic content of vocational courses developed in line with CIMPSA's standards allows for an understanding of the Exercise concept.

Despite the range of Exercise professions available for discussion, a sense of consistency is required. And, as the previous textbook analysis focused on the personal trainer it would seem relevant to consider the education of this same role. As a result, a UK L3 Personal qualification will be explored. All effort has been made to maintain anonymity, however, it must be emphasised, as noted with the term ACSM, this analysis of materials is not intended as a critique of a specific company or course. The intention is to consider the possible dominance of an 'Exercise is Medicine' paradigm on Exercise education. Therefore, as all courses must follow the standards set by Governmental and CIMSPA educational policies, it is taken that the quotations from materials here are a representation of the content available from all Exercise education companies. This concept analysis is not a comment on the quality of the companies, the courses, or professionals, but a proposal as to the nature of the paradigm education is guided by.

The epistemic consideration of the course was undertaken in two parts. First, a breakdown of time spent teaching each element or module of the course. The assumption was that the time spent teaching each topic would illustrate the balance of the intellectual virtues in the presented paradigm. Additionally, the measure of time was undertaken, as opposed to the details on the provided PowerPoint slides as such materials primarily replicate the epistemic content of the previous textbooks. Therefore, time spent on a topic is

[36] https://www.cimspa.co.uk/standards-home/professional-standards-library

demonstrative of what is considered most important for the novice professional to understand and learn. It is considered indicative of the paradigm presented by tutors as opposed to merely the '2-D' description within a textbook.

Secondly, schemes of work, slide content, and pedagogical instructions were read for an understanding of how the paradigm is explained. The intention was to examine the directives given to tutors for content delivery. Importantly, these descriptions are interpreted as indicative of the praxis. They are how the professional praxis is conceptualised into appropriate epistemic forms for explanation during teaching. Thus, it includes the exploration of how students are taught to interact with clients, how to teach exercise, and how to develop appropriate professional environments. Resultantly, it is the way in which the "knowing that" is translated into a "knowing how".

Teaching times.

Adding the compiled schemes of work, the total recommended teaching time for a course was calculated as 11,845 minutes.[37] Using the same Aristotelian framework as per the exploration of textbooks, this is broken down into the following elements summarised in tables 3 and 4:

Subject	Total recommended time (mins)	% of course content
Nutrition	2700	22.8
Programme delivery & design	2225	18.8
Medical conditions	2190	18.5
Professional & business acumen	1930	16.3
Encouraging positive behaviour	1545	13.0
Applied anatomy & physiology	1255	10.6

Table 3: breakdown of course content based on time presented in descending order.

[37] It is acknowledged this is 'classroom' time. Additional reading and 'homework' may be given dependent on course.

Aristotelian interpretation:

	time	% of course
Episteme	5855	49
Techne	4445	38
Phronesis	1545	13

Table 4: Aristotelian interpretation of weighting of intellectual virtues based on teaching times.

Again, it is conceded that licence has been taken in this analysis. These interpretations are based on the details provided in the schemes of work provided to tutors. It would be naïve to suggest other topics, anecdotal experiences, and ethical issues beyond the prescribed information would not be discussed within the learning experience: tutors bring the topic to life.

Yet, as stated in guidance provided for teachers of L3 courses, the given materials are "the content/syllabus that **must be covered** during delivery" [emphasis added] and the content of resources "should not be amended" as any alteration may mean the materials may limit students in meeting professional standards. Although, experienced tutors would no doubt expand and discuss their own practices, the directive is that the materials provided are deemed the necessary and sufficient elements to conceptualise Exercise. Thus, any deviation should not be in terms of the epistemological content, only in the style of delivery. The content is deemed to fulfil the prescribed needs of the role and aligned to the standards required for the professional status.

Again, the thematic categorisation of *phronesis* was derived from assumed existential content in topic areas such as psychology. Once more this weakness is recognised. It is a speculative interpretation of *phronesis* and does not align to an Aristotelian sense of the term. Rather it is interpreted through the idea that *phronesis* could be conceived of as a judgement of ethical means to achieve the *arete* of the exercise experience. This limitation arises because in both textbook and tutor pack as there is no explicit consideration of such issues. Yet, it is assumed that throughout there is a sense of morality within the course. However, once more this must be implied through the skill of the tutor as opposed to a significant volume of specific materials.

Despite possible methodological limitations, in brief, it is evident that most time is spent developing the professional's 'knowing that' of *sophia*. There is limited explicit exploration of the ethics of practice. Structurally, the epistemology of the qualifications reflects the professional organisation's textbooks. The balance of intellectual virtue is weighted in favour of *episteme.* As will be argued below, this is due to the demands for EBP and the consideration of a techno-rational praxis. Interestingly, it appears that the opportunities to use time to expand on the elements of *phronesis* that cannot be captured in the '2D' descriptions of textbooks are not explicitly taken. Therefore, the balance of the course materials appears to focus on the teaching of *causal laws* and *statistical generalisations.*

Content for praxis.

The second analysis began with the reading of teaching materials. The immediate observation was that lecture content presents the same epistemology as the textbooks. For example, the *causal laws* of exercise's impact on physiology, *statistical generalisations* of patterns of exercise for specific objectives, and descriptions of movement techniques for *techne*. As a result, there appears no difference between the academic research, the professional textbook, and qualification content. This is an expected observation. As stated, the courses and the professional organisations highlight their relationship; the latter write the former.

However, praxis is more than merely a 'memory test' of *sophia*. There is a need to consider how students are introduced to the process of collaborating with clients. That is, what are the *standards* of *techne,* and form of *phronesis* explained as underpinning the creation of an exercise experience for the client? To understand this, the following materials were considered illustrative of the professional paradigm:

1. The forms provided for structuring client interveiws and teaching materials which provided for the collection of information during the initial client consultation. These documents demonstrate how the professional is taught to understand the client and their needs. For example, the data described on the form as needed for collection during the intake session would indicate what

is deemed most important for defining the client and the *telos* of the exercise experience. Thus, they are the basis of an ontology of exercise client.

2. The lectures and additional information for programme design, session planning, and the delivery of personal training. These materials teach students how the information from the intake session is translated into an exercise experience. Specifically, they demonstrate the epistemology through which the professional is taught to create each exercise session and the overall programme for the client.

These elements are presented purposefully in order. As described in student's course handbooks, the professional encounter begins with an intake interview from which exercise requirements are recognised. The individual's programme is then created based on this information.

Client assessment

From an analysis of materials used to teach client assessment, it can be proposed that the objective is to quantify the individual in terms of biomedical information. Whilst courses contain discussion of such skills as verbal and non-verbal communication, open versus closed questioning, motivational interviewing, and similar techniques, the aim is to complete a structured table of data. Hence, the process begins with a quantified description of the client's physique along with the expectation that other assessments including fitness testing are undertaken. An analysis of the language of the learning outcomes and descriptions of the expected skills provided to tutors highlights the following observations:

1. the use of the terms 'validated, 'appropriate', and 'recognised protocol' are interpreted as indicating the primacy of an EBP evidence-base.

2. the use of the term 'meaningful data' is interpreted as data that fits not only the client's goals, but also allows scientific analysis and comparison to normative *statistical generalisations*. As will be described below, the data needs to allow for a diagnosis of specific variables. And not only physical variables such as strength and stamina but often psychological considerations such as stages of behavioural change.

3. the descriptions of the Exercise professional's tasks utilise such terms as 'measurement' and 'calculations' and hence are indicative of a quantified ontology.

4. the inclusion of medical screening, health screening, and recognition of medical professionals is fundamental for health and safety but illustrates the medical emphasis of the knowledge required by students in the assessment process.

In terms of the *arete* of praxis, what becomes evident is the need for the professional to demonstrate their epistemic capability as a biomedical 'scientist'. For example, leaning outcomes describe how the professional should be able to select the right methods for meaningful measurement, valid and reliable collection, and calculation of data. Thus, within *techne*, they must be skilled in the 'experimental procedure' for the application of psychological and physical testing alongside demonstrating skills of data and statistical analysis.

Furthermore, *techne* is not only focused on the interpretation of data for the measurement of physical fitness and capability. The professional needs to be able to assign the client to a particular stage of motivation, usually in the form of Prochaska and DiClemente's *Transtheoretical Model of Behaviour Change,* and recognise issues of self-efficacy evidenced through the client's participation barriers and motivators. Thus, the personal trainer is expected to be able to make 'qualitative' psychological assessment and diagnosis.

As a result, there is a correlation between Exercise's paradigm and Medicine's laboratory cosmology. As described, physicians must demonstrate familiarity not only with signs, symptoms, and medicine, but also the necessary laboratory facilities for diagnosis. Similarly, the Exercise professional's epistemology must allow them to be able to deduce not only an appropriate exercise experience but also the validated testing protocols which align to the client's symptoms. Consequently, processes of client interview and assessment are based on techno-rational biomedicine: analysis-diagnosis-prescription. As a result, the Exercise professional employs an *episteme* expressed in terms of biostatistical data through a *techne* that shows the skills of biomedical interventionist and scientific academic.

Creating an exercise intervention.

Upon completion of the first client assessment, the trainer is taught to interpret the data for the creation of a personalised programme. This involves lectures on programme design, exercise selection, and session planning. For these sessions, again in reading the language of learning outcomes and expected skills, the following elements emerge as indicative of the paradigm:

1. The notion of client goals, aims, and needs are ascertained via the fitness and psychological assessments previously undertaken. Consequently, the exercise experience needs to align to the interpretation of the data. As with medical interventions, the exercise movements prescribed must line up with the 'symptoms' of the client.

2. The exercise interventions draw upon an ontology of quantification and reductionism. That is, each element of physical capability, e.g., strength, stamina, and speed, need to be considered in isolation. Specific exercise modalities can then be applied to target that variable.

3. The Exercise professional gives primacy to the EBP guidelines. For example, materials for teaching programme design present details for an evidential and standardised prescription based on client goals and previously measured biostatistics.

4. The Exercise professional is expected to utilise the EBP allow for continual assessment and modifications based on changes in personal variables. This involves the regression or progression of a specific movement, and/or the use of periodisation theory for long-term adaptation via the scientific guidelines.

5. Finally, the outcomes for teaching exercise sessions are indicative of an expectation of both physiological and biomechanical norms. Thus, each movement has an idealised, optimal technique. If the client is at first unable to meet the ideal, their movements are modified until can do so. This is evidenced by the pedagogical instructions provided to tutors for the delivery of practical sessions. The tutor demonstrates 'optimal technique' and teaches the 'correct' coaching points. The students memorise this idealised movement and set of instructions for exercise activity, and, in practice, teach the client how to replicate the specified biomechanical actions.

These observations again support the argument that professional Exercise replicates Medicine's biostatistical and techno-rational paradigm. Data derived from prior assessment and testing is converted into prescriptions of intervention. Thus, the client receives the description of an idealised activity. Reminiscent of pharmaceutical intervention, the exercise experience targets the diagnosed deficiency through a mathematical prescription of sets, reps, duration, and similar quantifiable dosages derived from the EBP evidence base. And, ultimately, the client gets their required dose of exercise.

A critical comment on the proposed professional Exercise concept.

The preceding analysis could be challenged as an overly simplistic caricature of the Exercise educational experience. It has been a purposeful interpretation of materials at face value. As conceded, it would be naïve to suggest tutors do not develop axiological discussion, draw upon anecdote, and courses do not encourage teaching in a pragmatic 'this is how to do it in my gym' manner. Therefore, it could be dismissed as demonstrating the very type of imaginative armchair rumination for which philosophy is often accused.

However, in defence of this stark biomedical interpretation, the shift to an increasing number of online educational courses in the UK qualification process must be acknowledged. This is particularly evident within L2 gym instructor and L3 personal trainer (PT) courses which provide the foundation of the Exercise profession. For example, a search of the employment site reed.co.uk using the phrase "personal trainer", with both "online/distance learning" and "regulated" filters, states that there are "219 Online Personal trainer Regulated qualification courses" on offer.[38] Furthermore, a Google search illustrates that many companies commonly offer the L3 PT diploma via online learning, including practical examination, in anywhere from 4-12 weeks. Therefore, this appears to be an indication of a growing trend within Exercise education for online and hybrid delivery. Thus, a personal trainer can be qualified from novice to professional status within perhaps a month, no starting experience necessary.

[38] Search of reed.co.uk courses https://www.reed.co.uk/courses/personal-trainer/online/regulated accessed 12/08/2023.

Recognising this phenomenon, it becomes difficult to suggest any significant time is utilized to explore epistemic foundations, ontological considerations, and axiological demands beyond those presented by textbook or educational provider. Consequently, the 'armchair' nature of this discussion is conceded, however, it can be suggested that the growing trend of online delivery means the armchair is where many Exercise professionals are now educated.

Summary of professional paradigm.

In summary the proposition is that professional Exercise is a replication of a paradigm based on biomedicine's scientism, mechanism, and reductionism. Furthermore, both textbook and course epistemology emphasise an *arete* of *sophia* above the notion of *phronesis*. It is acknowledged that debate could be held concerning whether Exercise reflects the same physicalism as (bio)Medicine. There is an explicit recognition of psychological factors in the analysed materials. However, as described, there is a significant difference in the volume of content between the biological and the psychological information. Thus, the notion of an emphasis on achieving physical *arete* through the exercise experience can be defended. Correspondingly, the Exercise *phronimos* is defined as one who can safely and effectively apply the scientific evidence base to meet the biological needs and objectives of the client.

By way of example, this paradigm has led to the emergence of an accredited set of Exercise professionals in South Africa termed 'biokineticists' (Ellapen *et al*. 2017, Strydom *et al*. 2009). This role has been defined by Health Professions Council of South Africa (HPCSA), as professionals who are accredited to use EBP derived 'biokinetics' (therapeutic exercise) in both pathogenic and fortogenic contexts (Strydom *et al*. 2009). In this instance pathogenic is defined as managing an existing disease, whilst fortogenic refers to the concept of exercise as a preventative or pre-habilitative medicine. Therefore, the biokineticist has evolved as a personal trainer focused solely within a paradigm of Medicine to deliver individualised and personalised therapeutic exercise (Ellapen *et al.* (2017). Similarly conceptualised Exercise professionals are recognised in the US by the ACSM in such roles as Certified Clinical Physiologists, Certified Cancer Exercise Trainers, and Certified Inclusive Fitness Trainers (ACSM 2022). Whilst in the UK, work is being undertaken to develop similar allied health professional (Jones *et al*. 2021) alongside the on-going accreditation of GP referral specialists by CIMSPA and REPS.

Accordingly, (biomedical) Exercise professionals are seen as a key role in the development and delivery of health and wellbeing related agendas.

How Exercise is conceptualised for the professional.

Drawing together the analysis of both the academic and professional concepts it becomes evident Exercise is described in terms of (bio)Medicine. Consequently, using the framework of professional knowledge E-O-A the following interpretation of the paradigm can be made.

Epistemologically.

Medicine is described as an epistemic culture of EBP in which RCTs and meta-analyses are deemed the primary sources for developing *episteme*, *techne,* and the ethics of practice. And, although alternative labels such as personalised, genomic, and similar have emerged, the underpinning epistemic *arete* is biomedical *sophia* based on reductionism, physicalism, mechanism, and scientism (e.g., see Jureidini and McHenry 2022 and 2020, Thompson and Upshur 2018).

These same epistemic foundations are evident in Exercise. To begin, the professional is expected to be cognisant of an epistemology based on EBP (Hough and Schoenfeld 2022, Amonette *et al*. 2016). Additionally, they must, be able to interpret and critique this scientific evidence-base for praxis (Bennie *et al*. 2017 and Zenko and Ekkekakis 2015). Consequently, in professional education, learning objectives are explicit in the demand for academic, validated, and evidence-based decision-making. Furthermore, the on-going development of Exercise epistemology reflects the same biological considerations demonstrated in Medicine. Thus, the professional evidence-base illustrates a growing dominance of a *techne* based on EBP norms, biostatistics, derived from a biological *episteme* within its textbooks and course materials. Consequently, *phronesis,* with the metaphysical objective of *eudaimonia,* is disregarded as an appropriate intellectual virtue for academia or educational consideration.

Ontologically

The consequences of this epistemic process have led to an ontology of biological physicalism. As described, the initial stages of the exercise experience require the client to be reduced to a set of biostatistical variables. For example, the body becomes quantified

in terms of cardiovascular function, muscular strength, muscular endurance, and other individualised components. Similarly, movement patterns are refined through biomechanics for idealised foot placements, planes of knee motion other measurable patterns. Thus, through a diagnostic ontology of idealism, the client can be visualised as a deviation from the norms presented in the *episteme*.

Furthermore, the client's phenomenology is likewise decoded into a techno-rational experience. Accordingly, client inspirations and hopes are converted through processes such as SMART goalsetting into a quantified functional form. This allows ambiguous metaphysical terminology to be translated into positivistic outcomes. For example, aspirations such as 'wanting to be fit' or 'to feel good about myself' are described in the biostatistics of weight loss, speed of movement, body mass index or other variables which can be assessed and monitored (ACSM 2022, NASM 2022, NSCA 2022). This ontology then allows for a personalised, standardised, and evidential exercise intervention via the EBP evidence-base.

Axiologically

As stated, the term axiology is used to symbolize the integration of epistemology and ontology in praxis. Additionally, it represents the ethical decisions relating to both the *telos* and *arete* of an intervention. Hence, within a biomedical paradigm the *telos* is to improve biological functioning, whilst *arete* is considered the excellence of the patient's physical performance. Thus, in praxis, there is limited need to examine metaphysics beyond understanding the techno-rational instructions derived from the epistemology. Ethical decision making is based on adherence to the EBP and professional guidelines. Resultantly, the *arete* of the professional is measured in terms of their ability to achieve the biological objectives within a deontological application of EBP guidelines.

In considering the axiology of Exercise, it is evident the same biomedical perspective is observable. Through the developing epistemic base of *sophia*, the explanatory advantage of a scientific EBP negates the need for alternate metaphysical consideration in Exercise's *arete*. Accordingly, such objectives are unnecessary in the *telos* of the exercise experience. Exercise professionals, therefore, are not required to consider metaphysical concerns beyond those of physicalism or the deontological application of ethical codes of conduct

and legal policies. As the ACSM (2022) describes, whilst all physical activity has *"inherent risk of injury and death…[Exercise professionals] can minimize risk by obtaining proper qualifications; using appropriate client screening tools; and providing proper instruction, supervision, equipment and documentation…*"(p590).

Consequently, the Exercise professional is expected to adhere to the paradigm's published standards to avoid legal liability exposure. As a result, the Exercise professional can demonstrate *arete* and justify their praxis without axiological recourse to non-empirical or metaphysical considerations.

Conclusion to Stage 1.

In conclusion to the first stage of conceptual analysis: exercise is medicine and Exercise is Medicine. Specifically, professional Exercise is a concept that echoes the scientism, physicalism, mechanism, and reductionism of Medicine. Therefore, the 'Exercise is Medicine' paradigm can be described through a rewording of Williams' (2003) four elements of biomedicine:

> *Fitness and health are defined as deviations from a statistical norm and measurable level of biological functioning*.
> As demonstrated in the process of client assessments and introductions, Exercise uses diagnostic procedures to understand deviation from performative norms. Fitness is defined as a relationship to a statistical norm and measurable level of biological functioning. The goal of the Exercise professional is to design and prescribe an exercise intervention to achieve a mathematically derived normal parameter in each biological unit of fitness.
>
> *The components of fitness and health can be defined as specific and individual 'entities'*.
> In the marking criteria provided by educational organisations, professionals are expected to analyse participant data and recognise the functioning of specific fitness variables, e.g., strength, stamina, weight, etc. Additionally, the epistemology creates an EBP for specific physiological, biomechanical, and anatomical features. For example, training for muscular strength versus muscular endurance, or the isolation of the biceps brachii from the triceps brachii. Furthermore, specific exercise protocols for different issues such as diabetes, hypertension, and similar conditions are presented. The objective is for each fitness entity to have an EBP validated exercise protocol available.
>
> *Exercise is a neutral science*.
>
> It is conceded that client goals and values are described as important. However, the evidence-base follows the same epistemic culture as biomedicine. Thus, it demonstrates a positivistic epistemology that defines the *telos* of an activity in terms of physicalism. Accordingly, its methods are objective and mathematical, and limited in terms of exploring metaphysical mechanisms. As a result, whilst Exercise does mention a sense of existential individualism, such considerations are secondary

to the biological *telos* (Hargreaves 2021). Consequently, as demonstrated in the balance of intellectual virtues, and in the demand for a techno-rational *techne,* the *arete* of praxis is based on a hypothetico-deductive science. The Exercise professional is therefore the neutral arbiter of a practical science.

The 'ontological' foundation of Exercise is a mind-body dualism.
Biomedicine is a paradigm in which the body and mind can be understood independently. Furthermore, the body is ontologically described as "something physicians [can] observe, manipulate, transform and improve." (Freund *et. al*. 2003 p221). This is the foundation of Exercise. In terms of dualism, the isolation of both physical and psychological variables is evident. Furthermore, Exercise takes the perspective that the psychological factors demonstrate the same 'trainability' as physical components. Professionals are presented with techniques to measure and transform such concepts as motivation and self-efficacy. However, in line with mind-body dualism, these interventions are determined independently, thus the manipulation and improvement of the physical requires a different intervention to the psychological.

As a result, the Exercise paradigm is summed in the praxis of analysis-diagnosis-prescription. Importantly, this biomedical paradigm is becoming further embedded into the professional Exercise concept. For example, Medicine's increasing use of technology through AI, genomics, and similar inventions, is now mimicked in Exercise's development of robotics, wearable self-tracking gear, and other AI fitness kit. It becomes evident that Exercise is Medicine not only in terms of research methodology and language, but also teleological prediction for future avenues of intervention. Thus, it appears that the current 'Exercise is Medicine' concept is embraced by academics, Exercise organisations, and professional education alike. A position which is encapsulated within a 2020 UKActive blog by Professor Greg Whyte OBE, UKActive Scientific Advisory Board member, and a leading figure in UK Exercise Science:

"*Exercise is the wonder drug – I could not agree more with this statement*".[39]

[39]www.ukactive.com/blog/exercise-the-wonder-drug/ accessed 08/09/20.

In accordance with conceptual analysis, the exemplar Exercise concept has been proposed as ‘Exercise is Medicine’, hence:

1. The underpinning epistemology of Exercise is a reproduction of the biomedical concept of Medicine.
2. The Exercise ontology describes the exercise experience in dualistic, materialist, and biological reductionist terms.
3. There is an axiology of justifying professional action through evidence-based epistemology (EBP).
4. The teaching of Exercise professionals is within an axiology of mechanistic processes required for a biological outcome.
5. The balance of intellectual virtue for *arete* demonstrates a dominance of *episteme* (*causal laws* and *statistical generalisations*) and *techne* (*standards*).
6. Ethical considerations beyond deontological *techne standards* for the application of *episteme* are not made explicit.
7. Both the *telos* and *arete* of the Exercise professional are represented within biomedical markers of success.

‘Traditionally’ the second stage of conceptual analysis would propose exceptions and alternative definitions to this previous exemplar. But here the re-engineering of professional Exercise requires a modification of method. Rather than descriptive alternatives, the intention is to consider the practical consequences of the exemplar concept (Chalmers 2020). Consequently, what follows is an adaptation of Chalmer’s re-engineering’s implementation stage.

To begin, consideration is given to previous sociological critiques of biomedicalisation and the ‘Exercise is Medicine’ concept. However, the argument is made that such research fails to appreciate the issues of professional Exercise praxis. And although sociological critiques provide support for debate, there is a need for a philosophical exploration of praxis. Therefore, drawing upon the philosophy of Medicine, a challenge to ‘Exercise is

Medicine' through the notion of iatrogenic exercise experiences will be presented. [40] The discussion will begin with the consideration that Exercise epistemology is dominated by an iatrogenic perspective of Gnostic scientism. This is followed by a demonstration that Exercise is a paradigm that ontologically reflects Leder's (1992) dead body thesis. Finally, it is argued that through its epistemic and ontological foundations, professional Exercise now exhibits an axiology derivative of Fromm's (1973) necrophilia. And thus, thanatological *sophia* has sovereignty over existential *phronesis* in praxis. Resultantly exercise has lost its *eudaimonic* potential.

A brief note on limitations.

As stated, the intention is not to dismiss science but to explore the intellectual virtues in professional practice. There is no intention here to throw the baby out with the bathwater. Yet the question arises: is the current paradigm the most effective and appropriate epistemological path of professional evolution? The goal here is to challenge the accepted epistemic narrative of 'Exercise is Medicine', and that biological science is the best possible *arete* of the paradigm. In particular, there is the consideration of the problems that scientism may bring. Furthermore, it is acknowledged that to suggest a linear causation between Gnosticism, scientism, necrophilia, and iatrogenesis is simplistically naïve. Such a proposition would require a tortuous manipulation of cognition and complex jumps of imaginative rumination. However, there are clear relationships between these concepts that will be highlighted as artefacts of the biomedical paradigm embraced by the 'Exercise is Medicine' concept.

It is also recognised that the use of the term 'Exercise is Medicine' is not universally intended as a paradigmatic synonym. As Malcolm and Pullen (2017) state, there are arguments in which 'Exercise is Medicine' is suggested as a metaphorical conception as opposed to a description for praxis; a useful marketing tool to encourage participation. However, in a similar fashion to this thesis, they argue that the enthusiasm and hyperbole with which Exercise academics and organisations present this concept would "suggest that a more literal meaning is intended" (Malcolm and Pullen 2017 p50.). Hence, paraphrasing Nietzsche, it would therefore be foolish to not challenge our concepts, especially those

[40] I use the term iatrogenic throughout as a shorthand for 'iatrogenic illness or injury'. Hence, the term 'iatrogenic exercise' is used to denote injurious or dangerous experiences, and similarly an 'iatrogenic epistemology' would be knowledge that leads to injurious or dangerous outcomes, and so on.

which are inherited from scholars for professionals to apply to people's health and wellbeing.

Sociological critique of Exercise is Medicine

As described, a critique of the 'Exercise is Medicine' concept is not original. There are works which have challenged the socio-political philosophy of the ACSM's EIM™ project. For example, its neo-liberalistic foundations have been questioned by Cairney, McGannon and Atkinson (2018), Pullen and Malcom (2018), Malcolm and Pullen (2017), Williams and Gibson (2018), and Williams *et al.* (2018), Neville (2013), Sassatelli (2010) and Smith-Maguire (2008). And, taken in totality, this literature demonstrates the socio-political shifts through which exercise and health have become equated with standards of hegemony, normativity, and economic consumption. Consequently, such challenges focus on assumptions underpinning societal medicalization and the growing power of Medicine to control social structures through 'biological policy' (e.g., Wemrell *et al.* 2016, Conrad 1992, Foucault 1973).

Correspondingly, the existence of a growing biomedicalized Exercise is demonstrated. For example, the basic assumption underpinning social policy is the linear axiom that 'doing exercise = increased fitness = greater health' (Wrench and Garrett 2008). And this is suggested as leading to a neo-liberal position in which a lack of exercise is "an individual failing" (Cairney *et al*. 2018 p392). Therefore, illness is primarily caused by the individual not taking responsibility for their own health. This will be returned to later through the ethical concept of *kalokagathia*. However, it is important to note, this political position is reflected in professional praxis. The professional is taught to assess an individual's motivational level, and then apply strategies to 'fix' their motivation (Gavin 2018). Exercise psychology is conceived of in terms of personal agency and responsibility. As a result, Cairney *et al.'*s (2018) critique that much in Exercise is presented as a quick fix for an individual's agency is evident within professional training.

Furthermore, both Malcolm and Pullen (2017) and Cairney *et al*. (2018) critique the assumption that exercise participation is good for everyone. Both these 'academic teams' highlight that exercise is fundamentally, if not dogmatically, believed to be "benign, if not essentially beneficial" regardless of who, when, or where" (Malcolm and Pullen 2017 p50).

Consequently, it is demonstrated that these expectations of medicalised Exercise create the belief that an individual should be an exerciser regardless of context, even whilst in the workplace. For example, through technology such as 'desk treadmills', employees are encouraged to undertake physical activity during working hours (Cairney *et al.* 2017). The conviction is that more is better, and the moral individual can never do enough to improve their levels of physical activity. Again, these points are expanded upon later as the root cause of iatrogenic exercise.

For Neville (2013) the interactions between Medicine and Exercise are ineffective due to incommensurability between key concepts in the two domains, e.g., the body, exercise, and fitness. As a result, they argue that "equating exercise with medicine is to equate it with a definition of and relation to the body to which it is not entirely akin" (Neville 2013 p1). Additionally, Malcolm and Pullen (2017) point out similar issues. For example, Medicine is only available through licensed products and professionals, and both of these sources provide guidance on side effects and dosage. However, as Malcolm and Pullen (2017) argue, this creates three unresolvable issues for an 'Exercise is Medicine' science: "dosage, side effects, and prognosis" (p51). First, positivistic methodology cannot account for the dynamic nature of the exercise experience. Second, within Exercise research, dosages can only be statistical means. And, additionally, there is no opportunity for control measures. Hence, Exercise science can never meet the prognostic standards of Medicine's RCTs and EBP. It can only ever remain inductive and epidemiological as opposed to truly deductive and positivistic.

Moreover, Malcolm and Pullen (2017) illustrate that during a pharmaceutical intervention, the patient is eventually expected to reduce the medicine as health improves. Yet, the Exercise 'pill' is contrary to this strategy: [if] "exercise is medicine, the healthier you are the more medication you need…[so therefore]…Exercise cannot be a miracle cure because it isn't actually a cure" (p51). The conclusion is that paradigmatically Exercise cannot replicate Medicine and so there are unique concerns in developing an evidence-base to support effective Exercise praxis. In simple terms, implementing a cardiac rehabilitation Zumba™ class is a different process to prescribing a course of statins.

Alongside methodological issues, research demonstrates failings in practice. Specifically, whilst Exercise presents a depth of biological *episteme* for the management of fitness,

there is limited acknowledgement of inequities beyond physicalism for those such as the disabled, movement impaired, and aged (Williams *et al*. 2018).

> Taken together, exercise as medicine or therapy for already marginalized populations can increase health inequity, remind members of their disadvantaged state, induce guilt for their position and strip movement of other meanings that could be enjoyable, pleasurable or otherwise positive.
>
> (Clarke and Adamson 2021 p4)

Subsequently, sociological literature highlights a biomedical Exercise paradigm creating harmful inequities through a politics of compulsory able-bodiedness, self-determination, and expectations of independence. Thus, it may cause 'shame' in a lack of capability compounded by an individual's social characteristics (Clarke and Adamson 2021, Cairney *et al*. 2018, Williams *et al.* 2018). As a result, sociologists argue Exercise needs to question its paradigm.

> There is no room for blind advocacy in the complex world of chronic illness and injury, where pain and disability can interrupt the [Exercise is Medicine] rally cry. If exercise is indeed medicine, there is a case for academics, interventionists and health professionals to reflect on how we might begin to promote and prescribe it in an ethical way.
>
> (Williams *et al*. 2018 p452)

Need for metaphysics not sociology.

There is no debate the challenges raised by sociology are of concern to the Exercise professional. Taken together, the literature underscores the philosophical issues that arise from a biomedical conception of Exercise. Specifically, the questions of physicalism, and the pragmatic and epistemic problems which emerge from Exercise echoing the science of Medicine are reinforced within such literature.

But it must be highlighted that the inclusion of Williams *et al*. (2018) at the end of the section was purposeful. Specifically, the point that health professionals (interpreted to include Exercise) need to "promote and prescribe [exercise] in an ethical way" (p452). Although reasonable, such 'demands' for equity prove problematic in that no means for

doing so are described. Williams *et al*.'s (2018) conclusion only represents a 'knowing that', no example for 'knowing how' is provided.

This observation is evident in the preponderance of Exercise sociology. Such research empirically describes the dilemma but then omits a solution. What "ethical way" does Williams *et al.* (2018) refer to? Similarly, Clarke and Adamson (2021) state that their work is not an explanation of intervention but a call for further exploration. Likewise, Cairney *et al.* (2018) state, "We hope that these articles spark further interest and research on EIM" (p398). Yet, despite four years between Cairney *et al*.'s (2018) call for action and Clarke and Adamson's (2021) proposed "new thread" of research, it appears Exercise sociology creates description not direction for action. Thus, again, it can be argued these critiques highlight 'holes' in Exercise's knowing 'that' but fail to provide meaningful knowing 'how'.

Consequently, there is a need for a metaphysical understanding of praxis not further sociological description of a problem. Furthermore, whilst the conclusions from previous literature are relevant, the objective here is to provide a more original debate. Importantly, the goal is to maintain a focus on professional epistemology and its praxis. These are missing elements from the previous sociological explorations. Therefore, the intention is to provide an original philosophical consideration of the impact of the 'Exercise is Medicine' concept. To do so, the following is proposition is offered:

> Biomedical scientism has led to the creation of the iatrogenic exercise experience through the emergence of Gnosticism and a necrophilia in the paradigm of Exercise.

The problem of scientism and iatrogenic illness in praxis.

Illich begins his influential *Medical Nemesis* (1975) with the declaration: "The medical establishment has become a major threat to health" (p11). Whilst stark, this proclamation encapsulates the fact that, despite positives, there has been considerable discontent with Medicine and its biomedical paradigm. To Illich, amongst others, the major issue has been the increasing incidence of iatrogenic illnesses throughout the 20th and into the 21st CE (Stegenga 2018b). Defined as ill-health caused by Medicine, they are considered a

major ‘side-effect’ of (bio)Medicine and include “harm associated with contraindicated and substandard care as well as physician and nursing error” (Sharpe and Faden 1998 p2).

By way of evidence, Le Fanu (2018) states that there are now four times the prescription of drugs for diabetes, seven times the number of prescribed hypertensives, whilst statins are prescribed twenty times more than 2 decades ago. The result has been…

> A hidden epidemic of immiserating symptoms such as fatigue, muscular aches and pains, insomnia, and general decrepitude, a 75% rise in emergency admissions to hospital for adverse drug reactions (an additional 30,000 a year), and almost certainly a contributory factor to the recently noted decline in life expectancy (an additional 600 deaths a week).
>
> (Le Fanu 2018 p1)

In view of such evidence, it is stated that Medicine causes as much ill-health as it solves and has demonstrated little capability in reducing disease and increasing wellbeing. Recently, these arguments have led to a growing Medical nihilism in which there are those who deny the claims of any genuine success in the field (Broadbent 2019, Stegenga 2018b). Hence, “we should have little confidence in the effectiveness of medical interventions” (Stegenga 2018b p167).

Several avenues could be explored to explain this position, e.g., political, sociological, economical, or societal. However, within much of the literature the issue proposed is one of a ‘hard’ scientism.[41] That is, the epistemic position held in an almost religious belief that positivistic science will solve all Medicine’s problems (Milgrom 2021, Marcum 2017, Mizhari 2017, Miles 2009). And the possibility of this scientism being dangerous has been made explicit by commentators throughout recent history (e.g., Broadbent 2019, Miles 2018, Stegenga 2018a, b, Solomon 2015, Kontos 2011, Jewson 2009, Miles 2009, Porter 2003, Sharpe and Faden 1998, Nettleton 1995, Connors 1980, Gadamer 1977/2004, Engel 1977, Illich 1974, and Freidson 1970). However, it has been argued that dissenting voices have had minimal impact due to a Whiggish defence of Western epistemological progress (Broadbent 2019).

[41] For ease of reading, the term scientism will be used throughout the following sections as indicative of ‘hard’ scientism unless specified otherwise.

The Whiggish history of professional Exercise scientism.

> The impact of paradigmatic scientism, especially in terms of positivism, on medicine and its practice was inevitable – given scientism's epistemic hegemony.
> (Marcum 2017 p11)

Broadbent (2019) defines the notion of Whiggish triumphalism as the construction of historical narratives in which past failures are sharply contrasted against present success and which demonstrate that professional domains are "on the royal road of progress" (pxvii). Therefore, as Petersen and Regen de Bere (2006) stated in the earlier citation, historical timelines often represent professional paradigms as natural outcomes of a teleological advancement towards a scientific enlightenment. Hence, histories of Medicine commonly suggest the biomedical paradigm is the zenith of all possibilities; the pinnacle of methodology in both principle and practice (Milgrom 2021, Broadbent 2019, Porter 1999). Accordingly, all other health professions are considered 'alternative' (read inappropriate, inefficient, or 'false') until they align to those paradigmatic standards accepted by the Medical epistemic culture (O'Mahony 2019, Broadbent 2019, Solomon 2015).

Yet, as those such as Gray (2015, 2013), Mlodinow (2009), and Gould (1981/1996) have argued, Whiggish histories demonstrate a progressivist bias. The belief that the actions of humanity are continually advancing in an 'upward progression' towards a pre-determined ideal is a fiction. It is more accurate to consider that all histories, whether science, Medicine or Exercise are contingent on the past, with its moments of chance, luck, and the chaotic vagaries of human interaction. Therefore, it is a fallacy to represent professional practices as constructs of a progressive epistemic teleology.

Medicine's story of unbridled scientific advancement has been suggested as problematic on several occasions. Perhaps the most 'famous' is the controversial McKeown thesis which argued progressions in health were evident before the advent of current Medicine, and that such improvements were due to social and economic policy as opposed to Medicine's intervention (Stegenga 2018b, Colgrove 2002, McKeown 1979). Although suggested as discredited on empirical grounds, its premise that social change is more powerful than scientific curative intervention is still a factor in Medicine's disputes (Valles 2018, Colgrove 2002, Link and Phelan 2002).

Moreover, challenges to the Whiggish interpretation of Medicine's science are not only academic but also professional. For example, Miles (2009) argued that the intention to protect academic and corporate Whigs has led to a Medicine both flawed and dangerous: "The advent and rise of EBM codifies the modern scientism in medicine, then, and demonstrates all of the characteristics of scientism: radical reductionism, the privileging of the scientific method and inquiry above all others and a marked tendency to totalitarianism, even microfascism" (p944). And as O'Mahony (2019) more recently stated: "Contemporary biomedical research has become a danger to both society and medicine. It is a danger because it is scientifically corrupt, and because it serves its own needs, not those of society. Research that has no function other than the production of data and the advancement of careers is self-evidently dangerous" (p76). Consequently, this Whiggish scientism, and the dismissal and relegation of alternate theses, are suggested as the roots of Medicine's iatrogenic issues (Broadbent 2019, Stegenga 2018b, Illich 1974).

The consideration of scientism in Sport is not entirely original. For example, McNamee (2005) presents a number of edited essays by authors who imply a similar philosophical issue in Sports science, whilst McFee (2010) has previously argued this problem may have begun to emerge within Sports research. From a professional perspective, scientism has been discussed more recently by Culbertson (2020) who argued that Sports coaching now demonstrates *"*a form of scientism that consists of treating the athlete like a machine and believing that getting the science right is all that there is to the development of the athlete because that will bring the best possible performance, and, after all, that is what it is all about*"* (p26). Yet, these appear relatively isolated voices. There is limited evidence of further exploration of these ideas and these texts are not explicit in considering issues of professional praxis. Furthermore, although supporting an accusation of scientism, such works present Sport and Exercise as a singular domain. Thus, considerations unique to Exercise might be implied through a particular critical reading but are not discussed explicitly.

Therefore, it is proposed here that a historical bias of progress and scientism can also be seen in the foundations of the 'Exercise is Medicine' paradigm. In particular, the previously described historical accounts of Exercise imply the same Whiggish plot of a scientific triumphalism. For example, Shephard (2018), Tipton (2014), and Buskirk and

Tipton (1997) each present chronological lists illustrating a progressivist advancement. The philosophical results of this progression are the return of Exercise, through biomedicine, to its rightful scientific and professional status (Berryman 2010). By casting off the metaphysical concerns of the 'bedside manner', Exercise professionals can achieve the same 'laboratory' zenith as Medicine.

Thus, the story of Exercise is presented as a tale of 'ups and downs', until finally the profession matures with its acceptance of a natural scientific philosophy (Berryman 2010). As Joseph Campbell (1949) illustrates in *Hero of a Thousand Faces,* the nature of this hero's saga is a fundamental narrative in all human storytelling. But, in this instance, regardless of its appeal, the heroic tale of Exercise's journey towards its now 'perfected' scientific philosophy would seem unsatisfactory. Echoing Illich's depiction of iatrogenic Medicine, there is a growing body of literature which suggests the possibility of an *Exercise Nemesis*, an iatrogenic Exercise paradigm.

The Exercise Nemesis.

One enduring 'fact' concerning exercise participation is the oft referenced Hamill (1994) paper: *Relative safety of weightlifting and weight-training*. This work has been used consistently as evidence that resistance training is demonstrably the safest exercise form. Based on injuries experienced per one hundred hours participation, Hamill (1994) demonstrated that weight-training participants reported a 0.0017 ratio and weightlifters 0.0035. By comparison soccer reported a ratio of 6.2 and rugby 1.92. Arising from this evidence is a fundamental belief in the safety and efficiency of resistance exercises for health. Hence, many populist sites, e.g., ExRx.net and worldclassbodybuilding.com alongside professional position statements such as Kite *et al*. (2016), Lloyd *et al.* (2014), and Stone *et al*. (2013), cite Hamill (1994) in perpetuating the narrative of weight-training as the safest activity. [42]

However, despite this populist position, there is increasing evidence challenging the 'minimal risk' narrative. For example, shortly after Hamill's 1994 publication, Jones *et al*. (2000) presented data from a 20-year survey in which emergency departments reported a

[42] ExRx. Net at https://exrx.net/WeightTraining/Safety and World Class Bodybuilding at https://www.worldclassbodybuilding.com/forums/showthread.php?p=391602 accessed 01/09/2022.

35% increase in exercise injury between 1978 and 1998. And of these "about one in four injuries occurred from the misuse or abuse of weight training equipment." (p61).

More recently, Shahzad *et al*. (2021) compared injury rates between supervised and non-supervised weight-trainers over a three-month period. In total 138 weightlifters were split into two equal groups of 69. During the programme, 22 (31%) of supervised exercisers reported an injury, whilst 40 (58%) of the non-supervised group experienced similar harm. Although Shahzad *et al*. (2021) focused on the conclusion that supervised exercise reduces risk, it is noted here that significantly greater numbers of injury occurred in both groups compared to the 'Hamill narrative'.

In a similar fashion, Hülsmann, Reinecke and Reinsberger (2021) explored injury incidence in Crossfit®, a primarily weight-training modality. Using a systematic literature review they found that from a total 7612 participants, 2395 reported an injury, and the prevalence of injury in each study ranged from 14.9% to 56.1%. Again, these figures illustrate rates of injury at far higher rates than those reported previously.

Importantly, recent research also reports patterns of increasing injury rates in modalities other than weight-training. For example, Li, Onor, Lemme and Gil (2021) demonstrated that between 2009 and 2018, the incident rate *"*of all sports-related nerve injury significantly increased from 6,550 in 2009 to 16,775 in 2018… Among sports, exercise, and recreational activities, exercise (n = 56,328; 46.7%) was associated with the most [peripheral nerve injury]*"* (p356). Additionally, Aalborg *et al*. (2016) reported that cases of exercise induced rhabdomyolysis (EIR) admitted to a single University hospital increased four-fold in the period 2011-2014. On the same issue, Masuda *et al*. (2021) examined the impact of Spinning® classes on experiences of EIR. Using a review of 22 papers they found 97 cases of EIR and…

> Most patients were healthy females who had attended their first spinning session. The mean time to clinical presentation was 3.1 ± 1.5 days. The most common presenting symptoms were myalgia, dark urine, and muscle weakness in the thighs. Seven patients (7.2%) developed acute kidney injury, and two patients (2.1%) required temporary inpatient hemodialysis. Four patients (4.1%) developed thigh compartment syndrome and required fasciotomies.
>
> (Masuda et al. 2021 p1)

Thus, the validity of the marketing statement: "Spinning classes offer a variety of rides, movements, coaching and motivation that keep riders safe, excited and engaged" appears inaccurate without due consideration by both professional and practitioner. [43]

Furthermore, there is a growing list of clients who have sued Exercise professionals for their injuries and negative experiences. For example, Springer and Clarkson (2003) reported two cases of EIR taken to court by exercisers inappropriately instructed by trainers. Similarly, Eickhoff-Shemek (2010) describe analyses of eight negligence cases against personal trainers. And, in 2013, the Daily Mail reported on 30-year-old Rebecca Johnson spent four days in a UK hospital after experiencing a one-hour personal training session[44]. Whilst more recently in 2020 again the Daily Mail reported that Wendy Milkins, aged 63, was left with long term injury after her concerns during the exercise experience were ignored. [45] Therefore, based upon the totality of these observations there is unmistakable evidence of a growing trend of iatrogenic incidents due to Exercise. A rising *Exercise Nemesis*. The Whiggish narrative that the current Exercise paradigm is the scientific zenith of its *arete,* and the experience it creates is the 'drug of choice for everyone' appears erroneous. And, unfortunately, for some, this narrative has proved life threateningly dangerous. Therefore, it can be stated, but only somewhat tongue-in-cheek, '*Yes Exercise is Medicine, look at all the side effects!*'

The epistemic roots of the iatrogenic problem.

In explaining the rise of iatrogenic experiences there have been a number of avenues explored within Medicine's literature. These include the impact of economics, bureaucratization, technology, and a problematic educational system (Leder 1992). However, within Exercise, the response has been to suggest higher academic qualification and an improved scientific epistemology. Hence, the previously described shifts towards EBP (e.g., Hough and Schoenfield 2022, Jolley *et al*. 2020, Annette *et al.* 2016) and the calls for the greater application of academic Exercise based on biomedical *episteme* and techno-rational *techne* (e.g., Barnes *et al*. 2017, Bennie *et al.* 2017a, Barnes *et al*. 2016, Waryasz *et al*. 2016, Zenko and Ekkekakis 2015, Dietrich *et al.* 2014).

[43] https://www.spinning.eu/i/about-spinning.html accessed 28/08/2022.
[44] Rebecca Johnson suffered rare muscle condition brought on by exercising too hard | Daily Mail Online 28/08/2022.
[45] https://www.dailymail.co.uk/news/article-7903441/Goodlife-Robina-sued-gymgoer-injured-personal-training-session.html accessed 20/08/2022.

It is conceded there are strengths to this process. Notably, this would allow for a more efficient, effective, and consistent process of Exercise's analysis-diagnosis-prescription praxeology. For example, Bennie *et al*. (2018, 2017b) contend there is a lack of consistent assessment and monitoring within professional practice. Hence, they recommend that a set of standardised and validated tools be created for these purposes. The implication being that greater accuracy in biostatistical monitoring, control, and assessment could avoid iatrogenic issues.

However, whilst such solutions may have merit for technical accuracy, there are shortcomings. Arguably due to the Whig narrative, such answers fail to consider the possibility of issues within the epistemic culture and the EBP evidence-base. Specifically, the question as to whether the problem lies in scientism is not raised. It is assumed the science is 'correct', it is the application that is at fault. Yet, as Leder (1992) argued concerning the philosophy of Medicine, there is a truth in all solutions presented, i.e., economic, educational, and so on, but unless the metaphysics of the paradigm is questioned there will be always limits to the remedies.

In particular, in considering Exercise, it can be argued it is not just a case of creating more research or related educational content. Due to the dominance of biomedicine, the implementation of more epistemic material would merely involve an increase in biostatistical *episteme* and further mechanisation of a techno-rational *techne* (e.g., Bennie *et al*. 2018, 2017b). This is the nature of the scientism inherent in biomedicine (Milgrom 2020, De Ridder *et al.* 2018). The additional *episteme* would not question the epistemic culture nor re-consider praxis. And arguably it would not reduce Exercise's iatrogenic risk. It would simply be more of the same.

The ad hominem blame.

These previous discussions highlight that the blame for iatrogenic exercise is placed on the Exercise professional (Gray 2019). As evidenced by the growing number of personal injury lawyers providing advice for suing Exercise professionals, iatrogenesis is explained via *ad hominem* attacks. [46] The professional is the problem, being unqualified, lacking

[46] for example Mercury Legal at https://www.compensation.co.uk/accident-claims/gym-accident-claims/ accessed 22/08/2022.

experience, or else dismissive of other's experiences as described in the previously cited cases. This is not to doubt the guilt of some trainers. There are genuine concerns regarding professional boundaries (e.g., Barnes *et al*. 2017, 2016), and there is no defence for the trainer whose nutritional advice killed their client (Eickhoff-Shemek 2010). But, putting clearly guilty professionals to one side, in all other cases, as per the Whig narrative to follow the science, it is assumed the problem is with the person not the paradigm.

This Whiggish scientism can be suggested as emerging from Exercise scholars 'demanding' to be recognised as an authentic academic field and gain 'scientifically' legitimacy (Cairney, *et al*. 2018 and Williams and Gibson 2018). Such comments echo O'Mahony's (2019) argument that scientific investment is not for the 'good of society', but the economic and career goals of both academics and corporations. When considering the competitive nature of academia, multiple professional organisations, and the complexity of a multi-billion-dollar industry, this makes logical sense as to why Exercise rarely challenges its epistemology. Yet, despite this reticence on the part of academics and organisations, there is a growth in iatrogenic experiences. And as undertaken in related Medical roles, there is a need to examine the nature of the 'pill' Exercise professionals are being told to prescribe.

As a result, the objective in the following is a critical examination of the paradigm, whilst also attempting creativity in philosophical thought. Therefore, the proposition is that iatrogenic effects are emerging due to an epistemological culture of Gnosticism. In turn, this Gnostic scientism has led to an ontology encapsulated in Leder's (1992) thanatological dead body. And from this ontology, the axiology of Exercise professionals has come to reflect that of Fromm's (1973) necrophilous character.

Epistemology: Gnostic scientism.

> Many people today hold to the Gnostic view of things without realising the fact. Believing that human beings can be fully understood in terms of scientific physicalism, they reject any idea of freewill. But they cannot give up hope of being masters of their destiny so they have come to believe that science will somehow enable the human mind to escape the limitations that shape its natural condition.
>
> (Gray 2015 p9).

As argued, the epistemology of Exercise is used to create a scientific EBP and is defended through a Whiggish justification. Yet, despite its academic popularity, EBP has received considerable challenge within Medicine (e.g., Greenhalgh 2020, O'Mahony 2019, Webb 2018, Malcolm and Pullen 2017, Marcum 2017, Solomon 2015, Greenhalgh *et al*. 2014, Howick 2011, Goodman 2003). Moving forward, one avenue would be to challenge Exercise's epistemic base through these critiques. But this would inevitably lead down a narrow focus on methodology and the philosophy of Science. Consequently, rather than simply repeat previous arguments, the intention is to create a sense of originality and frame these issues through the concept of Gnosticism.

In brief, although the term Gnosticism is derived from ancient roots, the current definition is based on a religious response to Greek philosophy and the Judeo-Christian traditions of the 1st C.CE. (Doolittle 2021). This religion arose as a reaction to the rigid anti-intellectualism of the period and focused on the acquisition of a specialist epistemology termed *gnosis*. The Gnostic belief is that spiritual *arete* can only be achieved via the 'secret *gnosis*' which reveals the 'true' knowledge of the universe and an understanding of its language. Ultimately, the acquisition of this knowledge will allow humanity to escape the "broken world" and achieve genuine enlightenment (Doolittle 2021). Accordingly, the eating of the apple was evil only to those who sought to trap humanity in a world of anti-intellectual tyranny (Gray 2015); the original sin was the good that allowed Adam and Eve to see the *gnosis* and "true salvific knowledge" (Doolittle 2021 p284).

Despite the disappearance of the religion from society, this philosophy continues to impact on Western culture through epistemic positions in which there is a 'religious-like' belief in the power of a singular paradigm to reveal the truth of the World (Gray 2015, Voegelin

1968). [47] Therefore, a Gnostic "claims absolute knowledge of the fundamental principles of reality" through their singular methodology (Trepanier 2013 p1). Importantly, in professional terms, this *gnosis* is taught exclusively to the students seeking entry into the Gnostic sanctum; "a knowledge of divine mysteries reserved for the elite" (Dillon 2016 p25). As with the original sin, the 'true' knowledge is only available to those professionals who partake of the professional organisation's 'fruit'.

At present, Gnosticism is used synonymously with positivistic scientism (Doolittle 2021, Trepanier 2013). And, accordingly, there is a body of literature challenging this philosophy and the subsequent issues the paradigm raises. Importantly, as Connors (1980) argues, Medicine's iatrogenesis is due to Gnostic scientism and "[Medicine's] expert practitioners have come to play a role previously reserved for ministers of religions, using scientific principles as their theology, technologists as acolytes and the hospital as church" (p40). Therefore, by association, Exercise can be accused of similar iatrogenic Gnosticism within its professional paradigm.

The Gnostic nature of Exercise.

By their very nature, professions are 'naturally' Gnostic. Returning to Wilensky's (1964) model, each profession is the repository for a specialist knowledge. This knowledge then becomes formalised, conceptualised, and protected by the professional organisation. Entry into the profession is a Gnostic process of ascendency into the hidden 'secrets' of this *gnosis*. And in Exercise's case it can be demonstrated that it reproduces Pearson's (2007) three dictums of Gnosticism:

1. Gnosticism is based on a mind-body dualism in which rationality will lead to spiritual salvation.
2. Gnosticism involves the creation of *mythopoeia*, myths through which the 'power' of the *gnosis* is revealed.
3. Gnosticism is based on the venture to understand and reveal knowledge of the true nature of reality.

[47] I make my own comments concerning Gnosticism in the idea of research paradigms in appendix 2 in the subsection "*an observation of tribalism*?"

All three of these principles have already been described in relation to Exercise. The notion of dualism is evident via the demonstrated differentiation of physiology and psychology. Whilst the salvation of rationality underpins the calls for EBP and the mechanisation of praxis. Similarly, the creation of a *mythopoeia* to justify the 'sacred *gnosis*' is apparent in its Whiggish history, a mythic tale of ascendancy to a scientific status mirroring Medicine. Furthermore, the growth of a positivistic EBP, alongside an increasingly biological reductionism, illustrates the quest to reveal exercise's hidden nature. However, Exercise's Gnosticism can be further explored via the notion of *gnosis* as a 'secret' language (Doolittle 2021, Pearson 2007).

Problems of a Gnostic Sport and Exercise language have been previously highlighted in Prof. Roy Shephard's (1999) *G. Lawrence Rarick Commemorative Lecture*. In this presentation, Shephard accused postmodern Exercise researchers of Gnosticism by "[clothing] a weak philosophic position in pretentious language", using effectivities instead of attributes, and emic and etic instead of insider and outsider, in order to justify their unique academic status" (p334).

Bouffard (2001) rebutted Shepherd (1999) and charged him with the same Gnosticism by arguing that the positivistic scientists were just as, if not more, guilty of mystical terminology and belief in a 'secret epistemology of enlightenment'. By way of example, Bouffard (2001) pointed to terms such as ANOVA, correlation, and similar mathematical terminology. Furthermore, they argued that in reality there is no 'one' scientific methodology. Astrology is methodologically different to oceanography, yet within Sport and Exercise science there appears a belief in a single method i.e., a singular scientism. Therefore, it is Shepherd's (1999) use of the terms 'science' and 'scientific' that demonstrates Gnosticism.

Interestingly, Shepherd (2001) wrote a response to Bouffard (2001), which began with:

> From deep within the catacombs of quantitative science, I have long heard, if not the roaring of lions, at least persistent rumours of a second appearance of my good friend Marcel Bouffard on the theme of methodology to be adopted in adapted physical activity. I eagerly cherished a parousial hope, a time when the mystic veils of Gnosticism (Shephard 1999) would be lifted, to reveal to the unenlightened a glorious and critical analysis of the postmodern

> approach. Now Marantha, Marcel has come, but the parousial hope has been dashed.
>
> (Shephard 2001 p235).

And, in a fascinating and poetic response Shephard (2001) appears to defeat his own argument. It would be difficult to find a more semantically complex or esoteric comment in a Sports or Exercise text. But importantly, it can be argued that both sides are as guilty of Gnosticism as the other. In this argument, each writer proposed only they know the true *gnosis*. Both use specialist and obscure language to argue that the other does not sufficiently understand their 'true' methodology.

Admittedly this short-lived debate appears to have generated little interest and could be dismissed as merely a public 'spat' between competitive professors. However, it has been described in detail as it highlights that a *gnosis* requiring prolonged engagement with an esoteric epistemology and its language is evident in Exercise. And arguably, this Gnosticism has caused many of the iatrogenic issues observed. To be precise, in creating an EBP, Exercise has assumed a common language between academic and practitioner. This has led to a position in which the quest for the scientific Gnostic salvation of academics has created language 'untranslatable' for effective practice. As Francis Bacon (1561-1626) accused the dominant Scholastic philosophers of his time of 'missing the point', modern academics may also…

> …[begin] to hunt more after words than matter; more after the choiceness of the phrase, and the round and clean composition of the sentence, and the sweet falling of the clauses, and the varying illustration of their works with tropes and figures, than after the weight of matter, worth of subject, soundness of argument, life of invention or depth of judgement.
>
> (Bacon 1605/1862 p24).

The impact of Gnosticism on the Exercise experience

As both Shepherd and Bouffard argue, Sport and Exercise demonstrate numerous examples of Gnostic language. Whether the vVO2max and EPOC of conditioning, or the SMART and CSAI2 of psychology, Exercise scientists of all ilk have created their 'tongues'. And, to maintain the Gnostic cabal these semantics are only learned through dutiful engagement by acolytes. Therein lies the problem. As literature has demonstrated,

Exercise professionals lack the time and/or academic skill to develop an understanding of this complex epistemology. Furthermore, such academic-derived *gnosis* may lack relevance to the demands of practice.

Similar issues have been raised in Medicine (e.g., O'Mahony 2019, Webb 2018, Connors 1980). In particular, Webb (2018) argued Medicine's EBP suffers from problems arising from this epistemic position. First, many studies demonstrate a 'perfectionism' of methods rather than ecological validity. That is, scientific paradigm is paramount, and therefore research becomes 'data for the data's sake'. Furthermore, the increasing epistemic complexity presents an *episteme* in a language that does not relate to the practitioner's needs As a result, relevance to real world application is secondary and, thus, much of the evidence-base becomes inappropriate for praxis.

Second, much research is published through economic pressures from stakeholders not a genuine consideration of praxis. Thus, the relevance and suitability of the evidence is at the least speculative. And, finally, the amount of literature published in the culture of 'publish or perish' is beyond any practitioner's capability to effectively utilize. Even should a professional achieve sufficient epistemological skill, the sheer volume of material makes it impossible understand the entirety of the professional *gnosis.* Therefore, any reference to an evidence-base is always partial.

In Exercise, these issues are similarly evident and lead to the problem of misinterpretation. The terminology of the EBP has become so complex that both professional organisation and practitioner have misinterpreted the research conclusions. And importantly, words and concepts are being used interchangeably and out of context. Specifically, as will be demonstrated in the following section, it can be argued the dangerous experiences described in chapter 1 are in large part due to Exercise's Gnostic scientism.

The iatrogenic language of interval training.

> The less a science is advanced, the more its terminology tends to rest on an uncritical assumption of mutual understanding.
> (Quine, 1936, p. 90).

There are essential differences between the forms of exercise termed: interval, high-intensity interval (HIIT), sprint, and tabata training (Tabata 2019). However, whilst these terms have entered populist consciousness due to the Gnostic language of Exercise, they have been dangerously mistranslated.

Interval training was formalised in the 1930s as a method to improve athletic performance. It involves athletes training at faster than race pace for a set distance or time, and then immediately reducing effort to a lower intensity for a set period before returning to the higher workload. This fluctuating approach to intensity is repeated for a pre-determined number of sets based on the athlete objectives. This allows athletes to experience higher levels of performance for sustained periods, and hence, translates into greater athletic development (Tabata 2019).

It should be noted that all interval intensities during this protocol are submaximal heart rates (HR), <80% maximal, to allow for a prolonged training effort. However, later, a variant termed high-intensity interval training (HIIT) emerged. During HIIT the athlete is expected to work in short bursts of effort at >80% max. HR, most often at 85-95%. Unlike the earlier endurance objective of interval training, HIIT was intended to be performed in sessions of less than 30 minutes due to the effort needed. The final protocol in this group of training modalities is sprint-training defined as an 'all-out effort' at maximal velocity for no longer than 30 seconds with between 3- and 5-minute recoveries between efforts (Tabata 2019). Thus, there are three protocols in this commonly observed athletic conditioning category representing moderate, high, and maximal intensities of effort. Each with its own recognised specific method and objectives.

These protocols formed the basis of athletic and endurance training until a 1996 study by Izuma Tabata in which the additional 'tabata' protocol was formalised (Tabata 2019, Tabata *et al.* 1996). Tabata had elite cyclists perform a protocol of 20 seconds cycle at 170% max VO2max, followed by a pause of 10 seconds before repeating the protocol

seven more times. Thus, in the entirety, the athlete did eight sets of 20 seconds at 170% VO2max with a ten second pause between each work set. Importantly, Tabata highlighted that, unlike sprint training in which the work rate will naturally decline due to fatigue, the 'tabata' protocol must maintain supramaximal level in all eight sets (Tabata 2019).

Recently, in a 2019 paper, Tabata reiterated the efficiency of his protocol for physiological adaptation. But importantly, it was emphasised that 'tabata' was not intended for general exercisers and is currently not demonstrable as effective in non-cycling activities. Furthermore, the paper stressed there is no evidence that undertaking eight sets of high or maximal work for 20 seconds with 10 seconds recovery has any impact on physiological performance. The protocol must be at supramaximal intensity of 170% VO2max. Consequently, for general exercisers, the inexperienced, and non-elite athletes, issues of safety and appropriateness must be very carefully addressed. But as Tabata (2019) laments "at more than 20 years after the publication of the original study, the exercise intensity has not been emphasised, only the procedure of the training has been featured, especially amongst general exercisers*"* (p560).

Yet despite these warnings, the 'power of tabata' has become part of Exercise's *mythopoeia*. The belief is that Exercise science has found the HIIT 'magic bullet' of fitness. As reported by the Guardian (2013): *"*Dr Izumi Tabata has developed a punishing exercise regimen that he claims can boost cardiovascular health in minutes – and now he is bringing it to the masses".[48] And since such early headline claims, this belief has become absorbed into a fashion of high intensity training. For example, Amazon.co.uk lists Roger Hall's *Tabata Workout Handbook volumes 1 and 2* which provides over two hundred workout plans, and Simon Terry's *Tabata HIIT training: 4 minutes essential daily training for busy people* to name but two of many similar titles. But these examples demonstrate that whilst the conclusions of the scientific evidence-based are recognised, they are not wholly understood. In this instance, there is a mistranslation of the complex *gnosis* which differentiates tabata, HIIT, interval and similar modalities in terms of protocol and objective. At the very least, these misinterpretations lead to inefficient and ineffective exercise sessions, but at worst, the inappropriate application can lead to dangerous experiences.

[48] The Guardian at https://www.theguardian.com/lifeandstyle/2013/mar/25/tabata-harder-faster-fitter-quicker accessed 01/08/2022.

It is accepted that a counterargument could be proposed that these are not accidental mistranslations. Rather, they are entrepreneurs utilizing the zeitgeist in consumer consciousness. However, it is not only professionals and business-minded trainers who present a misunderstanding of terminology. Within peer-reviewed studies there is a similar demonstration of inaccuracy and confusion. For example, Lee, Noh, and An (2021) presented the paper: *Impact of Synchronous Online Physical Education Classes Using Tabata Training on Adolescents during COVID-19: A Randomized Controlled Study.* However, their interpretation of tabata was flawed and demonstrated four key errors.

First, Lee *et al*. (2021) described their protocol as high-intensity interval training despite the inclusion of tabata in the title. Second, a tabata structure of 8 x 20 seconds effort with 10 seconds recovery was used. But the work rate was only a "maximum exercise intensity (RPE 15 or more [out of 20])" (p1), not the 170% VO2 max 'demanded' by Tabata (2019). Third, the full tabata protocol was repeated three times in a session with a 1-minute rest between tabata's. Consequently, rather than 4-minutes in total comprised of 8 x 20 seconds at 170% VO2max, the students undertook 3 x 4-minute sessions at an intensity of approximately >80% max HR. And fourth, they used eight different exercise movements despite Tabata's (2019) statement that the protocol's effectiveness is not yet demonstrable in a non-cycling modality.

As a result, Lee *et al.*'s (2021) method appears a confusion of tabata, interval, and HIIT undertaken in the manner of circuit training. Therefore, not only is the researcher's translation of Exercise epistemology inaccurate, attempts by 'non-academic' EBP professionals attempting to apply these findings could be difficult. Additionally, the dangers of creating iatrogenic experiences whilst delivering such training online are not explored. The ethics of coaching young participants safely in HIIT at a distance and in an uncontrolled environment are not highlighted. Arguably, the *mythopoeia* of Exercise's evidence-base appears to have created a praxis in which there may be little consideration beyond the deontology of legal and research responsibilities. And, this is not an isolated error, examples of similar confusions commonly appear in Exercise physiology research, e.g., Popowczak *et al.* (2022), Patah *et al*. (2021), Domaradzki *et al*. (2020), and Ekström *et al*. (2019).

These examples begin to demonstrate the Gnostic complexity arising within Exercise. It appears even the academics attempting to create the *episteme* for EBP struggle with its sophistication. And, if academic Exercise is unable to accurately fathom the intricacies of its own *gnosis,* the challenges for the professional become evident. Thus, in conclusion, the iatrogenic issues observed during the practical examination of novices as they attempt to comprehend this Gnosticism, whilst not intentional, are an inevitability.

> What first appears as a hypothesis…turns immediately…into a fact which then gives birth to a whole string of similar non-facts.
> (Arendt 1972 p109 cited Connors 1980).

Ontology: The dead body.

In presenting an ontological critique of a biomedical praxis concerns have already been explored. For example, issues arising from physicalism and Cartesian dualism (e.g., Hickson's 2019, Marcum 2017, Joubert 2014, Mehta 2011, Kriel 2003, Switankowsky 2000, Leder 1992, ten Have *et al*. 1990, Gold 1985). As Leder (1992) stated "many of the flaws of modern medicine…can be traced to medicine's reliance on the Cartesian model of embodiment" (p28). Therefore, with a sense of originality, and drawing on challenges to Medicine, the following will demonstrate that Exercise's biomedical Gnosticism has created an ontology of the dead body.

Leder's (1992) dead body ontology.

The Holy Roman Emperor Frederick II (1194 – 1250) has already been mentioned as a key figure in the evolution of the professions. Yet, his challenges to Church dominance also created one of the most critical shifts in Medicine's history. In 1231, Frederick II mandated compulsory attendance at a human dissection once every five years for everyone practicing Medicine (Ghosh 2015). And thus, the emperor's mandate set in motion the biomedical paradigm: "opening up bodies – dead human cadavers, living animal ones – had become the prescription for true medical knowledge*"* (Porter 1999 p219)

However, as Leder (1992) argues this legacy has created a position in which Medicine has a science of the 'dead' not the 'living'. That is, the foundations of *episteme* are derived

from the dissection of the corpse. Resultantly, the knowledge of living structures is obtained through an understanding of, and comparison to, the dead. And, for the professional, this cadaverous epistemology creates an ontology in which the person is described through structural mechanisms, and the terminology of 'inanimate' biological material for dissection, analysis, and manipulation (Leder 1992).

In terms of practice, this "ontology of death" (Leder 1992 p21) can be summarised through three impacts on practice. First, it illustrates a similarity to Jewson's (2009) laboratory cosmology. The 'bedside' relationship has made way for the thanatological comparison of cells, tissues, and biostatistics. Health is now explained in terms of the distance from disease and death. As a result, the identification of malady is a job for the thanatological laboratory, whilst the categorisation of disease is a comparative nosology between the patient and the corpse (Leder 1992). Hence, the patient's life-story is described via their 'lumps, and bumps' from birth to death (O'Mahony 2019).

Secondly, thanatology creates an increase in diagnostic technology required to see the 'unseeable' (Leder 1992). Beginning with the stethoscope, then microscope, and the equipment has evolved into the AI of genomic and nano-technological procedures. Accordingly, the *arete* of the professional is one of 'autopsy' to reveal the true extent of 'dying' beyond the subjectivity of the patient. And, thirdly, 'healing' is the manipulation of biological structures to create normative functioning. And through biomedicine the human machine can be fixed and mechanisms which create the corpse can be slowed or avoided.

The dead exerciser and the techne *of dissection.*

> Medical education still begins with the dissection of the cadaver, just as the clinical case ends with the pathologist's lab. In between, the living patient is often treated in a cadaverous or machine-like fashion.
>
> (Leder 1992 p22)

Leder's (1992) "epistemological primacy of the corpse"(p22) is not only an artefact of academic Gnosticism, but also the foundation of professional education. As reflected in commentaries from practitioners, the primacy of dissection and ontology of a dehumanised biological machine are the first lessons learned (Miles 2017, 2013, Haque and Waytz 2012,

Perkins 2008 O'Mahony 2019, Baron 1992, Connors 1980). Resultantly, the professional becomes a technician of standardised diagnostic methods through an EBP of techno-rational dissection: the patient is merely a biological corpse for examination. As encapsulated in the title of Hewa and Hethrington's (1995) critique of biomedical nursing, practitioners are taught to be *Specialists without spirit.*

It is acknowledged there is a growing body of literature recognising these issues and their iatrogenic impact. And the philosophy of Medicine is exploring its epistemological assumptions and proposing practical alternative paradigms (e.g., Broadbent 2019, Stegenga 2018a, b, Thompson and Upshur 2018, Marcum 2017, Solomon 2015, Pellegrino 2008). However, the philosophy of Exercise is not being explored in a comparable manner. Yet, as demonstrated in chapter 5, the education of Exercise professionals is derivative of biomedicine and it is evident the majority of learning is anatomical structures, their function, and the mechanisms for their manipulation. Therefore, it can be proposed as an epistemology of cadaverous physicalism in which Exercise echoes Medicine's thanatology.

By way of example, the NASM (2022) begins its *Essentials of Personal Fitness Training* not with a discussion of the positive impact of the professional on wellbeing, nor the *eudaimonic* goals this role may provide. Rather, its opening chapter discusses scientific methodology and descriptions of key morbidities, including include obesity (p9), heart disease (p11), hypertension (p12), cholesterol (p13), diabetes (p14), cancer (p14), respiratory disease (p15) and stress (p15). Finally, this first chapter ends with a list of muscular dysfunctions the professional should understand. Thus, within the first twenty pages of the text, the reader is presented with the corpse not the living participant. Similarly, the ACSM's (2022) *Resources for the Personal Trainer* begins with the epidemiology of fatalities due to inactivity, obesity, and other chronic diseases. Whilst the NSCA (2022) opens directly with the dissection of the cadaver. Rather than the positivity of exercise potential, the reader learns of the macro- and micro- structure and function of the muscular, nervous and skeletal systems.

However, Exercise's 'dead body' ontology is not only an issue of *episteme*. As described by Medicine's practitioners, the *techne* taught to the professional is based on the skill of autopsy. That is, the ability to isolate and identify causes through a reductive process. And

arguably this ‘autopsy dissection’ is a praxeology communicated to Exercise professionals. From the first client interaction, the Exercise professional ‘dissects’ the client into discrete biostatistical features, e.g., height and weight, barriers and motivators, SMART goals and so on. Then aping the forensic scientist, each structure is placed on the dissection table of the client interview sheet from which the issues and patterns can be observed, labelled, and recognised as causative of the client’s symptoms.

Accordingly, the client’s narrative is ‘surgically’ reduced to its component parts, and the language of their experience is translated into the mechanistic terminology of Exercise’s *gnosis*. Statements such as “I want to improve my fitness” become dissected into the biostatistical variables of endurance, and similar. Whilst movement is translated into a Gnostic language of unique joint actions, muscle actions, and planes of motion. And, echoing Medicine’s partitioning of the dissected arm into the humerus, biceps brachii, and other structures, the experience is reduced to motivational variables such as autonomy, anxiety, and self-efficacy. This *techne* allows the professional to compare and examine the ‘organs’ independently to create a means for adjustment. Each partition becomes a data point for diagnosis. Thus, the dissection continues until the exact component is revealed as to the disease’s source; the ‘lesion’ in the biological machine.

As described by O’Mahoney (2019), Leder (1992), and Baron (1985), within Medicine at each stage the concept of a living, existential being slowly fades. Similarly, within Exercise, the participant disappears into a Gnostic ontology of heart rates, BMIs, ROMs and other biostatistical descriptors. Therefore, from the epistemology for exercise prescription, through to the teaching of exercise movements, the Exercise professional exhibits cadaverous reductionism. Thus, the *episteme* of the cadaver and the *techne* of dissection generate a praxis of autopsy, and the *arete* of the Exercise professional is forensic.

Thanatological exercise participation.

Beyond a techno-rational praxis, Leder’s (1992) ‘dead body’ defines the *telos* of exercise as a process to avoid mortality as opposed to a route for *eudaimonic arete*. That is, exercise is experienced as an avoidance of the negative as opposed to seeking the positive; it is constructed for a thanatological as opposed to biophilic purpose. This is demonstrated in

the emphasis placed on fitness testing in client analysis by such organisations as the ACSM, NASM, NSCA, and on educational courses. For example, as previously demonstrated, the NSCA (2022) increased its content of fitness standards by approximately 20% compared to the 2014 edition.

In a comparable manner, Hickson (2019) argues that a problem for Exercise is a reliance on physicalism. Echoing previously cited concerns, they state that a materialist metaphysical position "allows scientists to treat nature as a mere object that is to be controlled and dominated" (p3). As a result, the ontology is reduced, in terms of both participant and experience, to mathematics and a psychology of stimulus-response. Thus, Hickson (2019) argues that Exercise is in danger of losing the human being that should be central to the fitness experience.

Consequently, it can be argued fitness testing initiates the thanatological *telos*. Specifically, it does not measure possibility or potential. Instead, fitness testing is quantification of limitation. Resultantly, the diagnosis of its data creates awareness of 'weak and dying' elements in the biological machine. In essence, it is a measure of mortality. And from this data, the professional, through a 'dead body' ontology, recognises the client who is the wrong side of an expected norm and closer to biological malfunction. Accordingly, exercise experiences can then be prescribed for recognising, managing, and correcting dysfunction to within population, normal parameters. The outcome is a motivation for participation based on a *telos* for maintaining biological function and thus the 'living human being' disappears. The exercise experience is not a means for *eudaimonic* biophilia, it is ontologically conceptualised to avoid 'death'.[49]

Thus, whilst the fitness industry markets methods such as the TRX™ as the "ultimate way to train…Get strong. Get sweaty. Get results" the methodology to justify these 'ultimate' activities echo the epistemology of the corpse and the ontology of the cadaver (e.g., Taklimi 2021, Stevens *et al*. 2017, Melrose *et al.* 2015, Calatayud *et al.* 2014). [50] And the

[49] To avoid accusations of extremism, the term death here can also be understood through an existential perspective, e.g., Nesti (2004). Whilst there is a possibility of physical death due to a perceived lack of fitness, it may alternatively refer to the death of the self- and social identity which could occur due to the recognition of an exercise need.
[50] TRX training at https://www.trxtraining.eu/en-gb/?gclid=Cj0KCQjw94WZBhDtARIsAKxWG-9DwrqbQiJMiOxN1yBE-Ds5kXCPki00ccE_aip9XnoDJJT8TjGTKHQaAmaqEALw_wcB accessed 14/09/2022.

means for delivering these methods to clients is derived from a biomedical paradigm of analysis-diagnosis-prescription.

Axiology: A necrophilous praxis.

The term necrophilous character was first proposed by Fromm in *The Anatomy of Human Destruction* (Fromm 1973). It is a characterological form of personality in which an individual displays:

1. A passionate attraction to all that is dead, decayed, putrid and sickly.
2. The passion to transform that which is alive into something that is unalive.
3. To destroy for the sake of destruction.
4. The exclusive interest in all that is purely mechanical.
5. The passion to tear apart living structures. (Fromm 1973).

And Connors (1980) has proposed that, through biomedicalization, Medicine adopts this necrophilous character in its axiology. Pre-empting Leder's (1992) later arguments, for Connors (1980) the necrophilic paradigm is introduced to the professional through the education of cadaverous dissection. During these experiences, the physician learns a 'passion' to seek out the sick, the skill for transforming bodies into constituent parts, and the techniques for destroying the 'live' structures to expose the problematic decayed. The outcome is a necrophilous practitioner.

As, Connors (1980) argues there is an obsession for seeking out the dysfunctional and grotesque to the point that "naming the diagnosis seems to take precedence over the healing" (p45). This fixation has led to increased stress, apprehension, and a loss of autonomy for the patient. Whilst practitioners who, "having abdicated their freedom, they have nothing else left but their techniques" (Connors 1980 p45). Consequently, patients passively enter their interventions, whilst the detached professional focuses on the instructions of a thanatological and Gnostic scientism. And therein lies the iatrogenic issue. The physician is continually seeking the patient's next disease as opposed to developing a sense of flourishing. Resultantly, Medicine is in a position of "treating, and over-treating, but not healing" (O'Mahony 2019 p12) and its fixation on the 'dying', alongside the fetishization of biomedical science, has created the necrophiliac practice (Miles 2009, Connors 1980, Fromm 1973).

Through biomedicine, Exercise exhibits the same necrophilous characterization. Its EBP follows Medicine's praxis of analysis-diagnosis-prescription with the same fixation on a diagnostic *techne* for seeking 'disease.' Through sophisticated fitness testing, the professional is taught to break the body into parts for measurement; to 'destroy' the phenomenological to meet the mechanistic needs of Gnostic scientism; and transform a 'living' whole into the partitioned 'undead' data. Hence, the professional's 'passion' is for the mechanised, quantified workout routine and the creation of a quantified exerciser to 'wage war on fat' and re-sculpt stubborn body parts (Lupton 2016, Sailors 2009). [51] Furthermore, through a fixation on the 'putrid and sickly', the participant is encouraged to conceptualize exercise in the semantics of illness. Whilst the 'marketing' of the active lifestyle is framed through a lens of 'death':

> Step right up! It's the miracle cure we've all been waiting for. It can reduce your risk of major illnesses, such as coronary heart disease, stroke, type 2 diabetes and cancer and lower your risk of early death by up to 30%.
>
> (The NHS)[52]

Even the messengers of Exercise sell the concept through the language of the necrophiliac.

The impact on Exercise professional practice.

The argument that the ethical position in professional Exercise is deontological in nature has already been demonstrated. Its axiology is derived from a techno-rational EBP based on an epistemology of thanatological Gnostic *sophia,* and an ontology of the 'dead body'. But, in and of itself, such an ethical position would not be iatrogenic. In considering the objectives of EBP, the notion of following efficient techno-rational guidelines is justifiable; perhaps preferable. As stated, the 'knowing that' and 'knowing how' are fundamental elements of professional praxis. Hence, knowing the right thing to do at the right time justified by scientific evidence would seem logical.

Yet, as discussed, this Gnostic scientism has been challenged, and there are concerns for the effectiveness of EBP. As Beedie *et al.* (2016) argue, there is considerable data

[51] Bodybuiling.com at https://www.bodybuilding.com/fun/wage-war-on-body-fat-with-jamie-alderton.html accessed 20/08/2022. Mind pump media at https://www.mindpumpmedia.com/blog/how-to-improve-weak-and-stubborn-body-parts 20/08/2022
[52] The NHS at https://www.nhs.uk/live-well/exercise/exercise-health-benefits/ accessed 20/08/2022.

demonstrating that exercise can be positive, but "an apparent dearth of evidence of its effectiveness" (p323). That is, it works in the 'laboratory', but 'field' studies demonstrate practical, motivational, and economic issues. Therefore, if the current avenue of EBP development is maintained "we could condemn subsequent generations of the population to increasingly complex and expensive biomedical interventions, with the associated likelihoods of poorer public health and greater health inequalities" (Beedie *et al.* 2016 p324).

The issue of eugenics in Exercise.

Beyond the problem of praxis, the ethics of the necrophilous character in Medicine has also been critiqued due to the loss of *phronesis* (e.g., Boudreau and Cassell 2021, Braude 2017). And a praxis grounded in mathematical certainty has removed what Sternberg (1990) and Rubenstein (2003) termed wisdom or, as Jewson (2009) might state, the physician's experiential art of the bedside manner. Yet, the practitioner must employ some form of ethical decision-making. Consequently, it can be argued it is not the loss of wisdom per se, there is still a deontological *sophia* (theoretical wisdom). Rather, the *eudaimonic* goals which underpin the practical wisdom of *phronesis* are disregarded. That is, individual values and phenomenology are subsumed within the scientism of biomedicine and expectation of norms.

There is a danger of sounding repetitive as the lack of *phronesis* and Exercise's deontological decision-making has already been stated. However, there is a further axiological position that is emerging from Exercise's necrophilious character founded on a position of eugenics. In particular, "the dangers of reducing human life to its biological substrate and then exercising normative judgements on its value have also been exemplified by the various trajectories of eugenic movement." (Fialová 2017 p183).

As described by Fialová (2017), biomedicine creates a depersonalised axiology. It is one in which the disease is more important than the person, and the professional praxis is based on deontological normative reasoning. This leads to an ethics which "has the potential to become a judgement that healthy people are more worthy, desirable, or valuable than those affected by illness or disability, or those considered products of defective genes" (p187). Moreover, this position is already evident within the axiology exhibited by Exercise

professionals. Specifically, through the necrophilous fixation there has been a growing eugenic interpretation of *kalokagathia* within Exercise.

Kalokagathia is perhaps the 'original' Exercise axiological position. Arising from Homeric *arete*, it can be defined as the belief that an individual's outer beauty is a manifestation of inner intellectual and ethical superiority (Bergdolt 2008). *Kalos* is linked to human 'beauty', whilst *agathos* identifies the 'virtuous' mind (Petrochilos 2002). Consequently, exercise in its earliest conception was not merely a physical pursuit but an ethical one. The dedication required for physical beauty was moral perfection demonstrated through virtuous behaviour (Reid 2010). Thus, for Socrates:

> No citizen…has any right to be an amateur in the matter of physical training: it is part of his profession as a citizen to keep himself in good condition, ready to serve his state at a moment's notice. The instinct of self-preservation demands it likewise…what a disgrace it is for a man to grow old without ever seeing the beauty and the strength of which his body is capable!
>
> (Gardiner 2002/1930 p71)

Although practices may have changed, the concept of *kalokagathia,* and its underpinning eugenic position*,* is an influential factor in 21st C. CE society. For example, there is a large body of literature exploring the impact of attractiveness on social interactions. Research has ranged from such studies as Palmer and Peterson (2016) who demonstrated that individuals rated political knowledge of candidates based on physical attractiveness, to the recognition that women perceived as attractive and feminine were rated as having lower intelligence, competency, and likeability in an IT-computer skills environment (Fleischmann, Sieverding, Hespenheide, Weiß, and Koch 2016). The expectation of attractiveness reflecting personal worthiness is a philosophical bridge between Ancient and modern Western cultures.

As a result, in current Western society, an individual who does not exercise, does not want to exercise, or does not appear to exercise is considered 'morally wrong': how could he let himself go? It is a given assumption that 'good', responsible, people exercise, stay trim, and live an active lifestyle. As previously described by Cairney *et al*. (2017) the expectation is that a 'good' individual will seek the means for continuous exercise even within the workplace. Any counterargument that exercise is a modern invention and

perhaps not *the* central necessity for health and *arete* is dismissed (Lieberman 2020). Thus 'Exercise is Medicine' is not merely an epistemic culture, it is also an axiological position.

This has created what Pullen and Malcolm (2017) term a health imperative, a position in which individuals uncritically follow the Exercise conceptualization. For example, they reported their participants all agreed exercise prevented illness, increased health, and was a means to an improved social and economic self. Accordingly, there is a growing body capital within Western culture to which the Exercise professional is the gatekeeper (Ebbeck and Austin 2018, Sassatelli 2010 and Smith-Maguire 2008). It is therefore of little surprise that research into reasons for engaging with personal training consistently highlights body image anxiety and dissatisfaction as the major factors (Melton, Dail, Katula & Mustian 2011). The client considers a specific body shape as fundamental for health and success as defined by their cultural environment.

Consequently, the combination of the necrophilous paradigm and a cultural *kalokagathia*, has generated an Exercise in which its epistemology can explain how mortality delayed and moral worth can be improved by following the scientism of exercise. Importantly, if an individual does not have the right body type they must demonstrate Socratic discipline to become a 'good' person. Hence, the drive to develop the ideal body capital is observable in exercise addiction, disordered eating, muscle dysmorphia, and dangerous practices such as steroid use. The idea of 'no pain, no gain' has become a scientifically justified, religious-like catharsis of physical immorality.

Professional eugenics.

Within professional Exercise this axiology is evident in both education and practice. From the client interview, through to an exercise programnme for correcting those 'flabby' and 'unshapely' areas, the objective is to help create the 'ideal' biological machine for physical functioning. Furthermore, there is the expectation is that there should be the expression of good moral character through a personal motivation for avoiding 'fitness diseases'.

As, Philipps & Drummond (2001) demonstrated, trainer's conceptions of physical appearance influence their approach to working with clients. They found that negative behaviours arose through a trainer's preoccupation with physical beauty. And a "moralistic

and superior attitude towards clients" was evident in considering overweight and inactive individuals (Philipps & Drummond 2001 p101). These beliefs were considered to have adverse effects on clients seeking support for such issues, as trainers demonstrated a *"*superior and patronizing approach to customer interaction*"* (Philipps & Drummond 2001 p103). Similarly, Robertson and Vohora (2008) stated that both Exercise professionals and their client exhibited a fat bias in which fatness was deemed indicative of laziness and similar negative characteristics. Furthermore, in a recent review of Exercise professional weight bias, Panza *et al.* (2018) concluded there was still consistent evidence of these 'negative' *kalokagathic* perceptions influencing Exercise professional praxis.

Accordingly, iatrogenic exercise experiences can be explained through the argument that the professional is in a deontological position of EBP guided by the ideology of a eugenic 'Exercise is Medicine'. The professional is taught that the *gnosis* is correct due to its scientific foundations and that exercise is the salvation for health. Thus, to meet professional standards they must follow the E-O-A praxis of the profession. This creates a dehumanized ethics. Importantly, the professional has embraced the scientism of Medicine by dismissing the person.

> Indeed, in seeking to escape all interpretative subjectivity medicine has threatened to expunge its primary subject – the living and experiencing person of the patient.
>
> (Miles 2012 p330).

Conclusion to Stage 2.

The objective of this chapter has been to critically explore the impact of 'Exercise is Medicine' on professional practice. The conclusion is that biomedical Exercise, whilst promoted as a key factor in health agendas, may lead to negative outcomes in practice. Specifically, Exercise demonstrates a paradigm of Gnostic scientism that is in danger of replicating Medicine's nemesis. This has emerged through Exercise attempting to mirror the status and apparent 'power' of biomedical science in its EBP. Furthermore, through a desire for professional credibility, academic Exercise has created a complexity that can lack plausibility for praxis. Whilst academics argue for the greater use of EBP in professional practice, their Gnosticism has created an epistemology only intelligible to the most advanced of acolytes. Thus, iatrogenic issues emerge due to the educational epistemology presented to professionals as opposed to merely being the practitioner's inadequacy.

Furthermore, Exercise epistemology demonstrates a bias of thanatology. The outcome is a *techne* of Gnostic symbolism of heart rates, sets and reps, and a similar quantification of a client's current state of 'mortality'. Hence, exercise is an activity for disease management through an ontology of the 'dead body'. And, the *telos* of the exercise experience, alongside *arete* of professional practice, has become to prolong biological functioning and avoid death. The consequence of this epistemic culture is a praxis in which the professional is guided by a deontology of techno-rational scientism and a thanatological *sophia*.

Yet, this deontological axiology demonstrates an ideological foundation reflective of eugenics and the concept of *kalokagathia*. Those who do not, or cannot, engage with the *gnosis* are deemed 'lazy', 'irresponsible, and unethical. And for a professional, clients need 'encouraging' to fulfil the proven scientific formula of exercise dosage or else be shown their motivational failings in a culture of eugenic progress. The result is an axiological conception of an exercise hierarchy of the worthy and unworthy reflective of the wider neo-liberal political culture. And accordingly, the growth in unhealthy and hazardous activities justified through the foundations of EBP.

In conclusion:

1. The paradigm of Exercise is conceptualised in terms of biomedicine. Thus ‘Exercise is Medicine’ is more than mere symbolism but a pragmatic position.

2. Biomedicalisation has provided for the foundations of a scientific EBP, but it has also brought the danger of iatrogenic experiences.

3. Iatrogenic experiences are due to a thanatological epistemology, a subsequent cadaverous ontology, and a resultant axiology which is necrophilous in outlook.

4. This creates the eugenic ethics of *kalokagathia,* and a praxis focused on avoiding ‘death’: either physical or social.

5. Therefore, the epistemology of professional Exercise education requires re-examination if exercise is to avoid the same position of a dangerous iatrogenic nihilism proposed in Medicine.

Having demonstrated the conceptual structure of Exercise and discussed its implementation, the third stage is the consideration of alternative paradigms (Chalmers 2020). In this instance the objective will be a re-interpretation of the *telos* of the exercise experience. The rationale being that a change in the professional purpose requires a corresponding shift in professional epistemology to meet this new goal. As Wilensky's (1964) model states, a professional is the gatekeeper of an epistemology to solve a problem. If the problem changes so must the knowledge to fix it.

Therefore, I present a concept of exercise counter to the current 'Exercise is Medicine' paradigm. Specifically, I argue for a re-conceptualisation through a biophilic objective. By this I mean that Exercise should include a metaphysics of existential wellbeing, and its professional paradigm should be a balance of *sophia* and *phronesis* for a *eudaimonic* outcome. To do this I draw upon Spinoza's neo-Aristotelian philosophy, with an emphasis on his notions of *conatus* and joy. I will make the argument that the missing metaphysical elements from Exercise's current concept are the consideration of perfection and the possibility of *hilaritas* achieved through an attitude of playfulness.[53]

I recognise that within methods such as Walker and Avant (1983) this stage often involves an identification a 'full range' of alternative concepts. Accordingly, the use of a single philosophical position (i.e., Spinoza) could be challenged. However, this singularity is defended on two counts. First, seeking a saturation of alternatives creates a descriptivist list, an approach that has been strongly critiqued as to its professional practicality (e.g., Paley 2019, Draper 2014, and Hupcey *et al*. 1996). Second, it will be demonstrated that elements of Spinoza's philosophy appear in contrast to the previously described Exercise concept. Ranging from the dismissal of dualism to challenges of idealism, his ideas sit in contrast to those of biomedicine. As a result, the limits of a single critical perspective are conceded, but this is deemed necessary to present ideas for professional pragmatism.

[53] It will be noted I have changed the writing style to include the use of first person were appropriate. This chapter is personal speculation and an opportunity to explore an idea from a sense of my own philosophic playfulness. I therefore forgo any pretence at objectivity.

Changing the telos of exercise experience.

> …just as we know that walking is continually checked falling, the life our body is only a constantly checked dying, a constant postponement of death: finally, even our mental activity is a continuously delayed boredom. Every breath we take wards off the perpetual onslaught of death; in this way, we struggle against death at every moment, and again at greater intervals, with every meal, every sleep, every time we warm ourselves, etc.
>
> Arthur Schopenhauer, The World as Will and Representation.

> There is incontrovertible evidence that regular physical activity contributes to the primary and secondary prevention of several chronic diseases and is associated with a reduced risk of premature death.
>
> Warburton, Nicol, and Bredin 2006 p801

> Overall, starting exercise in one's middle years lowers the risk of death by 23 per cent over the next two decades or so.
>
> The sportsperformancebulletin.com[54]

I find something Schopenhauer-esque about Exercise. Everything has become focused on the darkness. And participation has become something necrophilous to stave off our eventual demise for as long as possible; either through the delaying of decay or the management of diseases we already have. Exercise is Schopenhauer's project; a means of 'do not go gentle into that good night' as Thomas would put it. And this 'rage against the dying of the light' is exemplified in the Quantified Self movement: a phenomenon echoing Schopenhauer's pessimism wrapped in the Gnostic comfort of science. It is fundamentally a project to measure our efforts in avoiding the inevitable.

Yet, as Schopenhauer pre-empts in *The World as Will and Representation* happiness is always behind the cloud of today. We never live in the now, the now is never enough and correspondingly neither are we. As a result, the necrophilic *telos* of exercise becomes a fool's errand. And within Exercise this thanatological perspective has created an iatrogenic

[54] https://www.sportsperformancebulletin.com/endurance-injuries-and-health/endurance-health-and-lifestyle/longevity-exercise-helps-live-longer/ accessed 10/11/2022.

paradigm which chases rainbows. Hence, the current conception of Exercise may create more problems than it solves; as already stated, the Quantified Self creates issues of exercise addiction, eating disorders, anxiety, and physical dysmorphia. Thus, it is a health paradigm which paradoxically justifies unhealthy behaviours and the incessant striving to meet biostatistical ideals lies at the root of iatrogenic exercise.

Within their biomedical *praxis*, Exercise professionals are taught the centrality of this perspective. The Exercise science centralizes an ontology of a client in a state of perpetual conflict with biology. We must continually demonstrate measurable progress in physical capability and prove our *kalokagathic* worthiness: if not the Reaper awaits. If the exerciser achieves a standard of performance, they must be pushed to the next biostatistical level of performance. If three sets of ten repetitions of push-ups are achieved today, then three sets of eleven must be the goal tomorrow. It is not sufficient to enjoy the day, or our progression in terms of the *eudaimonic* self. The *telos* is the quantified objective. Thus, propagated by the 'Exercise is Medicine' message, more extreme means to demonstrate worthiness and control the uncontrollable emerge: "*no pain, no gain*".

I must emphasise that I do not advise accepting fate and neglecting physical activity. As said before, there is no intention to dismiss either the good of exercise or its scientific justification. Instead, the proposition is that participation can be conceptualised as *eudaimonic* as opposed to merely a project for longevity. And I have found that an interesting alternative emerges from a reading of Spinoza works. This is not to suggest that on examination other philosophers are inadequate for the basis of this rumination. Rather, Spinoza's ideas provide not only a conceptual counter but also ideas of practical solutions for the problematic dualistic, materialistic, and pessimistic elements underpinning biomedicine.

A Spinozean interpretation.

Repeating my concession with Aristotle, I will fail to present a complete discussion of Spinoza's works. This is a pragmatic exploration of his ideas as opposed to a critical philosophy of his works. But, as a minimum, I acknowledge I must at least defend the jump from Aristotle's intellectual virtues to Spinoza's perfection. Furthermore, I am conscious of accusations of 'cherry picking' simply to fit rhetorical needs and I understand that debate will emerge concerning the fact I present his philosophy as a form of neo-Aristotelian. Therefore, I begin with a brief defence of my interpretation of Spinoza before exploring his ideas in more detail as a means for a eudaimonic understanding of exercise participation. Specifically, this section is based on the argument that Spinoza's positive affect of joy is an alternative to a biomedical necrophilia.

An Aristotelian reading of Spinoza.

I realise that the consideration of Spinoza in an Aristotelian lineage is a contentious position. I acknowledge there are considerable differences between the two thinkers, and many would state that Spinoza rejects Aristotle's ideas. For example, in terms of ontology, Aristotle draws upon a dualism whilst Spinoza rejects this in favour of monism. Thus, Aristotle's notion of hylomorphism which separates reality into matter and form/ potentiality and actuality, stands in contrast to Spinoza's singular substance which demonstrates attributes and modes. Furthermore, in terms of divinity, Aristotle saw God as differentiated from the world, whereas for Spinoza God is nature, there is only one substance and hence his is a pantheist position.

Yet I would argue that such topics are for theological research or those attempting to identify metaphysical universals concerning the nature of reality. Such objectives are beyond the scope of this work. The intention is not to create an ontological discussion nor to generate a thesis exploring the proposition that Spinoza was a neo-Aristotelian. Rather, the objective of this chapter is to develop a philosophical alternative to the proposed dominant paradigm underpinning professional Exercise. To achieve this, I have purposefully focused on literature which supports the argument that Spinoza revises not rejects Aristotle. Hence, whilst I have utilised Gutmann's (1954) translation of *Ethics preceded by On the Improvement of the Understanding* as a foundation, I draw upon ideas

within Nadler (2020 and 2011), Lebuffe (2010), Scruton (2002 and 2000), Ravven (1989), and Harris (1973) to provide modern interpretations of the work. Accordingly, it will be evident I utilise arguments supporting the position that Aristotle's notions were a major foundation of Spinoza's work. For example, Ravven (1989) highlights Spinoza was "profoundly indebted to Aristotle" (p3), whilst for Scruton (2002) the *Nichomachean Ethics* is pervasive throughout his writings. This is not to dismiss other interpretations. I understand that others provide alternative readings, for example some interpret Spinoza as suggesting that his *eudaimonic* concept of perfection (*arete*) is found in transcendental contemplation as opposed to rational pragmatism (Gamlund 2010). However, I intend to maintain the holistic 'action-in the world' of the former citations. Hence, I accept I make little critical examination of the literature debating Spinoza's metaphysics. My purpose here is to create a challenge to a paradigm through a philosophy which can be shown to stand in opposition to some of its dominant tenants. Thus, I present a means for a practical answer to the problems highlighted previously.

Perhaps the factor most relevant to this thesis is the recognition that both Aristotle and Spinoza presented a philosophy that emphasised the importance of epistemology in obtaining human wellbeing. That is, they were rationalists arguing that one of the key factors to achieve the 'good' of an activity, and in life, was the development of greater knowledge and understanding. Furthermore, whilst they differed in the end objective of this rationality, they were both ultimately suggesting an *arete* to life based on a *eudaimonic* concept (Nadler 2020) It is conceded that, Aristotle's *eudaimonia* was a relationship with God as opposed to Spinoza's perfection, defined as individual's understanding of Nature and self-realization. Yet, these can be suggested as theological and semantic differences in describing a *eudaimonic* position (Nadler 2020). At their root, they present *arete* as an experience of wellbeing, happiness, or flourishing. For example,

> the Aristotelian/Spinozean tradition…perceived measures of happiness as an expression of the most inner human desire, as well as the most important aim controlling human action when happiness was interrelated with a virtuous life. Aristotle's theory of virtue is quite often compared to Spinoza's theory of ethics due to their similar bases, although their indicators of happiness are different. In Aristotle, it is bliss while in Spinoza self-preservation.
>
> (Jakubovská and Waldnerová 2020 p37).

Furthermore, it is suggested that Spinoza rejected Aristotle's concept of teleology. However, I would counter that it is not the case he dismissed the notion of individuals being teleological. Rather, as with his revision of Aristotle's *eudaimonic* definition to one of perfection, he similarly changes the nature of the concept of teleology from God to Nature. I acknowledge his philosophy is described as deterministic, but as Spinoza states in the *Ethics*, the final causes of action are based on an individual's desire and not an external God: "what is called a final cause is nothing but a human appetite insofar as it is considered as a principle, or primary cause, of something" (Book II/207).

Yet in stating this I would suggest that an appetite is an objective, a desire to fulfil the *conatus* creates a purpose for action. Thus, their undertaking is goal driven, i.e., they are teleological. As Sabin (1919) defines it, teleological "[indicates] a control other than mechanical and of the nature which we call purposive. It is the direction of action by meaning, by an end to be attained." (p489). Consequently, I would argue that Spinoza has simply changed the goal from being with God to being one with oneself and nature. Furthermore, despite this religious difference in terminology, both philosophers state that this *eudaimonic* objective is a relationship which also encompasses others and society (Jakubovská, and Waldnerová 2020).

It is based on these observations I propose that Spinoza's philosophy provides ideas for implementing Aristotle's epistemology into the education of Exercise professionals. As Scruton (2000) states, most philosophers start from considering a specific or "local" problem and work towards "an abstract picture of reality", however Spinoza works "from the axioms of an abstract theory…to the human reality and to the problems that his theory

is supposed to solve" (p140). As a result, I do not consider it inappropriate to attempt to apply Spinozean 'thinking' to the problem of applying Aristotle's abstractions: "Spinoza begins from the point where other thinkers end" (Scruton 2000 p140). Therefore, I take a pragmatic position that Aristotle provides a framework of what the education should include. The tripartite model of epistemology is the "abstract picture of reality". Through the practicality of Spinoza's *eudaimonic* notions I will propose how this might be done. Thus, as I will demonstrate, I consider the application of Spinoza's philosophy an extension of the Aristotelian lineage of my thesis.

However, the challenge in discussing Spinoza is separating his ideas into discrete concepts. By this I mean it seems common to 'isolate' elements of Aristotle's metaphysics. For example, the use of his intellectual virtues as an epistemic framework is possible despite the redundancy of other propositions. Yet, as stated by Lebuffe (2010), this is more difficult for Spinoza. His notions are interwoven, and best understood through a broader discussion of his thoughts. Therefore, I will briefly introduce Spinoza's wider philosophy.

A brief introduction the key ideas of Spinoza.

To Spinoza the universe is made of one infinite substance: God or Nature.[55] Thus, within Spinozean metaphysics this substance is shaped into a multitude of forms termed modes. A thing or object is merely a mode of Nature, a different 'shape' of the universal substance. Thus, humans, kittens, and tables are one substance but in a qualitatively different mode. They are the specific expressions of the substance. Additionally, we perceive that each mode has what Spinoza calls attributes: that is those elements which make a thing what it is. However, he suggests we can only observe two attributes: thought and extension, hence we differentiate between modes based on our recognition of factors such as size, sense perception and so on.

I acknowledge that some may describe this differently. It may be said that the substance has infinite attributes, of which we perceive extension and thought. And modes are the specific things and events that are 'created' from the attributes. I do not reject this. However, in developing this thesis, I interpret Spinoza's idea as suggesting that our

[55] To avoid theological connotations or debate the term Nature will be used throughout.

perception of attributes provides the descriptions we use to conceptualise a mode. That is, when we describe an object (mode) we present definitional essences and conceptualisation based on thought or extension (attributes). For example, in comparing humans to kittens or tables we describe physical, psychological, and behavioural differences, i.e., those characteristics which demonstrate the specific attributes of the substance contained in that mode. Consequently, perceptions of extension and thought allow us to differentiate each mode. Similarly, each person can be conceived of as a distinctive mode of Nature, whilst their unique looks, wit, and charms are our expression of their attributes. And accordingly, all activity such as exercise cane be described in a similar manner.

Therefore, at this point emerges the proposition humans only experience two key attributes of their 'self': thought and extension, i.e., mind and body. These are described as the perception an individual has of their own mode and of their relationship to the one substance. It is our understanding as to what we are, and the description we make of ourselves. But importantly, unlike Cartesian dualism, Spinoza's holism lies in the proposition that these perceptions are technically attributes of a singular thing.[56] Thus, to Spinoza, describing an attribute of the body reflects an attribute of the mind. As a result, being 'tall' leads to thinking as a tall person: a habit of stooping for conversation, concerns for vehicular leg space, and so on.

Consequently, our perception of each attribute simultaneously creates both a physical and cognitive impact. And, thus, Spinoza presents the concept of affects. Affects (passions or emotions) are considered the interpretation of our interactions with the world and the mental and physical states they create. They are the outcome of our attributes relationship with the world. Importantly, as I will discuss in more detail below, affects are considered the significant element in achieving *eudaimonia,* accordingly they are the basis of Spinoza's 'good' life. Simply stated, experiences of positive affects are those which enhance our opportunity for being, whilst negativity is created when we are thwarted in developing ourselves. Hence, the *eudaimonic* individual is one who can develop their actions for positive physical and mental states, and hence the affect of joy.

[56] I recognise that this position is more akin to the term monism. However, I have used the term holism as this will allow for an easier recognition of lineage with these ideas and the current thinking in Medicine, Coaching, and some areas of Exercise concerning the holistic impact of interventions (e.g., Vergeer *et al.* 2021).

It is through the notion of attributes, and within the concept of affects, that Spinoza introduces humanity's 'existential motivation' termed *conatus*: "each thing, to the extent it is in itself, endeavours to persevere in its being" (Spinoza 1954 p135, *Book III pvi*). In simple terms the human *conatus* is our instinct for survival. It is evident in our experiences of hunger, fatigue, and so on. However, the *conatus* is more often translated as a 'striving' as opposed to 'mere instinct' or 'will to live' (Lord 2010). And as humans it is our 'unique attribute' to be conscious of the meaning of our *conatus* and strivings. Therefore, to Spinoza, we need not be at the mercy of our instinct or the slings and arrows of fortune. We can rationalise how to achieve our 'persevere' and can act with self-determined purpose.

Importantly, in using Aristotelian terminology, the *arete* of the *conatus* is to be found in what Spinoza terms perfection, a concept described as a clarity of understanding Nature and the maximisation of the body for action. And it is the notion of perfection that holds a synonymity with Aristotle's *eudaimonic* existentialism:

> For he who passes from infancy or childhood to death is called unhappy, and, on the other hand, we consider ourselves happy if we can pass through the whole period of life with a sound mind in a sound body. Moreover, he who, like an infant or child, possesses a body fit for very few things, and almost altogether dependent on external causes, has a mind which, considered in itself alone, is almost entirely unconscious of itself, of God, and of objects. On the other hand, he who possesses a body fit for many things possesses a mind which, considered in itself alone, is largely conscious of itself, of God, and of objects. In this life, therefore, it is our chief endeavour to change the body of infancy, so far as its nature permits and is conducive thereto, into another body which is fitted for many things, and which is related to a mind conscious as much as possible of itself, of God, and of objects.
>
> (Spinoza 1954 p277*)*

Hence Spinoza describes the importance of action for lifelong physical and mental capability to achieve a sense perfection. To fulfil our *arete* we must nurture the body "*fitted for many things*," and by doing so we create a corresponding mind open to multiple possibilities. And so, our striving is for a fulfilment that allows us to understand the possibilities of ourselves, our environment, and Nature.

The ‘feeling’ of the need to fulfil this *conatus* is the basis Spinoza’s concept of desire, one of three primary affects. In psychological terms, desire is motivation. When we desire something, we act to fulfil that want. Accordingly, the other two emotions are consequences of these actions. Joy is the “passion [emotion] by which the mind passes to a greater perfection” (Spinoza 1954 p137 *Book IIIP11S*). Joy occurs when we perceive that we have been successful in moving towards *arete* and the *conatus* ‘feels fulfilled’. Thus, joy is most acutely felt when we move towards perfection and whilst it is often translated as happiness, it is more accurately reflective of Aristotle’s *eudaimonic* wellbeing.

On the other hand, sadness is felt in the reduction of our sense of perfection, though this is not necessarily defined in terms of failure. We can be successful in fulfilling a need, yet, upon its completion, we can feel ‘empty’ or that the task was without greater purpose. Reflecting upon this there can be a greater sense of ‘accomplishment’ in cleaning the house than completing a professional course; one did not move us closer to our sense of perfection than the other. And therein lies the crux of Spinoza’s model of human nature: we should seek action for joy and to avoid sadness. In doing so we move closer to the *eudaimonic arete* of life.

This seems straightforward: do what floats your boat. However, Spinoza adds caveats to this modest proposition. First, he emphasizes the difference between hedonistic and *eudaimonic* motivations. That is, our desires should seek to empower our capability to act, develop our attributes, and enhance our connection with Nature. As Spinoza writes in the *Treatise on the Emendation of the Intellect*, although hedonistic ventures such as partying and drinking bring temporary affective highs, they are immediately followed by lows.[57] They reduce our ability to act and fail to provide existential satisfaction. It was the recognition of the issues of a hedonistic *conatus* that led Spinoza to write his *Ethics* in the first instance (Nadler 2011). And it is interesting to note that this understanding of hedonistic versus *eudaimonic* motivation has emerged in contemporary psychology, with the former ‘pleasurable’ fulfilment deemed problematic for long-term wellbeing (e.g., see Vittersø 2016, and Behzadnia and Ryan 2018).

[57] Spinoza’s complete works: https://homepages.uc.edu/~martinj/Spinoza_&_Hobbes/English/Spinoza%20-%20Complete%20Works%20(2002).pdf accessed 20/08/2022.

Interwoven with this first caveat, is the consideration perfection can only be achieved through the experience of active and not passive emotion. Specifically, Spinoza states that we do not find *arete* through extrinsic impositions on our actions. And it is only in the move from passive imposition to active control of our personal desires that we find escape from despair and bondage (Harvey 1973, Lebuff 2010, Nadler 2020). Therefore, genuine wellbeing is only achieved when we take active control of the *conatus* and do not fall foul of passive or hedonistic desires. The active individual is one who masters themselves and their 'life'. As a result, the *telos* of all activity should be directed to this end. And, accordingly, Exercise should explore beyond its current biomedical conception for a similar *telos* in its exercise experiences.

> …it is apparent to everyone that I wish to direct all sciences to one end and aim, so that we may attain to the supreme human perfection which we have named; and, therefore, whatsoever in the sciences does not serve to promote our object will have to be rejected as useless.
> (Spinoza 1954 p6-7)

Exercise in Spinoza's terms.

In Spinozean terms, Exercise currently creates a bondage. Through the biomedical EBP, and the emergence of such practices as the Quantified Self, the exerciser has become externally driven and passive in the fulfilment of *conatus*. There can only be the despair there is always another step to take, repetition to complete, or workout to do. Thus, Exercise creates servitude to a Gnostic biological scientism and its technology. In this Schopenhauer-esque light, we fail to achieve our sense of perfection and *eudaimonia*. Consequently, the challenge is a Spinozean re-engineering of Exercise to create a *telos* based on perfection and joy.

The perfect exerciser.

Within *Book IV of Ethics: Of Human Bondage,* Spinoza discusses the concept of perfection:

> If a man has proposed to do a thing and has accomplished it, he calls it perfect, and not only he, but everyone else who has really known or

> as believed that he has known the mind and intention of the author of that work will call it perfect too. For example, having seen some work… we shall call it perfect as soon as we see the work has been brought to the end which the author had determined for it. But if we see any work such as we have never seen before, and if we do not now the mind of the workman, we shall then not be able to say whether the work is perfect or imperfect. This seems to have been the first signification of these words; but afterwards men began to form universal ideas to think out for themselves types of houses, buildings, castles, and to prefer some types of things to others; and so it happened that each person called a thing perfect which seemed to agree with the universal idea which he had formed of that thing, and, on the other hand, he called a thing imperfect which seemed to agree less with his typal conception, although, according to the intention of the workman, it had been entirely completed.
>
> (Spinoza 1954 p187-188)

Hence, perfection was once subjective observation. But, as Spinoza describes, we have shifted to an idealism. Rather than accepting *arete* as a personal experience, it is conceived through comparison to ideals, norms, and the expectations of others. This is both our bondage and despair.

As previously described, within Exercise, the collection of 'idealised' biostatistics is a hallmark of its biomedicalisation.[58] Within the professional epistemology, client testing is a key skill for the techno-rational process of analysis-diagnosis-prescription. Furthermore, exercise interventions seek to reposition an individual so their biological functioning "[agrees] with the universal idea". As a result, Exercise creates the means to demonstrate "a thing imperfect which seemed to agree less with his typal conception". That is, as discussed earlier, client analysis is a test of imperfection not potential for joy, and hence perfection. However, the notion that someone is inadequate is a suggestion that "Nature herself has failed or committed an error and that she has left the thing imperfect" (Spinoza 1954 p188). As a result, Spinoza's metaphysics raise two immediate challenges to Exercise.

First, there is the ethical question of iatrogenic issues in making explicit the imperfections of the individual. As previously stated, research has consistently demonstrated the correlation between self-esteem and behaviours such as eating disorders, exercise addiction, and performance–enhancing drug use (e.g., Hilkens *et al.* 2021, Corazza *et al.*

[58] See Chapter 6.

2019). Hence, striving to fulfil a *conatus* via passive activity which consistently records imperfection provides only sadness.

Second, Nature is perfect, and therefore we have a sense of our perfection at any given time. Furthermore, we each understand our potential for action to develop our perfection. It is true, each of us demonstrates a unique capability (attributes): faster, stronger, or bigger. But active joy is a personal experience of thought and extension synergy as we act to progress our current capabilities towards a deeper understanding of self, others, and Nature. Therefore, the *telos* of exercise should be the experience of personal progression as opposed to the 'fixing' of the imperfect biological machine.

Accordingly, the first step in re-engineering Exercise is to shift the professional *arete* to an aptitude of understanding an individual's capacity for joy. Professional expertise should demonstrate an understanding of *conatus* as opposed to an EBP of laboratory data analysis; the professional should be able to create an existential encounter as opposed to a forensic diagnosis. Therefore, the experience should open with the question of 'what can (or does) the client already do to engage both mind and body?' Instead of measuring deficiency, Exercise praxis can begin with the position that the individual is already perfect for exercise: "[an activity] purposefully undertaken with the aim of maintaining or improving fitness or health" (Faulkner and Taylor 2005 p4). After all, they have conceded they feel 'imperfect' by seeking the professional's help, why then use intrusive and impersonal techniques to rub salt in the existential wound?

There is a danger here that my comments are misinterpreted and that I am suggesting no analytic stage is required. Clearly, there are ethical issues that need to be addressed. Medical advice should be sought, and Exercise professionals must screen for dangers. But beyond the necessity of safety, the creation of data for a diagnostic assessment is iatrogenically problematic. Spinoza's philosophy reminds us that we can already act; we can already exercise via our current attributes. Therefore, the initial analysis should be of those attributes through which active joy can be created within personalised 'safe' exercise experience. It becomes a means for understanding and perfection, not diagnosis and prescription.

Joy in the exercise experience.

Until this point, I have presented Spinoza's conception of joy as a monolith. Yet, this is simplistic. As Spinoza recognises, we can feel a sense of joy when only one element of the *conatus* feels engaged. A sense of happiness can be felt in any success, from participation in jogging to the completion of a crossword. Therefore, a differentiation is made between complete, immersive joy, termed *hilaritas*, and partial joy termed *titillatio* (Breivik 2019). Consequently, the former is the synthesis of both thought and extension in the experience of joy, whilst the latter involves only a single attribute of *conatus*. And, in seeking perfection, *hilaritas* is the objective of a *eudaimonic* experience. This nuance in joy has recently been presented in Sport through Breivik's (2019) discussion of the philosophy of Arne Naess (1912-2009). In brief Naess is considered one of the founding figures in the deep ecology movement (Breivik 2021). However, Breivik (2019) explored correspondence with Naess on how sport could be reconceptualised for a better environmental morality alongside a means for *hilaritas.*[59]

The major requirement of Naess' conceptualisation is a transformation of Sport from competition and passive performance to a *telos* for immersive joy. For example, in considering running, Naess' switched his thinking from running 'fast' to achieve objective times, to running 'slowly' for a greater relationship with Nature:

> Instead he found his old boots and started to run more slowly so that he could enjoy the landscape and surroundings and could hit stones without hurting his feet. The consequence was an increase in activeness since his mind was able to take in the varieties and beauty of the surrounding landscape.
>
> (Breivik 2019 p76)

Thus, by creating a *telos* in which the goal is the experience of Nature, Naess creates a possibility for *hilaritas.* The objective is greater than mere movement, the mind and body can simultaneously apply their capabilities, alongside a potential for experiencing the world.

[59] I did reach out to Breivik to track down Naess' writing on this area. However, the former was reluctant to send details as it was undertaken through personal correspondence. Consequently, I am primarily reliant upon the 2019 paper to understand Naess' sports ideas. His books are focused on approaches to the environment and 'life', and do not present sport as a central concept.

Similarly, Naess illustrates the same *arete* in combat sports such as boxing. In these activities "learning to control emotions and increase empathy" in realistic but play like performances, as opposed to a brutality of combative fighting, can be achieved (Breivik 2019 p77). Consequently, Naess draws upon Spinoza's holism, and "the parallelism of the attributes means that movements of the body are linked to parallel movements of the mind" (Breivik 2021 p421). And in doing so the awareness of the self, others, and the environment becomes possible. As a result, Naess creates his eco- as opposed to ego- or anthropo-centric philosophy. We can learn to focus on our place in 'Nature' through activities such as sports by changing the *telos* to a Spinozean *hilaritas*.

At this point it is noted there is a resonance with Aristotle's *phronesis*. Naess' Spinozean philosophy suggests seeking *hilaritas* allows for not only a sense of joy in learning our own Nature but also an understanding of others. It is a means for connecting socially and environmentally. Therefore, it potentially creates a wisdom beyond knowing rules, skills, and technology (*sophia*). In engaging with a sport through a *telos* for joy we can utilise our full intellectual virtue. Thus, Naess would appear to imply that through *hilaritas* can emerge a sporting *phronimos:* a virtuous performer.

I will return to a link between *hilaritas* and *phronesis* later. However, at present, it is noted that similar Spinozean metaphysics can be observed within some areas of Exercise. For example, both Moshe Feldenkrais (1904-1984) and Joseph Pilates (1883-1967) produced exercise modalities emphasising the mind-body connection. Feldenkrais in particular demonstrates a Spinozean influence when stating: "to every emotional state corresponds a personal pattern of muscular contraction without which it has no existence" (cited in Sankay 2014 c14p2). As a result, although as yet limited in depth, there is a growing recognition of what have been termed holistic movement practices (HMP) within Exercise science (see Vergeer *et al*. 2021a,b, Vergeer *et al.* 2018)

Additionally, Exercise echoes the concept of *hilaritas* through its explorations of what are termed optimal or peak experiences. These include notions of mind-body synergy such as 'runner's high', 'being in the zone', and the highly influential concept of flow (see, Jackman *et al.* 2019, Swann *et al*. 2019, Moran and Toner 2017, Gallucci 2014). And in terms of perfection each of these has demonstrated a relationship to positive self-concept,

intrinsic motivation, exercise adherence, and wellbeing (see Jackman *et al* 2019, Swann *et al.* 2019). Thus, this avenue of research has led to the recognition that:

> Positive affect during moderate intensity exercise was linked to future physical activity, but post-exercise affect displayed a null relationship. That is, even though people typically feel good after exercise, **how people feel during exercise appears to be more important for determining subsequent engagement**. [emphasis added]
> (Swann *et al.* 2019 p87)

In summary, it is more motivational, enjoyable, and 'joyful' to feel good within the activity through optimal or peak experiences. And these are achieved in a manner echoing Spinoza's parallelism: the synergy of mind and body. Hence, the argument for seeking *hilaritas* within the *telos* of the exercise experience has precedent.

The missing piece: playfulness.

However, despite these observations, Exercise maintains a biomedical scientism. Within the EBP evidence-base peak experiences and spiritual considerations have been explained in terms of positivism (e.g., Goddard *et al.* 2021, Swann *et al.* 2018, Najah *et al*. 2017, Spittle *et al*. 2014, Ridnour and Hammermeister 2008, Murray *et al.* 2005, Dillon and Tait 2000). Thus, perceptions of 'joy' have been reduced to models of independent cognitive variables. And, as expected, explanations of a biological basis for the phenomenology of optimal experiences have emerged. For example, Alexander *et al*. (2021), Gold and Corciari (2020), and Cheron (2016), each discuss the impact, role, and implications of the neuroscientific basis of flow. Thus, through removing joy in the demand for physicalism, we have stripped exercise of its *eudaimonic* meaning and reached a point predicted by Metheny (1968) in which:

> The man-made movement forms called exercise have a good name but bad reputation. Theoretically, they are designed to serve the purposes of self-improvement. If they are appropriately selected and consistently performed they usually do have the desirable effect. But alas, although many people extol the self-improving virtues of exercise they find it realities boring, demanding, and tiresome; and even when they recognize their own need for its benefits, they forgo improvement in order to avoid its tiresome demands.
> (Metheny 1968 p84)

This is not to dismiss science or the intentions of EBP. Spinoza similarly attempted to merge the existential with the scientific methodology. Accordingly, "there can be nothing in Nature contrary to Nature's laws since all things come to pass by fixed laws, so that each thing must irrefragably produce its own proper effect*"* (Spinoza 1954 p21).

Yet, for Exercise, the issue emerges that on one hand there is a growing base of Nature's laws. On the other, their application can be perceived as tiresome, eugenic, and/or iatrogenic. The challenge is therefore the creation of a *telos* of *hilaritas* through active exercise experiences guided by scientific reason (Gamlund 2011). My proposition is that an alternative perspective to the current issues of the techno-rational paradigm can be found in the concept of play. Specifically, the attitude of playfulness can provide a new praxis for Exercise's professional epistemology. To defend this, I return briefly to Spinoza's perfection and Naess' interpretation of *hilaritas* in sport.

> For the human body is composed of a great number of parts of diverse nature, which constantly need new and varied nourishment in order that the whole of the body may be equally fit for everything which can follow from its nature, and consequently that the mind may be equally fit to understand many things at once. This mode of living best of all agrees both with our principles and with common practice; therefore this mode of living is the best of all, and is to be universally commended.
>
> (Spinoza 1954 p222)

Perfection is thus found in a capability for complexity, and *hilaritas* is achieved in activities that stimulate us with 'varied nourishment.' This notion of novelty already underpins the science of Exercise prescription. That is, professionals plan varied stimuli throughout a programme to ensure not only physical development but also motivation. Resultantly, Exercise has the potential to fulfil the needs of *hilaritas*. Yet, as demonstrated, current Exercise fails.[60] Through a Spinozean lens, this is due to standardised movements, homogenous activities, prescribed intensities, and an environment of idealism.[61] The

[60] At the time of writing SportEngland released the Active Lives Adult Survey November 2020-21 report (April 2022). Whilst the pandemic accounts for some negative, the level of 'active' adults has remained constant at around 62%, and those 'inactive' around 26% since 2016. But the report does state there are now 1.3m more inactive adults reported since Nov 2019. Therefore, despite the accumulation of a vast body of literature on exercise behaviour, especially motivation, I would argue Exercise is falling short of its overall mission.

[61] See also Andreasson and Johansson (2016) who argue that even in 'creative' modalities, there is a growing sense of standardisation and homogenisation which they liken to Ritzer's McDonaldisation.

participant is often trapped into exercises which isolate single limbs, specify precise biomechanical performance, and are experienced in strict set, 'rep,' and time dosages. Thus, whilst the body passively moves, the mind need only to count.

It this recognition which underpins Naess' reconceptualization. His approach removes such constraints, and specialised "pure bodily performance" (Breivik 2019 p72). Rather than being a quantified movement prescription, both mind and body are engaged with a constant use and exploration of different capacities and possibilities. *Hilaritas* emerges through this complexity. Hence, the argument for "playfulness rather than achievement" in sporting endeavours (Breivik 2019 p74). It would seem reasonable to propose the same playfulness in the exercise experience.

Defining playfulness.

In general, the concepts of play and playfulness have a large body of literature exploring their impact on wellbeing, ethics, and culture (see Maclean, Russell and Ryall 2021, Tonkin and Whitaker 2019, Maclean, Russell, and Ryall 2016, Sicart 2014). Yet, there is considerable ambiguity in both the definition and differentiation of the terms play and playfulness (Masek and Stenros 2021, Nesti 2019). As Nesti (2019) highlights, the performance of play may sit on a spectrum from pre-planned serious engagement through to spontaneous frivolity. Consequently, there is no universally accepted definition of each term.

For the objective here, a useful interpretation emerges from Mareš and Ryall (2021). In exploring the idea of a playful attitude in Sport, they demonstrate that the concept of play has both experiential and attitudinal dimensions. Consequently, the term play is used in an experiential sense to describe the type of activity undertaken, i.e., we play a game or sport. And, to play is commonly accepted as participation in an activity which is intrinsically motivated, exploratory, creative, immersive, risky, and an end unto itself. [62] From this it can be argued there is a relationship between play as an experience and both Spinoza's *hilaritas* and Aristotle's *eudaimonia*. Play is the active engagement of mind and body for a sense of personal wellbeing. As Sicart (2014) describes "To play is to be in the world.

[62] i.e., challenging or competitive as opposed to necessarily physically dangerous.

Playing is a form of understanding what surrounds us and who we are, and a way of engaging with others. Play is a mode of being human" (p1.).

Within the Exercise industry there are elements which reflect this notion. For example, Hargrove (2019) recommends techniques such as Animalflow™, parkour, and other creative pursuits to see "the world as a playground" (p109). [63] Similarly, activities such as Zumba™ and the Les Mills™ programmes, can demonstrate elements of creativity and holistic engagement. Therefore, despite evidence of 'product' homogenisation (Andreasson and Johansson 2016), these popular approaches can be suggested as echoing a sense of play. Additionally, the emergence of gamification, i.e., the application of the elements of games into non-game activities, has also been successful in the exercise experience. For example, van der Kooij *et al*.(2019) demonstrated that digital gamification of balance exercises improved experiences of rehabilitation programs. Hence, the positive impact of play and gamification on exercise adherence, motivation, and enjoyment has been evidenced (González *et al.* 2018, Kari *et al*. 2016, Miller 2013).

As a result, there is support for creating a sense of play in exercise through parallelism, immersion, and complexity. And, in these modalities the possibility of a *telos* unconstrained by the dominant prescriptive Exercise praxis emerges. However, I am not attempting to re-conceptualise exercise as play per se. Rather, my objective is to propose that to achieve the benefits of play, the professional requires a sense of playfulness. That is, they require an attitudinal dimension within praxis (Mareš and Ryall 2021). [64] An activity is only play if we perceive it as such, therefore we must approach the encounter with a playful attitude. And importantly, the professional must approach their praxis in the same manner if they are to develop playful exercise experiences. Therefore, my argument is that the intellectual virtue of a playful attitude is an element of Exercise epistemology that provides a means for generating the biophilic exercise experience.

Hence, the proposition is that the development of a playful attitude should enter Exercise education. How this could be achieved in professional education is the content of the following chapter. But here play is considered a method for the "struggle against the efficiency, seriousness, and technical determinism" (Sicart 2014 p5) of an iatrogenic

[63] https://animalflow.com/
[64] I consider the term playfulness synonymous with Mareš and Ryall's (2021) playful attitude and thus use the terms interchangeably.

biomedical model. And, to define a playful attitude I draw upon a recent systematic review by Masek and Stenros (2021) which conceptualised playfulness as:

1. a focus on engaging with the context in a form that is both emotionally rewarding and reinforcing.
2. an openness to the experience and "the attitude of adapting to a changing context" (p18).
3. the active framing, or reframing, a context to allow for the greater engagement by themselves and the social group.
4. the imagining of alternatives and suspending reality to engage with the 'non-real reality'. As they describe, for example using sticks for a knightly sword battle.
5. the unconventional manipulation of the conventional to create engagement, and an emotionally and socially rewarding activity. Importantly, as with element 4 it requires the capability to recognise many ways and ideas of doing the same thing.
6. the ability to take a non-consequential position in that the engagement of the activity fulfils emotional and/or intellectual reinforcement but there is no requirement for "goal-driven behaviour" (p20).

It is recognised that point 6 may seem problematic, exercise by definition is goal-driven. However, as stated earlier, the nature of emotional involvement during exercise determines positive participation (Swann *et al*. 2019). And as concluded by Masek and Stenros (2021): "Playfulness prioritises engagement over external consequence, realness or convention" (p23). Therefore, whilst the overall health 'goal' of exercise is acknowledged, it can be argued that through a lens of playfulness this is secondary to the experience during the activity. Accordingly, this concept sits in opposition to an Exercise education based on a deontological engagement with scientific instrumentality and a techno-rational praxis of analysis-diagnosis-prescription. Instead, the playful professional calls upon an epistemology which allows for a dynamic, active, and openness to "unconventional" possibilities in the activity. Thus, Masek and Stenros' (2021) conceptualisation reflects the Spinozean framework for *hilaritas* through an explicit integration of emotional, imaginative, and intellectual involvement. Hence, I propose that the *telos* of exercise experiences should be based on *hilaritas*, and the *telos* of Exercise education should be creating professionals with a playful attitude.

Conclusion to stage 3.

Maintaining a methodology of conceptual re-engineering, this chapter has been the presentation of an alternative paradigm to Exercise. The proposition has been made that Spinoza provides a counter-conception to the biostatistical *telos* of techno-rational Exercise. Specifically, Spinoza's idea of perfection creates an exercise *telos* of *hilaritas* for a sense of wellbeing. In pragmatic terms, Exercise professionals can re-conceptualise their praxis for this purpose through a lens of playfulness. Specifically, the playful attitude provides a means for the creation of a *eudaimonic* EBP. Therefore, in a re-conceptualised Exercise, exercise is a not a pill for 'pharmaceutical' ends, but an experience for the pursuit of perfection.

Thus:

1. The dualism of biomedicine can be reconceived through the holism of Spinoza's perfection.
2. Perfection can be defined as the achievement of mind-body synergy with the self, others, and society.
3. The motivation to achieve perfection can be conceived as the *conatus*.
4. The *conatus* is fulfilled when the desire to actively engage the mind and body simultaneously is fulfilled.
5. Exercise can be reconceptualised to fulfil exercise *conatus*.
6. The exercise experience can be joy when both mind and body are engaged in union for perfection: *hilaritas*.
7. Therefore, the *telos* of exercise should be the experience of *hilaritas*.
8. Play is a state of activity through which *hilaritas* can be achieved.
9. To create play in the exercise experience requires a playful attitude.
10. Exercise professional education should consider the means through which to develop a playful attitude.
11. Praxis should shift from 'analysis-diagnosis-prescription' to 'analysis-understanding-perfection'.

And "to sum up the matter in a word, all our actions and thoughts must be directed to this one end."
(Spinoza 1954 p6-7)

> How can we fit the science that is now so important to us into the general pattern of our lives without distorting anything?
> Mary Midgely, *The Myths We live By*.

I confess this chapter is my 'blue sky' moment. But based on the preceding analysis, my recommendation for practice can be summarised as a need to redress the balance of Aristotelian intellectual virtue to allow for an Exercise *phronimos* seeking an *arete* of *eudaimonia*. Accordingly, education should be based on a curriculum designed for *phronesis*. To do this I propose Exercise should conceptualise praxis as a project of epistemological virtue and recognise *hilaritas* in the exercise experience. Currently this requires a pedagogical shift from the teaching of laboratory technicians skilled in analysis-diagnosis-prescription, to the development of reflective and 'playful' practitioners capable of coaching for analysis-understanding-perfection.

Yet, as Mary Midgley states, the challenge is how to take these armchair ruminations from the desktop into practice without losing either the 'power of science' or existential capability of exercise. My argument is that teaching Exercise should begin with a change of methodology and switch "emphasis toward the moral purpose of the work" as opposed to "compliance with codes of conduct" and the scientism of EBP (Kinsella and Pitman 2012a p168). Therefore, my first recommendation is the 're-introduction' of *phronesis* into the professional paradigm through the development of a reflective practitioner. The second step is to change the professional praxis from a mindset of scientific techno-rational consultancy to of exercise coaching.

Phronesis.

> When [Sport] coaches find themselves in problematic, ethically challenging situations, the coaches with phronesis will not appeal to predetermined, universal rules for the right actions. Instead, they will approach the situation with a sound balance between universal principles and the particular characteristics of the situation.
> (Standal and Hemmestad 2011 p50)

To recap, *phronesis* is the intellectual virtue which synthesises *episteme* and *techne* for ethical action. As such it embraces both rationalism and emotion to direct the application of the other virtues (Dunne 2011). *Phronesis* is therefore the unification of the epistemology of the universal and particular into an excellence of praxis (Popovska 2022, Burbules 2019).

However, this virtue extends praxis beyond techno-rationality. It is a mode of virtuous reasoning which draws upon the ability to accept the confusion, complexity, doubts, and dilemmas that emerge in professional contexts, especially within what Polkinghorne (2004) terms practices of care. Thus, as Kinsella and Pitman (2012b) describe, in praxis there are always moments of aporia when, regardless of lack of certainty from a scientific evidence-base or code of conduct, the professional must act. It is in these moments that wisdom and the understanding of experience are the key epistemic virtues.

Importantly, *phronesis* is not merely directed towards an ethical *sophia*, it is the intellectual virtue which creates the sense of *eudaimonic* perfection. As Nicholson (2022) describes, working only to fulfil externally driven objectives will fail as there is no recognition of the possibility of self-knowledge or a greater good. Similarly, Kosma and Buchanan (2019) state that such technologies as digital fitness apps will generally be unsuccessful due to a loss of embodied experience, i.e., mind-body holism. Therefore, in Spinozean terms, *phronesis* requires a connection between the individual, other, and Nature. It is action based on "ethical values, judgements, and a sense of purpose" (Nicholson 2022 p200). And in being described as a meta-virtue (Kristjánsson 2022), *phronesis* offers "a discourse for practitioners, individually and collectively, to resist the moral compromise and despair that a focus solely on external goods may invoke, and that the trend toward pervasive technicism, instrumentalism, and managerialism may fuel*"* (Kinsella and Pitman 2012b p166).

Therefore, it is a means for excellence rather than mere function and allows the Exercise professional to move beyond analysis-diagnosis-prescription and develop an *arete* for perfection and *eudaimonia*.

Problems with teaching phronesis.

Despite the revival in interest for teaching of *phronesis* in Sports coaching and nursing, there have been critiques of its implementation (see Kristjánsson 2022, Kinsella and Pitman 2012a, Noel 1999). These seem to fall into two categories.

Techno-rational phronesis.

The first is an issue of techno-rationality. As Noel (1999) states early attempts promoted a rigid pedagogy which did not allow for the complexity and tacit insights within practical domains. Therefore, despite *phronesis* being a consideration of the 'particular', the teaching of this epistemological dynamism was ironically subsumed within the positivistic techno-rationalism it was intended to counter. This issue is more recently evident in an emerging body of work by the philosophical psychologist Kristjánsson and their team in which they argue that our understanding of professional *phronesis* is limited by lack of a measurable construct. (e.g., Kristjánsson 2022, Darnell *et al.* 2022, Kristjánsson *et al.* 2021, Kristjánsson 2021, Darnell *et al.* 2019). Hence, Kristjánsson (2022) describes their development of pre- and post- measurement methods during an educational intervention. And Darnell *et al.* (2022) discusses improvements for the self-reporting of a quantified 'virtuous' variable.

Yet, this positivistic reduction of *phronesis* appears incongruent with its original conception. Through this research it has become incorporated into the Gnostic scientism and techno-rational praxis it was conceptualised as an antithesis to (Sellman 2012, Kinsella and Pitman 2012b, Schön 1983). For example, if Kristjánsson and team find that certain antecedents of *phronesis* have not statistically improved relative to others post-course, will they implement 'targeted lectures' to plug the specific '*phronesis* gap'? If my scores in Kristjánsson's (2022) measurable '*phronetic*' elements of constitutive, emotional regulative, and integrative functions are epidemiologically acceptable, but my blueprint functioning is lower than the norm, do I need training in a new blueprint?

I concede I am unfamiliar with the pedagogy used, but there seems an implication each element can be 'ticked off' during the teaching process. Hence, *phronesis* appears conceptualised as an isolatable and quantifiable psychological construct. This seems

ontologically divergent from a meta-virtue that works in those moments of epistemic lacuna during professional practice, those moments of doubt when the professional draws on their wisdom as opposed to merely mechanical knowledge.

Furthermore, as Burbules (2019) argues, *phronesis* is a social construct. We can only develop this virtue through actions which recognise others. Consequently, in Exercise we seek professionals who act for the perfection of their clients and recognise the *conatus* of others. It seems difficult to get a measure of a psychological variable that could change in each moment of a social interaction. Thus, I take a similar position to Kinsella and Pitman (2012b) that "*phronesis* cannot be reduced to propositions; it cannot be instrumentalised. We know it when we see it, yet to put it into words is a challenge" (p163). Hence, a positivistic 'psychological variable' approach seems inappropriate within exercise participation.

Epistemic Reliabilism vs. Responsibilism.

The second issue is an epistemic problem of reliabilism versus responsibilism. It is the question of whether *phronesis* is found within the nature (reliability) of the epistemology or the practice of the responsible professional. And accordingly, should the teaching *phronesis* be of 'what should be done' or 'what would a good professional do'? (Sellman 2009, Marcum 2009).

Within Medicine the prevailing approach has been a focus on deontological *sophia*. Thus, praxis has been conceived of through the creation and implementation of a scientifically 'reliable' EBP. Accordingly, as Marcum (2009) describes, there is an emphasis on understanding epistemological reliabilism within physician ethics. That is, how good is the professional epistemology in answering ethical questions? As a result, education is dominated by the learning of a reliable and scientific *episteme* to provide moral answers in praxis. Similarly, in nursing, Sellman (2009) states that there is a need to recognise issues of distinguishing between acting ethical and being an ethical practitioner. And again, they argue the former objective is dominant in professional education.

Hence, professionals are taught ethics like any other subject, i.e., it provides an *episteme* of 'correct answers' to the *techne* question of what should I do? As a result, professional

ethics are taught as set of reliabilist instructions and axioms to be considered as dogmatic. There is little consideration of what a 'good' responsible professional would do in those moments of aporia. A position previously demonstrated in the texts and course materials for the Exercise professional, and one which underpin the described iatrogenic exercise experiences.

A synthesis: The professional phronimos.

As Burbules (2019) discusses, part of the problem is *phronesis* is a complex combination of the learned and the experiential learning. Thus, in line with Sellman (2009), I perceive this virtue as a synthesis of both the reliabilist and responsibilist epistemic foundations. That is, according to Aristotle intellectual virtues are traits accumulated through consistent virtuous action to achieve *arete*. As such, *phronesis* is an intellectual virtue that is the outcome of habitually attempting to apply *phronesis*, hence Burbules' (2019) consideration it is both learned and learning. We apply what we currently know and gain a deeper *arete* of *phronesis* through our "experiences of difficulty, of success and mistakes, of being 'stuck' and not knowing what to do" for a greater good (Burbules 2019 p135). This argument is reflected in Sellman's (2009) conceptualisation of the professional *phronimos* as a practitioner that…

> knows what it is they need to know and what they need to be able to do;
> knows what it is they already know and what they already can do;
> knows what it is they do not yet know and what they cannot yet do;
> knows how to go about learning what it is they do not yet know and how to learn to do that which they cannot yet do; and (perhaps most importantly)
> is willing to act so as to rectify their knowledge and competence shortcomings…
>
> (Sellman 2009 p86)

Thus, I conceive of the teaching of *phronesis* as beginning with a personal epistemic project rather than the learning of ethical axioms.

However, I recognise this adaptation of Sellman's (2009) *phronimos* could be argued as merely a re-wording of support for biomedical EBP. That is, by developing academic skills, Exercise professionals would engage more effectively with the profession's

literature base as recommended by Jollet *et al.* (2022) and Bennie *et al.* (2017a). They would know what they know, do not know, and how to go about learning to rectify their knowledge. But, as Sellman (2009) describes, the *phronimos* should be capable of understanding not only the reliabilist elements within their epistemology, but also recognise that praxis "can never be reduced to simple or prescribed responses to the situations in which individuals find themselves" (p86).

Hence, in the teaching of Exercise for *phronesis* there are two key objectives that could be implemented. First, students should be taught effective skills of reflection as opposed to literature reviewing and academic research. Second, the praxis should be developed through a process of coaching not consultancy.

Reflective practice:

> Reflective practice is a state of mind…It enables us to make illuminative sense of where we are in our own practice, and our relation to our profession and our institution: we don't travel far without it. Yet it makes the difference between 20 years of experience and merely one year of experience repeated 20 times.
> (Bolton 2014 p1)

The roots of this epistemic activity date back to the original Socratic method, however in a contemporary professional context it is more often linked to the work of Schön (Bolton 2014, Rolfe 2002). For Schön (1983) reflection is the epistemic competence to deal with the issues within unstable professional contexts through an ability to interpret personal knowledge and experience. And based upon models such as Gibbs (1988) and Kolb (1981), a body of literature has emerged explaining how to reflect and develop this skill (e.g., see Launer 2022, Bolton and Delderfield 2018, Bassot 2015). Unsurprisingly, within the field of 'Sport & Exercise' there has been considerable interest in reflective practice as a tool for professional development (see Cropley *et al*. *forthcoming* 2023, Knowles *et al*. 2014). For example, it is now considered a central tenant in practitioner development for Sports professions such as coaching (Cushion 2018).

As an epistemic competence, reflective practice is described as the ability to draw upon knowledge from the two cognitive elements of reflection and reflexivity (Bolton 2014). The former element is how the 'reflector' answers the question 'why did that happen?'. As

Bolton (2014) describes, the experience is considered through different theoretical and hypothetical lenses of "significant theory and texts from the wider sphere" (p7). Importantly, reflection allows the practitioner to recognise the limitations of the espoused *sophia* and close the academia-professional gap (Fook 2007). Thus, it creates a criticality towards the professional epistemology and provides the *phronimos* the means "to rectify their knowledge and competence shortcomings" (Sellman 2009 p86).

On the other hand, reflexivity considers the meaning and ethical limits of personal knowledge. Consequently, it is defined as the examination of our own biases, assumptions, and epistemic judgements (Fook 2007). And is a questioning of "attitudes, theories-in-use, values, assumptions, prejudices and habitual actions; to understand our roles in relation to others" (Bolton 2014 p7). However, it is not merely inward and self-directed. Reflexivity involves recognition of "the connections with social and cultural understandings" (Fook 2007 p443). As a result, it is a consideration of how epistemic decisions are determined by the context. And, thus the relationship between *phronesis* and reflective practice becomes evident, with *phronesis* being conceived of as the outcome of epistemic reflexive reflection. (e.g., Tovey and Archibald 2023, Kinsella and Pitman 2012a, Sternberg and Jordan 2005, Schön 1987, and Schön 1983). Hence, "if phronesis is a goal, then education about ways of engaging various types of reflection in professional life is proposed as a cornerstone of the structure of professional education and of the educational experience of students" (Kinsella and Pitman 2012b p169).

Teaching reflection in Sport and Exercise.

Regrettably, as is the influence of a Whiggish academia, the teaching of reflective practice within Sport and Exercise has 'succumbed' to the tenets of techno-rationalism. As described by Cushion *et al.* (2022), Cushion (2018), and Borrie and Ryall (2023 *forthcoming*), the concept of reflective practice has become another scientific process, a mechanical cognitive exercise. Accordingly, the epistemic skill is undertaken in a linear scientific manner through the application of defined models and systems of thought, e.g., Gibbs and Kolb. It is "presented within assumptions bounded by positivistic epistemology with sequential steps, rational justification and measurable and observable outcomes" (Cushion 2018 p84).

Furthermore, the self-reflexivity required for a deeper epistemic understanding is often dismissed (Fook 2007). Instead, students are taught to 'fill in the blanks' of each box within the chosen framework, with little consideration for authentic reflection beyond the application of *sophia.* For example, as Kilgour *et al.* (2014) describe, often students simply write what they feel the teachers wish to hear or which sounds scientifically 'correct' for that situation. Consequently, reflective practice is merely EBP in which the student is taught to question the 'why?' of the situation through a comparison to the profession's *gnosis.* Hence, the development of reflexivity and subsequent *phronesis* are limited.

This educational academia-professional gap is further demonstrated in Kilgour *et al.'*s (2014) discussion of teaching reflective practice to HE Sport and Exercise students. Specifically, they describe their debate on when the most appropriate time would be for introducing this skill. Following observations from previous literature they suggest that the final year of undergraduate study would be most effective and "the case is made for how students are able to see the benefits of reflective practice in skill development once they leave their studies" (p72).

However, in making this statement Kilgour *et al.* (2014) imply reflection can only occur once a student has sufficient *episteme*. That is, without adequate scientific knowledge students will be unable to reflect upon their praxis. To introduce this practice in the first year of study would be deemed ineffective. Resultantly, students attending HE courses in Sport and Exercise are described as the same 'empty vessels' as Sports coaches into which the 'truth' of Sport and Exercise needs to be poured (Cushion *et al.* 2022). Hence, it is only once the 'true' professional *gnosis* has been obtained can the student understand the 'real' praxis of the profession. Therefore, students are only able to reflect upon and understand their sports and exercise experiences when they can do so via science. Personal understanding, affect, and reflexivity are dismissed as inappropriate elements this epistemic skill. Thus, again, reflective practice demonstrates the assumptions of Gnostic scientism.

This is problematic as not only does it result in reflective practice becoming a paper exercise in academic capability, but it resorts to a deontological EBP in which the metaphysics of *phronesis* are dismissed. The stance is one in which the answers to an individual's meaning, interpretation, and understanding lie in the scientific evidence. And

therefore, education is the delivery of science from teacher to novice. A top-down process of axiomatic learning. As in coaching this creates a situation of "acquiring knowledge from experts and neatly packaged modules are based on the pervasive idea of coaching expertise following a linear novice-expert continuum, alongside cognitive/acquisition metaphors and bio-scientific rationalities" (Cushion *et al.* 2022 p846).

Thus, reflective practice is taught as the skill of comparing a professional outcome to the 'truth' of the academic theory once the practitioner has gained sufficient qualification in the professional *episteme* (Kilgour et al. 2014). The consequences of this techno-rationality and scientism have been presented. And so, I propose that professional Exercise education should not consider reflective practice as the end objective but a starting point. Reflective practice should be an epistemic project day one, hour one for Exercise professionals.

Reflective practice in the Exercise classroom

At present, professional Exercise education begins with a cadaverous *episteme* which forms an EBP of analysis and diagnosis in a prescriptive *techne*. The process is one which can be likened to an acolyte becoming inducted into the secrets of the professional *gnosis*. Any previous epistemic understanding is either dismissed as 'non-academic' or converted through scientific processes into the 'correct' Gnosticism paradigm. Additionally, student epistemic skills are measured by the strict boundaries of worksheets and multiple-choice exams alongside the alignment of praxis to a techno-rational marksheet for practical examinations. Hence, praxis is presented in deontological terms and the student develops experience by 'reflecting' on the outcome of their EBP decision making.

However, to re-introduce *phronesis* and shift the process from laboratory technician to *phronimos*, students should begin with a personal exploration of previous experiences, their values, meanings, and sense of *arete*. By this I do not mean the usual icebreakers of 'why are you on the course?'. Rather, from hour one students should be encouraged to develop reflective practice through an initial understanding of their own experiences and self-reflexivity. The first activities on the course should mimic processes of autoethnographic self-reflection. The students should create detailed narratives of their

exercise experiences via a personal phenomenological case study. A form of epistemic bracketing through which students determine their personal assumptions, 'biases', and values. This would bring about three epistemological changes required for the development of the Exercise *phronimos*.

First, it would create case studies based on personal engagement with lived experiences. Thus, as the course progressed, and students subsequently developed detailed *sophia*, they have a natural reflective point: how does this theory explain my experiences? how could I use this area of research to solve the problems I have observed? Therefore, rather than teaching academic skills echoing HE research methods modules as suggested by Jolley, *et al.* (2022), Bennie *et al.* (2017a), Armstrong and Kraemer (2016), and Zenko and Ekkekakis (2015), students would engage in analytic reflection through genuinely understood lived experiences. Furthermore, it is through these explorations we would begin to find solutions to Williams *et al's* (2018) call for greater ethical consideration in the prescription of exercise. Through lived experiences of decision-making and judgement the ethical implications of exercise would be recognised. Hence, this creates genuine engagement with *phronesis*. Furthermore, this would generate not only greater understanding of applied Exercise but also a professional criticality and consideration for the scientific limitations of the evidence-base.

Second, this approach would develop a greater sense of reflexivity and consideration of not only personal motivations but also the interpretation and experiences of others. Using collective teaching, the sharing of experiences allows for the understanding of the social aspect of *phronesis*. That is, through shared explorations that the impact of personal interpretation, cultural, social, and contextual impacts on professional epistemology can be understood. Thus, a reflective practice would allow Exercise practitioners to recognise both the universal and the particular within their own axiology. Consequently, students can acknowledge the limitations of creating a praxis which assumes the stability of practice. Hence, the contextual nature of epistemology in complex practices and the problems of working with people in unstable situations becomes apparent (Schön 1983).

Third, I suggest the creation of reflective narratives would develop a holistic perception of the *conatus*. In describing first-hand experiences, the terminology and stories would create a sense of both t*elos* and *arete* beyond the reductionism and mechanism of biomedicine.

Specifically, a Spinozean mind-body synergy and encounters with *hilaritas* would inevitably emerge; those on Exercise courses enjoy exercise. However, regardless of terminology, familiar 'peak experiences' would describe an ontology beyond the dualism of the 'dead body'. And students would come to recognise the embodied motivations and values underpinning their exercise participation. Accordingly, a shift from the necrophilous to the biophilic could be a natural consequence of such discussions.

Importantly, my recommendation of a reflective starting point 'flips' the learning from a top-down, teacher as scientific expert, pedagogy. Instead, the objective is the development of reflective practitioners through an exploration of personal epistemology. The 'teacher' in this case is seeking to mentor the existential *arete* of a *phronimos* who is empathic to the impact of epistemology both to the self and others, as opposed to enforcing the diagnostic skills of a laboratory technician.

Establishing epistemic playfulness.

There is a danger that this pedagogical approach again reverts to scientism. That is, narratives are dissected to present scientific explanation and students are taught the 'right' answers as to why their experiences happened. The result being reflective practice is reduced to a techno-rational EBP as previously observed in Sport and Health professions. Hence, Sellman (2012, 2009) argued that teachers should not be 'narrow' academic experts in the professional *episteme*. Instead, educators should themselves be *phronimos.* They should identify with, and be able to model, the intellectual virtues expected of the professional *arete*. Therefore, there is a need for educators with not only academic qualification but also experiences of Schön's swampy lowlands and the *phronesis* of the profession, i.e., Exercise should be taught by those who can talk the talk and have walked the walk.

However, whilst I agree with Sellman's (2009) argument for an educational *phronimos*, I would add to this proposition the need to recognise that exercise provides an opportunity for *hilaritas* unavailable in other contexts. That is, the exercise experience has a distinctive route to wellbeing not achievable through medicine, nursing, or sport. Therefore, Exercise requires a unique philosophical approach in its recognition of 'exercise *phronesis'.* This

uniqueness I have already proposed is found in the concept of play. As a result, a re-formulisation of Exercise's education should include a consideration of the playful attitude. Specifically, in developing *phronesis* through reflective practice, the Exercise *phronimos* should use a virtue of epistemic playfulness which Nguyen (2022) defines as:

> a disposition to explore ideas for the value of the exploration itself. The ramblings of intellectual playfulness are not guided, in their particular movements, by a hope of finding a truer and better theory. The intellectually playful person tries out ideas because the process is fun or pleasingly wild, or because the ideas are beautiful.
> (Nguyen 2022 p2).

Thus, epistemic playfulness is a virtue in which the professional demonstrates the skills of perspective shifting, exploration, intrinsic engagement, alongside a sense of fun and imagination, whilst engaging with their *episteme* for praxis. (Nguyen 2022). And importantly, this virtue is described as a means for avoiding problematic epistemic traps, epistemic bubbles, and echo chambers that arise from scientism (Nguyen 2022, 2018). That is, this playful mode of thinking which allows the professional to avoid the academic dogmatism that leads to the avoidance, dismissal and ignorance of alternative ideas and counter evidence. Hence, I interpret this virtue as way of reflection in which the narrative is examined in light of both the *episteme* but also all personal theories, beliefs, and anecdotes. Every idea no matter how frivolous or absurd can be expressed, explored, and discussed in an epistemically playful manner. In doing so the boundaries of *episteme* and *techne* can be expanded or rather crafted to the *telos* of praxis.

To my mind the best example of this disposition is found in the work of Paul Feyerabend. Labelled the 'worst enemy of science' and often dismissed as being an advocate of pseudoscience, this philosopher created controversy through his provocative defences of witchcraft, voodoo, and astrology (Kidd 2016). However, on a deeper reading of his work, I would argue that Feyerabend was no doubt controversial but was using a sense of epistemic playfulness to challenge the dominance of scientism. For example, his text '*The Tyranny of Science*' is a direct challenge to science's arrogance and lack of understanding of its ideological impact (Feyerabend 2011). Thus, although Feyerabend's approach may have been unusual, and at times mischievous, his work demonstrates that his playfulness got closer to the integrity of science due to this lack of regard for convention (Kidd 2016).

Upon reading his works there is a sense that we should acknowledge that epistemic play creates an opportunity to add to the ontology of a phenomena regardless of the source of the idea. In simple terms, if it helps develop understanding and ethical progress, where the thought comes from does not matter even if it turns out to be false.

And it is this sense of epistemic playfulness that I interpret as bringing two advantages to the Exercise *phronimos*. First, through a 'joyfully ramble' around the student's reflections the dogmatic nature of the Exercise paradigm can be challenged. As a result, instead of dismissing non-scientific exercise experiences as "a questionable trend"(McGill and Montel 2017 p8), an authentic consideration of the particular and the universal can be developed. The epistemically playful professional can maintain an open-mindedness to opportunities dismissed in scientism and explore beyond the *gnosis*. Furthermore, by examining their own meanings and values through a playful reflexivity, the professional would see an ontology beyond biology and mechanism. Consequently, praxis can avoid the 'Exercise is Medicine' epistemic trap that all exercise participants can be reduced to biostatistical norms and the assumption that those with the same 'disease' require the same prescription.

Furthermore, as a methodological virtue, this epistemic play can be an adjunct to the demands of academic research methods. Practitioners can still maintain a sufficiently scientific approach to the questionable fitness fashions that materialize in the industry. However, rather than seeking the ideal meta-analysis to justify praxis as per Armstrong and Kraemer's (2016) suggestion, professional judgement can include considerations of existentialism, ethics, and personal integrity. As stated, the intention is not to dismiss science. But epistemic playfulness allows for the recognition that *phronesis* requires the wisdom derived from multiple forms of knowledge. Consequently, in teaching playful reflection students recognise those epistemological frameworks which echo Aristotle, Dewey, Polanyi, and Schön. Thus, following the skill of Feyerabend, an Exercise professional should be able to defend the seemingly contradictory and paradoxical use of slow motion and explosive training, bodyweight and Olympic barbells, AnimalFlow™ and vibro-plates, and all similar combinations of exercise activity that can be achieved through epistemic playfulness.

Second, building upon the previous statement, the use of epistemic playfulness in the classroom is a prelude to play in the exercise experience. Specifically, *hilaritas* is a mode of experience exemplified in play derived from the joy of mind-body synchronicity. And, to achieve play the practitioner must approach the creation of exercise in a playful manner. Hence, this process begins with a sense of playfulness towards one's knowledge of professional practice. And it can be suggested that to achieve this requires an educational approach combining Sellman's (2009) *phronimos* with Masek and Stenros' (2021) model of the playful attitude. As Masek and Stenros (2021) describe, the playful attitude is one in which there is the ability to shift perceptions, manipulate the conventional into the unconventional, and create greater engagement through understanding the emotional, social, and intellectual potential within an activity.

I would argue this attitude can be taught through the combination of epistemic playfulness and reflective practice. Such a pedagogical approach could allow Exercise students to explore possibilities, reframe experiences, and consider the nature of rewards beyond the biological. However, as stated, the intention is not to teach this through a scientific EBP lens, the idea would be for the free flow of ideas. Students should be encouraged to express any thoughts, experiences, or knowledge they can bring. This should also involve the suspension of 'reality' and thus allow students to look beyond the 'instruction manual' of equipment and movements, i.e., the 'tin of beans is a dumbbell' approach. The teacher can then model the virtuous *phronimos* by helping the students explore which ideas would be beneficial, which limited in effectiveness, and which unethical. And, by teaching this playful attitude, the exercise experience can be conceived of as play leading to peak experiences for *eudaimonia*. In simple terms, it would develop skills to avoid the epistemic trap of teaching and prescribing to the textbook. Or as Feyerabend might state, if it meets the client's *telos* of exercise safely, then anything goes.

Coaching not consulting.

Drawing on a pedagogy of reflective practice, Exercise professionals can be introduced to the nuances of the *phronimos*. Through a consideration of their own phenomenological *lebenswelts*, students can explore the relationship between reliabilist and responsibilist epistemic positions. Furthermore, a playful approach recognises the issues of a dualistic

model of Exercise. Thus, through understanding *phronesis* the opportunity for *eudaimonia* emerges.

However, within Exercise the 'otherness' of *phronesis* needs to be acknowledged. As discussed, *arete* is not developed in isolation of the self. Hence, in Aristotelian terms, *phronesis* involves the judgement as to the impact of actions on others, it is always aimed at human good (Jenkins *et al.* 2018). And for Spinoza, perfection is achieved through the synthesis of the self with both Nature and social environment. Therefore, whilst a professional may effectively develop their *episteme* through reliabilist rationalism, there is a need to consider a responsibilism for the 'other' in praxis. To achieve this Exercise praxis should be reframed from a techno-rational consultancy to coaching for participant perfection.

Coaching in Exercise.

I recognise I am not original in the argument for the use of coaching in Exercise. There are texts such as Sforzo *et al*. (2015) and Gavin (2018) which attempt to apply lifestyle and personal coaching to the exercise experience. Furthermore, the ACSM (2022) acknowledges the importance of coaching techniques in the client intake interview "with effective coaching skills, Personal Trainers can provide social support and professional expertise along with increasing the client's perceived ability to achieve goals and obtain optimal satisfaction and personal fulfilment." (p251).

However, it is apparent whilst the term coaching is used in Exercise education, through the influence of its biomedical paradigm, this praxis is once more reduced to a set of discrete communication 'tricks and techniques' to "elicit positive behavioural outcomes in clients" (ACSM 2022 p251). For example, in describing these skills, both the ACSM (2022) and the L3 teaching materials reduce them to the discrete techniques of active listening, verbal and non-verbal communication, and the use of empathy. As a result professionals are taught that whilst using the skill of active listening to ensure to make eye contact, nod the head, and restate the important comments made by the client. Similarly, the NASM (2022) describes these skills as Behavioural Change Techniques (BCTs) and provides a table in which "Desired Outcomes" are linked to specific interventions. For

example, it is suggested to achieve “Improved self-efficacy” the practitioner should “Set specific tasks” or “provide instructions” (see NASM 2022 p87). Furthermore, it is advised that interventions are linked to Prochaska and Velicer’s Transtheoretical Model of Behaviour Change. Thus, each identified client stage has a set of aligned motivational and BCT techniques. Accordingly, the Exercise professional should become proficient in a *techne* of psychological analysis, diagnosis, and prescription inline with the physical counterpart of their work.

The outcome is that coaching in Exercise is often presented as a set of techno-rational actions to be applied in a no different manner to the determination of physical exercise prescription; it is a set of skills for eliciting sufficient client detail and data for the diagnosis of the specific ‘fitness disease’. Therefore, inline, with the philosophy of scientific Gnosticism, such psychological techniques are used by the Exercise professional to change a behavioural issue. Exercise professionals are taught a set of techniques to ‘impose’ on the client no different to prescribing the squat, press-up, or treadmill.

Furthermore, whilst the communication skills of coaching are recognised as useful, they are secondary to the scientific capability for fitness testing, psychological measurement, and data analysis. Accordingly, there is little surprise that such considerations are discussed in less than 15% of the analysed course and only 11.2% of the ACSM (2022), 8.8% of the NASM (2022), and 2.4% of the NSCA (2022). Thus, whilst the term coaching is used in key texts and educational materials, the nature of its application is merely an extension of a scientific process within a psychological perspective.

Eudaimonic Exercise coaching.

As described, Exercise praxis is taught through a structured linear process. This is reflected in the teaching materials for collecting and interpreting client data and exemplified in the increasing biostatistical ontology within key textbooks. Hence, through a biomedical pedagogy, students learn to dissect, distort, and reduce participants to a ‘flawed’ biological unit ready for the prescription of the ‘miracle’ drug. However, a *phronimos* coaching paradigm would allow for lived experiences of *eudaimonia*. By exploring the role of meanings and values, practitioners can recognise that participants are greater than their

sum of biostatistical variables. As previously considered via Spinoza, clients are already the perfect exerciser, they are an individual replete with the capability and epistemic skill to fulfil their *conatus*. Therefore, rather than Medicine's cadaverous ontology of a 'dead body' to be dissected and manipulated, the participant becomes autonomous and empowered in co-creating a playful exercise experience. The Exercise professional is no longer taught to be an autocratic instructor seeking diagnostic data, they become a collaborative coach for mutual *arete*.

As a result, there is a need to create a paradigm shift, and to begin Exercise coaching should be defined through the recognition that "c*oaching is fundamentally about helping people fulfil their potential by allowing them to recognise the things that hold them back and by helping them discover ways around them*." (Somers 2007 p10).

Arising out of this philosophy is the recognition that a professional is not there to consult, impose, diagnose, or instruct (Bachkirova *et al*. 2010, Starr 2008, Somers 2007). As described by Somers (2007), coaching stands in opposition to the current biomedical Exercise praxis. That is, rather than professional-participant interactions being a method for collating data for a laboratory cosmology, the goal is client empowerment. Consequently, the conversation is one in which both the professional and participant collaboratively reflect to explore the 'client'. The intention is to develop an ontology of the client as a person through a phenomenological understanding of their 'biopsychosocial' and existential nature.

Therefore, Exercise coaching develops an understanding of a participant's potential for Spinoza's perfection as opposed to a focus on biological performance: "coaching is unlocking people's potential to maximise their own performance." (Whitmore 2009 p10). As described in Spinozean philosophy, the starting point is not one of 'disease' but a "human development process" (Bachkirova *et al*. 2010). Thus, the process is one in which the client is coached to develop their own strategies and capability for action as opposed to an experience of bondage within the ontology of a scientific Exercise. The professional does not impose the *episteme* for a diagnostic process of exercise prescription. Instead, they utilise an epistemic expertise to coach the participant in creating an effective understanding of those exercise experiences which would fulfil their *conatus*.

The outcome of a coaching paradigm would thus allow for an epistemically playful encounter. In a collaborative professional relationship, open-mindedness, imaginative, and personally meaningful ideas could be playfully explored outside the boundaries of a *gnosis*. The Exercise professional is not merely a teacher of exercise *episteme* and the exercise experience is not a one-way, 'top-down' mechanistic process. Instead, practitioners are the facilitators of existential *arete*. Furthermore, the Exercise *phronimos* is virtuous not only in their own actions, but also seeks to develop the capability of virtuous reflection of their participants. Through an educational approach that develops playful reflectivity and reflexivity, both professional and participant can create a *eudaimonic* experience. The shift is from the 'expert instructor' to a 'therapeutic relationship' in which "one of the major roles of a coach is to help their clients reflect, [and] which can foster behaviour change and enable sound decision making" (George 2021 p7). As a result, through coaching a genuinely collaborative approach to the exercise can be achieved that provides an *arete* beyond biology. And thus, it allows for both professional and practitioner to seek Spinoza's perfection.

This project has echoes in the related fields of Medicine, Sports coaching, and Sports strength and conditioning. Specifically, I recognise that the outcome that I am proposing is the appreciation of the exercise experience as a therapeutic relationship. Therefore, in line with nursing (e.g., Ryan 2022, O'Brien 2001) and physiotherapy (e.g., McAbe *et al.* 2022, McPherson 2011), I present the notion that the *arete* of a health activity is achieved not merely through material or extrinsic action, the fulfilment of 'healing' and wellbeing are fostered through the professional relationship. Although there is considerable divergence in terminology, I would argue these 'mechanisms' of the therapeutic relationship also lie at the heart of recent shifts in Sports coaching and strength & conditioning practices (e.g., see Cassidy *et al*. 2020, Jeffreys 2020, Lyle and Cushion 2016, Nesti 2004). Thus, there is an increased recognition of humanistic and existential coaching, the coach-athlete relationship, and the development of athletes described as a process of 'gardening' as opposed to an 'engineering project' (Jeffreys 2020, Nesti 2004).

As a result, Exercise professionals should reflect these elements of the related health domains if exercise is to achieve medicinal outcomes. Specifically, there is a need for a therapeutic relationship through coaching as a means to develop the *arete* of the Exercise *phronimos* and the responsibilist elements of the virtuous practitioner. However, there is

also the need to recognise exercise's unique *telos*. The participation in exercise can fulfil a participant's *conatus* through experiences of *hilaritas* and experiences of play. This is an element unique to Exercise and should be reflected in the professional paradigm. Accordingly, the epistemology of Exercise should reflect this uniqueness, and embrace the philosophy of playful coaching within its praxis.

Summary of recommendations

In summary I propose that Exercise education needs a re-balance of Aristotelian intellectual virtue if it is to avoid an increasing iatrogenic experience. This requires the explicit re-introduction of *phronesi*s into professional education. In pragmatic terms Exercise education should not begin with the cadaverous *episteme* of Medicine but with a concept of reflective practice. This should be delivered through a lens of epistemic playfulness guided by Exercise's scientific, ethical, and experiential evidence base with the objective of creating coaches not biostatistical consultants.

1. The teaching of Exercise should begin with the lived experience using reflective practice.
2. The introduction of *episteme* should be undertaken as a means for understanding the lived experiences.
3. Epistemic traps of Gnostic scientism can be recognised through epistemic playfulness.
4. The use of epistemic playfulness in the classroom would allow for a playful attitude in the 'field'.
5. The *telos* of a *eudaimonic* exercise experience requires a coaching philosophy.
6. Exercise pedagogy should be focused on creating *phronimos* as opposed to scholars.

A personal note on academic Exercise.

As I have argued, I take the stance that epistemically professional education is derived from the academic literature base. Consequently, as I admit, this chapter is a 'blue sky' discussion. And this is due to the recognition that the debate presented here will have

limited consideration or efficacy unless the academic Exercise paradigm changes. Therefore, I present the following as key discussion points that should be raised within academic circles:

1. Exercise needs to recognize it is not Medicine. There are clear overlaps but there are also essentialist differences between the concepts and activities. As I have argued throughout, if Exercise continues to hold the coattails of Medicine, this may prove problematic or at least self-defeating.

2. Exercise is not Sport, and therefore we need a specific Exercise philosophy. I would argue the reasons that debate is not forthcoming on Exercise are because it is subsumed under the Sport domain. Thus, we have Sport & Exercise philosophy, Sport & Exercise science and so forth. Yet, Exercise has philosophical elements unique to its experience, e.g., the means of hilaritas. At this point of Exercise's evolution, I would propose that it works to differentiate itself philosophically from its cousin.

3. Related to point 2, there is a need to further explore the workings of Exercise professionals. At present most of the research is either within a critical sociological approach based upon body image, social power relations, issues of unethical social media and similar considerations, or else is implied under the Sport umbrella. However, I would argue there is an opportunity for a research field which draws upon the lessons from Coaching, Sports coaching, and Leadership to recognise the unique praxis of Exercise professionals.

In simple terms, in understanding participation, Exercise should 'drop' the dominance of biomedicine and create experiences of playful coaching for Spinozean perfection through the unique capabilities of exercise.

> Conceptual engineers think that philosophy should involve the critique and improvement of the concepts we use.... Few things in the world are more important to human cognition and interaction than our concepts. They shape how we think about the world, how we communicate with each other, how we pursue our personal lives, and how we organize our society. Philosophy understood as conceptual engineering clearly has a lot of potential.
>
> (Koch 2021 p1955)

This thesis has been an attempt to open what is perceived as a missing philosophical discussion in Exercise. Through a method of conceptual analysis, I have attempted to present a thought experiment on the professional issues that may emerge if Exercise embraces a concept of biomedical scientism as the sole basis of its epistemology and education. The conclusion has been that if the 'epistemic machine' behind Exercise education follows a path of biomedicalisation it may lead to increasingly iatrogenic experiences. And, importantly for professional practice, questions emerge as to the culpability of the individual's epistemology in the increasing incidence of acute and chronic injury.

At first glance, the conclusion appears logical. Professions are based on an epistemology, the epistemology of Exercise is based on Medicine, Medicine's epistemology has been shown to be problematic in key situations, and accordingly Exercise may be the instigator of some of its own problems. However, there are major challenges that can be levelled at such thinking. Specifically, the work can be suggested as limited not only in terms of methodology, especially when compared to expectations in line with a scientism of Exercise, but also in a pragmatic sense. That is, due to the politics of academic practice, and the considerable finance that surrounds Exercise, the conclusions created here may be dismissed as speculative, lacking appropriate justification, and mere personal rumination. In simple terms, my ideas could meet a very strong resistance from those whose prestige, status, and economics are bound-up in defending an 'Exercise is Medicine' paradigm (Ritchie 2020). Therefore, I would like to briefly acknowledge these issues before proposing ideas for the future research.

Changing a professional paradigm.

This thought experiment has been a conceptual re-engineering to facilitate a challenge to not only a knowledge base, but ultimately a professional paradigm. Accordingly, my recommendations can be considered a demand for a paradigm change. Hence, the point of philosophy is not only to create an epistemology that describes the ontology of the world but to also inform axiological decision making. As William James and the pragmatists might state, it is a means to improve the 'cash value' of Exercise (Pihlstrom 2005). The goal is to generate better practical results. However, it is in recognising this objective that challenges against the thesis emerge.

In brief, as described by Kuhn (1996), paradigm changes occur in four-stages. First, anomalies are recognised which are difficult to explain via the current paradigm. Second, there is an increase in exploration as to the nature and prevalence of the anomalies. The third stage occurs if there is a continued accumulation of anomalies leading to alternative ideas and paradigms being explored in what Kuhn terms extraordinary research. Eventually, as a 'final' fourth stage in the cycle, an alternative paradigm is recognised that achieves the goal of explaining phenomena or meeting the needs of the problem with greater success. This new paradigm becomes dominant until new anomalies occur.

In considering this process I propose that the conclusions presented are evidence of possible anomalies in the 'Exercise is Medicine' paradigm. The data of iatrogenic experiences does not fit the dominant concept of exercise and the application of Exercise is not the described 'magic bullet' for wellbeing. These difficulties require greater recognition, and especially from the creators of professional epistemology. Accordingly, greater exploration would be useful to either dismiss or expand the challenges I raise. Hence, like Hickson (2019), I argue for a field of Exercise philosophy to study the nature of its professional science, paradigm, and ethical base.

However, I resign myself to the knowledge this work is unlikely to challenge to the dominance of the professional organisations and academic fellowships that create, and economically flourish in, the current Exercise paradigm. As Darwin stated in *the Origin of Species*, "Although I am fully convinced of the truth of the views given in this volume…I by no means expect to convince experienced naturalists whose minds are

stocked with a multitude of facts all viewed, during a long course of words" (cited Kuhn 1996 p151).

Similarly, I acknowledge my thesis may either be dismissed or ignored. Within the literature arguments such as these appear to create limited attention or impact in Exercise science. As I describe below, whilst there is a growing body of discussion, it is clearly a minority of voices, and the debates appear to receive little acknowledgement beyond those with an interest in the workings of science. This is perhaps evidenced by the fact that Kilgore, Baker, and Davies (2014) stated Exercise physiology fails to have a paradigm due to a lack of definitional consensus. Yet, as of August 2023, their work is suggested as having zero credits for citation on Google Scholar. It therefore appears there has been no development of, discussion concerning, nor 'bite back' against their premises. This observation is taken to indicate there is either a lack of general interest and/or an element of resistance to considering thoughts that may require a paradigm change. Whilst I concede this is a single citation, in this instance the discussion will take the latter stance and consider that it may be evidence of resistance that may emerge from challenges to a dominant paradigm.

Methodological resistance.

This work is a 'philosophically typical desk-based' enquiry and I do not deny it draws upon both personal experiences and a possible 'ivory tower' analysis.[65] Therefore, whilst utilising a structured method as might be representative of analytic philosophy, the methodology falls short in meeting such scientific demands as rigour, validity, reliability, and similar which underpin the Exercise paradigm. Furthermore, beyond data on injury epidemiology and the contents of textbooks there is limited evidence of a biomedical Exercise practice or nemesis. As a result, Exercise academics could argue against non-empirical theorising (e.g., Pompeu 2022) or else state that only "the crafting of falsifiable research" in a Popperian sense should be credited in Exercise science (Robergs, Opeyemi, and Torrens 2022 p145). Accordingly, questions such as 'where is the empirical evidence outside of a literary interpretation?' can emerge. And so, I acknowledge the anomalies presented can easily be dismissed as assumptive, speculative, and mere rumination.

[65] See appendix 1.

Yet I would highlight I present a detailed consideration of these concerns in appendix 1 and a defence for the use of philosophy and conceptual analysis in appendix 2. And I would further defend the use of thought experiments and similar philosophical approaches through illustrating the importance of these processes throughout the history and current ventures of science. As Brown (2011) describes, from Galileo and Newton to Einstein and Feynman, philosophical ruminations have generated all scientific advancement. But the acknowledgement of the musing, imagination, and reflection which are the basis of science have limited exploration in the scientism of Exercise. Rather, in considering anomalies, the argument has been for the development of 'stricter' scientific methods echoing an idealised EBP hierarchy (e.g., Jolley *et al*. 2022, Bennie *et al*. 2017a, Zenko and Ekkekakis 2015) as opposed to consideration of Nguyen's (2022) epistemic playfulness. This stance can be interpreted as defending the biomedical paradigm through a recourse to scientism. Essentially a demand that scientists do better at science as opposed to a consideration that the methodology is problematic. Therefore, anomalies are not product of the paradigm but the practitioners, whether Exercise professional or academic researcher.

I would posit that the source of this methodological resistance is due to a lack of Exercise philosophy as a 'unique' academic domain. Unlike science, mathematics, biology, and related sports fields, there are limited explorations into topics such as the role of ethics, metaphysics, and aesthetics as they pertain to exercise both in terms of its science and participation. This may be because Exercise has no defining paradigm (e.g., Kilgore, Baker, and Davies 2014), lacks sociological reflexivity (Hill 2020), or as Robergs, Opeyemi, and Torrens (2022) suggest, Exercise is stuck in a comfortable paradigm that allows for publications, career advancement, and Kuhn's 'normal science'. Regardless, resistance towards the conclusions of this thesis becomes possible as there is limited appreciation for the philosophy of science beyond the tenants of positivism within professional Exercise's epistemology.

Professional resistance.

Beyond what might be termed 'typical' issues of challenges against the method used in this thesis, there are perhaps elements of resistance which may emerge due to the nature of professionals. Specifically, it can be suggested that a considerable strength of resistance could arise from those working within the epistemic culture itself, i.e., the academic

researchers and entrepreneurial creators of the professional epistemology. Arguably it is they who must defend the status, meaningfulness, and sustainability of the profession's activities, and importantly their own. To consider the possible challenges from these sources, the 'pushbacks' might be simplified as twofold. Although recognised as an oversimplification of a complex political and economic situation, first, I would state that resistance will arise due a need to maintain an epistemic status by professional academics. Whilst the second is based on the financial success that this scientific status creates.

Epistemic status.

Due to Medicine's continued biomedicalization, replacements to deal with what are perceived as Medicine's problems have been subsumed under a biomedical rubric (see Broadbent 2019, Miles 2018, Stegenga 2018a, b, Solomon 2015, Kontos 2011, Jewson 2009, Miles 2009). Hence, many interventions are termed complimentary or alternative until they are considered an element of the biomedical canon. Thus, Medicine disregards those which cannot be demonstrated as scientifically justified and those that can are 'converted' into biomedical processes and terminology. The reasons for this can obviously be economical, and I will comment on those below. However, here I will propose that issues arise in-part due to the academic politics, a publish or perish culture, and prestige of an academic status leads to 'bad science' as researchers seek to defend the paradigm.

Arguably, the challenges to paradigm changes in both Medicine and Exercise are entwined with the politics of Gnostic scientism that dominate academic methodologies. Specifically, it can be suggested that the increasing demands for science and technological answers in academia, governmental politics, and populist understanding are a factor in the growing phenomena of 'bad' research practices. For example, the case of Elizabeth Holmes and the Theranos scandal is a clear warning of mixing business and Medicine (Carreyrou 2019). However, the need for fulfilling the paradigm's criterion alongside the influence of an increasingly incentivized status, has created high-profile cases of bad science, including falsified scientific findings from within academia (Ritchie 2020).

Perhaps one of the most high-profile recent cases of alleged academic misconduct has been Marc Tessier-Lavine who stood down as president of Stanford University as reported in

the Guardian July 2023.[66] In this instance Tessier-Lavine and his team were accused of falsifying data to make medical claims, increase research funding and profiles, and achieve personal economic success. And as reported this is not an isolated claim. For example, Ritchie (2020), O'Mahony (2019), and Goldacre (2012, 2008) each discuss the insidious nature of the problem, whilst retractionwatch.com is a website entirely dedicated to listing and exposing scientific fraud. Additionally, datacolada.org is a research blog specifically focused on identifying bad practice. And at present they have been a key factor in the allegations against psychologist Francesca Gino who is accused of achieving considerable academic and economic status at Harvard University via the falsification of data.[67] Thus, academics are accused of purposefully using poor methods, misinterpreting statistical data (p-hacking) to present desired outcomes, failing to undertake replication studies to support and justify findings, and purposefully hiding data to avoid scrutiny (e.g., see Chambers 2017).

Yet, as Smaldino and McElreath (2016) discuss, these practices as incentivised within academia. Careers are based on publish or perish cultures, and it is reported that peer-reviewed journals focus on the publication of positive and novel findings (Ritchie 2020, Chambers 2017). Thus, methodologies become the 'norm' not because of any greater ability to reveal a truth but in-part because they allow for a greater volume of publication and career advancement. Additionally, new researchers and PhD students are actively encouraged, if not required, to follow in the footsteps of their 'masters' as opposed to 'thinking outside the box'. As a result, whilst it is acknowledged that bad science is identified, academic pressures and incentives are arguably still a dominant driving force in Medicine and thus problematic research evidence is growing. Hence, the challenge of maintaining the epistemic status of the paradigm leads to using poor practices to avoid or dismiss anomalies.

Accordingly, it would be naive to consider an Exercise which embraces an 'Exercise is Medicine' concept would not demonstrate similar practices. To begin, as I describe in Chapter 3, it should be acknowledged that Exercise academics are working in a relatively new domain. In its modern conception, Exercise science is perhaps no more than a century old. Yet, whilst it has been constructed from the success of its practical application

[66] https://www.theguardian.com/commentisfree/2023/aug/09/scientific-misconduct-retraction-watchaccessed 11/08/2023
[67] Data Colada - Thinking about evidence and vice versa http://datacolada.org/ accessed 20/08/23.

throughout the history of physical culture, and from intellectual ventures of Sport, Physical Education, and Medicine, it is still arguably the 'new kid on the block'. Hence, it is often incorporated under the Sports science banner. As a result, Exercise academics are in a position in which they must 'fight' for recognition in a crowded academic world. Importantly, they need to create scientific credibility and research status within a 'publish or perish' atmosphere (Brischoux and Angelier 2015). Few academics may wish to venture into territories of exploration that fail to be published in journals seeking an impact on the H-Index or Scimago Journal Ranking (SJR). Furthermore, research students may either submit 'paradigmatically safe' proposals or else 'toe the supervisor's party line' to achieve the opportunity for PhD opportunities (Smaldino and McElreath 2016). As previously argued, the adoption of an 'Exercise is Medicine' paradigm brings an element of epistemic status and perception of authority to Exercise education, practice, and political conception. Therefore, "when profile and the next promotion become master, its often the quality of the science and/or effective communication of the message that's first sacrificed" (Tiller 2020 p190).

Thus, in a similar manner to Medicine, there have been increasing concerns of research quality within Exercise (e.g., Tiller and Phillips 2023, Tiller *et al.* 2022, Robergs *et al*. 2022, Twomey et al. 2021, Tiller 2020, Hill 2020 Hickson 2019, Halperin *et al*. 2018, Knudson 2017, Malcolm and Pullen 2017). Recently, Tiller and Ekkekakis (2022) highlighted "questionable research practices (QRPs)" in Exercise.[68] They begin with the case of Eric Poehlman, a physiologist who was given a prison sentence in 2006 for falsifying data in at least 10 published articles and obtaining over $3 million in grant funding. In his own words he "was motivated by my own desire to advance as a respected scientist".[69] However, as Tiller and Ekkekakis (2022) discuss, this is only one headline case in a scientific field that has problems "more subtle and deep-rooted in institutional norms" (p1). Consequently, they argue Exercise research increasingly demonstrates biased experiments, inaccurate procedures, post hoc hypothesizing, prolific self-citation, and research which is unable to be replicated. Although they concede that the exact size of the problem has not been studied, data demonstrates that the rate of retraction of papers from 'sports science' journals has increased between 2000 and 2018 with a reported 44% being

[68] Tiller and Ekkekakis (2022) use the term kinesiology as opposed to Exercise. However, here these terms are taken as indicative of a meta-paradigm studying exercise and are therefore synonymous.
[69] Science.org at https://www.science.org/content/article/poehlman-sentenced-1-year-prison. Accessed 14/08/2023.

"attributed to misconduct rather than honest error" (p3). This, they suggest, is comparable to the prevalence of the phenomena in Medicine's science. Hence, they conclude QRPs in Exercise are generated through the same demands for academic and professional status. And, accordingly, these issues suggest the defensive practices which could emerge as researchers are encouraged to stick to the boundaries of a dominant paradigm (Smaldino and McElreath 2016).

It is also acknowledged that academic Exercise is increasingly vulnerable to the processes of de-professionalisation. As described by such authors as Honary *et al*. (2019), Susskind and Susskind (2017), Nichols (2017), and Balthazard (2015) professions in the 21st C. are exposed to challenges from such phenomena as AI and social media. Where once professions acted as gatekeepers to their epistemology, through the advent of an increasingly open access to specialist knowledge, the nature of expertise has changed (Nichols 2017). For Exercise this loss of epistemic power is perhaps most evidently damaging. The emergence of celebrity trainers, Instagram influencers and YouTube educators has meant that the once guarded education of Exercise professionals is now available free in the public space. Need a workout? Search online.

Unsurprisingly, these observations illustrate the strength of resistance that could arise to propositions of engaging with epistemic playfulness and undertaking research counter to both academic and populist conceptions. Such propositions could elicit accusations of lacking rigour, extreme relativism, ineffectiveness, and over-emphasis on subjectivity and novelty from Exercise academics. As experienced by renowned physiologist Tim Noakes, attempts to present counterarguments and theoretical challenges through avenues that do not draw on the expectations of the dominant paradigm are at times met with considerable criticism if not hostility in Exercise (e.g., see Pompeu 2022, Robergs, Opeyemi, and Torrens 2022, Noakes and Sboros 2019, 2019, Robergs 2017, and de Oliveira Pires 2013, and also Episode#50 of the Primal Blueprint Podcast hosted by Mark Sissons).[70] Arguably, this may be because Gnostic scientism is all that academia and the professional Exercise organisations have left with which to maintain control over their epistemological superiority. Regardless of specific reason, considerations of a paradigm change which

[70]https://blog.primalblueprint.com/episode-50-mark-interviews-dr-timothy-noakes/ accessed 01/08/2023.

challenges current academic practices alongside invested individual's statuses are unlikely to receive a warm welcome.

Economic status

It would be naive to suggest that the resistance to paradigm change and the use of Tiller and Ekkekakis' (2022) QPRs is merely for the defence of epistemic status. Within Exercise, as within Medicine, the financial incentives are considerable. As reported by ucfs.net, the fitness equipment market exceeded $13.5 billion in 2022, whilst closer to home, Sport England estimated sport-related activity generates £20.3 billion annually for the British economy including the recognition that sports and exercise students provide £3.9 billion.[71] Furthermore, with a growing number of organisations offering research funding, e.g., the British Medical Association provides a £500,000 pot annually, there is clearly an incentive for academics to 'toe the party line' of the 'Exercise is Medicine' paradigm.[72] Additionally, should an Exercise academic create a fitness app via their research they will enter a marketplace which generated $5.35 billion in 2021.[73] Thus, again resistance to considering paradigm change from academic quarters is not an unexpected outcome. Maintaining the current avenue of research allows for publication, career advancement, and access to financial rewards.

However, challenges may not only emerge from academia but also from those entrepreneurs invested in the economy of Exercise education. Importantly, in considering entrepreneurial economics, the introduction of entirely online, or the mix of hybrid, teaching provides an efficient, rapid, and profitable process. The exact size of this private education business in Exercise is difficult to ascertain. But, as previously noted, companies advertise L3 personal trainer courses can be completed in under 12 weeks and as of August 2023, the cost of such courses appears to range from around £599 to £1,399. Therefore, when it is noted that according to statista.com, the number of registered personal trainers in the UK has risen from 22,910 in 2021 to 25,350 in 2022, this is both a growing and

[71] https://www.ucfs.net/exercise-and-fitness-equipment-industry-trends/ accessed 14/08/2023. And the psychological society and GuildHE 2019 report https://www.physoc.org/policy/higher-education/sport-exercise-science-education-impact-on-the-uk-economy/ accessed 14/08/2023.

[72] BMA Research Grants - The Faculty of Sport and Exercise Medicine (fsem.ac.uk) accessed 15/08/2023.

[73] Business of apps https://www.businessofapps.com/data/fitness-app-market/ accessed 15/08/2023.

lucrative industry. [74] Furthermore, it should be noted this is data for L3 personal trainer courses in isolation. Most companies provide a spectrum of Exercise education from L2 gym instructor to specialist L4 strength and conditioning and similar qualifications.

When considering the relationship between the epistemology and economics of this business, the initial generation of online materials may be costly, both in terms of finances and time, but once set up, the materials presented can be effectively left in perpetuity until new research or policy requires an update. Furthermore, importantly, the process does not require a consistent input from pedagogically trained tutors or experienced expertise from either academia or the profession. For many elements students can log in and follow the instructions before attending a practical exam if required. It is, perhaps, another unfortunate example of knowledge commodification and the prevalence of homo economicus in UK education (Tomlinson and Watermeyer 2022).

Therefore, in considering pragmatic resistance to a paradigm change, the old and humorous adage of 'you can only pick two of three in product development: cheap, quick, or quality' is acknowledged. The argument here is, due to public and political conceptions of 'Exercise is Medicine', educational companies can create a veneer of quality through the presentation of a biomedical basis for their content yet maintain the focus on profit and speed. The academic status of EBP epistemology brings with it the educational status of the course. This may be particularly true if the course can be shown to have been written in conjunction with either a major professional organisation such as the ACSM or faculty members of an HE establishment. Hence, the notion of professional Exercise being an EBP-based praxis is evident throughout, and from a business sense this understandable. Yet, it again raises questions as to a lack of criticality towards Exercise academia and its science. As discussed, neither the paradigm nor its epistemology is questioned. And this reproduction of educational materials without skepticism or critical consideration allows for the cheap and quick creation of the product.

Consequently, whilst the possible dangers of this process have been made explicit in this thesis, I concede that calls for a shift in education to incorporate reflexivity, epistemic

[74] Google search "how much does it cost to do an online PT course?" accessed 16/08/2023 and Statista.com https://www.statista.com/statistics/1194844/number-personal-trainers-uk/ accessed 16/08/2023

playfulness, and the foundations of a coaching leadership will prove problematic. As previously suggested, the current commodification of knowledge into ‘bite size’ modules allow educational deliverers to maximise efficiency and profitability. This is a fact recognised not only by private business educators but also an increasingly commodified HE (Tomlinson and Watermeyer 2022, McKenna 2022, Craig and Openshaw 2018). Therefore, I do not deny my ‘existential educational product’ would shift the emphasis from quick and cheap and require the introduction of a new definition of quality. Additionally, it would increase costs significantly in the long run.

Furthermore, resistance may also emerge through the question ‘why fix what isn’t broken’? Exercise entrepreneurs, echoing scientific researchers, may challenge the arguments due to a lack of empirical evidence of the iatrogenic problem. Again, through the dominant conceptions of science, education deliverers can suggest that the EBP is correct, it is merely a case of inappropriate application. Yet, as described above, if the science that the course is based on is ‘bad’, then the course content is limited in accuracy, and ultimately praxis is inevitably built on sand.

Therefore, again, I return to the need for a greater philosophical consideration of Exercise’s epistemology for professional education.

Avenues of exploration.

In considering the previous limitations there are several avenues that could be explored especially in considering the economics, sociological, and political influences on the academia and economics of professional education. For example, in discussing Sport and Exercise science, Hill (2020) suggests that "understanding the formation of academic identity and agency embedded in power structures that inform our decision processes, interaction, and ultimately knowledge production" (p1505). However, such socio-political and sociological research is beyond the scope here. Therefore, recognising the current philosophical objectives, I propose two avenues of development. The first is the formation of a philosophy of Exercise, whilst the second recognises the need for empirical support for the theory-practice gap that has been proposed in professional practice.

A philosophy of Exercise.

As previously discussed, Exercise is generally subsumed within Sport and therefore lacks a genuine 'identity' as an individual academic field. As Kilgore, Baker, and Davies (2014) state, Exercise physiology lacks a defined paradigm. Therefore, I would argue that Exercise needs to follow in the steps of other practices and develop a 'unique' field of philosophical study. I concede that I have made similar arguments in Gray (2019), and I echo the sentiment of others such as Hickson (2019). However, I draw upon the findings of this thesis to provide originality to the direction of future research for the creation of Exercise philosophy.

To begin, I would state there is a need to consider the *telos* of Exercise science. That is, what is Exercise science? By this I mean, what are the objectives for development of Exercise epistemology? What goals are trying to be achieved? As previously described, some would argue that the emphasis is on the commodification and economic sustainability of academic careers, political status, and educational Exercise businesses (e.g., Tiller 2019). Therefore, I would argue that Exercise needs to follow in the footsteps of nursing and physiotherapy and begin to develop a conceptual understanding of its professional practices. This is not merely an attempt at a definition but a project to understand both the species and instantiated essence of the concept (Sullivan and Panier

2014). It needs to create not only a means for scientific measurement but also ideological understanding. The objective here is to determine what exactly is it that makes exercise a unique human activity. In Aristotelian terms what is its unique 'good' and how can we define the *arete* of the activity? This 'good' should then be the objective of Exercise science, and how its success can be measured.

Alongside this initial conceptual analysis, I would consider the growing body of research that is challenging the nature of science in Exercise and its practices (e.g., Tiller and Phillips 2023, Tiller *et al.* 2022, Robergs *et al*. 2022, Twomey et al. 2021, Tiller 2020, Hickson 2019, Halperin *et al*. 2018). But, for a sense of originality, I would argue for taking an explicit epistemological perspective to explore the nature of epistemic cultures, aesthetics, and other elements of epistemic playfulness and skepticism in in the creation of Exercise science. For example, the framework of Knorr-Cetina (1999) and concepts such as Nguyen's (2020) echo chambers and epistemic bubbles can be used to examine the working practices of Exercise scientists. Additionally, discussions should be developed that echo work in the philosophies of Science, Mathematics, and related fields. Specifically, the role of aesthetics, imagination, and intuition in the creation of Exercise's scientific epistemology can be developed (e.g., see Murphy 2022, Levy and Godfrey-Smith 2019, Johnson and Steinerberger 2019, Girod 2007, Brown 1991, Irvine 1991, Wechsler 1978). Furthermore, avenues of discussion surrounding virtue epistemology and its relationship to professional practice and *phronesis* can be considered in greater detail than presented here. (Cook and Carr 2014, Baehr 2011, Brady and Pritchard 2006).

The argument here is that by recognising elements of the scientific process beyond techno-rational and hypothetico-deductive positivism, Exercise can explore new avenues of methodology and not become enmeshed in a trap of trying to achieve epistemic status through Gnostic scientism.

Again, it is recognised there is a danger here of being accused of an 'anti-science' stance and wishing to create a postmodernist epistemic relativity. Therefore, I would reiterate that the argument is for Exercise to engage with philosophical discussion on the nature of its scientific practices which inform its professionals. It is a call for an ideological understanding of the impact of scientific technology as echoed in previous works such as those of Chesterton, Heidegger, Feyerabend, Gould, Gadamer, and Midgley, to name but

a few. Arguably, it is a means to achieve a 'good' of Exercise science described by Tiller *et al*. (2023) as "[protecting] the general public, the individuals and groups with whom we work, and the reputation of the discipline by proactively opposing absurdity, falsehood, and error in health and wellness" (p1).

An empirical study.

As previously stated, many of the critiques against the conclusions of this thesis will emerge beyond the 'philosophical armchair'. Specifically, both academic and entrepreneur will ask where is the evidence? Consequently, there is a need to take these ideas out into the field. The objective is to consider the reality of the proposed issues: has the Exercise profession lost its 'bedside cosmology' and the exercise experience been subsumed within a 'laboratory' *techne* of analysis-diagnosis-prescription? In doing so, the initial questions to be explored should be based around the notion of praxis and would include:

1. How Exercise professionals conceptualize the 'good' of their practice?
2. How do Exercise professionals make sense of their practice, education and science and apply it in context?
3. What axiological dilemmas do Exercise professionals face and how are solutions achieved? Consequently…
4. Is there a theory-practice gap and what are the professional's experiences of it?

In considering specific methodologies to answer these questions there are several approaches that could be used, and it is recognised that many arguably fall within the purview of sociology as opposed philosophy. However, the intention here is not to uncover social power structures or develop an understanding of problematic injustice as has been previously undertaken (e.g., Williams *et al*. 2018, Markula and Chikinda 2017, Dimmock, Hallett and Grove 2009, Sassatelli 2010, Smith-Maguire 2008, Markula-Dension and Pringle 2007). Rather utilising methods such as phenomenology, narrative approaches, biographical studies, and ethnography, alongside tools such as interviews, diaries, and focus groups, experiences could be discussed through epistemological, ontological, and

axiological lenses. Furthermore, a focus on longitudinal approaches, especially with a focus on neophyte professionals, could allow for an understanding of the tacit elements of professional epistemology and *phronesis*. Therefore, the focus can be maintained on an understanding of praxis, professional *arete,* and the 'good' of the exercise experience from which to inform the profession's epistemology and education.

Summary

In summary the critical limitations of this thesis can be categorised as twofold. First, as with any research, criticism can be made of its methods. However, these have been addressed in appendices 1 and 2. But, due to the objectives of this work and the expectations that it provides original thought on the progression of a profession, there is a second element of critique that may be unique to a professional doctorate. Specifically, a limitation of this work is that any attempt to implement its ideas will be considered controversial and a challenge to a dominant professional paradigm. Hence, it is acknowledged that resistance to the paradigmatic anomalies presented here will emerge from both academic and entrepreneurial sources. Specifically, strong defenses may be invoked through a need to maintain perceptions of expertise, autonomy, identity, and financial status. Therefore, it can be suggested that despite evidence concerning the possible dangers of following a biomedical paradigm, Exercise could justify its position through its scientific, economic, and political successes. A Whiggish defence. However, in doing so it appears that once again 'Exercise is Medicine'. Exercise has embraced biomedicine not only in terms of a metaphysics leading to possible iatrogenic practices, but also the academic and economic practices and the marketing of a commodified education to maintain its status.

Consequently, though brief in description, the suggested avenues of future research are intended to demonstrate ideas for not only exploring further the conclusions of this thesis, but also the progression of professional Exercise science, education, and practice. I would argue that through the application of both empirical and rational methodologies, a deeper understanding of the relationship between the three domains of Exercise can be achieved: academia, entrepreneurship, and professional practice. Importantly, as stated by previous commentators, a greater prevalence of philosophy within Exercise and its education could guard against the bad science and the iatrogenic experiences through the acknowledgement

of the need for axiological and ideological considerations. However, the development of this philosophy should draw on empirical engagement with those professionals and participants the science is intended to aid. Exercise philosophy should be driven by the 'good' of exercise and the needs of the profession in fulfilling that 'good', not the demands of science.

This thesis was built upon the fulfilment of three objectives:

4. To create a critical examination of the educational epistemology of Exercise professionals.
5. To explore the possible impact of the education's epistemic base on praxis.
6. To suggest an alternative framework for professional education.

In summarising these achievements, a concept analysis has demonstrated that Exercise education is based on an epistemology of biomedicine. Thus, Exercise's paradigm is encapsulated in the concept 'Exercise is Medicine' and the praxis: analysis-diagnosis-prescription. This creates a *telos* of exercise for biological functioning, and an *arete* of the professional in the ability to use scientific procedures for biostatistical diagnosis and prescription. Consequently, expertise is defined in terms of epistemological *sophia.* It is a methodology that draws on a laboratory cosmology in which the ambiguous metaphysics of bedside medicine are supplanted by a scientific confidence for diagnosing normative functioning, statistical deviations, and epidemiological categorisation. And its progress is measured in relation to Medicine's techno-rational scientism. As Schön (1987) suggests, the closer a practice is to natural science the greater its reputation. Therefore, as a paradigm, 'Exercise is Medicine' has allowed Exercise science to be acknowledged in both academic and professional status.

Yet, whilst Exercise science creates an EBP of standardised professional practice, it is a necrophilous paradigm. Derived from a thanatological epistemology and motivated by Gnostic scientism, the impact on praxis is a growing *Exercise Nemesis* of iatrogenic experiences. Therefore, whilst embracing Medicine's methodology has brought professional status, Exercise's success in practice is debateable. Evidence would suggest a theory-practice gap between academic and professional Exercise. Specifically, as observed in related professions, an over-emphasis on scientific instrumentality fails to account for the context (Kinsella and Pitman 2012, Bondi *et al*. 2011, Schön 1984). Furthermore, unique to Exercise, the peak experiences and other phenomenological events which provide joy in its participation are reduced to biological explanations in theories of

physiological and psychological variables (e.g., Alexander *et al.* 2021, Goddard *et al.* 2021, Swann *et al.* 2018). The result is an Exercise education which demonstrates a techno-rational trap and an epistemic deontology (Fullagar *et al.* 2019, Eraut 1994, Schön 1987). However, the iatrogenic complications created are left unexplored in a paradigm that maintains the assumption: "Exercise is the miracle cure we've always had…This is no snake oil." (NHS: Benefits of exercise). [75]

Hence evidence would suggest three epistemic problems at the root of the iatrogenic Exercise issues:

1. a deontological approach to Exercise epistemology: we must follow the science of an EBP.

2. an observable lack of intellectual virtue beyond *sophia* in the education of Exercise professionals.

3. the reduction of the exercise experience to a biostatistical *telos* has dehumanized the encounter limiting the opportunity for *eudaimonia*.

Consequently, a substitute professional epistemology requires a consideration of the metaphysics dismissed by positivism, and a biophilic interpretation of Exercise's potential. Specifically, it needs to recognise the possibility for existential wellbeing in exercise. Therefore, an alternative framework has been proposed through the development of an educational *telos* for the Aristotelian *phronimos.* This requires the re-introduction of *phronesis* into the balance of intellectual virtues. Furthermore, the nature of exercise as defined through Exercise education can be re-conceptualised through the works of Spinoza. Specifically, with the recognition of Spinoza's perfection, the joy in exercise can emerge. Thus, the active engagement of the participant in seeking *arete* creates a context for *hilaritas* and a sense of *eudaimonic* accomplishment. As described, alternative educational objectives can be implemented through such pedagogy as reflective practice, the nurturing of epistemic playfulness, and the development of coaching skills.

[75] UK NHS: https://www.nhs.uk/live-well/exercise/exercise-health-benefits/ accessed 20/12/2022.

In conclusion, Exercise can be medicinal. But should it continue to be dominated by a desire to emulate Medicine, it will also follow a difficult path of skirting the iatrogenic cliffs of an *Exercise Nemesis*.

A final thought.

As I have confessed, the arguments presented are unlikely to make waves. Though there is a growing number of similar voices expressing concerns regarding Exercise and its science, its professional organisations and academic fellowships can repeatedly point to their status, political importance, and economic success. Yet, the fact the debate presented here can be deemed reasonable would suggest that genuine questions as to the effectiveness of Exercise's current paradigm exist.

Therefore, if nothing more, this thesis has played the old courtroom movie's twist in which the defending lawyer points to the court doors, proclaiming 'but here is the real killer!'. And if you looked at the courtroom door for the real culprit then you have reasonable doubt as to the guilt of the defendant on the stand. In the case of iatrogenic Exercise, it is the practitioner who takes the stand in the defendant's role. And, whilst not able to dismiss all cases, I have presented sufficient evidence to suggest that in many instances a jury of my peers would glance at the doors half expecting to see the gatekeepers of Exercise walk in as the real culprits.

References.

Aalborg, C.; Rød-Larsen, C.; Leiro, I.; Aasebø, W. An increase in the number of admitted patients with exercise-induced rhabdomyolysis. Tidsskr. Nor. Laegeforen. Tidsskr. Prakt. Med. Raekke. 2016, 136, 1532–1536.

ACE, (2003). *ACE Personal Trainer Manual.* 3rd edition. Green, D.J., senior ed. USA, American Council on Exercise.

ACSM., (2014) *ACSM's Resources for the Personal Trainer.* 4th edition. Thompson W.R. senior ed., Philadelphia, Wolters Kluwer.

ACSM., (2018). *ACSM's Resources for the Personal Trainer.* 5th edition. Hargen, T.A., senior ed. Philadelphia, Wolters Kluwer.

ACSM., (2022). *ACSM's Resources for the Personal Trainer.* 6th edition. Hargen, T.A., senior ed. Philadelphia, Wolters Kluwer.

Alexander, R., Aragón, O.R., Bookwala, J., Cherbuin, N., Gatt, J.M., Kahrilas, I.J., Kästner, N., Lawrence, A., Lowe, L., Morrison, R.G. and Mueller, S.C., (2021). The neuroscience of positive emotions and affect: Implications for cultivating happiness and wellbeing. *Neuroscience & Biobehavioral Reviews*. 121. pp220-249.

Allen, S.J., Rosch, D.M., Ciulla, J.B., Dugan, J.P., Jackson, B., Johnson, S.K., Pace, C., Kempster, S., Guthey, E., Murphy, S.E. and Riggio, R.E., (2022). Proposals for the future of leadership scholarship: Suggestions in Phronesis. *Leadership*. 0(0) pp1-27.

Ali, M., (2018). The "bio" in biomedicine: Evolution, assumptions, and ethical implications. In Islamic Perspectives on the Principles of Biomedical Ethics*: Muslim Religious Scholars and Biomedical Scientists in Face-To-Face Dialogue with Western Bioethicists*: www.worldscientific.com/doi/pdf/10.1142/9781786340481_0002

Alonso Pérez, J.L., Martín Pérez, S., Battaglino, A., Villafañe, J.H., Alonso-Sal, A. and Sánchez Romero, E.A., (2021). An up-date of the muscle strengthening exercise effectiveness in postmenopausal women with osteoporosis: a qualitative systematic review. *Journal of Clinical Medicine*, *10*(11), p.2229.

Altschul, J., (2014). Epistemic deontologism and role-oughts. *Logos & Episteme*, *5*(3), pp.245-263.

Ames, M.C.F.D.C., Serafim, M.C. and Zappellini, M.B., (2020). Phronesis in administration and organizations: A literature review and future research agenda. *Business Ethics: A European Review*. 29. pp65-83.

Amonette, W.E., English, K.L. and Kraemer, W.J., (2016). *Evidence-based practice in exercise science: The six-step approach*. Human Kinetics.

Anderson, D.R., (2002). The Humanity of Movement or "It's Not Just a Gym Class". *Quest*. 54(2). pp87-96.

Anderson, E. and Durstine, J.L., (2019). Physical activity, exercise, and chronic diseases: A brief review. *Sports Medicine and Health Science*. 1(1). pp3-10.

Anderson, A.G., Knowles, Z. and Gilbourne, D., (2004). Reflective practice for sport psychologists: Concepts, models, practical implications, and thoughts on dissemination. *The Sport Psychologist*. 18(2). pp188-203.

Andow, J., (2016). Abduction by philosophers: Reorienting philosophical methodology. *Metaphilosophy*. 47(3). pp353-370.

Andrade, A., Dominski, F.H. and Sieczkowska, S.M., (2020). What we already know about the effects of exercise in patients with fibromyalgia: An umbrella review. In *Seminars in arthritis and rheumatism* (Vol. 50, No. 6, pp. 1465-1480). WB Saunders.

Andreasson, J. and Johansson, T., (2016). 'Doing for group exercise what McDonald's did for hamburgers': Les Mills, and the fitness professional as global traveller. *Sport, Education and Society*. 21(2). pp148-165.

Andrews, D.L., (2008). Kinesiology's inconvenient truth and the physical cultural studies imperative. *Quest*. 60(1), pp.45-62.

Anshel, M., (2014). *Applied health fitness psychology*. Champaign, Ill, Human Kinetics.

Archer, R.M. and Kinsella, E.A., (2022). Phronesis in Veterinary Medicine: Navigating the Complexity of Practice with Wisdom. *Journal of Veterinary Medical Education*, p.e20220094.

Armstrong, L.E., and Kraemer, W.J., (2016). *ACSM's Research Methods*. Philadelphia, Wolters Kluwer.

Arney, W.R. and Bergen, B.J., (1984). *Medicine and the management of living: Taming the last great beast*. Chicago, University of Chicago Press.

Arnold, B.L. and Schilling, B.K., (2016). *Evidence-based practice in sport and exercise: A guide to using research*. FA Davis.

Arent, S.M., Walker, A.J., and Arent M. (2020). "The effects of exercise on anxiety and depression." in Tenenbaum, G., and Eklund, R. eds. *Handbook of sport psychology*. 4th edition. Wiley & Sons. pp872-890.

Aune, K.T. and Powers, J.M., (2017). Injuries in an extreme conditioning program. *Sports health*, *9*(1), pp.52-58.

Ayer, A.J., (1946). *Language, Truth and Logic*. 2nd edition. London, Victor Gollancz.

Bachkirova, T., Cox, E., and Clutterbuck, D. (2010)., Introduction. In Cox, E., Bachkirova, T., and Clutterbuck, D. (eds). *The Complete Handbook of Coaching*. London, Sage.

Backman, E. and Barker, D.M., (2020). Re-thinking pedagogical content knowledge for physical education teachers–implications for physical education teacher education. *Physical education and sport pedagogy*, *25*(5), pp.451-463.

Bacon, F. (1605/1985). The advancement of learning. *The Essays*. Pitcher, J., ed. Penguin, London.

Baehr, J., (2011). *The inquiring mind: On intellectual virtues and virtue epistemology*. OUP Oxford.

Baghramian, M. and Marchetti, S. eds., (2017). *Pragmatism and the European Traditions: Encounters with Analytic Philosophy and Phenomenology Before the Great Divide*. Abingdon, Routledge.

Balachandran, A.T., and Schoenfeld, B.J., (2022) Evidenced-based practice in personal training. In Hough, P., and Schoenfeld, B.J., eds. *Advanced Personal Training: science to practice*. London, Routledge.

Balthazard, C., (2015). What does it mean to be professional. *HRPA Series on Professionalization, Professionalism, and Ethics for Human Resources Professionals*. Available at https://hrpa.s3.amazonaws.com/uploads/2020/10/What-it-means-to-be-a-professional.pdf

Barker-Ruchti, N., Barker, D. and Annerstedt, C., (2014). Techno-rational knowing and phronesis: The professional practice of one middle-distance running coach. *Reflective Practice*, *15*(1), pp.53-65.

Barley, S.R., Bechky, B.A. and Milliken, F.J., (2017). The changing nature of work: Careers, identities, and work lives in the 21st century. *Academy of Management Discoveries*. 3(2), pp111-115.

Barnes, K., Desbrow, B. and Ball, L., (2016). Personal trainers are confident in their ability to provide nutrition care: a cross-sectional investigation. *Public health*. 140 pp39-44.

Barnes, K., Ball, L. and Desbrow, B., (2017). Personal trainer perceptions of providing nutrition care to clients: a qualitative exploration. *International journal of sport nutrition and exercise metabolism*. 27(2). pp186-193.

Baron, R. J. (1992). Why Aren't More Doctors Phenomenologists?. In Leder, D. (Ed.) *The body in medical thought and practice*. Springer, Dordrecht.

Bassot, B., (2015). *The Reflective Practice Guide: an interdisciplinary approach to critical reflection.* London, Routledge.

Baum, W.M., (1994). *Understanding behaviorism: Science, behavior, and culture*. New York: HarperCollins College Publishers.

Becker, B.E., (2015). 46th Walter J. Zeiter lecture, exercise is rehabilitation medicine: Our history and future. *PM&R*, *7*(4), pp.345-353.

Beebee, H., (2018). April. I—The Presidential Address Philosophical Scepticism and the Aims of Philosophy. *In Proceedings of the Aristotelian Society*. 118 (1). pp1-24.

Beedie, C., Mann, S., Jimenez, A., Kennedy, L., Lane, A.M., Domone, S., Wilson, S. and Whyte, G., (2016). Death by effectiveness: exercise as medicine caught in the efficacy trap!. *British Journal of Sports Medicine*. 50(6), pp323-324.

Behzadnia, B. and Ryan, R.M., (2018). Eudaimonic and hedonic orientations in physical education and their relations with motivation and wellness. *International Journal of Sport Psychology*, *49*(5), pp.363-385.

Bender, M., (2018). Re-conceptualizing the nursing metaparadigm: Articulating the philosophical ontology of the nursing discipline that orients inquiry and practice. *Nursing inquiry*. 25(3), p.e12243.

Bender, M., Grace, P.J., Green, C., Hopkins-Walsh, J., Kirkevold, M., Petrovskaya, O., Paljevic, E.D. and Sellman, D., (2021). The role of philosophy in the development and practice of nursing: Past, present and future. *Nursing Philosophy*. 22(4), p.e12363.

Bengson, J., Grube, E. and Korman, D.Z., (2011). A new framework for conceptualism. *NOUS*. 45(1). pp167-189.

Benner, P (2001) *From Novice to expert: excellence and power in clinical nursing practice.* Commemorative edition. New Jersey, Prentice Hall health.

Bennie, J.A., Wiesner, G.H., van Uffelen, J.G., Harvey, J.T. and Biddle, S.J., (2017a). Sources of practice knowledge among Australian fitness trainers. *Translational behavioral medicine*, *7*(4), pp.741-750.

Bennie, J.A., Wiesner, G.H., van Uffelen, J.G., Harvey, J.T., Craike, M.J. and Biddle, S.J., (2017b) Assessment and monitoring practices of Australian fitness professionals. *Journal of science and medicine in Sport*. 21(4), pp433-438.

Bennie, J.A., Wiesner, G.H., Vergeer, I., Kolbe-Alexander, T.L., De Cocker, K., Alexander, C., and Biddle, S.J., (2018). Feasibility for the use of a standardized fitness testing protocol among Australian fitness industry professionals. *Research quarterly for exercise and sport*. 89(3). pp380-385.

Berenskoetter, F., (2017). Approaches to concept analysis. *Millennium*. 45(2). pp151-173.

Bergdahl, E. and Berterö, C.M., (2016). Concept analysis and the building blocks of theory: misconceptions regarding theory development. *Journal of Advanced Nursing*. 72(10). pp2558-2566.

Bergdolt, K., (2008). *Wellbeing: A Cultural History of Healthy Living*. Cambridge, Polity.

Berryman, J. W. (1992). Exercise and the medical tradition from Hippocrates through antebellum America: a review essay. in Berryman, J.W. & Park, R.J. (eds) *Sport and exercise science:Essays in the history of sports medicine*. University of Illinois Press. Chicago.

Berryman, J.W., (2010). Exercise is medicine: a historical perspective. *Current sports medicine reports*. 9(4), pp195-201.

Berryman, J. W., (2012). Motion and rest: Galen on exercise and health. *The Lancet*, *380*(9838), pp210-211.

Biddle, S.J.H. and Mutrie, N. (2001) *Psychology of Physical Activity: determinants, well-being and interventions*. Routledge, London.

Bird, S.R., Smith, A., & James, K., (1998). *Exercise Benefits and Prescription*. Cheltenham, Stanley Thornes.

Blaikie, N., and Priest, J., (2017). *Social research: Paradigms in action*. Cambridge, Polity Press.

Bluhm, R. & Borgerson, K., (2011). Evidence-based Medicine. In Gifford, F., ed., *Handbook of the Philosophy of Science. Volume 16: Philosophy of Medicine*. Elsevier BV.

Boden, B.P., Isaacs, D.J., Ahmed, A.E. and Anderson, S.A., (2021). Epidemiology of exertional rhabdomyolysis in the United States: analysis of NEISS database 2000 to 2019. *The Physician and Sportsmedicine*, pp.1-8.

Bolton, G., (2014). *Reflective Practice: Writing and Professional Development*. 4th ed. London, Sage.

Bolton, G., and Delderfield, R., (2018). *Reflective Practice: Writing and Professional Development*. 5th ed. London, Sage.

Bolton, D., and Gillett, G., (2019). *The Biopsychosocial Model of Health and Disease: new philosophical scientific developments*. Switzerland, Palgrave Macmillan.

Bondi, L., Carr, D., Clark, C., and Clegg, C., eds., (2011). *Towards professional wisdom: Practical deliberation in the people professions*. Surrey, Ashgate Publishing, Ltd.

Boorse, C., (1977). Health as a theoretical concept. *Philosophy of science*. 44(4) pp542-573.

Booth, F.W., (1988). Perspectives on molecular and cellular exercise physiology. *Journal of Applied Physiology*, *65*(4), pp.1461-1471.

Borrie, A. and Ryall, E., (2023). Making Reflective Practice More Meaningful: Saying the "Unsayable". In Cropley, B., Knowles, Z., Miles, A. and Huntley, E. (eds). *Reflective Practice in the Sport and Exercise Sciences: Critical Perspectives, Pedagogy, and Applied Case Studies*. London, Taylor & Francis. pp53-65.

Boudreau, J.D. and Cassell, E.J., (2021). Medical Wisdom. *Perspectives in Biology and Medicine*, 64(2), pp.251-270.

Bouffard, M., (2001). The scientific method, modernism, and postmodernism revisited: A reaction to Shephard (1999). *Adapted Physical Activity Quarterly*. 18(3). pp221-234.

Brady, M. and Pritchard, D., (2006). Epistemic virtues and virtue epistemology. *Philosophical studies*. pp1-8.

Braude, H.D., (2017), Clinical Reasoning and Knowing. n Marcum, J.A., ed. *The Bloomsbury Companion to Contemporary Philosophy of Medicine*. London, Bloomsbury. pp323-341

Bray, H., Chapman, S., Myatt, A. Short, A., Bointon, S. and Martin, J., (2016). *Cambridge Technicals Level 3 Sport and Physical Activity*. Cambridge Technicals Hodder Education UK.

Breivik, G., (2019). What would a deep ecological sport look like? The example of Arne Naess. *Journal of the Philosophy of Sport*. 46(1). pp63-81.

Breivik, G., (2021). 'Richness in Ends, Simpleness in Means!'on Arne Naess's Version of Deep Ecological Friluftsliv and Its Implications for Outdoor Activities. *Sport, Ethics and Philosophy*, 15(3), pp.417-434.

Brischoux, F. and Angelier, F., (2015). Academia's never-ending selection for productivity. *Scientometrics*. 103. pp333-336.

Broadbent, A., (2019). *Philosophy of Medicine*. Oxford. Oxford University press.

Brock, S., (2017). "Is philosophy progressing fast enough". Philosophy's Future. *The Problem of Philosophical Progress*. pp119-131.

Brown, J.R., (2011). *The laboratory of the mind: Thought experiments in the natural sciences*. Abingdon, Routledge.

Bubbio, P.D. and Malpas, J. eds., (2019). *Why Philosophy?* Walter de Gruyter GmbH & Co KG.

Budd, M.A., (1997). *The Sculpture Machine*. London, Macmillan Press.

Budde, H. and Wegner, M. eds., (2018). The exercise effect on mental health: neurobiological mechanisms. New York, Routledge.

Burbules, N.C., (2019). Thoughts on phronesis. *Ethics and Education*. 14(2). pp126-137.

Burdea, G.C., Cioi, D., Kale, A., Janes, W.E., Ross, S.A. and Engsberg, J.R., (2012). Robotics and gaming to improve ankle strength, motor control, and function in children with cerebral palsy—a case study series. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 21(2), pp.165-173.

Buskirk, E.R., and Tipton, C.M., (1997). Exercise Physiology. In Massengale, J.D., and Swanson, R.A., eds., *The History of Exercise and Sport Science*. Champ, Illinois, Human Kinetics. pp367-438.

Butler, C.C., Evans, M., Greaves, D. and Simpson, S., (2004). Medically unexplained symptoms: the biopsychosocial model found wanting. *Journal of the Royal Society of Medicine*. *97*(5). pp219-222.

Cairney, J., McGannon, K.R. and Atkinson, M. (2018). Exercise is medicine: critical considerations in the qualitative research landscape. *Qualitative Research in Sport, Exercise and Health*. 10(4), pp391-399.

Calatayud, J., Borreani, S., Colado, J.C., Martín, F.F., Rogers, M.E., Behm, D.G. and Andersen, L.L., (2014). Muscle activation during push-ups with different suspension training systems. *Journal of sports science & medicine*, *13*(3), p.502.

Cappelen, H., (2018). *Conceptual Engineering: the master argument.* Available at 9780198801856-libre.pdf (d1wqtxts1xzle7.cloudfront.net)

Capra, F. (1982). *The Turning Point: Science, Society and the Rising Culture*. London, Wildwood House.

Carreyrou, J. (2019). *Bad Blood: secrets and lies in a Silicon Valley startup: The story of Elizabeth Holmes and the Theranos scandal*. New York, Picadour.

Carter, N., (2012). *Medicine, sport, and the body: A historical perspective*. London, Bloomsbury.

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public health reports*. 100(2), pp126.

Cassidy, T.G., Jones, R.L. and Potrac, P.A., (2016). *Understanding sports coaching: the pedagogical, social and cultural foundations of coaching practice*. Routledge. 3rd edition.

Cassidy, T., Handcock, P., Gearity, B., and Burrows, L., (2020). *Understanding Strength and Conditioning as Sport Coaching*. London, Routledge.

Chalmers, D.J., (2020). What is conceptual engineering and what should it be? *Inquiry*. pp1-18. Doi. 10.1080/0020174X.2020.1817141

Chan, J.S., Liu, G., Liang, D., Deng, K., Wu, J. and Yan, J.H., (2019). Special issue–therapeutic benefits of physical activity for mood: a systematic review on the effects of exercise intensity, duration, and modality. *The Journal of psychology*, 153(1), pp102-125.

Chapman, D.L., (2006). *Sandow: The Magnificent*. Chicago, University of Illinois Press.

Chase, J. and Reynolds, J., (2014). *Analytic versus continental: Arguments on the methods and value of philosophy*. Abingdon, Routledge.

Chatfield, S., Godfrey, R., Pattni, J. and Quinlivan, R., (2021). Rhabdomyolysis due to unaccustomed exercise: Experiences from a multidisciplinary clinic. *Physiotherapy*, 113, pp98-99.

Chen, G., Gao, L. and Li, X., (2019). Effects of exercise training on cardiovascular risk factors in kidney transplant recipients: a systematic review and meta-analysis. *Renal failure*, 41(1), pp408-418.

Cheron, G., (2016). How to measure the psychological "flow"? A neuroscience perspective. *Frontiers in Psychology*. 7. p1823.

Clarke, C.V. and Adamson, B.C., (2021). A syndemics approach to exercise is medicine. *Health*, p.13634593211021481.

Clarke, A.E., Jeske, M., Mamo, L. and Shim, J.K., (2021). Biomedicalization revisited. Cockerham, W.C., ed. *The Wiley Blackwell Companion to Medical Sociology*. John Wiley & Sons. pp125-149.

Colgrove J., (2002). The McKeown thesis: a historical controversy and its enduring influence. *American Journal of Public Health*. 92(5), pp725-729.

Connors, D.D., (1980). Sickness unto death: Medicine as mythic, necrophilic and iatrogenic. *Advances in Nursing Science.* 2(3). pp39-51.

Conrad, P., (1992). Medicalization and social control. *Annual review of Sociology*, pp209-232.

Conrad, L.I., Neve, M., Nutton, V., Potter, R., and Wear, A., (1995). *The Western Medical Tradition: 800BC to AD 1800*. Cambridge, Cambridge University Press.

Cook, H.J. (1986) *The Decline of the Old Medical Regime in Stuart London.* London Cornell University Press.

Cooke, S. and Carr, D., (2014). Virtue, practical wisdom and character in teaching. *British Journal of Educational Studies*. 62(2). pp91-110.

Cope, E. and Partington, M., eds., (2019) *Sports coaching: a theoretical and practical guide*. Abingdon, Routledge.

Corazza, O., Simonato, P., Demetrovics, Z., Mooney, R., van de Ven, K., Roman-Urrestarazu, A., Rácmolnár, L., De Luca, I., Cinosi, E., Santacroce, R. and Marini, M., (2019). The emergence of Exercise Addiction, Body Dysmorphic Disorder, and other image-related psychopathological correlates in fitness settings: A cross sectional study. *PloS one.* 14(4), p.e0213060.

Côté, J. and Gilbert, W., (2009). An integrative definition of coaching effectiveness and expertise. *International journal of sports science & coaching*, *4*(3), pp.307-323.

Coulson, M., (2007). *The Fitness Instructor's Handbook*. London, A & C Black Publishers Ltd.

Coulter, H.L., (1994). *The Divided Legacy*. Washington, Centre for Empirical Medicine.

Craig, D., and Openshaw, H., (2018). *The Great University Con: how we broke our universities and betrayed a generation.* Original Book Company.

Crook, D., (2008). *Some historical perspectives on professionalism*. Institute of Education, University of London. Available at Historical perspectives on professionalism (ucl.ac.uk).

Cropley, B., Knowles, Z., Miles, A. and Huntley, E. (eds)., (2023). *Reflective Practice in the Sport and Exercise Sciences: Critical Perspectives, Pedagogy, and Applied Case Studies*. London, Taylor & Francis.

Crowther, T.M., (2006). Two conceptions of conceptualism and nonconceptualism. *Erkenntnis*. *65*(2). pp245-276

Culbertson, L., (2020). Scientism and the welfare of athletes: Minds, brains, genes and agency. in Lang, M., ed. *Routledge Handbook of Athlete Welfare.* pp24-32. Abingdon, Routledge.

Cushion, C.J., (2018). Reflection and reflective practice discourses in coaching: A critical analysis. *Sport, education and society*. 23(1). pp82-94.

Cushion, C.J., Stodter, A., and Clarke, N.J., (2022). Its an experiential thing: the discursive construction of learning in high performance coach education. *Sport, Education, and Society*. 27(7). pp844-861.

Dahnke, M.D. and Dreher, H. M. (2016). *Philosophy of Science for Nursing Practice: concepts and applications*. 2nd edition. New York. Springer Publishing Company.

Damasio, A. (2003). *Looking for Spinoza: Joy, Sorrow, and the Feeling Brain*. New York: Harcourt.

Darnell, C., Gulliford, L., Kristjánsson, K. and Paris, P., (2019). Phronesis and the knowledge-action gap in moral psychology and moral education: A new synthesis? *Human Development*. 62(3). pp101-129.

Darnell, C., Fowers, B.J. and Kristjánsson, K., (2022). A multifunction approach to assessing Aristotelian phronesis (practical wisdom). *Personality and individual differences*. 196. p111684.

Dasso, N.A., (2019). How is exercise different from physical activity? A concept analysis. *Nursing forum*. 54(1). pp45-52.

De Florio, C. and Giordani, A. eds., (2018). *From Arithmetic to Metaphysics: A Path Through Philosophical Logic* (Vol. 73). Walter de Gruyter GmbH & Co KG.

De Lyon, A.T., Neville, R.D. and Armour, K.M., (2017). The role of fitness professionals in public health: a review of the literature. *Quest*, *69*(3), pp.313-330.

De Oliveira Pires, F., (2013). Thomas Kuhn's 'Structure of Scientific Revolutions' applied to exercise science paradigm shifts: example including the Central Governor Model. *British journal of sports medicine*. 47(11). pp721-722.

De Ridder, J., Peels, R. and van Woudenberg, R. eds., (2018). *Scientism: Prospects and problems*. New York, Oxford University Press.

Dellsén, F., Lawler, I. and Norton, J., (2021). Thinking about Progress: From Science to Philosophy. *NOUS*. pp1-27.

Dewey, J. (1938). *Experience and education*. New York: Macmillan.

Dietrich, J., Keyzer, P., Jones, V., Norton, K., Sekendiz, B., Gray, S. and Finch, C. (2014). Train the trainers: Maintaining standards to minimise injuries and avoiding legal liability in the fitness industry. *Journal of Science and Medicine in Sport*. 18. p.e3.

Di Leo, J.R., (2017). Higher Education under Late Capitalism: Identity, Conduct, and the Neoliberal Condition. Cham, Switzerland, Palgrave.

Dillon, M., (2016). Gnosticism theorized: Major trends and approaches to the study of Gnosticism. . In DeConick, A.D., ed. *Secret Religion*. Macmillan Interdisciplinary Handbooks. Farmington Hills, USA. Macmillan. pp.23-38.

Dillon, K.M. and Tait, J.L., (2000). Spirituality and Being in the Zone in Team Sports: A Relationships?. *Journal of Sport Behavior*. 23(2).

Dimmock, J.A., Hallett, B.E. and Grove, R.J., (2009). Attitudes toward overweight individuals among fitness center employees: An examination of contextual effects. *Research Quarterly for Exercise and Sport*. 80(3). pp641-647.

Domaradzki, J., Cichy, I., Rokita, A. and Popowczak, M., (2020). Effects of tabata training during physical education classes on body composition, aerobic capacity, and anaerobic performance of under-, normal-and overweight adolescents. *International Journal of Environmental Research and Public Health*. 17(3), p.876.

Donaghue, N. and Allen, M., (2016). "People don't care as much about their health as they do about their looks": Personal trainers as intermediaries between aesthetic and health-based discourses of exercise participation and weight management. *International journal of sport and exercise psychology*. 14(1). pp42-56.

Doolittle, B.R., (2021). Gnosticism, Wittgenstein, and the Language of Medicine. *The American Journal of Medicine*. 135(3). pp284-285.

D'Oro, G., and Overgaard, S., eds., (2017). *The Cambridge Companion to Philosophical Methodology*. Cambridge, Cambridge University Press.

Doust, J., Walker, M. and Rogers, W.A., (2017). Current dilemmas in defining the boundaries of disease. *Journal of Medicine and Philosophy*. 42(4). pp350-366.

Downey, J., (2017). Lifestyle assessment and behaviour change. In Hough, P. and Penn, S. eds., (2017). *Advanced Personal Training: Science to Practice*. Abingdon, Routledge.

Draper, P., (2014). A critique of concept analysis. *Journal of Advanced Nursing*. 70(6). pp1207-1208.

Drummond, J. and Standish, P., (2007). *The philosophy of nurse education*. London, Bloomsbury.

Dyrud, M.A., (2021). What Is a Professional?. In *2020 CIEC*. https://peer.asee.org/what-is-a-professional accessed 20/08/2022

Duffy, T.P., (2011). The Flexner report—100 years later. *The Yale journal of biology and medicine*, *84*(3), p.269-276

Dunne, J., (2011). 'Professional Wisdom' in 'Practice'. In Bondi, L., Carr, D., Clark, C., and Clegg, C., eds. *Towards Professional Wisdom*. Surrey, UK., Ashgate Publishing Ltd.

Durepos, P., Orr, E., Ploeg, J. and Kaasalainen, S., (2018). The value of measurement for development of nursing knowledge: Underlying philosophy, contributions and critiques. *Journal of advanced nursing*. 74(10), pp.2290-2300.

Dvorák, M., Tóth, M. and Ács, P., (2021). The Role of Individualized Exercise Prescription in Obesity Management—Case Study. *International Journal of Environmental Research and Public Health*. 18(22). p.12028.

Eastwood, J.L., Koppelman-White, E., Mi, M., Wasserman, J.A., Krug III, E.F. and Joyce, B., (2017). Epistemic cognition in medical education: a literature review. *International journal of medical education*. 8 p.1.

Ebbeck, V. and Austin, S., (2018). Burning off the fat oppression: Self-compassion exercises for personal trainers. *Fat Studies*. 7(1), pp81-92.

Eickhoff-Shemek, J.M., (2010). An analysis of 8 negligence lawsuits against personal fitness trainers: 3 major liability exposures revealed. *ACSM's Health & Fitness Journal*. 14(5), pp34-37.

Eikeland, O., (2008). *The ways of Aristotle: Aristotelian phronesis, Aristotelian philosophy of dialogue, and action research* (Vol. 5). Bern, Peter Lang.

Eilenberger, W., (2020). *Time of the Magicians: the invention of modern thought, 1919-1929*. Trans by Shaun Whiteside. UK. Allen Lane.

Eisner, E.W., (2002). From episteme to phronesis to artistry in the study and improvement of teaching. *Teaching and teacher education*. 18(4). pp375-385.

Ekkekakis, P. and Tiller, N.B., (2022). Extraordinary claims in the literature on high-intensity interval training: II. Are the extraordinary claims supported by extraordinary evidence?. *Kinesiology Review*. 1(aop). pp1-14.

Ekkekakis, P., Swinton, P. and Tiller, N.B., (2023). Extraordinary Claims in the Literature on High-Intensity Interval Training (HIIT): I. Bonafide Scientific Revolution or a Looming Crisis of Replication and Credibility?. *Sports Medicine*. pp1-26.

Ekström, A., Östenberg, A.H., Björklund, G. and Alricsson, M., (2019). The effects of introducing Tabata interval training and stability exercises to school children as a school-based intervention program. *International journal of adolescent medicine and health*. 31(4). https://doi.org/10.1515/ijamh-2017-0043

Ellapen, T. J. et al., (2018), 'Biokinetics: A South African Health Profession Evolving from Physical Education and Sport', in M. Merc (ed.), Sport and Exercise Science, IntechOpen, London. 10.5772/intechopen.73126.

ElMeligie, M.M.A.H., (2022). Exercise Mimetics: An Emerging and Controversial Topic in Sport and Exercise Physiology. DOI: 10.5772/intechopen.102533 https://www.intechopen.com/online-first/80310

Emmet, E.R., (1968). *Learning to Philosophize*. London, Penguin Books.

Engel, G., (1977). The Need for a New Medical Model: A Challenge for Biomedicine. *Science*. 196 (4286). pp129-136.

Engelhardt, H.T., and Jotterand, F., (2011). *A philosophy of Medicine Reborn: a Pellegrino Reader*. Notre Dame, University of Notre Dame.

Epstein, R.M., and Hundert, E.M. (2002). Defining and Assessing Professional Competence. *JAMA*. 287(2). p226-234

Eraut, M., (1994). *Developing professional knowledge and competence*. Abingdon, Routledge.

Fan, W. and Evans, R.M., (2017). Exercise mimetics: impact on health and performance. *Cell metabolism*. 25(2). pp.242-247.

Faulkner, G. E., & Taylor, A. H. (2005). *Exercise, health and mental health: Emerging relationships*. Taylor & Francis.

Ferngren, G. B., and Amundsen, D. W. (1985). Virtue and health/medicine in pre-Christian antiquity. In Shelp, E.E., ed., *Virtue and Medicine*. pp3-22. Netherlands, Springer.

Feyerabend, P., (2010/1975). *Against method: Outline of an anarchistic theory of knowledge*. Venice, Verso Books.

Feyerabend, P., (2011). *The Tyranny of Science*. Cambridge, Polity Press.

Fialová, L. (2017) Inspirations of the Twentieth Century. In Marcum, J.A., ed. *The Bloomsbury Companion to Contemporary Philosophy of Medicine*. London, Bloomsbury. pp183-204.

Fleischmann, A., Sieverding, M., Hespenheide, U., Weiß, M. and Koch, S.C., (2016). See feminine–Think incompetent? The effects of a feminine outfit on the evaluation of women's computer competence. *Computers & Education*. 95. pp63-74.

Flew, A., (1971). The concept of miracle. *Philosophical Books*, 12(2). doi. 10.1111/j.1468-0149.1971.tb00559.x

Flyvbjerg, B., (2001). *Making Social Science Matter: Why Social Inquiry Fails and How It Can Succeed Again*. Cambridge, Cambridge University Press.

Fook, J., (2007). Reflective practice and critical reflection. . In Lishman, J. ed., *Handbook for practice learning in social work and social care*. 3rd ed. London: Jessica Kingsley. pp440–454

Forteza, F., Giorgini, G. and Raymond, F., (2021). Neurobiological processes induced by aerobic exercise through the endocannabinoidome. *Cells*. 10(4). p.938.

Foss, L., (2002). *The End of Modern Medicine: biomedical science under the microscope*. New York, State University of New York Press.

Foss, L., and Rothenberg, K., (1987). *The Second Medical Revolution: from biomedicine to infomedicine*. Boston, New Science Library.

Foucault, M., (1973). *The birth of the clinic*. London, Tavistock.

Freidson, E., (1970). *Profession of Medicine: a study of the sociology of applied knowledge*. Dodd, Mead & Co. New York.

Freund, P.E., McGuire, M.B. and Podhurst, L.S., (2003). *Health, illness, and the social body: A critical sociology*. New York, Prentice Hall.

Fricker, M., Graham, P.J., Henderson, D. and Pedersen, N.J. eds., (2020). *The Routledge handbook of social epistemology*. London, Routledge.

Frigo, G., Marthaler, F., Albers, A., Ott, S. and Hillerbrand, R., (2021). Training responsible engineers. Phronesis and the role of virtues in teaching engineering ethics. *Australasian Journal of Engineering Education*. 26(1), pp.25-37.

Fromm, E., (1973). *The Anatomy of Human Destructiveness*. London, Pimlico.

Fullagar, H.H., McCall, A., Impellizzeri, F.M., Favero, T. and Coutts, A.J., (2019). The translation of sport science research to the field: a current opinion and overview on the perceptions of practitioners, researchers and coaches. *Sports Medicine*. 49(12). pp1817-1824.

Furman, K., (2022). Epistemic Bunkers. *Social Epistemology*, pp1-11. DOI: 10.1080/02691728.2022.2122756

Gadamer, H.G., (1977/2004). *The Enigma of Health*. Cambridge, Polity Press.

Gallucci, N.T., (2014). *Sport psychology: Performance enhancement, performance inhibition, individuals, and teams*. Psychology press.

Gamlund, E., (2011). Living Under the Guidance of Reason: Arne Naess's Interpretation of Spinoza. *Inquiry*, 54(1), pp2-17.

Garber, D., and Roux, S., eds., (2013). *The Mechanization of Natural Philosophy*. New York, Springer.

Gardiner, E.N., (2002/1930). *Athletics in the ancient world*. Courier Corporation/ Oxford University Press.

Garner, P., Roberts, W.M., Baker, C. and Côté, J., (2022). Characteristics of a person-centred coaching approach. *International Journal of Sports Science & Coaching*. doi.17479541221077052.

Gaukroger, S., (2020). *The Failures of Philosophy*. Princeton University Press.

Gavin, J. (2018). *Lifestyle wellness coaching*. Champagne, Illinois. Human Kinetics.

George, A.J.T., (2021). Phronesis as Reflection. *Philosophy of Coaching*. 6(2) pp7-21.

Ghaemi, S.N., (2011). The biopsychosocial model in psychiatry: A critique. *American Journal of Psychiatry*. 121. pp451-7.

Ghosh, S.K., (2015). Human cadaveric dissection: a historical account from ancient Greece to the modern era. *Anatomy & cell biology*, *48*(3), pp.153-169.

Gibbs, G. (1988). *Learning by doing: A guide to teaching and learning methods*. Oxford, UK Oxford Brookes University, Further Education Unit.

Girod, M., (2007). A conceptual overview of the role of beauty and aesthetics in science and science education. *Studies in Science Education*. 43 (1). pp38-61.

Glock, H, J., (2017). Impure Conceptual Analysis. In D'Oro, G., and Overgaard, S. eds. *The Cambridge Companion to Philosophical Methodology*. Cambridge, Cambridge University Press.

Goddard, S.G., Stevens, C.J., Jackman, P.C. and Swann, C., (2021). A systematic review of flow interventions in sport and exercise. *International review of sport and exercise psychology*, pp.1-36.

Gold, J., (1985). Cartesian dualism and the current crisis in medicine—A plea for a philosophical approach: Discussion paper. *Journal of the Royal Society of Medicine*, *78*(8), pp.663-666.

Gold, J. and Ciorciari, J., (2020). A Review on the Role of the Neuroscience of Flow States in the Modern World. *Behavioral Sciences*. 10(9), p137.

Goldacre, B., (2008). *Bad Science*. London, Fourth Estate.

Goldacre, B., (2012). *Bad Pharma*. London, fourth Estate.

Gomez-Carmona, O. and Casado-Mansilla, D., (2017). SmiWork: An interactive smart mirror platform for workplace health promotion. In *2017 2nd International Multidisciplinary Conference on Computer and Energy Science (SpliTech)* July. pp1-6.

González, C.S.G., del Río, N.G. and Adelantado, V.N., (2018). Exploring the benefits of using gamification and videogames for physical exercise: a review of state of art. *IJIMAI*. 5(2). pp46-52.

Goodman, K.W., (2003). *Ethics and evidence-based medicine*. Cambridge, Cambridge University Press.

Gorgey, A.S., (2018). Robotic exoskeletons: The current pros and cons. *World journal of orthopedics*. 9(9). p.112.

Gould, S.J., (1981/1996). *The Mismeasure of Man*. revised edition. London, W.W.Norton.

Graber, K.M., Byrne, E.M., Goodacre, E.J., Kirby, N., Kulkarni, K., O'Farrelly, C. and Ramchandani, P.G., (2021). A rapid review of the impact of quarantine and restricted environments on children's play and the role of play in children's health. *Child: Care, health and development*. 47(2). pp143-153.

Gray, J., (2013). *The Silence of Animals*. UK, Allen lane, Random House.

Gray, J., (2015). *The soul of the marionette: A short inquiry into human freedom*. UK, Allen Lane, Random House.

Gray, J., Smith, A. and James, H., (2014a) An Aristotelian investigation into personal training. *Health & Fitness Journal of Canada*, 7(5), pp33-47.

Gray, J., Smith, A. and James, H., (2014b). From "Locker-Rack–Shower–Repeat" to a coaching focused model of strength and conditioning. *Health & Fitness Journal of Canada*, 7(3), pp42-50.

Gray, J., (2019). The Hazards of a Biomedical Exercise Paradigm: Exploring the Praxis of Exercise Professionals. *Philosophies*. 4(3). pp1-13.

Greenhalgh, T., (2020). Will COVID-19 be evidence-based medicine's nemesis?. *PLoS Medicine*. 17(6), p.e1003266.

Greenhalgh, T., Howick, J. and Maskrey, N., (2014). Evidence based medicine: a movement in crisis?. *British Medical Journal*. 348 doi: 10.1136/bmj.g3725

Gubert, C. and Hannan, A.J., (2021). Exercise mimetics: harnessing the therapeutic effects of physical activity. *Nature Reviews Drug Discovery*, 20(11), pp862-879.

Guerin, B., (2020). From "what is philosophy?" to "the behavior of philosophers". *Behavior and Philosophy*. 48, pp69-81.

Hall, E.W., (1942). Is Philosophy a Science ? *The Journal of Philosophy*. 39(5), pp.113-118.

Halperin, I., Vigotsky, A.D., Foster, C. and Pyne, D.B., (2018). Strengthening the practice of exercise and sport-science research. *International Journal of Sports Physiology and performance*. 13(2). pp127-134.

Hamill, B.P., (1994). Relative safety of weightlifting and weight training. *Journal of Strength & Conditioning Research*, 8(1), pp53-57.

Hannon, M. and Nguyen, J., (2021). Understanding Philosophy. Available at Understanding Philosophy (philpapers.org)

Haque, O. S., & Waytz, A. (2012). Dehumanization in medicine: Causes, solutions, and functions. *Perspectives on Psychological Science*. 7. pp176-186.

Hardey, M., (2022). Tracking the trackers: Self-tracking in households as social practice. *Digital Health*, *8*, p.20552076221093131.

Hardman, A.R. and Jones, C., (2010). Sports coaching and virtue ethics. In *The ethics of sports coaching* (pp. 86-98). Routledge.

Hargreaves, M., (2021). Exercise and health: historical perspectives and new insights. *Journal of Applied Physiology*, *131*(2), pp.575-588.

Hargrove, T., (2019). *Playing with Movement*. Seattle, Better Movement.

Harris, E.E., (1973). *Salvation from Despair*. The Netherlands, Martinus Nijhoff.

Harris, N., Kilding, A., Sethi, S., Merien, F. and Gottschall, J., (2018). A comparison of the acute physiological responses to BODYPUMP™ versus iso-caloric and iso-time steady state cycling. *Journal of science and medicine in sport*. 21(10). pp1085-1089.

Haug, M., (1975). The deprofessionalization of everyone. *Sociological Focus*. 8(3) pp197–213.

Hawley, J.A., Joyner, M.J. and Green, D.J., (2021). Mimicking exercise: what matters most and where to next?. *The Journal of physiology*, *599*(3), pp791-802.

Heinze, K., Cumming, J., Dosanjh, A., Palin, S., Poulton, S., Bagshaw, A.P., and Matthew R. Broome, M.R., (2021). Neurobiological evidence of longer-term physical activity interventions on mental health outcomes and cognition in young people: A systematic review of randomised controlled trials. *Neuroscience & Biobehavioral Reviews* 120. pp431-441.

Hemmestad, L.B., Jones, R.L. and Standal, Ø.F., (2010). Phronetic social science: A means of better researching and analysing coaching? *Sport, Education and Society*. 15(4). pp447-459.

Hewa, S. and Hetherington, R.W., (1995). Specialists without spirit: Limitations of the mechanistic biomedical model. *Theoretical Medicine*. 16(2), pp.129-139.

Hickson, M., (2019). The necessity of philosophy in the exercise sciences. *Philosophies*. 4(3), pp45-56.

Hidler, J., Hamm, L.F., Lichy, A., and Groah, S.L., (2008). Automating activity-based interventions: The role of robotics. *Journal of Rehabilitation Research & Development*. 45(2). pp337-344.

Higgs, J., (2012). Realising practical wisdom from the pursuit of wise practice. in Kinsella. E.A., and A. Pitman.A., eds. *Phronesis as professional knowledge: Practical wisdom in the professions*. Boston, MA, Sense. pp73–85.

Hilkens, L., Cruyff, M., Woertman, L., Benjamins, J. and Evers, C., (2021). Social Media, Body Image and Resistance Training: Creating the Perfect 'Me'with Dietary Supplements, Anabolic Steroids and SARM's. *Sports Medicine-Open*. 7(1). pp1-13.

Hill, L., (2020). A case for reflexivity in exercise science and sports medicine research. *Journal of Physical Education & Sport*. 20(3). pp1505-1512.

Hjørland, B., (2011). Evidence-based practice: An analysis based on the philosophy of science. *Journal of the American Society for Information Science and Technology*. 62(7). pp1301-1310.

Honary, M., Bell, B.T., Clinch, S., Wild, S.E. and McNaney, R., (2019). Understanding the role of healthy eating and fitness mobile apps in the formation of maladaptive eating and exercise behaviors in young people. *JMIR mHealth and uHealth*, *7*(6), p.e14239.

Horwitz, R.I., Hayes-Conroy, A., Caricchio, R. and Singer, B.H., (2017). From evidence based medicine to medicine based evidence. *The American Journal of Medicine*. 130(11). pp1246-1250.

Howick, J., (2011). *The Philosophy of Evidence-Based Medicine*. Chichester, John Wiley and Sons Ltd.

Howley, E.T., and Thompson, D., (2016). *Fitness Professional's Handbook*. 7th Edition. Champ, Illinois. Human Kinetics.

Hough, P. and Penn, S. eds., (2017). *Advanced Personal Training: Science to Practice*. Abingdon, Routledge.

Hough, P., and Schoenfeld, B.J., (2022) *Advanced Personal Training: Science to Practice*. 2nd ed. Abingdon, Routledge.

Huertas, J.R., Casuso, R.A., Agustín, P.H. and Cogliati, S., (2019). Stay fit, stay young: mitochondria in movement: the role of exercise in the new mitochondrial paradigm. *Oxidative Medicine and Cellular Longevity*. Open access. pp1-18

Hülsmann, M., Reinecke, K., Barthel, T. and Reinsberger, C., (2021). Musculoskeletal Injuries In CrossFit®: A Systematic Review and Meta-Analysis of Injury Rates and Locations. *Dtsch Z Sportmed*. 72. pp351-358.

Hupcey, J.E. and Penrod, J., (2005). Concept analysis: examining the state of the science. *Research and theory for nursing practice*. 19(2). pp197-208.

Hupcey, J.E., Morse, J.M., Lenz, E.R. and Tasón, M.C., (1996). Wilsonian methods of concept analysis: a critique. *Scholarly Inquiry for Nursing Practice*. 10(3). pp185-210.

Illich, I., (1975). *Medical Nemesis: The Expropriation of Health*. London, Calder & Boyers Ltd.

Irvine, A.D., (1991). *Thought experiments in scientific reasoning*. Available at http://philsci-archive.pitt.edu/3190/1/9_irvine.pdf. Accessed 04/08/2023.

Jackman, P.C., Allen-Collinson, J., Ronkainen, N. and Brick, N.E., (2022). Feeling good, sensory engagements, and time out: embodied pleasures of running. *Qualitative Research in Sport, Exercise and Health*. pp1-14.

Jackson, M., and Jackson, B., (2012). Understanding and philosophical methodology. *Philosophical Studies*. 161(2). pp185-205.

Jakubovská, V. and Waldnerová, J., 2020. Reflections on happiness and a happy life. *Ars Aeterna*. 12(2). pp.34-44.

Jeffreys, I., (2020). *Effective Coaching in Strength and Conditioning*. London, Routledge.

Jenkins, K., Kinsella, E.A. and DeLuca, S., (2019). Perspectives on phronesis in professional nursing practice. *Nursing Philosophy*. 20(1). p.e12231.

Jewson, N.D., (2009). The disappearance of the sick-man from medical cosmology, 1770-1870. *International Journal of Epidemiology*. 38. pp622-633.

Johnson, S.G. and Steinerberger, S., (2019). Intuitions about mathematical beauty: A case study in the aesthetic experience of ideas. *Cognition*. 189. pp242-259.

Jolley, D., Davis, M., Lavender, A.P. and Roberts, L., (2022). An online critical thinking course reduces misconceptions in the knowledge of personal trainers. *Studies in Continuing Education*, 44(1), pp.39-54.

Jones, C. and Christensen, C., & Young, M., (2000). Weight Training Injury Trends A 20-Year Survey. *The physician and sports medicine*. 28. pp61-72.

Jones, K., (2009). Analytic versus Continental philosophy. *Philosophy Now*. 74. pp8-11.

Jones, H., George, K.P., Scott, A., Buckley, J.P., Watson, P.M., Oxborough, D.L., Thijssen, D.H., Graves, L.E., Whyte, G.P., McGregor, G., and Naylor, L.H., (2021). Charter to establish clinical exercise physiology as a recognised allied health profession in the UK: a call to action. *BMJ Open Sport & Exercise Medicine*, *7*(3), p.e001158.

Jones, R.L. and Hemmestad, L.B., (2021). Reclaiming the 'competent'practitioner: Furthering the case for the practically wise coach. *Sports coaching review*. 10(1). pp1-19.

Joubert, C., (2014). Medicine and mind-body dualism: A reply to Mehta's critique. *Mens Sana Monographs*. 12(1). pp104-226.

Jureidini, J., and McHenry, L.B., (2020) The Illusion of Evidence-Based Medicine: Exposing the Crisis of Credibility in Clinical Research. South Australia, Wakefield Press.

Kamber, R., (2017). Does philosophical progress matter. Philosophy's Future. *The Problem of Philosophical Progress*. pp133-143.

Kandilakis, C. and Sasso-Lance, E., (2021). Exoskeletons for personal use after spinal cord injury. *Archives of Physical Medicine and Rehabilitation*. 102(2), pp.331-337.

Karahan, S. and Karaagaoglu, A.E., (2021). Development of Biostatistics: From Past to Future. *Duzce Medical Journal.* 23(3), pp.234-238.

Kari, T., Piippo, J., Frank, L., Makkonen, M. and Moilanen, P., (2016). To gamify or not to gamify? Gamification in exercise applications and its role in impacting exercise motivation.

Katz, J.J. and Postal, P.M., (1991). Realism vs. conceptualism in linguistics. *Linguistics and Philosophy*. pp515-554.

Kemper, H.C. and Van Mechelen, W., (1996). Physical fitness testing of children: a European perspective. *Pediatric Exercise Science*. 8(3), pp.201-214.

Kenny, A., (2010). *A new history of Western philosophy*. Oxford, Oxford University Press.

Kidd, I.J., (2016). Why did Feyerabend defend astrology? Integrity, virtue, and the authority of science. *Social Epistemology*. 30(4). pp464-482.

Kidman, L. and Lombardo, B., (2010). *Athlete-centred coaching: developing decision makers*. Worchester, IPC.

Kilgore, J.L., Baker, J.S. and Davies, B., (2014). A consideration of the paradigm of exercise physiology. *Research in Sports Medicine.* 22(3). pp.314-322.

Kinsella, E.A. and Pitman, A., (eds). (2012a) *Phronesis as professional knowledge* Rotterdam, SensePublishers.

Kinsella, E.A. and Pitman, A., (2012b). *Phronesis as professional knowledge: implications for education and practice*. In Kinsella, E.A. and Pitman, A., (eds). *Phronesis as professional knowledge* Rotterdam, SensePublishers. Pp163-172.

Kite, R., Lloyd, R. and Hamill, B., (2016). British weightlifting position statement; youth weightlifting. https://britishweightlifting.org/resources/youth-position-statement-270918145402.pdf accessed 27/08/2022.

Knorr-Cetina, K.D., (1999). *Epistemic cultures: How the sciences make knowledge*. Harvard University Press.

Knowles, Z., Gilbourne, D., Cropley, B., and Dugdill, L., eds. (2014). *Reflective Practice in the Sport and Exercise Sciences: contemporary issues*. London, Routledge.

Knudson, D. (2017). Twenty Years of Authorship, Sampling, and References in Kinesiology Research Reports. *International Journal of Kinesiology in Higher Education*. 1(2).pp44–52.

Koch, S., (2021). Engineering what? On concepts in conceptual engineering. *Synthese*. 199(1-2). pp1955-1975.

Kolb, D.A., (1981). Learning Styles and disciplinary differences. In Chickering, A.W., ed. *The Modern American College*. San Francisco, Jossey-Bass.

Kontopodis, M., (2013) Biomedicine, psychology and the kindergarten: children at risk and emerging knowledge practices. *Sport, Education and Society*. 18(4) p475-493.

Kontos, N., (2011). Biomedicine - Menace or Straw Man? Re-examining the Biopsychosocial Argument. *Academic Medicine*. 86 (4). pp509-515.

Kosma, M. and Buchanan, D.R., (2018). "Connect," Log It, Track It, Go! Techne—not technology—and embodiment to achieve phronesis in exercise promotion. *Quest*. 70(1). pp.100-113.

Kretchmar, S., (2014) The Philosophy of Sport and Analytic Philosophy. In Torres, C. ed. *The Bloomsbury Companion to the Philosophy of Sport*. London, Bloomsbury.pp41-51.

Krieger, N., (2011). *Epidemiology and the People's Health: theory and context*. New York, Oxford University Press.

Kriel, J. R., (2003). Removing medicine' s Cartesian mask. The problem of humanizing medical education: Part I. *Journal of Biblical Ethics in Medicine*. 3(2). pp18-22.

Kristjánsson, K., (2021). Twenty-two testable hypotheses about phronesis: Outlining an educational research programme. *British Educational Research Journal*. 47(5), pp1303-1322.

Kristjánsson, K., (2022). Teaching phronesis to aspiring police officers: some preliminary philosophical, developmental, and pedagogical reflections. *International Journal of Ethics Education*. June. pp1-17.

Kristjánsson, K., Fowers, B., Darnell, C. and Pollard, D., (2021). Phronesis (practical wisdom) as a type of contextual integrative thinking. *Review of General Psychology*.25(3). pp239-257.

Kuhn, T.S., (1974). Second thoughts on paradigms. *The structure of scientific theories*. 2nd edition. pp.459-482. Available at Second Thoughts on Paradigms, Thomas Kuhn (uomustansiriyah.edu.iq). last accessed 30/06/2022.

Kuhn, T., (1996). *The Structure of Scientific Revolutions*. 3rd edition. London, The Chicago University Press.

Kurtz, T., (2022). The End of the Profession as a Sociological Category? Systems-theoretical Remarks on the Relationship between Profession and Society. *The American Sociologist*. 53(2). pp265-282.

Lachmund, J., (1998). Between scrutiny and treatment: physical diagnosis and the restructuring of 19th century medical practice. *Sociology of Health & Illness*. 20(6). pp.779-801.

Launer, J., (2022). *Reflective Practice in Medicine and Multi-Professional Healthcare*. London, CRC Press.

LeBuffe, M., (2010). *From Bondage to Freedom : Spinoza on human excellence*. Oxford, Oxford University Press.

Leder, D., (1992) A Tale of Two Bodies: The Cartesian Corpse and the Lived Body. In Leder, D., ed. *The Body in Medical Thought and Practice*. Kluwer Academic Publishers, Netherlands.

Lee, K.J., Noh, B., and An, K.O. (2021) Impact of Synchronous Online Physical Education Classes Using Tabata Training on Adolescents during COVID-19: A Randomized Controlled Study. *International Journal of Environmental Research and Public Health*.. 18(19) doi: 10.3390/ijerph181910305.

Le Fanu, J., (2018). Mass medicalisation is an iatrogenic catastrophe. *British Medical Journal*. 361. doi:10.1136/bmj.k2794

Lemoine, M., (2013). Defining disease beyond conceptual analysis: An analysis of conceptual analysis in philosophy of medicine. *Theoretical Medicine and Bioethics*. 34(4). pp309-325.

Levy, N., (2003). Analytic and continental philosophy: Explaining the differences. *Metaphilosophy*. 34(3). pp284-304.

Levy, A. and Godfrey-Smith, P. eds., (2019). *The scientific imagination*. Oxford University Press.

Li, S. and Laher, I., (2015). Exercise pills: at the starting line. *Trends in pharmacological sciences*. 36(12). pp906-917.

Li, S. and Laher, I., (2017). Exercise mimetics: running without a road map. *Clinical Pharmacology & Therapeutics*. *101*(2), pp.188-190.

Li, S. and Laher, I., (2020). Rethinking "Exercise is Medicine". *EXCLI journal*. 19. p.1169-1171.

Li, N.Y., Onor, G.I., Lemme, N.J. and Gil, J.A., (2021). Epidemiology of peripheral nerve injuries in sports, exercise, and recreation in the United States, 2009–2018. *The Physician and Sportsmedicine*, 49(3), pp.355-362.

Lieberman, D., (2020). *Exercised: The science of physical activity, rest and health*. UK, Penguin.

Light, R., & Harvey, S. (2019). Positive Pedagogy for Sport Coaching (2nd ed.). Routledge. https://doi-org.glos.idm.oclc.org/10.4324/9780429266300

Lloyd, R.S., Faigenbaum, A.D., Stone, M.H., Oliver, J.L., Jeffreys, I., Moody, J.A., Brewer, C., Pierce, K.C., McCambridge, T.M., Howard, R. and Herrington, L., (2014). Position statement on youth resistance training: the 2014 International Consensus. *British journal of sports medicine*. 48(7), pp498-505.

Lockie, R., (2015). Is philosophy useless?. *The Philosophers' Magazine*. 71. pp24-28.

Loland, S., (2017). The exercise pill: should we replace exercise with pharmaceutical means?. *Sport, Ethics and Philosophy*, *11*(1), pp.63-74.

Lord, B., (2010). *Spinoza's Ethics: An Edinburgh Philosophical Guide*. Edinburgh, Edinburgh University Press.

Lotfi, A., Langensiepen, C. and Yahaya, S.W., (2018). Socially assistive robotics: Robot exercise trainer for older adults. *Technologies*. 6(1), p.32.

Lowy, I., (2011). Historiography of biomedicine:"bio,""medicine," and in between. *Isis*. 102(1), pp116-122.

Loughlin, M., Lewith, G. and Falkenberg, T., (2013). Science, practice and mythology: a definition and examination of the implications of scientism in medicine. *Health Care Analysis*. 21(2). pp130-145.

Lunt, D., and Dyreson, M., (2014). A History of Philosophic Ideas about Sport in Torres, C.R., ed. *The Bloomsbury Companion to the Philosophy of Sport*. London, Bloomsbury.

Lupton, D., (2016). *The Quantified Self*. Cambridge, Polity Press.

Lv, J., Zhang, H., Chen, N. (2021). Exercise Mimetic Pills for Chronic Diseases Based on Autophagy. In: Chen, N. (eds) *Exercise, Autophagy and Chronic Diseases*. Springer, Singapore. https://doi.org/10.1007/978-981-16-4525-9_12

Lyle, J. and Cushion, C., (2016). *Sport coaching concepts: A framework for coaching practice*. Routledge. 2nd edition.

Lyngstad, I., Bjerke, Ø. and Lagestad, P., (2019). Phronesis, praxis and autotelic acts in physical education teaching. *Sport, Education and Society*. p1-12. doi:10.1080/13573322.2019.1629898

MacIntyre, A., (2007). *After Virtue*. London, Bloomsbury.

Maclean, M., Russell, W. and Ryall, E. eds., (2016). *Philosophical perspectives on play*. Abingdon, Routledge.

Maclean, M., Russell, W. and Ryall, E. eds., (2021). *Play, Philosophy and Performance*. Abingdon, Routledge.

Malcolm, D. and Pullen, E., (2017). Is exercise medicine? A critical sociological examination. in Piggin, J., Mansfield, L., and Weed, M., eds.. *Routledge Handbook of Physical Activity Policy and Practice*. Abingdon, Routledge. pp. 49-60.

Marcum, J. A., (2008). Reflections on humanizing biomedicine. *Perspectives in biology and medicine*. 51(3). pp392-405.

Marcum, J.A., (2009). The epistemically virtuous clinician. *Theoretical Medicine and Bioethics*. 30. pp249-265.

Marcum, J.A., (2010). *An Introductory Philosophy of Medicine. Humanizing Modern Medicine*. USA, Springer.

Marcum, J.A., (2017) Introduction. In Marcum, J.A., ed. *The Bloomsbury Companion to Contemporary Philosophy of Medicine*. London, Bloomsbury. p3-28.

Marcum, J.A., (2019). Professing clinical medicine in an evolving health care network. *Theoretcial Medicine and Bioethics*. 40. pp197–215. https://doi.org/10.1007/s11017-019-09492-x

Markula, P. and Chikinda, J., (2017). Group fitness instructors as local level health promoters: a Foucauldian analysis of the politics of health/fitness dynamic. In *Sport, Physical Activity and Public Health* (pp. 93-114). Abingdon, Routledge.

Markula-Denison, P. and Pringle, R., (2007). *Foucault, sport and exercise: Power, knowledge and transforming the self*. Abingdon, Routledge.

Mareš, L. and Ryall, E., (2021). 'Playing sport playfully': on the playful attitude in sport. *Journal of the Philosophy of Sport*. 48(2). pp293-306.

Masek, L. and Stenros, J., (2021). The meaning of playfulness: A review of the contemporary definitions of the concept across disciplines. *Eludamos. Journal for Computer Game Culture*. 12(1), pp 13-37.

Masuda, Y., Wam, R., Paik, B., Ngoh, C., Choong, A.M. and Ng, J.J., (2022). Clinical characteristics and outcomes of exertional rhabdomyolysis after indoor spinning: a systematic review. *The Physician and Sportsmedicine*, pp.1-12. doi: 10.1080/00913847.2022.2049645

May, T. and Annison, J., (2020). The de-professionalization of probation officers. In *The sociology of the caring professions*. London, Routledge. pp. 157-177

McCabe, E., Miciak, M., Roduta Roberts, M., Sun, H. and Gross, D.P., (2022). Measuring therapeutic relationship in physiotherapy: conceptual foundations. *Physiotherapy theory and practice*. 38(13), pp2339-2351.

McEwen, M., (2014). Overview of theory in nursing. In McEwen, M., and Wills, E.M., eds. *Theoretical basis for nursing*. London, Lippincott, Williams & Wilkins. pp23-48.

McFee, G. (2010).*Ethics, knowledge and truth in sports research: An epistemology of sport*. Abingdon, Routledge.

McGill, E.A. and Montel, I. eds., (2017). *NASM Essentials of Personal Fitness Training*. Burlington, Jones & Bartlett Learning, LLC.

McKeown, T., (1979) *The Role of Medicine*. Oxford, Blackwell.

McIntyre, L., (2019). *The Scientific Attitude. Defending science from denial, fraud, and pseudoscience.* London, MIT press.

McKay, J., Gore, J.M. and Kirk, D., (1990). Beyond the limits of technocratic physical education. *Quest*, *42*(1), pp.52-76.

McKean, M.R., Slater, G., Oprescu, F. and Burkett, B.J., (2015). Do the nutrition qualifications and professional practices of registered exercise professionals align?. *International Journal of Sport Nutrition & Exercise Metabolism.* 25(2). pp154-162.

McKean, M., Mitchell, L., O'Connor, H., Prvan, T. and Slater, G., (2019). Are exercise professionals fit to provide nutrition advice? An evaluation of general nutrition knowledge. *Journal of Science and Medicine in Sport*, *22*(3), pp.264-268.

McKenna, S., (2022). Plagiarism and the commodification of knowledge. *Higher Education.* 84(6). pp1283-1298.

McNamee (1998) Celebrating Trust Ethics and Sport, edited by Mike McNamee and Jim Parry. Published in 1998 by E & FN Spon, 11 New Fetter Lane, London EC4P 4EE. ISBN: 0 419 21510 7

McNamee, M., (2005). Positivism, Popper and Paradigms: an introductory essay in the philosophy of science. In McNamee, M., ed. *Philosophy and the sciences of exercise, health and sport: critical perspectives on research methods.* Abingdon, Routledge.

McNamee, M., (2010). Introduction. In McNamee, M., ed. *The ethics of sports: a reader.* Abingdon, Routledge.

McNamee, M., and Morgan, W.J., eds. (2017). *Routledge Handbook of the Philosophy of Sport.* Abingdon, Routledge.

McPherson, K.M., (2011). Assessing therapeutic relationships in physiotherapy: literature review. *New Zealand Journal of Physiotherapy.* 39(2), p.81.

Mehta, N., (2011). Mind-body dualism: A critique from a health perspective. *Mens sana monographs*, *9*(1), p.202-209

Meleis, A.I., (2012). *Theoretical nursing: Development and progress*. London, Lippincott Williams & Wilkins.

Melrose, D. and Dawes, J., (2015). Resistance characteristics of the TRX™ suspension training system at different angles and distances from the hanging point. *Journal of athletic enhancement.* 4(1), pp.2-5.

Melton, D., Dail, T.K., Katula, J.A. and Mustian, K.M., 2011. Women's perspectives of personal trainers: A qualitative study. *The sport journal*, *14*(1).

Mendoza, G., and Fundaro, G., (2022). Helping clients to change. In Hough, P., and Schoenfeld, B.J., (2022) *Advanced Personal Training: Science to Practice.* 2nd ed. Abingdon, Routledge.

Menninger, W.C., (1936). The Relations Between the Endocrine System and the Personality. *The Journal of Nervous and Mental Disease*. 83(4). pp461.

Midgley, M., (2018). *What is Philosophy For*? London, Bloomsbury.

Miles, A., (2009). On a Medicine of the Whole Person: away from scientistic reductionism and towards the embrace of the complex in clinical practice. *Journal of evaluation in clinical practice*. 15(6). pp.941-949.

Miles, A., (2012). Person-centered medicine-at the intersection of science, ethics and humanism. *International Journal of Person Centered Medicine*. 2(3). pp329-333.

Miles, A., (2013). Science, humanism, judgement, ethics: person-centered medicine as an emergent model of modern clinical practice. *Folia Med*. 55(1). pp.5-24.

Miles, A., (2017). From evidence-based to evidence-informed, from patient-focussed to person-centered—The ongoing "energetics" of health and social care discourse as we approach the Third Era of Medicine. *Journal of Evaluation in Clinical Practice*. 23(1), 3-4.

Miles, A., (2018). Evidence-based medicine-2018. Quo Vadis?. *Journal of evaluation in clinical practice*. 24(1), pp.3-6.

Milgrom, L.R., (2021). Against scientism: corrupted science and the fight for medicine's soul. *Complementary Medicine Research*, 28(1), pp56-63.

Miller, C., (2013). The gamification of education. In *Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL conference* (Vol. 40).

Millet, G.P. and Giulianotti, R., (2019). Sports and Active Living Are Medicine, and Education, Happiness, Performance, Business, Innovation, and Culture… for a Sustainable World. *Frontiers in Sports and Active Living*. 1. pp1-5.

Mizrahi, M., (2017). What's so Bad about Scientism?. *Social Epistemology*. 31(4). pp351-367.

Mizrahi, M. ed., (2022). *For and Against Scientism: Science, Methodology, and the Future of Philosophy*. London, Rowman & Littlefield.

Mlodinow, L., (2009). *The drunkard's walk: How randomness rules our lives*. London, Penguin.

Monaghan, L.F. and Bury, M., (2022). The Medical Model. In Monaghan, L.J., and Gabe, J., eds., *Key Concepts in Medical Sociology*. London, Sage. pp201-208.

Moore, G., Durstine, J.L., Painter, P. and American College of Sports Medicine, (2016). *ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities,* 4TH edition. Champ. Illinois. Human Kinetics.

Moran, A. and Toner, J., (2017). *A critical introduction to sport psychology*. Abingdon, Routledge.

Morgan, W.J., (2019). Conceptual Analysis and Normative Inquiry in Sport. A Cautionary Note. *Synthesis philosophica.* 34(2). pp243-252.

Morris, J.N., Heady, J. A., Raffle, P. A. B., Roberts, C. G., and Parks, J. W. (1953). Coronary heart-disease and physical activity of work. *Lancet*. 2(1053) pp1111.

Mortimer, B., (2021). *And Away…Bob Mortimer: The Autobiography*. London, Gallery Books.

Morse, J.M. (1995) Exploring the theoretical basis of nursing using advanced techniques of concept analysis. Advances in Nursing Science 17(3) 31-46

Morse, J.M., Hupcey, J.E., Mitcham, C. and Lenz, E.R., (1996). Concept analysis in nursing research: a critical appraisal. *Scholarly Inquiry for Nursing Practice*. 10(3), pp253-277.

Mudie, K., Billing, D., Garofolini, A., Karakolis, T. and LaFiandra, M., 2022. The need for a paradigm shift in the development of military exoskeletons. *European Journal of Sport Science*, *22*(1), pp.35-42.

Murphy, A., (2022). Imagination in science. *Philosophy Compass*. 17(6). p.e12836.

Murray, M.A., Joyner, A.B., Burke, K.L., Wilson, M.J. and Zwald, A.D., (2005). The relationship between prayer and team cohesion in collegiate softball teams. *Journal of Psychology & Christianity*. 24(3).

Muscella, A., Stefano, E. and Marsigliante, S., 2020. The effects of exercise training on lipid metabolism and coronary heart disease. *American Journal of Physiology-Heart and Circulatory Physiology*. 319(1). pp.H76-H88.

Nadler, S., (2011). *A Book Forged in Hell*. Princeton, New Jersey, Princeton University Press.

Nadler, S., (2020). *Think Least of Death*. Princeton, New Jersey, Princeton University Press.

Nado, J., (2021). Conceptual engineering, truth, and efficacy. *Synthese*. 198(7). pp1507-1527.

Nairn, S., (2012). A critical realist approach to knowledge: implications for evidence-based practice in and beyond nursing. *Nursing inquiry*. 19(1) pp6-17.

Najah, A., Farooq, A. and Rejeb, R.B., (2017). Role of religious beliefs and practices on the mental health of athletes with anterior cruciate ligament injury. *Advances in Physical Education*. 7(2). pp181-190.

NASM., (2012*). NASM Essentials of Personal Fitness Training*. 4th edition. Clark, M.A., Lucett, S.C. and Corn, R.J. eds. Philadelphia, Wolters Kluwer.

NASM., (2022). *NASM Essentials of Personal Fitness Training*. 7th edition. Sutton, B.G., ed. Jones & Bartlett, Burlington.

Neilson, S., (2020). Ableism in the medical profession. *CMAJ*. 192(15), ppE411-E412.

Nesti, M., (2004). *Existential psychology and sport: Implications for research and practice*. London, Routledge.

Nesti, M.S., (2019). Play. In Ronkainen, N.J., and Nesti, M.S., eds. *Meaning and Spirituality in Sport and Exercise*. Abingdon, Routledge.

Neville, R.D., (2013). Exercise is medicine: some cautionary remarks in principle as well as in practice. *Medicine, health care and philosophy*. 16(3), pp615-622.

Newberg, A., (2018). *Neurotheology: How science can enlighten us about spirituality*. Columbia University Press.

Nguyen, C.T., (2020). Echo chambers and epistemic bubbles. *Episteme*, *17*(2), pp.141-161.

Nguyen, C.T., (2022). Playfulness Versus Epistemic Traps. In Alfano, M., Klein, C. and de Ridder, J. (eds)., 2022. *Social virtue epistemology*. London: Routledge. (pp. 269-290).

Nichols, T., (2017). *The death of expertise: The campaign against established knowledge and why it matters*. Oxford, Oxford University Press.

Nicholls, D.A., (2018) *The end of physiotherapy*. Abingdon, Routledge.

Nicholson, G., (2022). Truth and Scepticism: developing Bildung and phronesis through Socratic questioning. *Philosophical Enquiry in Education*. 29(3). Pp197-208.

Nietzsche, F.W. (1901/1968). *The Will to Power*. Trans. Kaufmann, W. New York, Random House.

Noel, J., (1999). On the varieties of phronesis. *Educational philosophy and theory*. 31(3). pp273-289.

Noakes, T., and Sboros, M., (2019). *Real Food on Trial: how the diet dictators tried to destroy a top scientist*. Columbus Publishing,

Novak, I., and Mahmutefendic, I., (2015). What good is philosophy*?*. *Journal of Education Culture and Society*. 6(2). pp11-19.

NSCA., (2012). *NSCA's Essentials of Personal Training*. 2nd edition. Coburn, J.W. and Malek, M.H. eds. Champaign, Ill. Human Kinetics.

NSCA., (2022). *NSCA's Essentials of Personal Training*. 3rd edition. Schoenfeld, B.J., and Snarr, R.L., eds. Champaign, Ill. Human Kinetics.

Ntoumanis, N., Ng, J.Y., Prestwich, A., Quested, E., Hancox, J.E., Thøgersen-Ntoumani, C., Deci, E.L., Ryan, R.M., Lonsdale, C. and Williams, G.C., (2021). A meta-analysis of self-determination theory-informed intervention studies in the health domain: Effects on motivation, health behavior, physical, and psychological health. *Health psychology review*. 15(2). pp214-244.

Nuopponen, A., (2010). Methods of concept analysis-a comparative study. *LSP Journal-Language for special purposes, professional communication, knowledge management and cognition*, 1(1). pp4-12.

Nussbaum, M.C., (2001). The Protagoras: A Science of Practical Reasoning. In Millgram, E., ed. *Varieties of Practical Reasoning*. London, MIT Press. Pp153-201.

O'Brien, A.J., (2001). The therapeutic relationship: historical development and contemporary significance. *Journal of Psychiatric and Mental Health Nursing*. 8(2). pp129-137.

O'Brien, D., (2017). *An Introduction to the Theory of Knowledge*. 2nd edition. Cambridge, Polity.

O'Mahony, S., (2019) *Can Medicine be Cured?: the corruption of a profession*. London, Head of Zeus Ltd.

Oksenberg Rorty, A., (1980) Introduction., in Oksenberg-Rorty, A., ed., *Essays of Aristotle's Ethics*. Berkley, University of California Press. p1-6.

Overgaard, S., Gilbert, P. and Burwood, S., (2013). *An introduction to metaphilosophy*. Cambridge, Cambridge University Press.

Pakis, S., (2020). Neuro-Recreation: A Conceptual Framework Building a Bridge Between Neuro-Science and Recreation. *International Journal of Recreation and Sports Science*. 4(1), pp.37-54.

Paley, J., (1996). How not to clarify concepts in nursing. *Journal of Advanced Nursing*. 24(3). pp572-576.

Paley, J., (2021). *Concept Analysis in Nursing: A New Approach*. London: Routledge.

Palmer, C.L. and Peterson, R.D., (2016). Halo effects and the attractiveness premium in perceptions of political expertise. *American Politics Research*. 44(2). pp353-382.

Paluska, S.A. and Schwenk, T.L., (2000). Physical activity and mental health. *Sports medicine*, *29*(3), pp167-180.

Panza, G.A., Armstrong, L.E., Taylor, B.A., Puhl, R.M., Livingston, J., and Pescatello, L.S., (2018). Weight bias among exercise and nutrition professionals: a systematic review. *Obesity Reviews*. 19(11). pp1492-1503.

Pascoe, M., Bailey, A.P., Craike, M., Carter, T., Patten, R., Stepto, N. and Parker, A., (2020). Physical activity and exercise in youth mental health promotion: A scoping review. *BMJ open sport & exercise medicine*. 6(1), p1-11.

Passmore, J., (1970). *Philosophical Reasoning*. 2nd edition. London, Gerald Duckworth & Co. Ltd.

Patah, I.A., Jumareng, H., Setiawan, E., Aryani, M. and Gani, R.A., (2021). The importance of physical fitness for pencak silat athletes: Home-based weight training tabata and circuit can it work? *Journal Sport Area*. 6(1), pp86-97.

Pearson, B.A., 2007. *Ancient Gnosticism: traditions and literature*. Minneapolis, Fortress Press.

Pedersen, B.K. and Saltin, B., (2015). Exercise as medicine–evidence for prescribing exercise as therapy in 26 different chronic diseases. *Scandinavian Journal of Medicine & Science in Sports*. 25. pp.1-72.

Pelligrino, E.D. & Thomasma, D.C., (1981). *A Philosophical Basis of Medical Practice*. Oxford, Oxford University Press.

Peluso, M.A.M. and De Andrade, L.H.S.G., (2005). Physical activity and mental health: the association between exercise and mood. *Clinics*. 60(1), pp.61-70.

Penn, S., and Brown, N., (2017). Components of Fitness. In Hough, P., and Penn, S., (eds). *Advanced Personal Training: Science to Practice*. Abingdon, Routledge.

Perkins, I., (2008). Dehumanization of the clinician: The demise of the healing relationship. *The National Catholic Bioethics Quarterly*. 8(3). pp.479-490.

Petersen, A., and Regan de Bere, S. (2006). Dissecting medicine: Gender biases in the discourses and practices of medical anatomy. In Rosenfeld, D. and Faircloth, C., eds. *Medicalised masculinities*. Philadelphia, Temple University Press.

Petrochilos, G.A., (2002). Kalokagathia: The ethical basis of Hellenic political economy and its influence from Plato to Ruskin and Sen. *History of Political Economy*. 34(3). pp599-631.

Philips, J.M. and Drummond, M.J., (2001). An investigation into the body image perception, body satisfaction and exercise expectations of male fitness leaders: implications for professional practice. *Leisure Studies*. 20(2), pp.95-105.

Pickering, A. ed., (2010). *Science as practice and culture*. Chicago, University of Chicago Press.

Pihlstrom, S. (2005). *Pragmatic Moral Realism: a transcendental defense*. New York, Rodopi.

Pirozelli, P., (2020). Paradigms in Action. *Revista de Filosofia Aurora*. 32(56) pp 558-574.

Polkinghorne, D., (2004). *Practice and the human sciences*. New York, State University of New York Press.

Polanyi, M., (1958). *Personal Knowledge: Towards a Post-Critical Philosophy*. Chicago, University of Chicago Press.

Pompeu, F.A., (2022). Why Pheidippides could not believe in the 'Central Governor Model': Popper's philosophy applied to choose between two exercise physiology theories. *Sports Medicine and Health Science*. 4(1). pp1-7.

Popovska, J. (2022). "Educating Phronesis and Phronesis for Educators: Two Neo-Aristotelian Perspectives." *75th Anniversary of Institute of Pedagogy - Educational Challenges and Future Perspectives Conference Proceedings*. Faculty of Philosophy – Skopje. pp409-415.

Popowczak, M., Rokita, A. and Domaradzki, J., (2022). Effects of Tabata training on health-related fitness components among secondary school students. *Kinesiology*. 54(2), pp221-229.

Popper, K. and Hansen, T.E., (2014). *The two fundamental problems of the theory of knowledge*. London, Routledge.

Porter, R., (1999). *The Greatest Benefit to Mankind: A Medical History of Humanity from Antiquity to Present*. London, Fontana Press.

Porter, R., ed., (2006). *The Cambridge History of Medicine*. Cambridge, Cambridge University Press.

Pratt, J.W., (1989). Towards a philosophy of physiotherapy. *Physiotherapy*. 75(2). pp.114-120.

Priest, G., (2006). What is philosophy?. *Philosophy*. 81(2), pp189-207.

Pullen, E & Malcolm D. (2018). Assessing the effects of the exercise pill. *Qualitative Research in Sport, Exercise and Health*. 10(4), pp493-504.

Quine, W. (1936). Truth by convention. In *Philosophical essays for Alfred North Whitehead*. New York: Longmans, Green. pp90-124.

Quirke, V., & Gaudillière, J. P., (2008).The era of biomedicine: science, medicine, and public health in Britain and France after the Second World War. *Medical History*. *52*(4) pp441-452.

Raggatt, M., Wright, C.J., Carrotte, E., Jenkinson, R., Mulgrew, K., Prichard, I. and Lim, M.S., (2018). "I aspire to look and feel healthy like the posts convey": engagement with fitness inspiration on social media and perceptions of its influence on health and wellbeing. *BMC public health*, *18*(1), pp.1-11.

Ravven, H.M., (1989). Notes on Spinoza's critique of Aristotle's Ethics: from Teleology to Process Theory. *Philosophy and Theology*, *4*(1), pp.3-32.

Reed, P.G. and Shearer, N.B.C., (2017). *Nursing knowledge and theory innovation: advancing the science of practice*. Springer Publishing Company.

Reid, H. L. (2010) Plato's Gymnasium. *Sport, Ethics and Philosophy*. 4(2) p170-182

Reisz, M., (2015). Is philosophy dead? Leading philosophers took up the challenge of Stephen Hawking's claim that 'philosophy is dead'. *Times Higher Education Supplement*, *22*.

Ridnour, H. and Hammermeister, J., (2008). Spiritual Well-Being and Its Influence on Athletic Coping Profiles. *Journal of Sport Behavior*. 31(1).

Risjord, M. (2010). *Nursing Knowledge: science, practice and philosophy*. Chichester. John Wiley and Sons Ltd.

Ritchie, S., (2020). *Science Fictions*. London, Penguin Random House.

Riivari, E. and Heikkinen, S., (2022). Virtuousness in Sports Organizations: Examination of Ethical Organizational Culture and Its Virtues. *Journal of Global Sport Management*, pp1-27.

Robergs, R.A., (2017). Lessons from Popper for science, paradigm shifts, scientific revolutions and exercise physiology. *BMJ Open Sport & Exercise Medicine*. 3(1). p.e000226.

Robergs, R.A., Opeyemi, O. and Torrens, S., (2022). How to be a better scientist: Lessons from scientific philosophy, the historical development of science, and past errors within exercise physiology. *Sports Medicine and Health Science*. 4(2), pp140-146.

Robertson, N. and Vohora, R., (2008). Fitness vs. fatness: Implicit bias towards obesity among fitness professionals and regular exercisers. *Psychology of Sport and Exercise*. 9(4). pp547-557.

Rodgers, B. L., (2021). Guest editorial: Confronting conceptual challenges in nursing scholarship. *Advances in Nursing Science*. 44(1). pp1-2.

Rodgers, B.L., Jacelon, C.S. and Knafl, K.A., (2018). Concept analysis and the advance of nursing knowledge: state of the science. *Journal of Nursing Scholarship*. 50(4), pp451-459.

Rodgers, B.L. and Knafl, K.A., eds. (2000). *Concept development in nursing: Foundations, techniques and applications*. 2nd edition. Philadelphia, W.B. Saunders Company.

Romanchik-Cerpovicz, J.E., Melton, B. and Ryan, G.A., (2022). Nutrition Advice and Perceived Confidence: A Cross Sectional Study of Practices among Female US Certified Fitness Professionals. *International Journal of Kinesiology in Higher Education*. pp.1-11. doi:10.1080/24711616.2022.2039575

Ronkainen, N.J. and Nesti, M.S., (2018). *Meaning and Spirituality in Sport and Exercise*. London, Routledge.

Rowe, C., and Broadie, S., (2002). *Aristotle Nicomachean Ethics: translation, introduction, and commentary*. Oxford, Oxford University Press.

Rowley, N., Mann, S., Steele, J., Horton, E. and Jimenez, A., (2018). The effects of exercise referral schemes in the United Kingdom in those with cardiovascular, mental health, and musculoskeletal disorders: a preliminary systematic review. *BMC public health*, 18(1) pp.1-18.

Rubenstein, R.E. (2003) *Aristotle's Children*. Oakland. Harcourt Inc.

Ruckenstein, M. and Schüll, N.D., (2017). The datafication of health. *Annual review of anthropology*. 46. pp261-278.

Ruf, E., Lehmann, S. and Misoch, S., (2020a), May. Use of a Socially Assistive Robot to Promote Physical Activity of Older Adults at Home. In *International Conference on Information and Communication Technologies for Ageing Well and e-Health* . Springer, Cham. May. pp. 78-95.

Ruf, E., Lehmann, S. and Misoch, S., (2020b). Motivating Older Adults to Exercise at Home: Suitability of a Humanoid Robot. In *International Conference on Information and Communication Technologies for Ageing Well and e-Health*. Springer, Cham. May. pp. 113-120.

Russell, B., (1945). *History of Western Philosophy and its Connection with Political and Social Circumstances from the Earliest Times to the Present Day*. New York, Simon and Schuster.

Ryall, E., (2016). *Philosophy of sport: key questions*. London. Bloomsbury Publishing.

Ryan, T., (2022). Facilitators of person and relationship-centred care in nursing. *Nursing Open*. 9(2). pp892-899.

Ryan, R.M., and Deci, E.L., (2018). *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*. Guildford Press.

Ryle, G., (2009). *Collected Essays 1929-1968: Collected Papers Volume 2*. Abingdon Routledge.

Sabin, E.E., (1919). Pragmatic Teleology. *The Journal of Philosophy, Psychology and Scientific Methods*. 16(18). pp488-493.

Sackett, D.L., (1997). Evidence-based medicine. *Seminars in Perinatology*. February. 21(1). pp3-5.

Sailors, P.R., (2009). More than a pair of shoes: Running and technology. *Journal of the Philosophy of Sport*. 36(2), pp.207-216.

Sallis, R.E., (2009). Exercise is medicine and physicians need to prescribe it! *British journal of sports medicine*. 43(1). pp3-4.

Sankay, T., (2014). *Feldenkrais Illustrated: the art of learning*. Movement and Creativity Press.

Santa Mina, D., Ritvo, P., Matthew, A.G., Rampersad, A., Stein, H., Cheung, A.M., Trachtenberg, J. and Alibhai, S.M., (2012). Group exercise versus personal training for prostate cancer patients: a pilot randomized trial. *Journal of Cancer Therapy*. 3(2). DOI:10.4236/jct.2012.32020

Sargent, M.G., (2005). *Biomedicine and the human condition: Challenges, risks, and rewards*. Cambridge University Press.

Sartori, G., (1984). Guidelines for concept analysis. *Social science concepts: A systematic analysis*, pp.15-85.

Sassatelli, R. (2010). *Fitness culture: gyms and the commercialisation of discipline and fun*. Palgrave Macmillan.

Saynor, Z. and Shepherd, A., (2022). Exercise Is Medicine, but Does Not Need To Be Prescribed by a Physician: Time to Recognize the Role and Expertise of the Clinical Exercise Professional. *PRiMER*, *6*. doi: 10.22454/PRiMER.2022.950894

Schiller, C.J., (2018). Teaching concept analysis to graduate nursing students. *Nursing Forum*. 53(2). pp248-254.

Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.

Schön, D., (1984). Chapter 13: The crisis of professional knowledge and the pursuit of an epistemology of practice. in Raven, J. and Stephenson, J,. eds. *Competence in the Learning Society*. New York, Peter Lang. pp.183-207.

Schön, D.A., (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. New Jersey, Jossey-Bass.

Schwartz, M.A. and Wiggins, O., (1985). Science, humanism, and the nature of medical practice: A phenomenological view. *Perspectives in Biology and Medicine*. 28(3). pp.331-361.

Schwartz-Barcott, D., and Kim, H. S., (1993). An expansion and elaboration of the hybrid model of concept development. In Rodgers, B. L., and Knafl, K. A., eds., *Concept development in nursing*. Philadelphia, Saunders. pp107-133

Scott, C.D., (2012). The death of philosophy: A response to Stephen Hawking. *South African Journal of Philosophy= Suid-Afrikaanse Tydskrif vir Wysbegeerte*. 31(2). pp384-404.

Scruton, R., (2000) Spinoza. In Monk, R., and Raphael, F., eds. *The Great Philosophers: from Socrates to Turing*. London, Pheonix.

Scruton, R., (2002). *Spinoza: a very short introduction*. Oxford, Oxford University Press.

Seligman, M., (2019). My three heavyweight bouts with behaviorism. *Learning and Motivation*, *68*, p.101593.

Sellman, D., (2009). Practical wisdom in health and social care: Teaching for professional phronesis. *Learning in Health and Social Care*, *8*(2), pp.84-91.

Sellman, D., (2012). Reclaiming Competence for Professional Phronesis. In Kinsella, E.A., and Pitman, A., (eds). *Phronesis as professional knowledge* Rotterdam, Sense Publishers. pp115-130.

Setchell, J., Nicholls, D.A. and Gibson, B.E., (2018). Objecting: Multiplicity and the practice of physiotherapy. *Health*. 22(2). pp.165-184.

Sforzo, G.A., Moore, M. and Scholtz, M., (2015). Delivering change that lasts: health and wellness coaching competencies for exercise professionals. *ACSM's Health & Fitness Journal*. 19(2). pp.20-26.

Shahzad, H., Jabeen, H., Arslan, H.R.M., Ghouri, M.H., Ali, S., Gondal, M.U., Arif, M. and Bibi, S., (2021). Musculoskeletal injuries among weight lifters with or without supervision? a comparative cross sectional study. *Int J Front Sci*. 5(2). Pp1-5.

Shannon-Baker, P., (2016). Making paradigms meaningful in mixed methods research. *Journal of mixed methods research*. 10(4), pp.319-334.

Shao, M., Alves, S.F.D.R., Ismail, O., Zhang, X., Nejat, G. and Benhabib, B., (2019), You are doing great! only one rep left: an affect-aware social robot for exercising. In *2019 IEEE International Conference on Systems, Man and Cybernetics (SMC)* October. pp. 3811-3817.

Sharpe, V.A., and Faden, A.I., (1998). *Medical harm*. Cambridge, Cambridge University Press.

Shephard, R.J., (1999). Postmodernism and adapted physical activity: A new gnostic heresy?. *Adapted Physical Activity Quarterly*. 16(4). pp331-343.

Shephard, R.J., (2001). The scientific method, modernism, and postmodernism revisited: A response to Bouffard (2001). *Adapted Physical Activity Quarterly*. 18(3). pp235-239.

Shephard, R.J., (2018). *A history of health & fitness: Implications for policy today*. Springer International Publishing.

Sicart, M., (2014). *Play Matters*. Cambridge, The MIT Press.

Slatyer, S., Coventry, L.L., Twigg, D. and Davis, S., (2016). Professional practice models for nursing: a review of the literature and synthesis of key components. *Journal of nursing management*, 24(2), pp.139-150.

Slezak, P.P., (2018). Is there progress in philosophy? The case for taking history seriously. *Philosophy*. 93(4). pp529-555

Smaldino, P.E. and McElreath, R., (2016). The natural selection of bad science. *Royal Society open science*. 3(9). p.160384.

Smith, P.J. and Merwin, R.M., (2021). The role of exercise in management of mental health disorders: an integrative review. *Annual review of medicine*, 72, pp45.

Smith-Maguire, J. (2008). *Fit for consumption: Sociology and the business of fitness*. Abingdon, Routledge.

Solomon, M., (2015). *Making Medical Knowledge*. Oxford, Oxford University Press.

Somers, M. (2007). *Coaching at Work*. Chichester, Jossey-Bass.

Sorell, T., (2013) *Scientism: Philosophy and the infatuation with science*. London, Routledge.

Spinoza, B., (1954). *Ethics and On the Improvement of the Understanding*. Gutmann, J. ed. New York, Hafner Publishing Company.

Spittle, M. and Dillon, R., (2014). Mystical experience to measurable description: The relationship between spirituality and flow in golf. *Facta Universitatis. Series: Physical Education and Sport*. 12(1). pp.1-10.

Springer, B.L. and Clarkson, P.M., (2003). Two cases of exertional rhabdomyolysis precipitated by personal trainers. *Medicine and science in sports and exercise*, 35(9), pp1499-1502.

Stafford-Brown, J., Rea, S., and Eldridge, T., (2016). *BTEC National Level 3 Sport and Exercise Science*. 4th Edition. Hodder Education.

Standal, Ø.F. and Hemmestad, L.B., (2011). Becoming a good coach: Coaching and phronesis. In Hardman, A, R., and Jones, C., (eds). *The ethics of sports coaching* . London. Taylor and Francis. pp45-55.

Starr, J. (2008). *The Coaching Manual*. Edinburgh, Pearson Education Limited.

Stegenga, J., (2018a). *Care & Cure: an introduction to philosophy of medicine*. London, University of Chicago Press.

Stegenga, J., (2018b). *Medical Nihilism*. Oxford, Oxford University Press.

Sternberg, R.J., (1990). Wisdom: its nature, origins, and development. Cambridge, Cambridge University Press.

Sternberg, R.J., and Jordan, J., (2005). *A Handbook of Wisdom: psychological perspectives*. Cambridge, Cambridge University Press.

Stevens, V., Van Tiggelen, D., Bernard, E., Verdru, C., Vanherweghe, E. and Danneels, L., (2017). The effect of suspension training systems on muscle recruitment during two types of dynamic exercises. *Journal of Science and Medicine in Sport*. 20. p.S153.

Stoljar, D., (2017). *Philosophical progress: In defence of a reasonable optimism*. Oxford University Press.

Stone, G.A., (2018). The neuroscience of self-efficacy: Vertically integrated leisure theory and its implications for theory-based programming. *Journal of Outdoor Recreation, Education, and Leadership*, 10(2). pp87-96.

Stone, M.H., Pierce, K.C. and Ramsey, M.W., (2013). Dispelling the myths of resistance training for youths. In Lloyd, R.S., and Oliver, J.L., eds. *Strength and Conditioning for Young Athletes*. Abingdon, Routledge. pp191-206.

Straus, S.E., Glasziou, P., Richardson, W.S. and Haynes, R.B., (2018). *Evidence-based medicine E-book: How to practice and teach EBM*. Elsevier Health Sciences.

Stubbs, B. and Schuch, F., (2019). Physical activity and exercise as a treatment of depression: evidence and neurobiological mechanism. In Quevedo, J., Carvalho, A.F., and Zarate. C.A., eds. *Neurobiology of depression*. Elsevier Academic Press. https://doi.org/10.1016/C2016-0-04779-4 pp293-299

Strydom, G.L., Wilders, C.J., Moss, S.J. and Bruwer, E., (2009). A conceptual framework of biokinetic procedures and referral system: an integrated protocol for the various health paradigms: biokinetics. *African Journal for Physical Health Education, Recreation and Dance*. 15(4., pp.641-649.

Sullivan, T.D. and Pannier, R., (2014). *Modern challenges to past philosophy: Arguments and responses*. London, Bloomsbury.

Susskind, R., and Susskind, D., (2017). *The future of the professions*. Oxford, Oxford University Press.

Svenaeus, F., (2001). The phenomenology of health and illness. In Toombs, S.K., ed., *Handbook of Phenomenology and Medicine*. Dordrecht, Springer. pp 87-108

Swann, C., Jackman, P.C., Schweickle, M.J. and Vella, S.A., (2019). Optimal experiences in exercise: A qualitative investigation of flow and clutch states. *Psychology of Sport and Exercise*. 40. pp87-98.

Swann, C., Piggott, D., Schweickle, M. and Vella, S.A., (2018). A review of scientific progress in flow in sport and exercise: normal science, crisis, and a progressive shift. *Journal of Applied Sport Psychology*. 30(3). pp249-271.

Swift, D.L., McGee, J.E., Earnest, C.P., Carlisle, E., Nygard, M. and Johannsen, N.M., 2018. The effects of exercise and physical activity on weight loss and maintenance. *Progress in cardiovascular diseases*, *61*(2), pp.206-213.

Switankowsky, I., (2000). Dualism and its importance for medicine. *Theoretical medicine and bioethics*. *21*(6). pp.567-580.

Swystun, T.J., (2020). *Beyond Wilenskey: A Speculative Model of Professional Devolution*. doi: 10.31235/osf.10/mcfv9 (CC-By Attribution 4.0 International)

Tabata, I., (2019). Tabata training: one of the most energetically effective high-intensity intermittent training methods. *The Journal of Physiological Sciences*. 69(4), pp559-572.

Tabata, I., Nishimura, K., Kouzaki, M., Hirai, Y., Ogita, F., Miyachi, M., Yamamoto, K., (1996). Effects of moderate intensity-endurance and high intensity-intermittent training on anaerobic capacity and VO2max. *Medicine and Science in Sports and Exercise*. 28. pp1327–1330

Taklimi, G., (2021). The effect of 12 weeks of whole body resistance training (TRX) on testosterone and cortisol serum levels in elderly men. *KAUMS Journal (FEYZ)*. 25(3). pp917-925.

ten Have, H.A.M.J., Kisma, G.K., and Spicker, S.F., (1990). *The Growth of Medical Knowledge*, Netherlands, Kluwer Academic Publishers.

Thojampa, S., Sarnkhaowkhom, C., Klankhajhon, S., Boonpracom, R., Puraya, A. and Sahattecho, W., (2020). Self-Efficacy of Exercise in Older Adults with Diabetes: A Concept Analysis. *Jurnal Ners*. 15(1). pp105-112.

Thompson, W.R., and American College of Sports Medicine, (2019). *ACSM's Clinical Exercise Physiology*. Lippincott, Williams, & Wilkins.

Thompson, R.P., and Upshur, R.E.G. (2018). *Philosophy of Medicine: an introduction*. Abingdon, Routledge.

Thornton, E. (2001) *It's More Than Just Making Them Sweat: a career training guide for personal fitness trainers.* San Francisco, Robert D. Reed Publishers.

Tibana, R.A. and de Sousa, N.M.F., (2018). Are extreme conditioning programmes effective and safe? A narrative review of high-intensity functional training methods research paradigms and findings. *BMJ open sport & exercise medicine*, *4*(1), p.e000435.

Tiller, N. (2020). *The Skeptic's Guide to Sports science: confronting myths of the health and fitness industry.* London, Routledge.

Tiller, N.B. and Phillips, S.M., (2023). How Skepticism (not Cynicism) Can Raise Scientific Standards and Reform the Health and Wellness Industry. *International Journal of Sport Nutrition and Exercise Metabolism.* 1. pp1-5.

Tiller, N.B., Sullivan, J.P. and Ekkekakis, P., (2023). Baseless Claims and Pseudo science in Health and Wellness: A Call to Action for the Sports, Exercise, and Nutrition-Science Community. *Sports Medicine.* 53(1). pp1-5.

Tipton, C.M., (2014). The History of "Exercise Is Medicine" in ancient civilisations. *Advances in Physiological Education.* (38). pp109-117.

Tomlinson, M. and Watermeyer, R., (2022). When masses meet markets: credentialism and commodification in twenty-first century Higher Education. *Discourse: Studies in the Cultural Politics of Education.* 43(2). pp.173-187.

Tonkin, A, and Whiatker, J., (2019). *Play and Playfulness for Public Health and Wellbeing.* Abingdon, Routledge.

Tonkin, A. and Whitaker, J., (2021). Play and playfulness for health and wellbeing: A panacea for mitigating the impact of coronavirus (COVID 19). *Social Sciences & Humanities Open.* 4(1). https://doi.org/10.1016/j.ssaho.2021.100142

Toombs, S.K., ed. (2001). *Handbook of phenomenology and medicine.* Dordrecht, Springer.

Torres, C., ed. (2014). *The Bloomsbury Companion to the Philosophy of Sport.* London, Bloomsbury.

Toulmin, S., (1972). *Human Understanding: the collective use and evolution of concepts.* Princeton University Press.

Tovey, T.L. and Archibald, T., (2023). The relationship between reflective practice, evaluative thinking, and practical wisdom. In Hurteau, M. and Archibald, T. (eds). *Practical Wisdom for an Ethical Evaluation Practice.* USA, IAP publishing. pp87-102.

Trappenburg, M. and van Beek, G., (2019). 'My profession is gone': how social workers experience de-professionalization in the Netherlands. *European Journal of Social Work*, *22*(4), pp.676-689.

Trepanier, L., (2013). Science and Scientism in Eric Voegelin's Thought. *Anamnesis Journal.* http://anamnesisjournal.com/2013/10/science-and-scientism-in-eric-voegelins-thought/ accessed 27/11/2022.

Trothen, T.J., (2022). Corporeal Enhancement and Sport's Spiritual Dimension: A Virtue Ethics Proposal. In *Training the Body* (pp. 59-73). Routledge.

Twomey, R., Yingling, V., Warne, J., Schneider, C., McCrum, C., Atkins, W., Murphy, J., Medina, C. R., Harlley, S., & Caldwell, A. (2021). The Nature of Our Literature: A Registered Report on the

Positive Result Rate and Reporting Practices in Kinesiology. *Communications in Kinesiology*. 1(3). Article 3. https://doi.org/10.51224/cik.v1i3.43.

Urmson, J., (1999). *Aristotle's Ethics*. New York, Basil.

Vaidya, A.J., (2010). Philosophical methodology: The current debate. *Philosophical Psychology*. 23 (3). pp391-417.

Valenzuela, P.L., Castillo-Garcia, A., Morales, J.S., de la Villa, P., Hampel, H., Emanuele, E., Lista, S. and Lucia, A., (2020). Exercise benefits on Alzheimer's disease: State-of-the-science. *Ageing Research Reviews*. 62. p1-15.

Valles, S.A., (2018). *Philosophy of population health: philosophy for a new public health era*. Abingdon, Routledge.

Vanderbeeken, R., (2011). A plea for agonism between analytic and continental philosophy. *Open Journal of Philosophy*. 1(1). pp16-21

Van der Kooij, K., Van Dijsseldonk, R., Van Veen, M., Steenbrink, F., De Weerd, C. and Overvliet, K.E., (2019). Gamification as a sustainable source of enjoyment during balance and gait exercises. *Frontiers in Psychology*, *10*, p.294.

van der Windt, D.J., Sud, V., Zhang, H., Tsung, A. and Huang, H., (2018). The effects of physical exercise on fatty liver disease. *Gene Expression*. 18(2), p89-101.

Van Zyl, L., (2018). *Virtue ethics: A contemporary introduction*. London, Routledge.

Varela, M., Ruiz-Esteban, R. and De Juan, M.J.M., (2010). Chaos, fractals, and our concept of disease. *Perspectives in Biology and Medicine*. 53(4). pp584-595.

Vasconcellos, D., Parker, P.D., Hilland, T., Cinelli, R., Owen, K.B., Kapsal, N., Lee, J., Antczak, D., Ntoumanis, N., Ryan, R.M. and Lonsdale, C., (2020). Self-determination theory applied to physical education: A systematic review and meta-analysis. *Journal of Educational Psychology*. 112(7), p1444.

Vergeer, I., Bennie, J.A., Charity, M.J., van Uffelen, J.G., Harvey, J.T., Biddle, S.J. and Eime, R.M., (2018). Participant characteristics of users of holistic movement practices in Australia. *Complementary Therapies in Clinical Practice*. 31. pp181-187.

Vergeer, I., Johansson, M. and Cagas, J.Y., (2021a). Holistic movement practices–An emerging category of physical activity for exercise psychology. *Psychology of Sport and Exercise*. *53*. p101870.

Vergeer, I. and Biddle, S., (2021b). Mental health, yoga, and other holistic movement practices: A relationship worth investigating. *Mental Health and Physical Activity*. 21. pp1-5.

Vincze, J. and Vincze-Tiszay, G., (2022). The Biomathematics Is a Borderland science. *Philosophy*. 12(1). pp18-25.

Viru, A., (2017). *Adaptation in sports training*. Abingdon, Routledge.

Vittersø, J., ed., (2016). *Handbook of eudaimonic well-being*. Champaign, Springer International Publishing.

Vivodtzev, I. and Taylor, J.A., (2021). Cardiac, autonomic and cardiometabolic impact of exercise training in spinal cord injury: A qualitative review. *Journal of cardiopulmonary rehabilitation and prevention*. 41(1), p.6.

Voegelin, E., (1968). *Science, Politics and Gnosticism*. Delaware, ISI Books.

Voltaire (1764) The Philosophical Dictionary. Translated 2006 at https://www.gutenberg.org/files/18569/18569-h/18569-h.htm#Character

Waddington, C.H., (1941). *The Scientific Attitude*. West Drayton, Penguin.

Wade, D.T. and Halligan, P.W., (2017). The Biopsychosocial Model of Illness: a model whose time has come. *Clinical Rehabilitation*. 3(8). pp995-1004.

Walker, L., and Avant, K., (1988). *Strategies for Theory Constructing m Nursing*. California, Appleton and Lange.

Wall, A., (1994). Riposte: behind the wallpaper: a rejoinder. *Health Care Analysis*. 2(4). pp317–318.

Warburton DE, Nicol CW, Bredin SS. (2006) Health benefits of physical activity: the evidence. *CMAJ*. 174(6) pp801-809. doi: 10.1503/cmaj.051351.

Warnock, M., (1999). What makes someone a philosopher?. In Warburton N. ed. *Philosophy: basic readings*. London, Routledge. pp1-2.

Watson, T. and Watson, T.J., (2008). *Sociology, work and industry*. Abingdon, Routledge.

Waryasz, G.R., Daniels, A.H., Gil, J.A., Suric, V. and Eberson, C.P. (2016). Personal trainer demographics, current practice trends and common trainee injuries. *Orthopedic reviews*. 8(3). pp1-19.

Webb, W.M., (2018). Rationalism, empiricism, and evidence-based medicine: a call for a new Galenic synthesis. *Medicines*. 5(2) pp40. doi:10.3390/medicines5020040

Wechsler, J. (1978). *On aesthetics in science*. Mass. MIT Press.

Weinberg, R.S. and Gould, D., (2019). *Foundations of sport and exercise psychology, 7E*. Human kinetics.

Wemrell, M., Merlo, J., Mulinari, S. and Hornborg, A.C., (2016). Contemporary epidemiology: a review of critical discussions within the discipline and a call for further dialogue with social theory. *Sociology Compass*. 10(2), pp153-171.

Whitmore, J. (2009). *Coaching for Performance*. 4th ed. London, Nicholas Brealey Publishing.

Wilensky, H.L., (1964). The professionalization of everyone? *American Journal of Sociology*. 70(2), pp137-158.

Wilkerson, J.D., (1997) Biomechanics. In Massengale, J.D., and Swanson, R.A., eds., *The History of Exercise and Sport Science*. Champ, Illinois, Human Kinetics. pp321-366.

Williams, B., (1996). On hating and despising philosophy. In *Essays and Reviews: 1959-2002*. Princeton University Press. 2016. pp363-370.

Williams, S. J., (2003). *Medicine and the Body*. London, Sage.

Williams, O. and Gibson, K. (2018). Exercise as a poisoned elixir: inactivity, inequality and intervention. *Qualitative research in sport, exercise and health*. 10(4), pp412-428.

Williams, T. L., Hunt, E. R., Papathomas, A., & Smith, B. (2018). Exercise is medicine? Most of the time for most; but not always for all. *Qualitative Research in Sport, Exercise and Health*. 10(4), pp441-456

Williamson, T., (2007). *The Philosophy of Philosophy*. Malden, Blackwell Publishing.

Wilson, J., (1963). *Thinking with concepts*. Cambridge University Press.

Winter, E.M. and Fowler, N., (2009). Exercise defined and quantified according to the Systeme International d'Unites. *Journal of Sports Sciences*. 27(5) pp.447-460.

Wrench, A., & Garrett, R. (2008). Pleasure and pain: Experiences of fitness testing. *European Physical Education Review*, *14*(3), 325-346.

Wyatt, J.C., (2001). Management of explicit and tacit knowledge. *Journal of the Royal Society of Medicine*. 94(1), pp.6-9.

Woolgar, S. and Pawluch, D., (1985). Ontological gerrymandering: The anatomy of social problems explanations. *Social problems*. 32(3), pp.214-227.

Zaharias, G., (2018). What is narrative-based medicine?: Narrative-based medicine. *Canadian Family Physician*. 64(3). pp176-180.

Zhang, M., Davies, T.C. and Xie, S., (2013). Effectiveness of robot-assisted therapy on ankle rehabilitation–a systematic review. *Journal of neuroengineering and rehabilitation*, *10*(1), p.30.

Zenko, Z. and Ekkekakis, P., (2015) Knowledge of exercise prescription guidelines among certified exercise professionals. *The Journal of Strength & Conditioning Research*. 29(5), pp1422-1432.

Appendices

Appendix 1: Starting points.

In reading sports and exercise research it has always struck me how much of the work lacks the recognition of its evolution and the personal journey to its completion. We are presented with a research paper or conference presentation that provides a neat bundle of perfectly complete thought; an extended, grammatically correct soundbite. We are rarely presented with the author's biography or how they decided this was an appropriate topic; why did they do what they did? Why is it personal to them? I concede this does occur within some realms of qualitative, grounded theory, and phenomenological narrative research. For example, Allen-Collinson (2011) presents a discussion on studying embodiment from an autoethnographic perspective. But this is a very specialised and purposeful approach to autobiographical and narrative research. My prevailing observation has been that even in many of these studies they often return to a typical hypothetico-deductive model in which the major rationale for the study is presented through reference to previous literature. Thus, they refer to the testing of a previous writer's theory, usually it seems Foucault[76], or for comparison to the experiences described in other Exercise studies.

The closest comparison to what I am referring to may be the process of bracketing within phenomenological research. Bracketing involves the researcher making explicit their prejudices, knowledge, and values. By highlighting their personal cognitions, the intention is to avoid false assumptions, attribution, and bias. For example, Halliday (2007) illustrated how they utilised bracketing to avoid stereotyping their participants and to "consider the fact that they were students first and to consider their Chineseness as an explanation of their behaviour only if it emerged [in the data]." (p178). Such researchers suggest the technique of bracketing is used to allow readers to pass judgement on the writer's conclusion. Hence, this activity is intended to ensure the conclusions made are firmly grounded within the data and actively avoid personal presupposition, assumption, and bias.

[76] This observation is based on my first degree in sports and exercise science with sociological studies during which all of the reading around exercise sociology seemed to incorporate Foucault. My observation appeared confirmed later by Markula's (2007) publication *Foucault, Sport and Exercise*. More recently (05/07/2021), a google scholar search of the phrase: Foucault +sport +exercise filtered to show only publications since 2020 creates 3,370 results. In comparison the same search but substituting Baudrillard for Foucault creates 360 results. It would suggest that Foucault is still the key figure in much sports sociology.

I present my own bracketing at the end of this section in the form of a table. However, undertaking this process felt very mechanical at times and impersonal despite its personal exploration. Thus, whilst demonstrating some of my first-hand experiences, which will no doubt 'colour' my work's interpretations, again it does not tell the story of how I got to the point that I felt the philosophical foundations of exercise praxis need to be explored. That is the objective of this first personal reflection on my research journey.

Starting Point:

It would be nice to say that the initial motivation for my research began with a sense of altruism; a sense of higher calling to make the World a better place through improving our approaches to health and wellbeing. With the emphasis in this work's rhetoric being an exploration of exercise as a means for fulfilling this latter objective, you are forgiven for assuming this was a piece of work written by someone seeking to improve society's ills (no pun intended). However, I am sorry to say this study emerged from more egotistical and selfish roots. Whilst on my MSc in sport psychology, I was told that researchers, especially psychologists and sociologists, tend to explore the areas they consider missing, problematic or needed in themselves or their own lives. Despite its pessimistic overtones, from the experience of my own starting point I am afraid to say it rings a truthful bell.

In 2009 I was working as a senior lecturer. I was not only responsible for lecturing in sport and exercise science but also management of a department responsible for the delivery of sport, exercise, and fitness initiatives. I managed a team of exercise professional staff alongside delivering vocational courses for students both internal and external to the university. As a result, as is common in the industry, I received several professional magazines and publications. These were usually nothing more than marketing opportunities for equipment manufacturers, industry developments and vocational courses. However, in one publication I spotted an article entitled National Fitness Awards Personal Trainer of the Year: (X). I confess I have forgotten the name, but just below this bold title was a memorable photograph of a young male, maximally tanned, smiling, and standing in only shorts, hands on hips, to display pectorals, biceps and 'six-pack', the apparent image of the pinnacle of exercise professionals and personal training.

Reading the brief article, it described the trainer's location (London), their time in the field, and how they had helped a considerable number of people, including celebrities, achieve

their fitness goals. This form of description is usual for industry publications, the presentation of profiles extolling the virtues of particular trainers and professionals occurs in each issue. Within my own professional and friendship circles, we recognise this practice is not based on a genuine hierarchy of ability but rather it is a case of friends in publishing doing friends in the field a favour by providing a marketing opportunity. The trainer's name becomes known. In most cases I ignore these pages beyond a brief look at the name to see if I have known them as either colleague or student. Yet this one instance struck something critical within me. For a moment, I will be honest, I found myself asking: why is he better than me? Why had no one asked me who I'd consider or even sent information on how to vote for someone? Vanity and egotism as a starting for a research thesis is rarely made explicit.

Yet reflecting on those initial thoughts led to some earnest consideration of this article. Why had this trainer been chosen? This was in no way intended to belittle any of his experiences or skill, I was not in a place to comment on either. But I began to ask why is the trainer of the year presented semi-naked and extolling his ability to train celebrities? If the trainer of the year is considered the pinnacle of the professional role and its practice, is this the image other trainers should be living up to and working towards? Is this the encapsulation of the definitional essence of exercise professionalism? This is what it is all about?

At the time, my staff and I were working to enormous success with individuals with disabilities, mental health issues, and other personal medical concerns. In my own private practice, I worked with clients seeking support for poor lifestyle, physical injury, and illness including cancer, depression and arthritis. Yet what I noticed, beginning with this trainer of the year article, was that each profile seemed to highlight work with celebrities, professional athletes and fitness or bodybuilding competitors. Perhaps these profiled individuals did work with clients who were seeking support for health issues, I could not tell. But, if this was the case it seemed to be hidden beneath the more glorious accolades behind broad, cryptic, sentences such as 'works to improve the activity levels of their local community 'and similar comments. Thus, I began to ask: what is a personal trainer? How are they defining personal trainer of the year and what does this mean to the standards and practice for exercise professionals? However, despite a number of attempts, I never got any response from the National Fitness Awards on their judging criteria. Alas, I left this

route of exploration considering such standards as merely the same judgement process of the Hollywood Oscars panel: friends praising friends.

These investigations, however, led me down the avenue of attempting to understand how we define and demarcate the work of exercise professionals. As I began the initial explorations I found that I was coincidentally drawing upon an Aristotelian perspective. That is, Aristotle has suggested that the definition and essence of a 'thing 'is its purpose. There is a rational and objective for something existing. This was echoing my thoughts created by the trainer of the year article. Should I genuinely believe that the essence of personal training is as a tool to create a desired body image and fulfil an objective of physical fitness and aesthetics? This may be the case for some clients, but it has not been the entirety of my experiences. But I would argue that this may exemplify the exercise objective in some situations, yet it does not provide an encompassing definition of personal training or the exercise professional. Such a perspective only illustrates a subset of exercise activities. As a result, I began exploring the professional, academic, and educational literature of trainers and exercise work to examine who they defined the role. What I found in many texts, dictionaries, and internet sources were explanations that summarised the exercise professional as someone who created, implemented, and guided individuals through exercise experiences. This felt very dissatisfactory and failed to present the exercise professionals in their own right. Was there nothing that made the exercise professional unique and valid in an Aristotelian sense when compared to physiotherapists, PTI's, coaches or even a bodybuilding friend or acquaintance who provided free advice in the gym weights room? It was from this line of thinking that my reading and thoughts began to shift from the notion of the exercise professional per se to attempting to understand the key term exercise. If, in Aristotelian terms, the purpose (energia) of the exercise professional is the delivery of exercise, then what is exercise? What is the purpose of exercise?

Fortunately, at the same time I began to ask these questions, there was an emerging movement by many organisations to highlight the impact of exercise as a medicine. Although GP referral schemes began in the UK in the 90s, it was not until the early to mid-2000's that educational courses introducing personal trainers to specialist GP referral qualifications and other medical aspects of exercise were created. The American College of Sports Medicine (ACSM) introduced the concept of Exercise is Medicine™ through the

work of its former CEO Robert Sallis and the UK's REPs began to introduce its accreditation of Level 4 trainers as those qualified in specialist medical topics such as obesity and back pain in the late 2000's. Therefore, fortuitously, just as I was attempting to explore possible definitions of exercise it seemed that my work had been completed elsewhere: exercise was going to be defined in terms of medicine.

Unfortunately, my being a would-be philosopher, this caused me yet another problem: what is medicine if exercise is it? By what terms would exercise now be defined and what would this mean for the exercise professional? Consequently, my reading and research led me to explore the challenges, critiques, and concerns of modern medical professionals and academics in defining and understanding their role. However, rather than finding answers for the exercise is medicine definition I became aware of critical issues. It was in this large body of philosophically critical research that I found damnations of medicine, especially in terms of its scientific foundations, implementation of evidence-based practice, and a reliance on theoretical underpinnings for its praxis. Writings from such medical practitioners and philosophers as Pellegrino in the 1960's, Illich in the 1970's, Gadamer in the 1990's through to Miles in 2018, demonstrated to me that the philosophical essence of medicine has been a continuing issue. It was at this point that I began to realise that although I am glad that exercise professionalism has perhaps moved on from its early aesthetic imagery, I was not sure the wholehearted embracing of a medical definition for its philosophy would prove any less problematic.

Hence this thesis the culmination of this personal academic journey. As I said at the beginning, my questions began in a selfish manner: why could I not achieve recognition for my work? It seemed inappropriate in terms of professional standards that trainers without celebrity status or appropriately enhanced physiques were overlooked for awards. But this questioning ultimately evolved into the underpinning impetus for this thesis. That is, the intention of this work is to open the debate on whether the use of a definition of exercise based on the 'exercise is medicine 'philosophy is appropriate in supporting the education and training of exercise leaders.

Key points for Bracketing:

Information to be 'Bracketed'	Rational
I have successfully worked in personal training situations for 25 years.	This will impact on my considerations as to how trainers should work. I use the term 'successfully' on purpose as my personal training led to work in such diverse fields as professional football and with Olympic athletes, support for cancer survivors and mental health clients. As a result, there is a need to maintain a constant sense of criticality and objectivity so as not to impart my personal agenda on specific practices.
I have never worked fulltime as a personal trainer.	By this I mean personal training has never been my 'bread & butter' wage. Such work has always been a part time or secondary job. As a result, in my approach to clients and ethical decision making I have rarely had to account for economic survival. I would concede this has allowed for a more experimental approach to practice. Thus, in developing my understanding of the training role, my experiences may vary from those who must achieve a fulltime salary and economic sustainability through this work.
I started delivering personal training before genuine qualifications and accreditation were considered important.	My initial work was based on the fact I was studying sport at University whilst holding a part-time role as a gym instructor and lifeguard at a local leisure centre. I have always been recommended to clients who never asked for specific qualifications. This has created my belief that leadership and achievement of objectives provided for the greater part of my success in being recognised competent rather than level of qualification or specialised education. However, I must be cognisant that courses are crucial in the professionalisation and ethical delivery of practice. They are written with a greater clarity of information and knowledge than my own early 'trial and error' learning processes.
I have worked with a truly diverse range of clients: professional athletes to GP referral, from bodybuilders to fitness enthusiasts.	Within exercise there are many approaches to physical training which appear universal. Yet despite using the same techniques the outcome can be vastly different. For example, I worked with 6 different football managers who each had different results despite the same foundations and team. Hence, based on my range of experiences, I do not believe there is a 'magical' or 'ultimate scientific universal' training technique that fulfils all needs. Rather, it is the relationship between professional and participant that creates success or failure.

I teach recognised personal trainer and gym instructor courses.	There could be an argument that I need to maintain a distance between my experiences of delivering these materials and the objective content of the courses. However, in this instance this is deemed an essential element for reflection. The key objective is to understand the epistemic nature of the professional's education and its relevance to practice. My intimate relationship with the academic material arguably gives a deeper understanding. So whilst this issue is acknowledged in the bracketing, arguably if utilised effectively it will lead to conclusions that provide greater discourse.

Appendix 2: Philosophical and Methodological considerations:

A defence of philosophy and methodology.

McNamee's (2005) challenge to philosophers that "Ought not every scientist reflect on the relations of theory, method and data?" (p4) is interpreted as a call for understanding methodology. Therefore, the intentions of the following are to meet this test and illustrate the methodological framework from which this thesis was developed.

In the first instance, it is recognised that there is an assumption this work sits in an academic domain named 'philosophy'. This claim requires both clarification and justification. And with this statement there is a need to consider the methodological implications the position brings. It is recognised that, despite McNamee's (2005) challenge, the necessity and relevance of such methodological detail for philosophical research is debated. Yet, in this instance, the essence of the thesis concerns the centrality of epistemology in professional practice. Accordingly, it would seem appropriate to illustrate the epistemic basis of this methodology.

Before proceeding it is necessary to ensure clear explanation of the use of the terms 'methodology' and 'method' as intended here. The term 'methodology' is used to describe the assumptions and justifications made concerning the methods, i.e., forms of data collection, used in a domain's research. For example, evidence-based practice (EBP) can be considered a methodology. It has arisen as a philosophy of research to underpin much of health research and practice. However, it is not considered synonymous to the concept of a paradigm. Using Kuhn's (1974/1996) notion of a disciplinary matrix, the term paradigm is representative of a full professional praxis which would include an academic research methodology but also other considerations. Thus, whilst important to a paradigm's foundation, the term methodology is not intended to represent its entirety as conceived in some educational texts.[77]

[77] In this instance a research paradigm is more appropriately conceived as synonymous with Knorr-Cetina's concept of an epistemic culture. It is not merely expressive of research methods but includes notions of communication, social interaction, and practical action alongside epistemological, ontological, and axiological considerations.

Why is this work philosophical?

It is conceded that a key methodological assumption has been made that the work sits within a domain called philosophy. As proposed the objective is a "critical philosophical examination of the current education of exercise professionals, and the possible impact of exercise education's epistemic basis". Therefore, there is a purposeful differentiation of the thesis from schools of sociology, psychology, and other social science methodologies. However, such methodological categorisation cannot be made without inevitable debate. For example, to begin, a specific domain of 'Exercise philosophy' does not appear to exist[78], whilst its cousin 'Sports philosophy', is neither a prominent, fashionable, nor seemingly popular area of interest. Resultantly, justifiable challenges could be raised at this point to ask why this work would want to define itself as philosophical. Consequently, this section explores the domain of meta-philosophy, i.e., the philosophy of philosophy, as a means to consider these challenges (Overgaard et al. 2013).

As expected, meta-philosophy has a long and complex history, and there is insufficient space to address this volume of work with complete justice. However, taking a broad approach, the debates surrounding the domain of philosophy appear to be founded on two overlapping debates. Firstly, there is debate as to whether philosophy is still relevant as an academic practice, especially with the advent of science. And secondly, even if considered of interest, it lacks a distinguishing methodology and therefore is not a specific academic domain which produces meaningful solutions.

Problems of relevancy.

As previously stated, a brief exploration of Sport and Exercise literature illustrates that philosophy is not often regarded as an important contemporary venture. And, in broader academia, the subject has become labelled as one of the ten most useless degrees alongside Star Trek studies and Queer Musicology[79] (Lockie 2015). Even the Rt. Hon. Bertrand

[78] A simple Google Scholar search for the Boolean phrase "exercise philosophy" produces no specific philosophical texts 05/04/2022.

[79] No judgement is made here on these courses as per content, their academics nor students. They are no doubt specialised means for teaching a specific set of social science skills. It is merely recognised that philosophy is categorised amongst such academic activities. But, as will be made clear, it is believed that philosophy provides a more meaningful and pragmatic intellectual activity in considering professional practice than such disciplines. The perception here is that such degrees are the epitome of modern study for study's sake.

Russell was once reported as sardonically stating that the wisdom of the British is encapsulated in the excellence of their philosophers alongside its people's contempt for them (Lockie 2015). Thus, as Williams (1996) summarised: "As long as there has been such a subject as philosophy, there have been people who hated and despised it" (p363).

Perhaps most problematic for philosophy is the question of its usefulness. The field is often accused of esotericism and hence of little relevance to the real world. Such accusations are not improved when it is recognised that Ludwig Wittgenstein, one of the most celebrated philosophers of the 20th C, is reported to have consoled his PhD examiners by stating "Don't worry, I know you'll never understand it" (cited in Eilenberger 2020 p8)[80]. Hence, philosophy is often considered merely an exercise in 'armchair rumination' undertaken for the pleasure or amusement of a select few (Vaidya 2010).

These accusations have led to debate as to whether philosophy has made any pertinent contribution to social progress since its inception and, importantly, if the field is of contemporary use moving forward (see Gaukroger 2020, Guerin 2020 Slezak 2018, Brock 2017, Kamber 2017, Stoljar 2017, Novak and Mahmutefendic 2015, Williamson 2007, and Williams 1996). From one side, it is stated that philosophy has utterly failed and should retire to allow science to subsume its work, whilst the other argues the field has already answered all the big questions and hence it is now redundant (Dellsen, Lawler and Norton 2021). Such polemic debates would seem an unusual position for any academic field. Whilst there are clearly discussions on the future of the social sciences, there appears less debate directly asking if such research has been useful or if it should be retired.

Furthermore, the challenge to philosophy's relevance is not limited to the academic field. In the context of professional practice, the disparagement is exemplified by Wall's (1994) critique of attempts to explore Medicine's practices:

> I certainly admire those who have spent their lives trying to improve the quality of thought but for those of us employed in more mundane processes of what is called 'real life 'we must be forgiven for feeling that some intellectual ruminations are not to our purpose.
>
> (Wall 1994 p317)

[80] His examiners were the Rt. Hon. Russell and the influential G.E. Moore.

Thus, summarizing the negative perceptions, Williams (1996) states "philosophy gets no answers, or no answers to any question that any grown-up person would worry about, or no answer which would be worth worrying about, even if the question were." (p364). As a result, the caution of both professional doctoral students and 'applied 'academics appears well founded.

Problems of methodology.

Within the discipline of philosophy itself, there is considerable debate as to what it is that defines the characteristic aims and methodology of the field. That is, what is it that philosophers do that makes it philosophy? As Beebee (2020) states, the problem arises that any philosopher with methodologically supported notions inevitably meets another just as well equipped with arguments that would "sincerely avow a view that's incompatible [with the former]" (p2). For example, one school demonstrates that philosophy is that which can be fully defined through language, however another argues philosophy is for the transcendental and should be the study of that for which there are insufficient words (Pelligrino and Thomasma 1981).

Additionally, philosophers provide little in the way of definitions that allow for succinct understanding of their methodology. St Augustine (354-430CE) stated that philosophy should be defined as the task of understanding of all of existence (Kenny 2010), whilst Russell suggested:

> Philosophy, as I shall understand the word, is something intermediate between theology and science. Like theology, it consists of speculations on matters as to which definite knowledge has, so far, been unascertainable; but like science, it appeals to human reason rather than to authority, whether that of tradition or that of revelation. All definite knowledge…belongs to science; all dogma as to what surpasses definite knowledge belongs to theology. But between theology and science there is a No Man's Land, exposed to attack from both sides; this No Man's Land is philosophy.
>
> (Bertrand Russell 1945 p xiii)

Whilst Russell distinguishes philosophy from its related domains of theology and science, the question as to what exactly philosophy is left unanswered. If theology is based on an

argument to authority and science is derived from a rational process, as philosophy sits betwixt these two is it a rational appeal to authority? However, this is not clarified.

Similar poetic descriptions appear throughout philosophical literature. For example, such lyrical sentiments are echoed in Kenny's (2010) consideration that philosophy has been named the 'queen', 'handmaid', 'womb 'and 'midwife 'of the sciences. And, Ryall (2016), in similar vein, describes the work of (sports) philosophers as gardeners weeding out the harmful to allow for the flourishing of the philosophical landscape. But despite the literary appeal, such descriptions fail to facilitate a methodologically bounded field of study. The idea of philosophers struggling in the wilds of an academic 'No Man's Land' to uncover knowledge previously hidden creates a feeling of scholarly romanticism but do nothing to explain the methodology of their activity.

This ambiguity creates a lack of definition. Consequently, problems in presenting a methodological boundary, along with the great diversity of opinion as to where the margins sit, are inevitable. For example, To Warnock (1999) the essential elements of philosophical methodology are merely a motivation for 'explanatory ambition' (p2) and the provision of supporting arguments for a thesis. Yet, the means to create these explanations or supporting arguments lack systematic clarification. In a related manner, to answer the question 'What is Philosophy?' Priest (2006) proposes that philosophers should ignore notions of truth and factual accuracy in their work and simply have fun writing. Taking this statement to its logical conclusion there are as many methodologies as there are research active 'fun' philosophers (Williams 2006).

Compounding this issue is the recognition that those concerned with methodology are accused of spending too much time occupying themselves with questions of methods and not enough in applying them to answering questions (Ryle 2009). Philosophers should simply get on with it, and accept that, as J.L. Austin is often cited as stating, "philosophy is just what philosophers do". (cited in Gaukroger 2020 p283). As a result, contemporary philosophy could be conceived of as merely postmodernist relativism and academic Dadaism.

Whilst such sentiments may provide inspiration and open the door for opportunity, imagination, and creativity in rhetoric, they would seem limited in defending philosophy.

Consequently, there has emerged a body of literature questioning the relevancy of philosophy as a genuine academic domain and asking if it is merely an ancestor, extension, or subset of science (Gaukroger 2020, Guerin 2020, Overgaard, Gilbert and Burwood 2013, Kenny 2010, Williamson 2007). In recognising the issue, Passmore (1970) suggested that these challenges began with Hume's dismissal of any theory that lacked quantification. Subsequently, philosophers began to question the relevance of any conclusion not supported by a scientific method. This Humean sentiment is echoed in the previous citation of Hall (1942), and more recently by Andow (2016) who stated that the philosophy should be "structurally analogous to scientific thinking" (Andow 2016 p364).

The diversification of perspective is exemplified in the differentiation of the Analytic, Continental and Pragmatic schools of thought (see Bhaghramian and Marchetti 2017, Torres 2016, Vanderbeeken 2011, Chase and Reynolds 2011, Jones 2009 and Levy 2003). The identification of each school would appear to be along methodological lines. In simplistic terms, it can be said that The Pragmatic School focuses on understanding the real and practical consequences of philosophical analysis, and in contrast, the Continental School explores the human agent and their experiences. Yet, from another perspective, the School termed Analytic attempts to justify its conclusions through a comparison to the physical sciences (Gaukroger 2020). Hence, this latter school argues for the centrality of empirical approaches within its research whilst generally rejecting the 'armchair ruminations' of the other schools (Vaidja 2010). And it is because of this scientific alignment, that the Analytic school has become the dominant approach, especially within the field of Sport and Exercise (Kretchmar 2014).

The outcome of this Analytic School ascendancy to prominence is that the concerns of philosophers have become problems answerable through science. Ergo philosophy as an independent field is redundant. If Ayer's (1946) suggestion that philosophy is those questions that science cannot answer is accepted, and the contemporary dominant philosophical school is based upon science, logically there are no questions unassailable by science. Hence, to some, the perspective is that there is no longer any need for philosophy, only science.

Summing up the challenge.

Based on these observations the charges against philosophy can be suggested as twofold. On one hand, philosophy is a redundant variant of science. On the other, if there is a philosophy separate from science, it is merely rumination and fails to demonstrate methodologically valid or trustworthy conclusions. Understandably, these criticisms lead to the question as to why this thesis does not integrate itself within mainstream social science. Such methodologies would certainly sit more comfortably and fashionably within Exercise research.

It would be conceited to suggest it is even remotely possible to provide a universally acceptable answer to this challenge. Therefore, this is a flag planting exercise. It is an argument that is only a way; a proposed philosophical means by which to explore Exercise professional practice. And, in this instance, despite the tribulations of creating an appropriate methodology, it is argued that it is an opportunity for an exploration that would not be achieved through other academic lenses.

Defending a philosophical label.

In 2010, Prof. Stephen Hawking proclaimed in The Grand Design (2010) that philosophy was dead. Unsurprisingly, considerable debate as to the truth of this statement emerged (see Reisz 2015, Scott 2012). However, this proclamation was recently re-addressed during a 2019 debate hosted by The Institute of Art and Ideas[81]. IN this debate the appropriateness of Hawking's comment was asked of the biologist Prof. Lewis Wolpert, sociologist of science Prof. Steve Fuller, and philosophical commentator, and New Statesman editor, Jonathon Derbyshire.

To begin the discussion, Wolpert quickly began to denounce philosophy. Taking a stance similar to those arguments presented earlier, Wolpert stated that science has rendered philosophy obsolete. Citing the physicist Richard Feynman, he stated "the philosophy of science is as useful to scientists as ornithology is to birds". Science is about evidence, internal consistency, and finding out how things work; but what has the philosophy ever

[81] The Institute of Art and Ideas YouTube Channel: Hawking vs Philosophy: Lewis Wolpert, Steve Fuller, Jonathon Derbyshire. Uploaded to YouTube 21 Apr 2019. Accessed 10/09/2021.

discovered? Thus, Wolpert concluded philosophy could be deemed “empty beyond words”.

However, both Derbyshire and Fuller defended philosophy. Firstly, Derbyshire challenged Wolpert’s assertion that philosophy has lost its function because it does not discover things. He argued philosophy is not about discovering ‘things’, it is about how things are discovered, the nature of the process for discovery, and the impact of the ‘things’ discovered. Thus, they argued that science, by its nature, brings with it philosophical assumptions about the nature of evidence, validity, theory construction and so on. Hence, whilst philosophy might not create data it can provides clarification on the nature of that data. It provides meaning to the analysis and impact of science’s discoveries. The problem arises that scientists take these assumptions for granted. As a result, by the very nature of both Hawking’s and Wolpert’s arguments, they are inherently doing philosophy.

Derbyshire also argued that elements of human activity are beyond the grasp of scientific study. Using the example of a cricket umpire’s gestures, they proposed that whilst such movement could be studied via neuroscience, physiological, or similar scientific approaches, the meaning behind the gestures requires a different form of intellectual methodology. To accurately recognize the aesthetic and ethical impact of a gesture requires more than a scientific process. Hence, Derbyshire concludes that philosophy can clarify a world beyond the capability of science.

Fuller similarly defended philosophy by illustrating the differences between the objectives of the two practices. To Fuller philosophy provides answers to such questions as what is the goal of science; why is science done? Therefore, philosophers develop normative clarifications beyond the ontological descriptions of science. Drawing upon an empirical history of science, Fuller conceded that scientific achievements have had a positive input for medicine and humanistic technology. Yet, importantly, Fuller argues science must also acknowledge its role in current environmental issues, military arms races, and the problems of an expanding population. Without science there would be neither the former positives nor the latter dangers. Thus, Fuller presents philosophy as a means to question whether science is always the best form of knowledge and paradigm for action. Hence, philosophy is both ethical and epistemic as opposed to merely ontological and technological.

These points are neither new nor novel. However, this specific debate has been described in detail as it summarises the many vindications of philosophy in the field's literature. Ranging from challenges to scientism, e.g., De Ridder, Peels and van Woudenberg (2018), Gould (1981/1996), and Feyerabend (2011), to defences of philosophical thinking from Bubbio and Malpas (2019) and Midgley (2018); there are a considerable number of commentators arguing that metaphysics is a necessary practice beyond the scientific methodological reach.

Synthesis of debates.

In this thesis, the position is taken that some elements of ontological naturalism are justified, and the technological success of science is beyond denial. But the means for how this ontology is understood, communicated, and applied are not within the capability of science. That is, despite the scientism in arguments against philosophy, science cannot do everything. Hence, the metaphysical assumption in this thesis is summarised through Mizrahi's (2017) notion of 'weak' scientism:

> Weak Scientism does not amount to a denial of non-scientific knowledge. On Weak Scientism, there is knowledge other than scientific knowledge; it's just that scientific knowledge is better than non-scientific knowledge. According to Weak Scientism, of all the academic knowledge produced by academic disciplines, including scientific disciplines like astrophysics and non-scientific disciplines like philosophy, scientific knowledge is the best knowledge we have.
>
> (Mizrahi 2017 p356)

Similar positions are described in Strawson's 'soft 'or McDowell's 'relaxed 'naturalism (Overgaard, Gilbert and Burwood 2013). The point made is that whilst science produces the 'best' theoretical knowledge, real world ontologies are based on more than scientific theory. Science cannot dismiss the relevance of practice in understanding human activity (Gadamer 1977/2004). The superiority of science is a contextual proclamation, i.e., what works in one situation may not work in another. There is a need for the consideration of the particular and, importantly within contexts such as this thesis, the personal.

Therefore, As Mizrahi (2017) states, there may be other forms of epistemology required. And, logically, there are alternative methodologies. Thus, it may be possible that such alternatives provide useful perspectives hitherto unconsidered (Feyerabend 2010/1975). Consequently, there is no intention to deny science but rather challenge 'hard' scientism and the belief in the infallibility of its methodology. In achieving their ends, philosophers must draw on different methodologies within the broader notion of a meta-philosophy. As Mary Midgley (2018) (p158) states:

"There is nothing to stop minds, or rabbits, being understood in more than one way".

A definition of philosophy

Summarising the previous debates, the following two propositions are considered the foundations of a methodological definition of philosophy:

1. *Philosophy is differentiated from science through its epistemic goals of understanding the content of concepts*[82].

Wilson (1963) differentiates philosophy from science through the demonstration of two forms of research question. Firstly, there are questions of fact. These would include such questions as 'could a whale sink a ship?'. Secondly, there are questions of concept which would ask 'is the whale a fish?'. It is the latter that Wilson (1963) suggests are the domain of the philosopher. Hence the differentiation of philosophy from science is through its epistemic goals (Hannon and Nguyen 2021). Specifically, it is argued that science focuses on the development of theory and fact. Philosophy's goal is the conceptual clarification of those theories and facts. Therefore, philosophy's primary objective should be metaphysical and conceptual not simply ontological. As Glock (2017) states: "whereas empirical science tackles factual issues, conceptual issues constitute the proper domain of philosophy" (p79).

[82] The inclusion of the term concept at this point is purposeful and will be justified in subsequent discussions.

2. *Philosophy can create an understanding of professional issues through an epistemic analysis as to the way in which professional concepts impact on action, i.e., a form of conceptual pragmatism.*

Via the first proposition it can be stated that philosophy is concerned with the links between forms of knowledge. However, this is insufficient in isolation to express the nature of philosophy. Philosophy should not only understand observations but consider the ideological impact of such phenomena on the world (Feyerabend 2011). As Mary Midgley (2018) concludes in her text What is Philosophy for? the aim is to explore the way in which varieties of concept can be connected to the real world: "how to imagine them, how to visualize them, how to fit them into a convincing world picture" (p208).

Historically, philosophy has approached such concerns through logic, geometry, and mathematics (Toulmin 1972). However, more recently, a growing emphasis has been to understand epistemology for practical needs. Thus, rather than considering concepts as a form of ontology, they have also been considered in terms of their impact on epistemic, axiological, and ethical dimensions of professional practice. That is, Wilson's (1963) whale example should not end with an answer to 'is a whale a fish?' Rather, the examination should extend to: 'what does the answer mean in terms of our interaction with such animals?' This methodology of conceptual pragmatism is evident in several health professions and their emergent questions on bioethics and ethical practice (e.g., Paley 2021, Rodgers and Knafl 2000).

Therefore, the philosophy of a profession can be defined as an understanding of the interaction between professional concepts and their impact on praxis. Praxis, in this sense, is defined as the means of a connection between the 'facts' and the explanations of practical consequences of their implementation, either observed or possible. Resultantly, the study of a profession's philosophy is conceived as a practical venture in determining conceptual praxism.

Critical considerations of the methodology and method.

It is necessary to acknowledge limitations and debates concerning the proposed model of professional knowledge, the term conceptualism, and the use of conceptual analysis to explore a concept of Exercise. In this section, these will each be considered in turn.

Defending epistemic centrality

To begin, it is recognized that the proposed epistemic model can be challenged for being overtly rationalistic. That is, there is an assumption that all professional decision making follows a logical and rational process appears in the model of E-O-A. However, the intention of this model is not to represent the specific process of professional decision making but rather the development of the professional paradigm that is encompassed by Exercise. The profession begins with the 'expert knowledge'. Furthermore, through a neo-Aristotelian lens, the 'good' of a profession is the application of the intellectual virtues for a eudaimonic objective. As previously described, this is an epistemic challenge.

Yet despite the paradigmatic focus, an inherent rationality in a professional's decision making can still be claimed. It could be suggested that due to professional and ethical concerns, the professional will consider the expert knowledge of the profession before undertaking a more personally creative approach. This is not to suggest that all professionals 'stick to the book', but rather there is acknowledgement of the possibility of a professional epistemic solution before providing an 'unaccredited solution'.

It is acknowledged that the E-O-A model could be considered circular, or at least the starting point may not be categorically epistemic. The professional may initially be faced with an axiological decision which then moves to an ontological acknowledgement before a consideration of the epistemic requirements. For example, it could be argued that a personal trainer may be faced with an ethical issue of inclusivity whilst working with a disabled client. This would require the collection of information as to the ontological position of the client. The trainer would then need to refer to the 'textbooks' for the requisite knowledge as to how to safely exercise this specific client. This would not be an unusual approach and in fact could be deemed a standard experience. However, the argument is still made that the epistemology of the Exercise science will create the answer

for the trainer's axiological question. Thus, in terms of praxis and delivery of intervention the model E-O-A is maintained.

Furthermore, it can be argued that the ethical understanding of the situation, and the questions to be used for the development of the contextual ontology would be derived from an initial understanding of the epistemic content of the professional role. This latter argument reflects the notion of expertise as defined by Benner (2001) in discussing expert nursing practice:

> "Expertise developed when the [practitioner] tests and refines propositions, hypotheses and principle-based expectations in actual practice situations…[Experience] results when preconceived notions and expectations are challenged, refined or disconfirmed by the actual situation." (p3)

Within this quotation the 'preconceived notions' and 'expectations' are interpreted as being derived from an epistemic basis. Thus, in Benner's (2001) work exploring the shift from novice to expert, the centrality of epistemology in professional practice is evident. The need to consider the epistemic foundations of the education of professionals becomes clear. If novices are presented with inappropriate paradigms, they will develop an inappropriate praxis.

C*hallenges to metaphysical conceptualism.*

It is also acknowledged that within philosophy the consideration of metaphysics has often been challenged due to its lack of pragmatism. From Kant through to Carnap and modern Analytic schools, metaphysics is generally treated as "sterile", "useless" and with contemporary "deep suspicion" (Callender 2014 p34). It is understood that it is the metaphysical nature of conceptualism that inherits the major philosophical controversy in this instance. In his 1976 autobiography, Unended Quest, Popper describes the issues he had with the analysis of universals based on essentialism:

> Never let yourself be goaded into taking seriously problems about words and their meanings. What must be taken seriously are questions of fact, and assertions about facts; theories and hypotheses; the problems they solve and the problems they raise.
> (Popper 1976 p19)

Popper's argument is interpreted as too much time can be wasted in attempting to provide an understanding of a concept. The focus should be on the practical realities and problems to which philosophical and epistemic understanding are applied. More recently, within Sport philosophy, Ryall (2016) makes a similar point stating that historically philosophy wasted considerable time and effort in attempting to understand the meaning of words. Overall, these arguments suggest that the purpose of metaphysical conceptualism is problematic. The point being there is little practical value in analysing concepts for greater positivistic specialisation and precision without a sense of empiricism and/or pragmatism (Sartori 1984).

However, it is hard to perceive what form of methodology other than metaphysical could consider the nature of a paradigm presented in a professional epistemology. Therefore, it is argued here that these critiques are based on the dominance of the descriptivism in contemporary analytic philosophy. This could be worded in terms of a focus on the identification of species as opposed to instantiated essences underpinning the concept. As evident in Dasso (2020) and Morgan (2019), there is an effort to identify the universal necessary and sufficient conditions for a definition as opposed to an understanding of contextual instantiation. Therefore, as previously argued, the focus should be on a conceptual re-engineering for a revision of concepts in the context of professional practice; a shift from that of descriptivism to a revisionist re-engineering for pragmatic purposes.

This focus on methodological conceptualism as a means for understanding action as opposed to generating positivistic universalism is not original. Wittgenstein (1953/2009) maintained that when considering the meaning of terms and their associated concepts, a philosophical understanding should be based upon the pragmatic language of ordinary use. The idea of exploring metaphysical universals beyond their practical and empirical application is problematic. Therefore, Wittgenstein states that concepts can only be conceived and understood within a communal space. Thus, concepts are constructed within social contexts and through social negotiation, not an individual's rational cognition. This is interpreted to suggest that the professional concept is means by which a profession is socially identified and understood. Similar positions are reflected in both Kuhn's (1974) definition of a paradigm and empirically supported in Knorr-Cetina's (1999) 'epistemic culture' interpretation of practical science. The concept is a descriptive of the paradigm.

Consequently, there is a justification to consider the implications of concepts, and the possible epistemic essence from which they are derived, in professional practice. The arguments against metaphysical conceptualism appear based on the abstract nature of positivism, methodological descriptivism, and a perception of limited capability for developing action. However, if praxis includes the merging of knowledge into a concept for practice, then bad concepts lead to bad epistemology, bad epistemology leads to bad paradigms, and bad language leads to bad professionals (Duncan et al. 2007, Sartori 1984).

Thus, whilst the anti-essentialist critiques are valid from a positivistic standpoint, the essence of definition used to conceptually construct a professional paradigm has implications for the outcome of action. Hence, what is proposed here is a form of conceptual praxism. Drawing upon an epistemically derived paradigm, an Exercise professional decides on practical action from an instantiated concept of exercise. Therefore, if the concept is not metaphysically questioned it may lead to not only ineffective but dangerous practices (Gray 2019).

Challenges to the method of conceptual analysis.

Despite the commonality of concept analysis research in health fields, the method remains controversial. Specifically, commentators have challenged the nature and worth of such projects. For example, Draper (2014) has argued that, regardless of the expectation and enthusiasm for conceptual analysis in developing nursing performance, "the approach may have looked like a good idea in the 1980s, but it has no contribution to make to the scholarship of contemporary practice" (Draper 2014 p1208). However, as with the arguments concerning conceptualism, the criticism is focused on the delivery of the project as opposed to the notion of the project itself.

A reading of the critical papers suggests the issues arise due to problems in the method, as opposed to the idea that conceptual analysis can improve professional practice. Drawing upon critiques from Hupcey et al. (1996), Draper (2014), and Paley (2019) as illustrative of the usual challenges, the following limitations are commonly levelled against conceptual analysis. Firstly, the method used is challenged for being an oversimplified literature review. The use of conceptual analysis is commonly done without the explanation of a rigorous data collection process, and there is limited explanation of inclusion and exclusion criteria. Secondly, the approach is often narrow in terms of scope

of data collected. Thirdly, the analysis has been suggested as focusing on an empirically observable phenomenon. This is suggested as being contradictory to the definition of a concept which is an abstract, metaphysical construction. And finally, as evidenced by Draper's (2014) observation, the project rarely shows evidence of a relationship to professional practice.

In answering these challenges, the following solutions have been utilized. First, the methods for the collection and analysis of data have been made explicit in each instance. Secondly, as previously stated the full range of professional education material will be explored. This will include the full course materials and primary textbooks provided for professional education alongside a consideration of the peer-reviewed research evidence-base used for educational development. Thirdly, this work defends the use of the term concept as it is focused on a metaphysical notion of epistemology as opposed to terms such as learning or qualification which are objectively measurable. Finally, the intention of this analysis is to understand the possible impact of the conception of the Exercise paradigm on practice. Consequently, through a perspective of revisionist conceptual re-engineering proposals for direct action on professional practice can be made.

Summary.

In conclusion, whilst the debates are acknowledged, the stance is taken that philosophy can add notions of understanding beyond those available in social and/or natural science. Through a definition founded on conceptualism it is argued that philosophy allows for the exploration of the epistemological meanings and interpretations that may lie beyond propositional facts provided within a professional practice. Specifically, an exploration of the epistemic frameworks created through professional education is argued as important for developing an understanding of a praxis of a given profession.

However, despite drawing upon a systematic method, the ruminative elements of this 'armchair exercise' are neither ignored nor relegated. The influences of personal interpretation and critical reflection through professional experience are embraced. Therefore, whilst this work may fail to provide entirely convincing conclusions for material change in professional education it is hoped that alternative possibilities are made explicit. As Chalmers (2020) suggests, the intention is not to develop new concepts but

rather to consider the question of whether the current concepts are fit for purpose. Furthermore, it is hoped Priest's sentiments of academic fun and imagination are evident in the exploration of Ryall's garden and Russell's no man's land. For, as Ulivi and Fisogni (2021) concede, all that philosophy can desire is to provide an idea; a novel thought that is "available to scientists and philosophers, sophisticated intellectuals, and men [sic] of good will, a reference and a debating platform within which to interact with critical attention and intellectual honesty" (p189).

A Personal Reflection on Methodology.

Paraphrasing my methodological position, concepts are more than mere knowledge, they imbue an idea, an ontology, and a means for action. Therefore, how a profession conceptualises its knowledge creates praxis. In simple terms relative to this thesis, how professional bodies conceive of exercise is how Exercise practitioners will deliver their work.

Yet, despite its simplicity, I confess that presenting this position in a defendable academic manner has been exceptionally difficult. What is philosophy? I am no nearer an answer despite my attempts to justify this work. At times it became a temptation to take a step-back to an apparently 'simpler', structured sociological analysis that fit neatly with the some of the adjacent literature I was reading. But, in all fairness the major issue was mine. No matter how often I attempted to simplify my thoughts I began the exploration of another twisted route. I fell into a trap of searching for the answer and this led to a tortuous journey of rabbit-hole ferreting. And I went down some very convoluted warrens of thought. Many of these tunnels were due to an overwhelming belief that there must be a persuasive and 'universal' defence for the use of the words: philosophy, methodology and concept. This was proved impossible. However, learning is never wasted. So, I would like to present some of these routes of thought. I dismissed their immediate relevancy in the end reckoning but as I reflect on my ideas, they have clearly influenced this thesis.

A personal perspective I would make is to admit that I emerged from some tunnels with a belief that academic argument in some quarters is used much like a military deterrent. I am often of an opinion that for some academics the stance is: if my thinking looks logical, vaguely common-sensical, and seems to match some observed experiences, no one will look too closely because they do not want their own approaches critically explored. Examples of this were brought to light in my reading of contemporary postmodernist/poststructuralist sociology and how certain positions have allowed the shenanigans by Sokal, and Boghossian, Pluckrose, and Lindsay. So, in this section I would like to explicitly present my 'rabbit holes' of thinking. The intention is to illustrate some thoughts on why I am avoiding debates on incommensurability and arguments concerning possibility of merging multiple paradigms. Ultimately, I hope to open for debate both the weaknesses and strengths of this abductive mishmash of theoretical influence. In the end it is my defence philosophy allows for an eclectic, pragmatic, bricolage of collective thoughts in creating a methodological framework for this thesis. As Feyerabend states more eloquently: anything goes.

My Rabbit Holes

There is something of a catharsis to this reflection. I present the following disclosure of my lines of thought not only as a means for expressing ideas and thoughts that could later emerge but also

for a sense of personal completeness. It is reminiscent of the process of phenomenological bracketing, a means to help both myself and the reader to see the journey and organise some discussion of the myriad of influences underpinning the end conclusions.

To begin, this reflection can be said to emerge from an all-too-common conversation I have had with colleagues, friends, and peers that focused on the question "so what are you?". As opposed to an ontological query as to the nature of my existence, I quickly realised this question was asking what philosophical, theoretical, or paradigmatic position I belonged to. And I use the term 'belonged' purposefully as I will discuss below. Importantly, the basis of this question was not a focus on what method might I collect data with nor what was my research process. Rather it was a need-to-know what school of thought I was aligning myself to. Was I a positivist, a social constructionist, or a critical realist? Foucauldian, neo-Marxist, or Weberian? Aristotelian, Hegelian, or Wittgensteinian? Or…. And onwards. Very often my answer was reminiscent of "Well, I have read them. I like that bit but not sure of that bit, so I have pinched this bit". But such answers were at best academically unsatisfactory; at worst I was accused of a lack of proper consideration and respect for the demands of academic research. How could I not start from a proper theorist's theory? I was at once cheeky, arrogant, and "not academic". So, it was with such conversations in mind that I felt compelled to present my attempt at a more traditional/expected/academically appropriate discussion explaining where I feel my work sits methodologically. Hence the inclusion of these introductory and reflective sections.

However, despite my attempts at a structured description in the preceding chapters, I would wish my style were more reminiscent of my key influencers such as Midgley, Gould, Feyerabend, Wittgenstein, Quine, Stove, and Gray. I have found their works informative, challenging, and exciting. Such writers have ideas and thoughts which are clearly coherent and structured. But, although no doubt to a strict methodologist their works are philosophically 'boxable', to my reading their approach seems entirely eclectic. Their works draw on multiple sources, no ideas are off the table, and the strict boundaries between paradigms, schools of thought, and systems are blurred. I found this inspirational. Rather than the strict confines of modern process driven academia, these writers ranged far and wide in creating thought-provoking dialectics. Yet it has been the unfortunate downfall in writing this work. That approach suits me better than a strict 'formulated experiment' designed to appease the 'publish or perish' culture in academia. It is the old punk in me. This anarchism was a struggle to grasp in writing.

Thus, I admit my work has emerged as a bricolage of ideas. I recognise that alongside attempting a methodology for professional Doctorate, with a structured dialectic echoing the ideas of Plato, Kant, and Hegel, there is the influence of Feyerabend, Gould, and Stove. Attempts to use my full

range of knowledge and the admission I learned from all my readings. The formulation of my work is thus rational and empirical, theoretical, personal, and experiential. Hence, at heart I would say philosophical. I often feel I am sat in Russell's No Man's Land. And so, emulating the aforementioned writers, I try to ensure my comments are not only empirical and logical but also speculative, imaginative, and purposefully provocative.

Yet, this approach is not unproblematic. This style of academia led me to some awkward encounters with adjacent bodies of literature. I found myself engaging with materials on semiotics, sociolinguistics, discourse studies and other related 'language' topics. Such areas were clearly not the fields of study I wished to pursue. The development, construction, and use of language is beyond the scope intended here. But I found myself in a situation of confusion. What exactly was my thesis? Had I taken a wrong turn or was this really what I was studying? Had I mis-interpreted my methodology?

It was from these explorations that I first encountered Kant's notion of analytic vs. synthetic statements. Reading the debates surrounding analytic statements and a priori knowledge involving Kant, Carnap, Wittgenstein, and Quine, I came away with the consideration that many propositions in Exercise science are treated as Kantian analytic statements. By this I mean there appears a conviction that when terms such as exercise are used there is an a priori collective understanding and definition. Consider the message: 'exercise is good so go do it'. The assumption within Exercise science this is a simple instruction thanks to an implicit a priori understanding of the words exercise, do, and good. Yet, as I will argue in the following chapters, such beliefs are problematic.

There is also the proposition in Kant's configuration of analytic statements that they are true based on their terms as opposed to the need for empirical fact. That is, they are constructed of terms that are not reducible to further elements of essentialism; their definition is singular and complete. Therefore, the meaning of the statement is beyond debate. The usual example given is the statement all bachelors are unmarried. Thus, in this sense, I would propose that many in Exercise science take terms such as 'exercise', 'do' and 'good' in a similar universalistic manner. We know what exercise is, we know what doing exercise is, and we know what is good for us. Based on this I became aware of a position in which statements such as 'exercise is good for health', and 'exercise is medicine', appear to have become philosophically unassailable in some quarters. Within elements of Exercise science these statements seem to have become sacrosanct and deemed axiomatic without a need for synthetic consideration. Thus, just as all bachelors are unmarried, exercise is good for us.

In this Kantian line of exploration, I found myself reading the ideas of philosophers such as Frege, Quine, and Wittgenstein. And it was from these writers that I began to develop ideas concerning the issues for praxis that can emerge through the possible analytic conceptualisation of professional knowledge. One key element that was of interest was Frege's differentiation of sense and meaning. In this discussion Frege suggests that the planet Venus has two names the morning star and the evening star. Therefore, both names have the same meaning, i.e., they refer to the same object, but the sense that the names bring is different. They have a different mode of meaning. The led me to consider that there is an assumption that when discussing exercise. It is assumed that everyone has both the same meaning and sense. This was an argument reflective of Quine's suggestion there is no such thing as a Kantian analytic statement as all terms are based on interpretation (sense). Similarly, Wittgenstein argues that the use of language is a contextual game, and the use of a word will differ dependent on the user, situation and objective. Therefore, all terms are open to exploration, debate, and philosophical analysis. Even the concepts that 'exercise is good' or, as will be discussed in the next chapter 'Exercise is Medicine', should be challenged in their dominance.

As I said I concede this linguistic thinking is a little 'left field' to my work. It is a very embryonic thesis. But there is an idea here. It is beyond the scope of this thesis to flesh it out but certainly the notion that key statements, propositions, and concepts in Sports and Exercise science have become analytic statements feels an interesting line to explore in future work. My thoughts are whether the use of certain terminology and concepts in an analytic manner are based on deductive certainty or more socially derived forces. This line of inquiry is not without merit when considering the recent legal cases against Prof. Tim Noakes amongst others.

But these lines of thinking led me to Wittgenstein. I have will expand on the notion of the bewitchment of language in the following chapter. However, the evolution of my dialectic becomes apparent when I consider my thoughts on the 'fixed', 'analytic' nature of Exercise science's propositions. As Wittgenstein is famous for suggesting, philosophy is the attempt to stop our intelligence being 'bewitched' by language. As I lay out in my idea of conceptualism, our ideas create our praxis. This is clearly derived from some of Wittgenstein's thoughts though I stress I am not a Wittgensteinian. I confess to the sense of idealism here. As I said I do not wish to get drawn into theology, but in terms of professional of practice the praxis begins with the epistemology, the thought. And as I will argue in this thesis, I believe that we may be in danger of being bewitched by the notions of exercise and the power of Exercise science to solve our health problems.

Based on this last comment I feel that one major influence on my work has been my undergraduate and early teaching experiences. I previously undertook a major in sports science with a minor in sociological studies in 1997 before beginning to teach sport sociology in 1999. At that time some of the major influences were the writers of the Frankfurt school, Wright-Mills, Foucault, Lyotard, Adorno, and Derrida. So, I cannot deny the impact of debates in social science which emerged from those sociologists. I realize that this group of sociologists are often labelled as poststruturalists or more commonly postmodernists. I am not sure of the accuracy of that labelling, I believe Foucault explicitly denied the label, however it seems sufficient to make my points here: this is not a postmodernist thesis.

Sometime ago I deviated from studying what is termed postmodernist sociology due to my own philosophical disagreement with its most recent evolutions and emerging tenants. As other commentators have said [83], for me the problems with the contemporary dominant (post-?) postmodernist 'Critical' paradigms are the central arguments for epistemic, moral, and cultural relativity. I am not suggesting that the basis of these paradigms is a perceived naïve relativity that is sometimes levelled against them, i.e., the accusation that postmodernists consider there is no such thing as realist elements in the world and absolutely everything is relative. And I understand the points that post-colonialists, post-feminists, post-colonial feminists and so on are trying to make. But the problem for me, and I am not alone as much recent media and literature demonstrates, is that trying to make any rational discussion for solving problems seems impossible. How can any conversation on the judgement of praxis occur if everything is to be judged in terms of social ideology? I understand the need for ideological consideration in some fields but the apparent demand for mathematics, physiology, biomechanics, and other underpinning elements in sports and exercise science curriculums to be ideologically deconstructed and decolonised seems unnecessary, counterintuitive and at times downright contradictory. I agree with Sokal and Bricmont (1999) who state that postmodernists have "an excessive interest in subjective beliefs independently of their truth or falsity; and an emphasis on discourse and language as opposed to the facts to which those discourses refer' (p173-174). It is this 'excessive' ideological lens that has caused a shift in my methodological interests. I would suggest I maintain a more perspectivist stance acknowledging the relevance of ontological naturalism and the possibility of methodological contextualism or relativism. From my understanding this is in-line with people such as Wittgenstein, Feyerabend, and Chomsky who take more nuanced positions. There are limits to methodological naturalism and the structural perspective of positivism. And I agree there

[83] e.g., Pluckrose, H. and Lindsay, J.A., (2020). *Cynical theories: How activist scholarship made everything about race, gender, and identity—and why this harms everybody*. Pitchstone Publishing (US&CA). Hicks, S.R.C., (2004). *Explaining postmodernism: Skepticism and socialism from Rousseau to Foucault.* Scholarly Publishing, Inc.

is an inherent moral line. I guess I could be best described as a 'soft' or 'sympathetic' postmodernist.

So, it was through my reading of these materials that I was led down lines of critique for professional epistemology based on such terms as epistemic cultures, bubbles, and echo chambers. Whilst I do not take the postmodernist ideological lens to reading these ideas looking for ideological power structures and injustice, I agree with some of the ideas inherent in these works concerning scientism. Clearly, in taking a conceptualist stance I echo the postmodernist [84] sentiment that all cognitive representations are mediated by language. All concepts are initially derived from social interaction. I would I argue cannot conceive of something I do not encounter either in my environment or in social interaction (back to the Kantian a priori debate).

The focus of my thesis is on the nature of the epistemology taught. Yes, I concede, that the epistemic nature of the Exercise education can be construed through its links to social structures. For example, Adorno and Horkheimer in "The Dialectic of the Enlightenment" may argue that the 'choice' of science as the dominant epistemic methodology is due to the late capitalist cultural process. Yet, within Exercise science there is a danger in the anti-structuralist elements of postmodernism. I would defend the need for scientific rigour, objectivity, and coherence in elements of Exercise physiology, biomechanics, nutrition, and related topics. However, in-line with those such as Campbell, Barthes, and Midgley, I also argue that conceptualisation is more than objective, empirical knowledge. There is the power of mythology in concepts and this is a crucial part of professional epistemology and hence praxis.

My argument is based on a broader approach to conceptualism which recognises the relativity of interpretation. In moving from the learning of epistemology in the classroom to the application of an ontology in the field, I agree with the influences described in postmodernist writings. My focus however is on the philosophical elements of this process not the ideological, political, or sociological. Plus, on a personal note, my intention is to affect change in the professional educational sphere. I leave the challenges of changing society to others.

An observation of tribalism?

My final thought in this section is based on an observation that has emerged over my 22 years of working in academia and higher education. As I said in my opening thoughts, my attempts to synthesize ideas from competing schools, paradigms, and academic disciplines have often been met with apparent disdain from observers. This is not just in conjunction with this thesis. In my

[84] For ease of writing, I am using the term postmodernism in its broadest sense and hence include foundational ideas such as poststructuralism.

teaching I am often looked at with suspicion by students who do not understand why I raise issues of epistemology in physiology lectures and problems of psychology in biomechanics. I have often challenged students to prove to me that the outcomes of field-based fitness testing are based entirely on physiological capability and not motivation; I only run for as long as I want to or feel the need for. A debate that is taken up by neither students nor colleagues. Plus, I concede I am epistemically unconvinced by modular approaches to Exercise science higher education. For me, this reductionist approach creates artificial boundaries around subjects and fails to illustrate the genuine nature of practice. I discuss this theme in more detail later in this work through discussions of epistemic cultures, bubbles, and echo chambers. However, in terms of the current topic of methodology, the issue from my experience has been that people become enmeshed in a single voice or school and do not seem to move beyond it. Nor do they critically examine it too carefully once invested.

One of my personal observations of this approach illustrates the way in which academics often begin to identify themselves in terms of a particular school of thought. I have worked with a considerable number of colleagues who argue they are a qualitative or quantitative researcher and identify themselves and their work in such terms. Or else they are focused on only a single concept for study; 'I am a sociologist' has been a common recent experience. Such comments would seem out of line with the genuine philosophy of science and the power of the dialectic many suggest they espouse. How can an individual claim to only be a qualitative or quantitative researcher? Is it not the nature of the research question, and its philosophical demands for a form of data, that would determine this? I would argue the phrase should more accurately be "the questions I ask are usually qualitative in nature". How is it possible to genuinely attempt to understand social behaviour without some considerations beyond the ideological analysis of a particular sociological school? Because of these experiences I have become convinced of a form of methodological 'tribalism' that exists in academia with each clan setting its castles for defence.

This is an echo of my reading of Feyerabend. I personally interpret Feyerabend in a comparable manner to his contemporary commentators such as Shaw, in that his text Against Method and "anything goes" argument was directed at the epistemic limitations of science. Feyerabend's argument was that we tend to ignore knowledge that does not fit with our idea of the scientific attitude and its positivistic methodology. This perspective was at the time of writing primarily aimed at positivistic natural science, yet his approach was dismissed as clownish, and he was labelled the worst enemy of science. One example was his equal defence of the relevance of such practices as Voodoo, Christianity, and astrology. Having read Feyerabend's autobiography 'Killing Time' I am convinced that he made many of these statements through a European sense of humour that may have been lost on some of his critics. However, I am also of the opinion that his point was that we could learn relevant lessons from each of these topics, if not all of literature.

Is it genuinely possible to suggest there is nothing to be learned for human flourishing from the messages of Christianity, Islam, Hindu, or Voodoo? Or of human psychology and culture from our variety of interactions with astrology, tarot cards and tea leaves? Perhaps we are too quick to dismiss our human collective paradigms.

My perception is that, based on notions of tribalism, the dismissive process is now also evident in social science. We appear to be in a situation in which researchers do not attempt to explore paradigms or schools outside their personal position. I concede that academics are forced into greater reductionism, specialism, and professional identification in the pressure to publish and be heard in a rapidly expanding global academia. The motivation is based on a publish or perish culture and a need to be the 'recognised expert in X' if consistent publication is to be achieved. Unfortunately, in many instances, I have found this leads some academics to reduce their debates into a reduction to argument from authority (argumentum ad verecundiam) or else ad hominin attacks debunking the rival theorist as opposed to the theory. I would argue both are bad rhetoric. And based on these experiences, I believe that if I had aligned myself to a specific theorist or the application of a singular analytic framework, I would have limited my thinking and arguments. I cannot boast to be a polymath, but I do believe that in attempting to undertake genuine philosophy there is a need for a broader view of the matrix.

I first formulated my thoughts of tribalism when undertaking a previous piece of academic work. I was asked to present my paradigm for a research proposal. On reading Kuhn's ideas, I began to consider that things had drifted from his original terminology and thought. As I have already discussed in the glossary chapter, my definition of a paradigm is based on Kuhn's form of a disciplinary matrix. But I came away from this reading with a belief that not only has the term become misappropriated, but also a banner to highlight membership to a particular research tribe. A means for personal identity.

In my interpretation Khun wrote his original text Scientific Revolutions as a project to describe a philosophical account of the history of science. His argument, perhaps a reflection of Hegelian dialectical idealism, states that science follows a progressive path. The work focuses on how dominant paradigms emerge. Similar themes are evident in numerous other texts such as Kant, Mill, James, Wittgenstein, Feyerabend, and Lakatos. However, Kuhn was clearly a (the?) key figure in synthesising these ideas into a clear and palatable form. Yet, as I have said, current discussions of paradigm seem to have deviated from this historical and dialectical consideration. Having taught research methods at both undergraduate and postgraduate level, they seem to have become merely terms for ways to identify research methods with, at times, only a passing nod to an underpinning methodology. To my mind this is putting the cart before the horse.

Firstly, there appears an alignment of paradigm to specific forms of data. For example, paradigms are described to research students as being quantitative, qualitative, or mixed method as described in a number of textbooks. This sounds neither epistemologically nor methodologically accurate. As an example, I am often told that by collecting quantitative data the paradigm must be positivism. I would argue methods collect data described by those categories, but the philosophical foundations of the disciplinary matrix are nuanced. Again, I would suggest it is the nature of the research objective not the paradigm that determines the exact data form collected by the researcher. But as previously stated, I have been confronted by 'qualitative' or 'quantitative' researchers on a number of occasions, each demanding that they do not or would not attempt to understand the other 'tribes' perspective.

This tribalistic observation appears further justified when the expanding number of paradigms are considered. For example, I have encountered texts such as Magdill et al that state there are at least three paradigms within qualitative data research alone: realist, contextualist and radical constructionist. And within each of these methodologies it is suggested that there exist unique approaches to questions of validity and reliability, the boundaries of which must not be transgressed. The message seems that the paradigm's formula must be adhered to, the tribe's rules must be observed. For example, in describing realist methods Madill et al suggest that the process of triangulation should involve discussion between researchers for consensus. However, in terms of contextualist research this process should involve the research participants. Minor details may be, but the expectation is that the method must be undertaken which matches the paradigm. If the tenants of that paradigm are not met, then one is not using that paradigm and must question which paradigm they wish to use.

However, this reductionist approach is not limited to research identified as qualitative. Considering wider research fields, texts such as Blaike and Priest provide an argument for the recognition of at least 10 choices of paradigm. According to them, this now includes 4 classical and 6 uniquely contemporary approaches. But is all of this necessary in all instances? At times, it merely appears that academics seem 'keen' to present a unique identity and formulate a continually expanding number of reductive and narrowly bounded paradigms. In cynical moments I would argue these do not extend our epistemological understanding. They appear only as more ways to present a particular academic's unique contribution to philosophy. Are you not the writer who invented/recognized/termed paradigm X? Why follow when you can lead?

Previously, I have commented that this tribalism seems to mimic phenomena often observed in the music industry especially the Heavy Metal sub-genre. It is a common phenomenon that groups assign themselves to genres of music. The example I often present is that of the band Metallica. In their early days they vehemently identified as a 'heavy metal' in their interviews of the 1980's.

However, during the documentary "Some Kind of Monster"[85], Metallica openly expressed that they found being trapped within the category Heavy Metal stifled their creativity. Because of this they demonstrably struggled to meet the demands of this musical paradigm and the tribalism of the fans. They became trapped in the dilemma of sticking to what they knew would 'sell' or else taking a new route and risking the 'wrath' of their tribe.

At times I would argue I have seen similar issues in academia. I have known students, friends, and colleagues undertaking research forced down restrictive routes of thinking and constraints of method to maintain their 'membership' of a theoretical or paradigmatic title. To step beyond the expected methodology and research process in a school of thought is problematic. As I was once told "business students are not allowed to study topics related to sport or exercise industries because they are nothing to do with their degree title". But, when I asked the same individuals what could be studied, I was confidently, and ironically, told with exasperated patience "anything they want because everything can be seen as a business or in light of business ideas". Thus, in the eyes of some academics, schools are unique and never the twain shall meet.

Additionally, from my experiences, there appears to be an unnecessary but ongoing motivation for further reductionism and greater speciality in the labelling of paradigms. As in Heavy Metal with its continuous reductionism to subgenres to fulfil market needs: e.g., Death Metal, Technical Death Metal, Symphonic Death Metal, Melodic Death Metal, etc., the labelling of research paradigms to greater specificity appears the order of the day. Thus, researchers create new paradigm titles such as embryonic positivism, post-feminism, post-colonialism, post-colonial feminism and so on. But therein lies the problem. In developing a methodology, I was left wondering whether these research paradigms were genuinely philosophical perspectives or merely attempts to plant a tribe's colours. A way to 'sell' an apparent unique perspective and academic identity. But I would argue this need for an identity and the desired tribal membership becomes problematic when the genuine porous nature of academia is encountered.

Thankfully, I was not alone in this questioning of the contemporary approaches to Kuhn's thesis. Woolgar and Pawluch (1985) recognise similar issues and present a research process they called ontological gerrymandering. They used this term to highlight that in attempting to maintain a unique paradigmatic stance, researchers end up ignoring their own limitations, contradictions, and issues. I am not sure if this is due to personal 'human factors', postmodernism's relativism or simply a genuine limitation of the scientific process and the epistemic nature of research.

[85] *Metallica's Some Kind of Monster DVD Elektra Entertainment Group/ Warner Bros. 2004*

In developing my own methodology, I guess it may be because of my practitioner background that I state: "if it is effective and makes things better do it". A Feyerabendian 'anything goes' if it helps develop our knowledge and understanding. So, it is without humour and pedantic argument that I ask: "why cannot the best practice from each framework be used?". If it is the case a process improves research, leading to greater insight on an issue, why should a researcher be constrained by the demands of a paradigm? As some philosophers have argued, the concept of non-porous and hard boundaries of paradigm is unrealistic. In light of my work, more importantly the hard-boundary paradigm is unsubstantiated within the history of health, medical and wellbeing research. Yet the position of 'pick a box' and stick to it' seems without challenge in most of the academic research. I find this observation particularly interesting when confronted by academics who defiantly suggest they are either a sociologist, or psychologist. The tribalism of academics.

I concede that when I first made these observations it was naïve of me. I argued that paradigms can only be considered a posteriori and not a priori because the researcher has no idea of their research journey. An interesting idea but I admit my faults. I accept that in some instances the 'choice' of a paradigm provides guidance. But I would still suggest that the 'final' paradigm is recognized after a reflection on the research design used. A researcher would have to reflect on the assumptions behind their epistemology, ontology, and method. Yet, these must be recognized a priori to the identification of paradigm. To state "I intend to study object X through paradigm Y" must be based on a priori philosophical decisions before the paradigm is identified. Furthermore, I still standby my observation that in discussions on my work I have been challenged for my specific tribe, which clan am I intend to align to. I would argue that is for others to decide as they interpret my ideas and maintain the dialectical debate. My answer that my work is an eclectic bricolage, and I am a methodological omnivore, has not been met with acceptance in all instances. However, reflecting on how I developed my methodology it seems the only one I have.

A final defence.

As I said at the beginning of this piece I have attempted to make explicit the range of engagement through which I have emerged with an eclectic approach to philosophy. I have engaged with materialists and idealists, essentialists, and relativists. I have explored the ideas of nominalists and realists in terms of conceptualism. My reading has ranged through each of the Analytic, Continental, and Pragmatic philosophic schools. Alongside this I have reflected on my own experiences and drawn upon empirical and armchair rumination.

As a result, I hope that I have made explicit the origins of my methodological position. Thus, I will defend my lack of 'boxed' academic label beyond my speculative use of the terms: philosophy,

metaphysical, and conceptualism by arguing I have intended to follow philosophy's dialectic tradition (Marxist dialectical materialism to one side). I am presenting a thesis, considering possible antitheses, and providing an original synthesis. I can genuinely state this is my argument that I present. I believe that in the dialectic tradition it is for another to consider, critique, and then allow us both to judge any progress towards greater knowledge through shared discussion and synthesis. At least that is how I understand Socrates, Plato, and Aristotle amongst others set Western philosophy on its path.

Appendix 3: Textbooks 2022 analysis

	ACSM (2022)	NSCA (2022)	NASM (2022)
Section title: Introduction to the field of and profession of personal training			
Indicative content	Describes the profession of personal training. Key topics on size and shape of industry. Includes two pages on ethics (not included in total)	No specific chapter provided	Describes the current statistics on health and fitness. Provides definitions of key medical terms and issues. includes a section on EBP. Describes the shape of the industry and business skills. Includes three pages on ethics (not included in total)
	29.5 (5.5%)	n/a	50.5 (8%)
Section title: The science of training			
Indicative content	Anatomy, kinesiology, biomechanics, physiology, and nutrition	Structure and function of the muscular, nervous, skeletal, cardiorespiratory systems, bioenergetics, biomechanics, responses & adaptations to training, nutrition	The nervous, muscular, skeletal, cardiorespiratory, endocrine, and digestive systems. Human movement science, metabolism and bioenergetics, nutrition, and supplementation Includes two pages on the ethics of nutritional advice (not included in total)
	138.5 (25.9%)	121 (18%)	168 (26.7%)
Section title: Behaviour modification			
Indicative content	Exercise psychology, theories of behaviour change, eliciting positive behaviour, coaching	Exercise psychology, motivation, and goal setting	Psychology of exercise and a CBT approach to behavioural coaching
Pages (% of content)	60 (11.2%)	16 (2.4%)	55.5 (8.8%)
Section title: Client screening			
Indicative content	Screening, fitness testing, assessment, and client evaluation techniques	Consultation and health appraisal, fitness evaluation, selection and administration, protocols, and norms	Anthropometric assessments, postural, movement and performance assessments
Pages (% content)	89 (16.7%)	131 (19.5%)	47 (7.5%)

Continues overleaf.

Section title: Developing the Exercise programme			
Indicative content	How to design and teach a programme. Includes the key teaching techniques of exercises. Includes EBP for special populations and medical conditions	Training programming and teaching of key exercise techniques. Includes EBP for specialist populations and medical conditions	Key focus on using the NASM OPT programme approach. Training programming and teaching of key exercise techniques. Includes EBP for specialist populations and medical conditions
Pages (% content)	180 (33.7%)	342 (51%)	304 (48.3%)
Section title: The Business of Personal training			
Indicative content	Techniques for business and marketing	Facility and equipment maintenance, marketing, and business skills	No specific chapter provided
Pages (% content)	15 (2.8%)	29 (4.3%)	n/a
Section title: ethics and legal			
Pages (% content)	20 (3.7%) (includes previous identified pages)	32 (4.8%)	No specific chapter or section provided. 5 (0.7%)* (includes previous identified pages)
Total content	534	671	629

*it is acknowledged that the NASM text does present text boxes at key points in some chapters stating the importance of confidentiality of client data and similar comments. However, no designated chapter or discussion is provided.

END