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DEVELOPING RESILIENT AGENCY IN LEARNING: THE INTERNAL STRUCTURE OF LEARNING POWER

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Understanding students' learning dispositions has been a focus for research in education for many years. A range of alternative approaches to conceptualising and measuring this broad construct have been developed. Traditional psychometric measures aim to produce scales that satisfy the requirements for research, however such measures have an additional use - to provide formative feedback to the learner. In this paper we re-analyse 15 years of data derived from the Effective Lifelong Learning Inventory. We explore patterns and relationships within its practical measures and generate a more robust, parsimonious measurement model, strengthening its research attributes and its practical value. We show how the constructs included in the model link to relevant research and how it serves to integrate a number of ideas which have hitherto been treated as separate. The new model suggests a view of learning that is an embodied and relational process through which we regulate the flow of energy and information over time in order to achieve a particular purpose. Learning dispositions reflect the ways in which we develop resilient agency in learning by regulating this flow of energy and information in order to engage with challenge, risk and uncertainty and to adapt and change positively.

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LEARNING FOR RESILIENT AGENCY: THE INTERNAL STRUCTURE OF LEARNING POWER

1. INTRODUCTION

The concept of learning power and its assessment tool, the Effective Lifelong Learning Inventory (ELLI), was developed in the late 1990s. It was the outcome of research which tested constructs suggested within the literature of the time as having some relevance for the establishment of dispositions, attitudes and values associated with being an effective learner. The result was both a measurement model and a set of research-validated strategies. Both have proven to be of value for education, business and corporate organisations seeking to innovate in how they support individual and collaborative learning. In contrast to the skills based approach that became popular during the same period, the concern with learning power was to develop a range of competences crucial for success in the complex, networked, information-rich and radically uncertain world of the emerging 21st Century. These competencies are now to the forefront - forming the outcomes focus for institutions and organisations the world over. Unsurprisingly then, since the first assessment tool was published in 2002, it has been in significant demand from both practitioner and research users.

The scientific foundation for the research programme which led to the development of the ELLI emerged from the synthesis of two concepts (i) learning power and (ii) assessment for learning. The original research was funded by the Lifelong Learning Foundation. It identified seven qualities of effective learners through factor analytic studies and established scales to measure them. These formed the first iteration of the ELLI self-assessment instrument. The instrument was designed to identify and strengthen an individual's learning dispositions, attitudes and values and provide a starting point for self-directed learning and teacher-led pedagogical change. ELLI assessment data included aspects of a person's learning that were both 'internal' and 'social' - influenced by a person's sense of 'self' in a cultural context. Feedback was in the form of an immediate visual image of an individual's learning 'profile' as a spider diagram. This provided a framework for a coaching conversation which moved between the coachee's identity as a learner and their learning experiences and purposes. In providing both research and immediate diagnostic information for self-directed change, ELLI provided an early example of a learning analytic tool (Buckingham Shum and Deakin Crick, 2012). This tool was validated with both school age students and adult learners, enjoying considerable face validity and corresponding acceptance with both populations (Deakin Crick et al., 2013, Deakin Crick and Yu, 2008).

Ongoing research explored learning and teaching facilitation strategies which enable individuals to become responsible, self-aware learners by responding to their learning power profiles (Deakin Crick et al., 2010b, Deakin Crick, 2007b). A series of studies identified different factors which influence learning power (Ren and Deakin Crick, 2013) and the sorts of cultures and learning environments in which it thrives (Deakin Crick, 2009a, Goodson and Deakin Crick, 2009, Harlen and Deakin Crick, 2003). Several further empirical studies identified particular pedagogical strategies which support learning power: coaching for learning (Wang, 2013, Ren, 2010) authentic pedagogy (Huang, 2014)

teacher development (Aberdeen 2013) and enquiry based learning (Deakin Crick, 2007a, Deakin Crick, 2009a, Deakin Crick, 2009b, Godfrey et al., 2014, Jaros and Deakin Crick, 2007). The conceptual framework provided by the seven dimensions of learning power provided specificity, assess-ability and thus rigor to the conceptually and empirically complex social process implicated in effective learning.

Demand for access to ELLI from users was such that it has been translated into German, Italian, Chinese and Arabic and Malay. It has again enjoyed face validity in those contexts although full re-validation tests have not been conducted. It has been applied to schools, work based learning – piloted with a major UK retailer, a bank and in the financial services industry (Deakin Crick et al., 2013); Indigenous Australian Communities (Goodson and Deakin Crick, 2009, Deakin Crick and Grushka, 2009) the education of young offenders; leadership studies; Engineering Education; and teaching in Higher Education (Small, 2010b, Small, 2010a, Small and Deakin Crick, 2008).

Nothing, however, stays static and with the accumulation of deeper and richer data from this wide range of contexts, as well as of experience of working with the constructs with learners in the field, limitations in the original conceptualisation of learning power became increasingly evident. At the same time the development of more sophisticated data capture, analysis and delivery systems gave rise to new possibilities.

2. Learning Analytics and the generation of data

As noted above, ELLI represented an early example of an online learning analytic platform, which provided data useful for feedback at four levels (individuals, teams, organisations and system). The level of demand it enjoyed has enabled the accumulation of a large data set which has been collated and archived at the University of Bristol. A three year research programme for mining and exploring this secondary data set has now been established. This includes an ongoing research programme to extend, replicate and validate the measures, including in alternative cultural contexts, to generate new knowledge and know-how and also to explore the affordances of this type of survey in the emerging field of learning analytics.

In the context of virtual learning ecologies, data from such surveys can be analysed alongside other data – such as trace data – to inform the use of technology to support deep learning and learning to learn – at all stages of the learning journey from purpose to performance (Deakin Crick, 2014, Deakin Crick, 2012). The challenge was, and remains, the development of a relevant learning analytic which can be used in practice across domains and cultures. It was therefore decided that the revised framework and associated tools be kept in a research phase for at least three years and to quarantine the development from commercialisation pressures which might tend to short circuit the redevelopment effort during that period.

3. PURPOSE OF THIS PAPER

This paper addresses the first stage of this research and redevelopment programme. It represents a thorough re-examination of the internal structure of 'learning power'. Our extensive experience of working with ELLI enabled us to form tentative hypotheses about the deeper structure of learning power, the relationship between its various aspects and the sensitivity of the dimensions of learning power to individual and contextual factors. This experience had also highlighted several problems or dilemmas with the existing framework which could be explored and hopefully resolved through this work. The extensive and diverse data set, with records from individuals of all ages and from a range of cultures, enabled us to test these hypotheses systematically. In this paper we explore the sub-components of each learning power scale statistically and theoretically, then present a revised set of eight new and more parsimonious scales with levels of reliability similar to those in the original ELLI instrument.

4. SUMMARY OF FINDINGS

The initial testing of our practical and experiential theory about learning power through Structural Equation Modelling confirmed that there were three orthogonal dimensions within the overall construct of Learning Power: (i) Learning Relationships (ii) Fragility and Dependence and (iii) the set of 'active' learning power dimensions: Strategic Awareness, Creativity, Critical Curiosity, Meaning Making and Changing and Learning. Learning relationships was the most complex, whilst fragility and dependence, although mildly negatively correlated with all of the active learning power dimensions, was not their direct opposite and this was discussed in detail in our previous paper (Deakin Crick et al.). Our hypothesis was that the Fragility and Dependence scale was picking up a visceral, emotionally based disposition about a person's state of openness or closed-ness to the unknown, to risk taking, ambiguity and uncertainty, in contrast to the more volitional and cognitive constitution of the remaining five active dimensions, of which strategic awareness was the most significant.

We then explored the internal structure of each of these three orthogonal dimensions, beginning with the set of active learning power scales. We did this by using an exploratory factor analysis on each scale with a randomised half of the dataset, and followed it with confirmatory factor analysis, through building a structural equation model with the other half. This demonstrated that the scale of Strategic Awareness was comprised of three latent variables, one of which was to do with the management of feelings, the second was to do with managing of the processes of learning and the third was about a sense of agency in learning. We demonstrated two latent variables in Creativity ('imagination and intuition' and 'risk-taking and playfulness') and two in Meaning Making ('making connections' and learning 'mattering emotionally to the learner'). We theorised that Strategic Awareness was a 'second order' type of dimension developed through language, dialogue and relationship and so we chose to develop a Structural Equation Model to explore the relationship between Strategic Awareness and the remaining 'active' learning power dimensions. Learning Relationships was constituted by three latent variables ('dependency', 'collaboration' and 'belonging') which were evidently contextually sensitive. Of these three, the 'dependency' variable correlated with Fragility and Dependence. The Fragility and Dependence scale contained two latent variables (i) 'submissive mindset' and (ii) 'dependence'.

Finally we re-constructed a Structural Equation Model of the whole set of scales to test our emerging hypothesis about the internal structure of learning power and to present a completely new instrument which is more parsimonious (72 items in the original version reduced to 49 in the revised) but balances the competing requirements of practical utility with statistical rigour. Despite being more parsimonious, the new model is more fully articulated and nuanced and provides much greater clarity about the nature of the relationships between the dimensions of learning power.

5. THEORETICAL STARTING POINT

The empirical and theoretical foundations of learning power have been elaborated and refined by scholars and practitioners since the original ELLI instrument was developed in 2002 (for example, Aberdeen, 2014, Deakin Crick, 2006, Deakin Crick, 2007b, Deakin Crick and Goldspink, 2014, Deakin Crick et al., 2013, Deakin Crick and Jelfs, 2011b, Deakin Crick et al., 2007a, Deakin Crick et al., 2007b, Deakin Crick and Wilson, 2005, Goldspink, 2010, Goodson and Deakin Crick, 2009, Goldspink and Foster, 2013, Huang, 2014, Hutchins, 2011, Jelfs, 2008, Wang, 2013, Willis, 2014).

This work has led us to conclude that, whilst the concept of learning power captures a number of salient dispositional characteristics of more or less effective learners, these form part of a complex and dynamic process of learning which has lateral and temporal connectivities (Bloomer, 2001, Bloomer and Hodkinson, 2000). This complexity is not only 'intra' personal and 'inter-personal' but it is also social and organizational – that is, it is significantly influenced by the social organizations, cultural practices and world views of the learning contexts in which learners find themselves (Deakin Crick et al., 2011, Ren, 2010, Ren and Deakin Crick, 2013, Tracy, 2014). This realisation led us to develop a conceptual framework of learning as a complex process, whose boundaries are defined by a purpose, and which operates recursively at different layers and levels in social organisations which are themselves characterized by socio-technical and political complexity (Buckingham Shum and Deakin Crick, 2012, Buckingham Shum and Ferguson, 2011, Deakin Crick et al., 2014 , Ferguson and Buckingham Shum, 2011, Ullmann et al., 2011). Drawing on work in systems designing from Engineering (Blockley, 2010, Blockley and Godfrey, 2000) we developed a complex systems architecture for learning journeys which valorises the identification of a *personally chosen* purpose, that is integrated and internalized by the learner as a pre-requisite for meaningful learning.

Whilst logically simple, the importance of purpose is often overlooked in education systems where choice about what, or even how to learn, is limited. Its importance as a contextual factor was also frequently overlooked in the various attempts to commercialise ELLI as a product in the market during this time. Outside of formal education or training, where the curriculum and pedagogy are too often politically determined, effective learning requires the identification of personal desire or purpose, in response to first identifying a need or a problem which requires a solution of some sort. Learning which begins from this point in lived, concrete experience is 'bottom up' and usually both inter-disciplinary and inter-domain – in other words it transgresses traditional subject boundaries (Deakin Crick et al., 2007b, Jaros, 2009a, Jaros, 2009b, Jaros and Deakin-Crick, 2007). Articulating a purpose in learning requires that I or we know something about ourselves, our story and what is of value to us

and it is thus associated with identity as well as time (Deakin Crick and Goldspink, 2014, Deakin Crick and Jelfs, 2011a, Deakin Crick et al., 2011).

There are five social processes which enable an understanding of learning as a journey of enquiry from purpose to performance, discussed at length elsewhere (Deakin Crick, 2014). These are

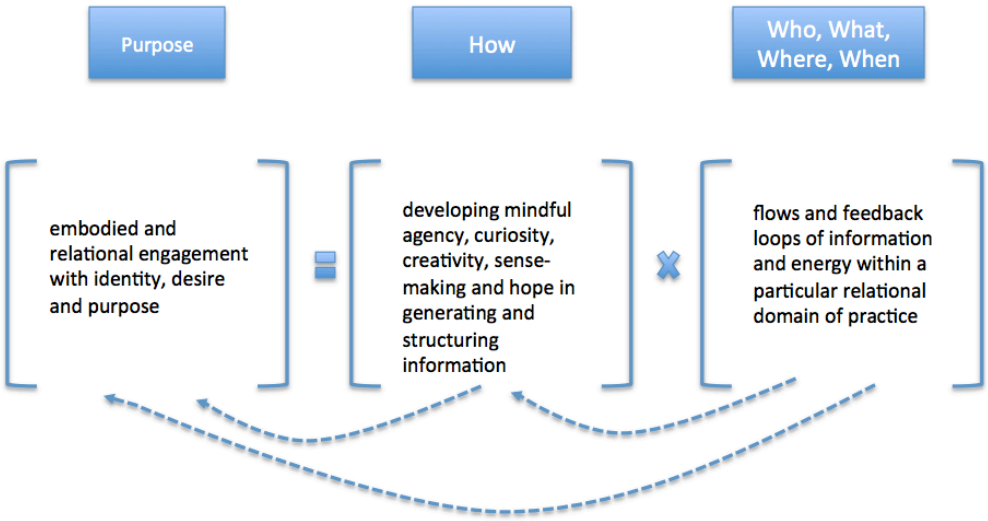
1. forming a learning identity and purpose
2. developing learning power
3. generating knowledge and know how
4. applying or performing learning in authentic contexts
5. sustaining learning relationships

As we have noted elsewhere, formal education generally focuses on the third of these, leaving the others essentially untreated. However, all five processes are pedagogically significant for the core tasks of (i) designing contexts for learning and (ii) facilitating learning for individuals and groups which support the development of learning power and resilient agency – learners who can persist in learning, responding effectively to open-ended and complex problem spaces, as demanded by 21c learning outcomes.

This understanding led us to problematise the relationship between the active learning power dimensions of ELLI and the dimensions of Strategic Awareness, Fragility and Dependence, and Learning Relationships. The ELLI spider diagram presented all of the dimensions as if they have similar status and a simple relationship to one another. We became less convinced that this was the case as more data from a range of contexts was collated. It was most clearly problematic in a pilot study with young offenders in a secure unit (Deakin Crick and Salway, 2006, Deakin Crick et al., 2014). It was this shift from a reductionist to a complexity perspective on learning power that led us to focus on the concept of 'agency and purpose' as a key driver of learning as a dynamic and relational process. A complex systems architecture for this process, drawing on Blockley (ibid) and discussed elsewhere (Deakin Crick, 2014) is set out in Figure 1 below.

This model presents learning as a sequential process with iterative feedback loops which operate through the relationships between self, others and the environment. It begins with the Person who is learning and their sense of purpose or desire. This provides the energy to engage in learning as a journey which takes place in a particular context, over time. A person is influenced by their perceptions of context as well as by their own processes of learning (Huang, 2014). Teachers or learning facilitators can have a direct influence on the context of learning, they can scaffold the processes of knowledge structuring and increasing awareness of learning power, while agency needs to be grown from inside the learner and cannot be imposed by other people. This model has guided the development of hypotheses and their testing against the data set which we will now describe.

Figure 1. A complex systems architecture with purpose as a key driver of learning (adapted from Blockley (2010)



6. The Data Set

The data were taken from four online sources, each originally developed to serve various ELLI research and development programmes over a period of 10 years, between October 2003 and June 2013. The number of items being served to participants varied between sources and versions but each source and version contained the core ELLI items relevant for adult and school age learners, standardised in terms of administration and representation in each database. The respondents were drawn from 190 organisations in six countries, representing a variety of sectors including: institutes of higher education, training organisations, private sector corporations, staff from primary, secondary and further education; students in schools and colleges. Each adult participant undertook their own learning power profile either as part of their accreditation training to incorporate learning power in their professional development practice for briefing others within that organisation and as part of their own personal development. Each school-aged participant undertook his/her learning power profile as part of a formal learning programme, supervised by a trained facilitator. This analysis used a sample of 50314 that is described in Table 1.

Table 1. Descriptive of the data sample

	Participant Cohort			**Total**
	School	Adult	Undetermined	
N of complete profiles	27,345	13,353	3,465	44,163
N of incomplete profiles	3,952	1,576	623	6,151
Total	31,297	14,929	4,088	50,314

Indicative demographics of the sample are presented in Table 2 and Table 3. It should be noted that the submission of participant bio-data was not a mandatory requirement and as a result these tables do not include data from the entire sample. The potential for bias in the reporting of such data is recognised.

Table 2. Distribution of respondents by gender

	Frequency	Valid Percent
Female	7,667	41%
Male	11,020	59%
Total valid	18,687	100%

Table 3. Distribution of respondents by ethnicity

	Frequency	Valid Percent
White	9,774	83%
Asian or Asian British	1,131	10%
Black or Black British	209	2%
Mixed / Dual Background	241	2%
Chinese	213	2%
Any Other Ethnic Group	257	2%
Total valid	11,825	100%

7. ETHICAL CONSIDERATIONS

All of the adults who provided survey data did so voluntarily and agreed to allow their anonymised data to be stored for research purposes through an explanation online and prior to the survey, which they then agreed to by 'click box'. School age children completed the survey in accordance with their school's ethical policies, and no schools were able to use the ELLI survey without accredited training. Anonymised learning power assessment data were stored in a secure online repository whilst user-identifying data, needed for the personalised feedback, were stored separately, under the control of the user organisation. Personalised feedback was provided immediately online and formed a focus for a coaching conversation with each individual led by an accredited Learning Power coach in the case of adults and in the case of children by an accredited teacher, or in a coaching programme supervised by an accredited teacher.

8. THE ORIGINAL MEASURES

The Effective Lifelong Learning Inventory (ELLI) was a self-report questionnaire in which respondents indicated their approach to various aspects of learning through completion of an on-line four point Likert-type questionnaire (Likert, 1932). The items in the questionnaire elicited information about what the individual thinks, feels and tends to do in relation to everyday learning situations. The respondents' judgements in responding to the items were based on their own experiences, past and present, including the context in which they found themselves at the time they completed the

questionnaire. The scales for the seven dimensions of learning power were calculated online and used to produce feedback for the individual characterising their perception of their own learning power on these dimensions in the form of a spider gram shown in Figure 2. The scores were produced as a percentage of the total possible score for that dimension.

The instrument was designed to find a balance between use for developmental intervention and for research as discussed in the introduction. With regard to the latter application, the alpha reliability co-efficients for the scales in the existing instrument, based on two different data sets of >10000 and <6000 are presented in Table 4 below.

Figure 2. Example of a spider diagram feedback

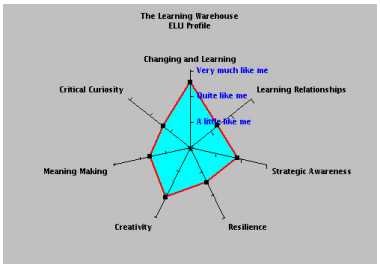


Table 4. Alpha coefficient of the existing ELLI instrument

Learning power dimension	Reliability statistics in the 2008 study		Reliability statistics in the 2013 study	
	Number of items	**Cronbach Alpha**	**Number of items**	**Cronbach Alpha**
Strategic Awareness	13	0.85	12	0.81
Meaning Making	7	0.75	7	0.66
Critical Curiosity	9	0.76	8	0.72
Creativity	10	0.79	9	0.80
Changing and learning	4	0.75	5	0.73
Learning relationships	12	0.72	10	0.76
Fragility and dependence	17	0.82	20	0.87

Source: Deakin Crick and Yu (2008) and Deakin Crick et al (2013)

9. APPROACH TO ANALYSIS

The original design work for ELLI and the subsequent confirmatory factor analysis consistently demonstrated a three-part structure to the original scales: (i) active learning power dimensions determined by strategic awareness, including creativity, curiosity, meaning making and changing and learning (ii) learning relationships and (iii) fragility and dependence. One of the aims of revisiting the measures using the large data set discussed above was better to understand the internal structure of each of this three part structure as well as the relationship between the parts.

The data were split into two randomised sets. We used the first set to conduct exploratory factor analyses of each of the scales, to explore their internal structure and to identify whether there were any latent variables present. Where latent variables were identified, we confirmed the structure on the second half of the data set using Structural Equation Modelling. Items which did not fit were

abandoned. We then modelled each of the three parts separately before combining them into a single model. Only the structural equation modelling is discussed in detail here.

Structural Equation Modelling

Analysis was undertaken using AMOS 19. Maximum likelihood estimation was used. For all of the following analyses the position of (Hu and Bentler, 1999) is adopted with respect to determination of fit. It is generally not expected that the Chi square statistic (CMIN) will prove insignificant ($p<0.05$) thereby confirming fit where larger sample sizes are involved. In such cases, the less stringent CFI and RMSEA statistics are generally used. For the model to be accepted as in fit, the CFI needed to be >0.95 and/or the RMSEA <0.05. The data presented below represents standardised measures. Standardisation is achieved by setting one factor loading to 1. All analysis is performed on the covariance matrix.

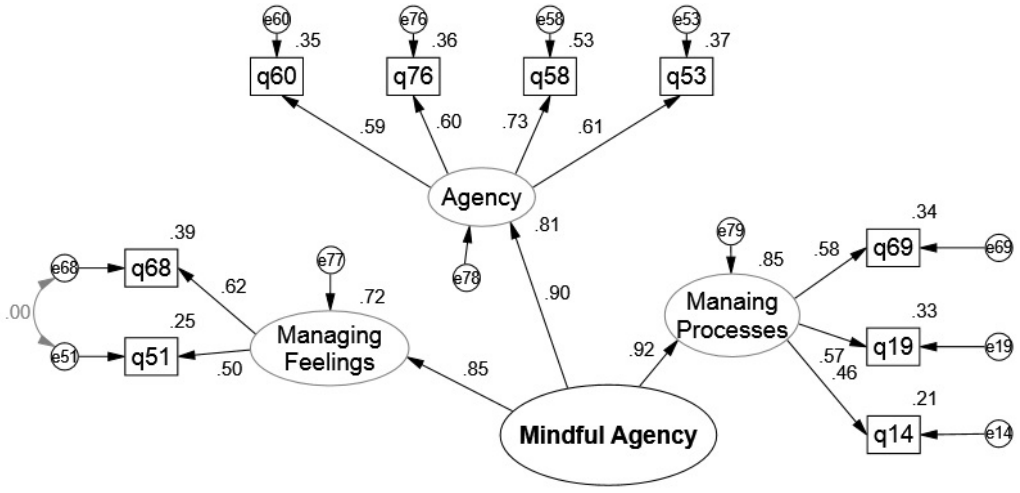
10. THE ACTIVE LEARNING POWER DIMENSIONS

Our first analysis was on the internal structure of the 'strategic awareness' construct used in ELLI. This is renamed 'Mindful Agency' in the revised instrument as a result of the analysis and redesign of the scales as discussed below. The exploratory factor analysis of the items associated with the strategic awareness latent variable returned three factors which we have called: (i) managing the processes of learning (ii) managing the feelings associated with challenge and (iii) agency in taking responsibility for learning purposes, processes and procedures. These items were used to construct the Structural Equation Model shown in Figure 3.

This suggests a tri-partite structure for Mindful Agency, which is about the Self as agent of his or her own learning, able to take responsibility for the process, as well as managing feelings in learning (such as feeling confused) and being able to judge how long something may take and how to go about it (meta-cognitive strategy). This serves to integrate three distinct strands in the research literature: meta-cognition, the role of affect in self-regulation (emotional intelligence) and self-efficacy or agency, as will be discussed further below.

The model is in good fit (RMSEA=0.031; CFI=0.984) and demonstrates that Mindful Agency accounts for 81% of the variance in agency, 72% of the variance in managing feelings and 85% of the variance in managing processes of learning.

Figure 3. Mindful Agency SEM model



The resulting scale, returned an alpha reliability co-efficient of 0.78 with nine items presented in Table 5.

Table 5. Mindful Agency Scale[1]

I know that if something is important I can find a way to learn it.	Agency
I know I can learn in my own way, even if my colleagues think it's a waste of time.	
I know I can find a way of solving a problem if I have enough time to think	
I enjoy improving the way I go about things.	
I have ways of making myself learn if I don't feel like learning.	Managing Feelings
If I get distressed when I'm learning, I'm pretty good at finding ways of feeling better	
I tend to be careful and logical in my approach to learning.	Managing Processes
I think about everything that I will need before I begin a task.	
I can generally predict how long it will take me to learn something.	

Each of the three components of Mindful Agency should be uncontroversial as they have long been associated with processes of learning and with improved learning outcomes. Although they are not always brought together in the literature, there are prior instances of where these elements have been directly associated. Brown (2009, p.578) states for example that self-regulative learners are those who are aware of themselves as active agents who are then able to exercise that agency through various strategies to actively shape and construct their learning experiences as well as their motivational and affective responses. Similarly Mercer, drawing on a detailed longitudinal study of a particular learner,

[1] Each of these items and items in other scales below has been tracked with a unique identifier, which is available upon request, to enable cross project meta-analysis.

observed that '... three components of Joana's agentic system appear to play a more significant role...in directing the trajectory of her agency: motivation, affect and self-regulation (including goals, meta-cognitive knowledge, and strategic knowledge)' (2011, pp.432-433).

Of the three constructs, agency is likely to be the most problematic. This concept gets caught on the horns of the 'free-will vs determinacy' dilemma which, even in its more moderate form, leads to argumentation about how the independent will of individuals sits alongside the constraints resulting from the wider social context. Nevertheless it frequently appears within the educational literature (Etalapelto et al., 2013). It refers to the implicit or explicit (Moore et al., 2012) sense of initiating and controlling events - the will and capacity to act and to influence others or the environment. This is in contrast to the adoption of a sense of having no control over one's own destiny and taking a passive or reactive stance to events and others. This presupposes a sense of self-efficacy and hence links to the extensive education-related literature on that subject (Bandura, 1982, Bandura, 1986, Bandura, 1994a, Schunk, 1987, Zimmerman et al., 1992).

The role that managing feelings plays in relation to learner effectiveness is also well addressed in the literature, most notably with regard to the concept of emotional intelligence. This literature addresses the different capacities individuals have to regulate their own emotions and/or to detect and influence those of others upon whom attainment of their goal depends. Emotional intelligence has been shown in some studies to predict academic achievement across a wide range of age groups (see for example Billings et al., 2014, Sanchez-Ruiz et al., 2013, Mohzan et al., 2013). Emotion may however play a much broader role, as Morse and Lowe (n.d.) argue, drawing on the developing theory of enactive cognition (Varela et al., 1991) as well as the neuroscience of Damasio (2000, 2006) *'emotion in fact may be seen as a form of motivated disposition to act whose adaptive benefit to its possessors is its role in anticipating outcomes of more explicit motivational relevance...and in its affording preparatory responses to facilitate appropriate, considered action'*. Perhaps most importantly, following Fredrickson et al (Fredrickson, 2001, Fredrickson and Joiner, 2002, Fredrickson and Losada, 2005), emotions may have the implication of disposing someone to be open to new learning - to approach the unknown - or closed to it. Positive emotions have been shown to 'broaden peoples' momentary thought-action repertoires and build their enduring personal resources' (Fredrickson, 2001).

Finally, it is again uncontroversial to argue that individuals differ in their ability to exercise judgement about how effective they are being in their chosen approach to learning (meta-cognitive monitoring) and/or to exercise effective control over their choice of learning strategies (meta-cognitive control) . Again there is a substantial literature (Andrade, 1999, Blakey and Spence, 1990, Coutinho and Neuman, 2008, Dunlosky and Metcalfe, 2009, Kitchener, 1983, Veeman et al., 2006, Vrugt and Oort, 2008) which deals with these from the perspective of heuristics linked to specific disciplines through to the underlying neuroscience. However, Efklides (2006) argues that meta-cognitive experience - especially feelings - guide subsequent choices about strategy. As well as feelings of familiarity, difficulty, knowing, confidence and satisfaction, these experiences include judgments about how much effort will be required to learn something and how much time it may take (aligning directly with the items included in the 'managing process' construct). These meta-cognitive feelings and judgments

'...are products of nonanalytic, nonconscious inferential processes particularly when there are conditions that do not allow full analysis of the situation such as ...under conditions of uncertainty'. (Efklides, 2006, p.5). The feelings respond to the gestalt of presenting circumstances, including the task difficulty, the context including whether it is perceived as positive or negative, one's self concept and affective factors such as mood. Efklides concludes that metacognitive experience monitors *...'the progress being made towards ones goal and they convey this information in an affective or cognitive manner...guiding the self-regulatory process in both the short and long run.'* (Efklides, 2006, p.7). A great deal of the assessment of the contextual support for learning implied in the model in Figure 3 may therefore be by way of affective pre-appraisal and the attendant meta-cognitive judgments. Importantly these may influence i) the learner's willingness to enter into and engage with the context at all, ii) the choices they make about how to engage and finally iii) if and how they join with others in the process. Work by Iiskala and Lehtinen (2004), for instance, suggests that people co-regulate their learning on the meta-cognitive experience cues of those with whom they are collaborating.

This research then has re-identified empirical support for these well established dispositions and capabilities associated with effective learning. All three sub-dimensions of Mindful Agency can be shown to connect the learner to their context, including its relational and social/emotional characteristics and this serves to validate the interdependence found in the empirical evidence.

How then does this construct relate to the other active learning power dimensions? The factor analysis (both exploratory and confirmatory) suggested four additional learning power dimensions closely associated with Mindful Agency. This is consistent with the ELLI but following the re-analysis and the re-specification of scales these are re-named: creativity; sense making; optimism and hope; and curiosity.

Creativity

The exploratory factor analysis of the creativity items returned two factors: (i) imagination and intuition and (ii) risk-taking and playfulness. The final scale of Creativity returned an alpha reliability co-efficient of 0.80 with the eight items presented in Table 6.

Table 6. Creativity Scale

Sometimes good ideas just come into my head.	Imagination and Intuition
I tend to use my imagination to help me learn.	
Sometimes if I stop and wait good ideas just arrive in my head.	
Often it is when I let my mind 'float free' that my best ideas come to me.	
I like to try out new ways of doing things even if there is very little time.	Risk Taking & Playfulness
I enjoy trying out new ways of learning.	
When my learning gets tedious I am good at finding ways to make it interesting.	
I feel it's alright to experiment with new ways of learning.	

These latent variables in the creativity scale are consistent with the literature on creativity. Hennessy and Amabile's (2010) review concluded that in spite of the array of disciplinary approaches to understanding creativity, what is required now are all-encompassing systems theories of creativity designed to tie together and make sense of the diversity of perspectives, from the 'innermost neurological level to the outermost cultural level' (p.590). Although creativity has some trait-like stable characteristics is it also a state subject to influence by the social environment and people are most creative when they are intrinsically motivated. Kim (2006) suggests that reflective abstraction is the mechanism for creativity and also that creativity and imagination are inter-related. Vygotsky went further and argued that imagination serves as an imperative impetus of all human creative activity and that its operation is a 'function essential to life' (1930/2004, p.13). He also suggested that, developmentally, imagination is a successor of children's play (1930/2004, p.77)..

There is also substantial support in the literature for playfulness as a creative activity and process (Hennessey and Amabile, 1987, Saracho, 2002) which is a way of exploring ideas and testing alternative pathways for problem solving (Tsai, 2012). It also is important in seeing problems with a 'different lens' which is important in shifting paradigms and worldviews (Mumford, 1984). Tsai's review argued that 'educators should bring play and imagination into their classrooms in order to encourage creativity' (2012, p.15). What is also relevant is the importance of affect in creativity – Torrance (1972) for example found that creativity is supported by both affective and cognitive factors, and Anderson identified that 'play depends on two rudimentary ingredients: safety and stimulation' (1994, p.10). To be creative an individual has to engage with the unknown or the uncertain – this requires an environment which is 'safe enough' to do so.

Sense-Making

The exploratory factor analysis of the Meaning Making scale returned two factors (i) making meaning and (ii) making connections. We renamed this scale Sense Making. This scale returned an alpha reliability co-efficient of 0.75 with the seven items presented in Table 7.

Table 7. Sense Making Scale

I make connections between what I am learning and what I have learned before.	Making connections
I often look back and think about what I have learned.	
Remembering what I already know often helps me to learn something new.	
What I learn often leads to me doing things differently	
I prefer learning something when I have a good reason to do so.	Making meaning
I enjoy learning something new when I understand its relevance in my life.	
I enjoy learning about things I care a lot about.	

Sense-Making is a core part of learning and these two latent variables are supported in the literature. Cross (1999) argues that learning takes place through making connections in several ways:

neurological, social, cognitive and experiential. People understand the world through schemata – 'a cognitive structure that consists of facts, ideas and associations organised into a meaningful system of relationships' (1999, p.8). It is through constantly comparing existing schema with new information and understanding that we develop through our encounter with the world, that we adapt or stretch our existing understanding to accumulate richer and deeper knowledge. De Jaegher & di Paolo argue that our understanding of the world and relationships is not just through storing information as an 'objective' entity. We do not passively receive information from our environment – rather we translate information into internal representations whose value is significant. 'They [human beings] actively participate in the generation of meaning in what matters to them: they enact a world' (2007, p.488). Sense-Making is, for them, a relational and affect-laden process grounded in biological organisation. Interestingly this process of creating a perspective of value on the world has been more recently elaborated scientifically in terms of the theory of autopoeisis– the self-organising development of the individual in recursive relationship with its environment (Di Paolo, 2005, Thompson, 2007, Weber and Varela, 2002). The two latent variables in the Sense-Making scale reflect both the affective/narrative aspect of meaning making and the schematic, cognitive aspect of making connections.

Curiosity

The scales for Curiosity and Changing and Learning did not reveal latent variables. The scales and these are presented here as Optimism & Hope in Table 8 and Curiosity in Table 9. The Optimism and Hope scale returned an alpha reliability co-efficient of 0.73 with three items. The Curiosity scale returned an alpha reliability co-efficient of 0.69 with four items.

Table 8. Hope and Optimism Scale

I know I am changing and growing over time.
I am getting better at learning all the time.
I have a sense of myself getting better at learning.

Table 9. Curiosity Scale

I prefer learning something when I have to try really hard to understand it.
I am more stimulated by interesting questions than easy answers.
I find learning more interesting if it is hard.
I enjoy a challenge.

Curiosity is understood by Runco (2007) as one of the qualities of a creative personality, and it has been consistently understood as a critical motivator of human behaviour at all stages of the life cycle. Loewenstein (1994) positions curiosity as a cognitively induced deprivation which arises from the perception of a gap in information or understanding, or a motivation inherent in information processing (Hunt, 1963). This is significant for educators – curiosity is influenced by the state of one's knowledge

processing, but the motivation to understand may be a powerful means of generating those knowledge structures. This scale reflects both the motivation and the cognitive understanding aspects of curiosity.

Optimism & Hope

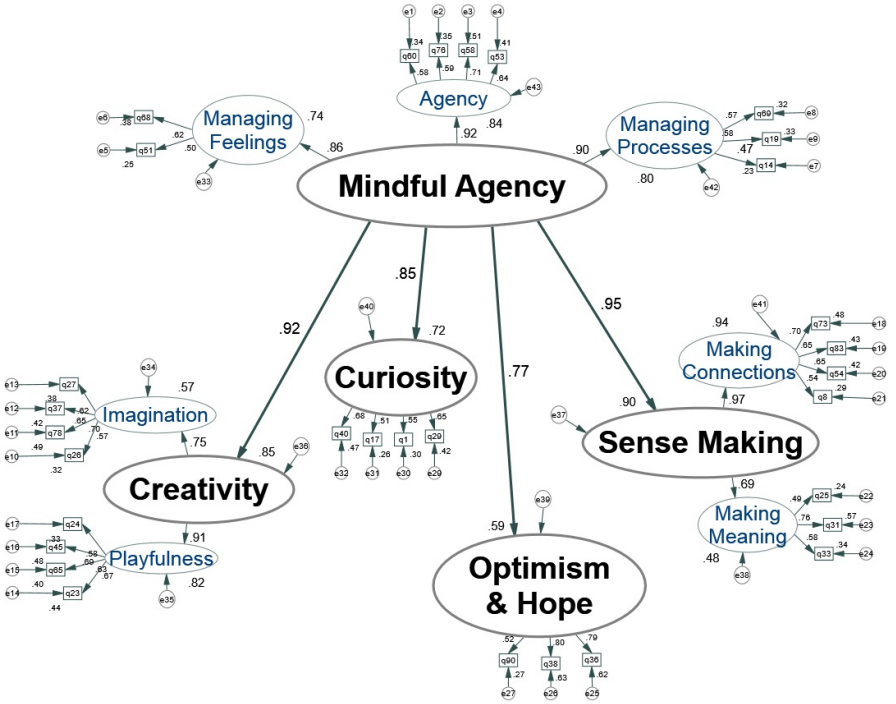
The Hope and Optimism scale is named more accurately to link with the extant literature. Snyder (2000) defines hope as a motivational construct that initiates and sustains progress towards a goal. It is a control belief, the perception that one can strategise different routes required to progress towards a goal (Snyder et al., 1991, Snyder et al., 2002). There is an agency component to hope – the perception that one has the ability and the energy successfully to navigate a chosen pathway to achieving a goal. Hope is predictive of student achievement at all educational levels (Curry et al., 1999) and adults with hope have higher coping mechanisms and problem solving capabilities. It predicts better study skills (Onwuegbuzie and Snyder, 2000).

Hope is closely related to Optimism – a control belief involving positive thinking and a positive attitude to life events (Seligman, 1991, Scheier and Carver, 1985) and also to Self-efficacy (Bandura, 1986) – a competence belief about one's capability to execute a particular action and achieve a particular goal. Robinson and Snipes (2009) propose that hope, optimism and self-efficacy are expectancy beliefs that form a set, with each focusing on different aspects of competence and control. Together their study demonstrated these three variables form a motivational system of competence and control related to academic well-being. This scale is most closely described as hope, with optimism. It does relate however to self-efficacy and agency and this will be discussed later (Zimmerman and Schunk, 2006).

11. MINDFUL AGENCY AS AN EXPLANATORY VARIABLE

We hypothesised that the Mindful Agency construct stood in a meta-relationship to the remaining five active learning power dimensions. Our second analysis was therefore an exploration of the relationship of Mindful Agency to Optimism & Hope, Sense Making, Curiosity and Creativity. Our hypothesis was that this Mindful Agency is developed through language and relationship in the process of learning and that it is generated explicitly through becoming aware of one's creativity, curiosity, sense making and hopefulness - providing the executive functioning to know when to use these to solve problems through learning. The model in Figure 4 presents the details of each of the four active dimensions of learning power (Curiosity, Sense Making, Creativity and Hope) in relation to Mindful Agency. The model is in good fit according to RMSEA =.036 and shows that 90% of the variance in Sense Making, 85% in Creativity, 72% in Curiosity and 59% in Optimism and Hope are accounted for by Mindful Agency. This confirms our hypothesis that Mindful Agency is strongly associated with the other four active learning power dimensions and reflects the development of the other four, hence is considered to be a second order dimension. This model also supports the internal structure of Creativity and Sense Making that were identified from exploratory factor analyses described earlier.

Figure 4. Internal structure of the active learning power dimensions



12. LEARNING RELATIONSHIPS

The exploratory factor analysis of the learning relationships scale in the ELLI returned three factors: (i) dependence on others (ii) collaboration and (iii) belonging to a learning community. This suggested that the original 'learning relationships' scale was conceptually unclear. Learning, as we articulated in our theoretical starting point, is a relational process which requires interdependence (John-Steiner, 2000). This enabled us to further tease out the different nature of the three components identified through our analysis. Collaboration is a person's inclination towards learning with, and from, other people; whilst the sense of belonging reflects a person's perception of other people's support and engagement in relation to his/her learning and is emergent from interpersonal interactions (McGinn et al., 2005, McGinn, 2012). The sense of belonging also reflects relational trust through which learners are confident that when they turn to significant others for help in learning they will be supported (Bryk and Schneider, 2002). Self-determination theory identifies 'the need for *relatedness* which concerns the experience of love and care by significant others' as a basic human need which requires conditions of nurturance based on psychological need satisfaction (Vansteenkiste and Ryan, 2013).

Therefore these two scales, 'collaborating with others' and 'belonging to a learning community', are considered to be conceptually different, while both describe positive approaches to learning relationships and are to be developed in mutuality. In contrast to interdependence, being inclined to be dependent on others says more about the relational dynamics between self, other and the environment than about a straightforward, desirable learning disposition. It is more of visceral 'state' than an agentic disposition or tendency to behave in a certain way. We found it conceptually clearer to group these dependency items with Fragility and Dependence items because they all address a relational state of

dependency on others, or structures, in a particular learning environment. We will further elaborate on this in the next section. The scale of Collaboration and the scale of Belonging returned an alpha coefficient of 0.71 and 0.76 respectively with three items each.

Table 10. Collaboration scale

I enjoy solving problems together with other people.
I find it helps me to learn if I can talk about it with colleagues.
I like talking through challenging problems with friends.

Table 11. Belonging scale

There is at least one person close to me who has helped me to learn.
I have at least one person close to me who I can turn to for guidance in my learning.
I know at least one person in my community/social network who I can turn to for guidance in my learning

13. FRAGILITY AND DEPENDENCE

This scale was the subject of extensive analysis and reporting in a separate paper (Deakin Crick et al.). In summary, the study demonstrated that the 'fragility and dependence' scale operates independently from the remaining six scales and there is no clear pattern, except with those individuals who score lowest on all learning power scales. These cases are associated with low levels of Dependence and Fragility. Our conclusions were that low scores on Dependence and Fragility cannot be construed as Resilience (as was assumed in practice in applications of the ELLI). Rather, a low score on Dependence and Fragility is better understood as an emotional and cognitive 'closedness' to the inter- and intra-personal dynamics of learning power as a defence against external 'threats' and this indicates a barrier to deep learning. A high score, indicating dependence and fragility, is also not desirable in terms of learning power, since it leads to loss of subjectivity (Morin, 2008) and therefore agency, due to the failure of a healthy and productive operational closure (Goldspink and Kay, 2009). The study suggested that this quality of being either 'closed' or 'dependent' in the learning is context dependent and can only be appropriately interpreted in the light of the relational context of the learner (i.e. it may be adaptive or maladaptive from the perspective of the learner, depending on the context). For the current study we conducted an exploratory factor analysis on all of the items measuring Dependence and Fragility and identified two latent variables: (i) a 'submissive mindset' and (ii) 'dependence on others'. Both of these are indicators of the degree of learner's openness or closedness to the learning environment so the scale was renamed Openness to Learning and it returned an alpha coefficient of 0.78 with 10 items.

Table 12. Openness to Learning scale

I find it difficult to know what to do when I get stuck.	Submissive mindset
Because I dislike feelings of confusion and uncertainty I generally steer clear of learning something new	
If I cannot learn something it's generally because I haven't figured out how to approach it.	
If I am struggling to understand something I tend to give up after a while	
If I find something really hard to learn, I usually think it's because I'm not very intelligent.	
I often get quite upset if I find learning too difficult	
I find learning difficult when I am not told how to go about it.	Dependence
I can learn things well when other people help me.	
I need positive comments from a tutor or mentor in order to keep trying.	
I am happier learning when I have clear instructions.	

This model suggests that this scale should be treated differently from the other scales since either extreme is undesirable for learning. To be (i) closed or to be (ii) dependent on the other, suggests that (i) the other is not available for relationship in learning or (ii) the Self is not available for relationship in learning. Both reactions in effect close the flow between the learner-self and the others though in very different ways.

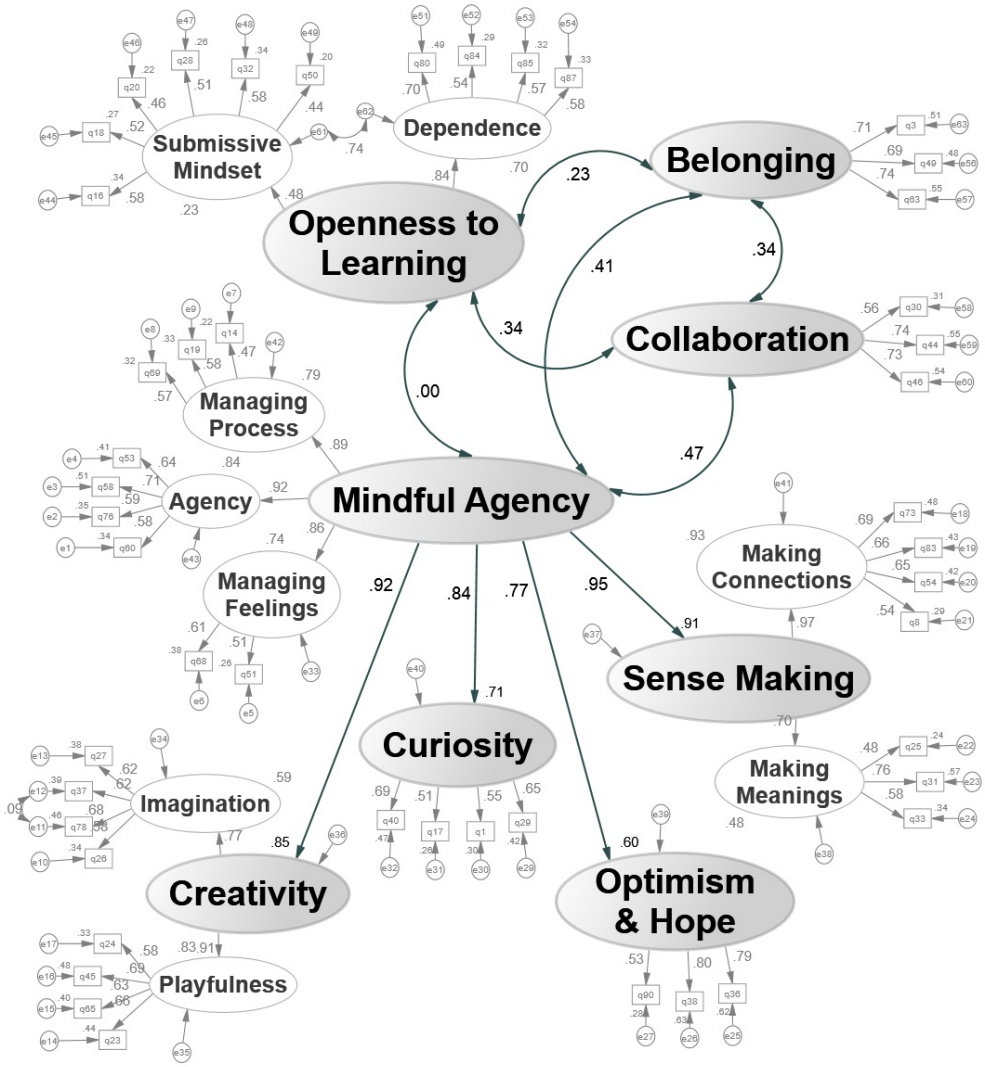
What this scale measures is an emergent state of the self-eco relational processes. A desirable measure would be a mid point, for optimal learning, although in some contexts of risk either extreme may be found appropriate. There are few research papers which address this issue in educational psychology (Bossche et al., 2006). It has, however, been well investigated within the team learning and administrative science literature under the terms 'trust' and 'psychological safety'. Levin and Cross define trust as the quality of "the trusted party that makes the trustor willing to be vulnerable" (2004, p.1478). They point out that "trusting relationships lead to greater knowledge exchange: When trust exists, people are more willing to give useful knowledge" as well as "more willing to listen to and absorb others' knowledge" (ibid). This knowledge exchange is essential to learning both because the learner needs to absorb knowledge from other people and is more likely to receive effective help when he/she shares useful knowledge from or about him/herself. Similarly, psychological safety, defined as "a shared belief that the team is safe for interpersonal risk taking", facilitates "learning behavior in work teams because it alleviates excessive concern about others' reactions to actions that have the potential for embarrassment or threat, which learning behaviors often have" (Edmondson, 1999, p.354). Edmondson (1999) also points out that "engaging in learning behavior in a team is highly dependent on team psychological safety by suggesting that team members' confidence that they will not be punished for a well-intentioned interpersonal risk enables learning behavior in a way that team efficacy, or confidence that the team is capable of doing its work, does not" (p.376). This is in line with our hypothesis that openness to learning is distinct in nature from the capability of learning powered by Mindful Agency and other active learning dispositions.

14. THE INTERNAL STRUCTURE OF LEARNING POWER

Through the exploration we describe above, we renewed our view of the internal structure of learning power. Meaningful learning involves deep changes in learners' behaviour, beliefs and attitudes. While these changes are energised by a personally chosen and meaningful purpose, it is the active learning power dimensions of Sense Making, Creativity, Curiosity and Hope that regulate the flow of energy in the learning process, enabling it to empower the journey from purpose to achieve a particular performance outcome. This regulatory process is achieved through Mindful Agency, constituted by agency, managing processes and managing feelings. We hypothesise that this regulatory process is only engaged when there is a context which is judged as presenting a level of risk consistent with supporting Openness to Learning. This assessment of risk is most likely unconscious, involving processes of emotional pre-appraisal. Collaboration and Belonging have been shown to improve the effectiveness of learning where the problem to be solved imposes a high cognitive demand (Kirschner et al., 2011), at the same time, participation in peer learning has been shown to influence individuals choice of learning strategies (Iiskala and Lehtinen, 2004). Collaboration is therefore a process choice (metacognitive strategy), but once that choice has been taken, Mindful Agency becomes somewhat shared.

In order to test this hypothesis we built a Model of the internal structure of learning power, using those items belonging to the latent variables we have described. At first, although the model was in good fit (RMSEA= 0.35), the solution of the parameter estimates indicated a negative covariance estimate between Mindful Agency and Openness to Learning. As a result this covariance parameter was constrained to be 0, according to the suggestion of Bentler and Chou (1987). This resulted in the same fit statistic as the first solution. The estimates are presented in Figure 5. The model confirms that (i) Openness to Learning is orthogonal to the active learning power dimensions of which Mindful Agency is the key, and (ii) Collaboration and Belonging, the two scale previously treated as a single dimension of learning relationships, can be measured as separate scales. The relationships between collaboration, mindful agency, belongingness and openness to learning are modelled by allowing each to co-vary. This is reflecting the fact that we do not as yet have a clear view about the nature of the relationships between these variables beyond that they are loosely related. It is an area for further exploration during the three year research phase.

Figure 5. The internal structure of learning power is in good fit according to RMSEA=.035.



15. DISCUSSION OF FINDINGS

This re-examination of data collected since 2002 has enabled a more nuanced and rigorous conceptualization of the concept of learning power and its role in the process of enquiry than was originally developed. In this section we will firstly discuss the findings from a statistical perspective, together with the benefits, limitations and affordances of the model. We then explore the conceptual and theoretical implications of the findings, leading to a refined working redefinition of the concept of learning power as it fuels a learning journey towards resilient agency.

Firstly the overall model produced demonstrates a good fit with strong effect sizes, which provides a solid foundation for conceptual and theoretical development. Each of the scales has been improved by a reduction in the number of items whilst maintaining internal consistency. The whole questionnaire is now 49 items, considerably less than the previous 72. Of these 49 items only 32 were drawn from the original instrument – the others were devised during the ongoing effort of research and development between 2003 and 2013. The experience of the team in working with the scales in both theory and practice facilitated the iteration between the theorisation and testing necessary for exploration using

structural equation modelling. The reliability of the model was tested systematically through the randomized splitting of the data set.

In practical terms this has enabled much greater discrimination about the nature and dynamics of the different elements of the model and this should facilitate more effective practical scaffolding of resilient agency in learning, by teachers and facilitators. Because the instrument was conceived as an assessment tool to stimulate self-directed change, it is important that it reflects the complexity of human learning rather than aiming to measure one single variable, which would inevitably reduce its utility in practice. This has led to criticism on the one hand, because of the co-variance between the scales which is undesirable from a purely psychometric perspective, but has afforded some face validity and pedagogical value on the other.

It is the inter-relationships between the components of learning power which have become clearer through this study. Firstly the scale of Mindful Agency has proven to be a crucial dimension in the development of learning power. This is because Mindful Agency is constituted in the self-awareness and confidence to engage and progress in learning to achieve a chosen purpose, the confidence to recognise and recover from negative feelings associated with learning and to plan and manage the Self in the processes associated with learning tasks. Mindful Agency predicts Sense-Making, Creativity, Curiosity and Hope, suggesting that Mindful Agency is the 'motor' of learning power, which is developed through meta reflection on learning in practice. Awareness and reflection develop through language – even though we often know more than we can say. Mindful Agency also reflects a person's relationship with themselves.

Sense making is about making connections between otherwise separate information or data and about learning that is meaningful to the learner. Curiosity is the orientation to want to understand, to get beneath the surface and to 'dig deeper' and Creativity is constituted by imagination on the one hand and risk taking and playfulness on the other, such that new value is created. Hope and Optimism is about the self knowledge a person has about being able to grow and change over time – a growth-orientation towards life and learning.

This model suggests that to develop Mindful Agency the learner should expose themselves to varying situations which demand different levels of creativity, curiosity and a sense-making, while being supported to reflect on progress towards what has been achieved. Through this they will have the opportunity to develop the cognitive and emotional awareness necessary to guide their agentic choices about how to learn and in so doing develop the optimism and hope to continue. They will develop resilience agency– the capacity to respond profitably to risk, uncertainty and challenge over time.

The model provides a language with which to engage and reflect – and in turn this provides a framework for coaching conversations which focus on empowering learners to 'do it for themselves'. So Mindful Agency is grounded and given specific meaning through the remaining four active learning dimensions. Mindful Agency can also be used to leverage change: as one consciously develops, say one's ability to ask questions and one's curiosity, through the process of 'consciousness raising', one is also developing Mindful Agency.

The scales which measure learning relationships have now gained greater clarity through this exploration. Belonging to a community or group which is supportive of one's learning and collaborating are two distinct but related social aspects of learning. The scale 'Openness to Learning' is a new and improved interpretation of the former 'fragility and dependence' scale which has been dealt with extensively in a separate paper which we theorise is an emotional and cognitive state of 'openness' to the inter- and intra-personal dynamics of learning power, which precedes engagement and utilization of Mindful Agency. These three scales are highly context responsive. In other words they depend to a large extent on the relational context and levels of relational trust of the learner in that context, based on their discernment of the intentions of others in relation to them (Bryk and Schneider, 2002). This also demonstrates how each of the scales are not of a similar status nor do they have simple relationships with each other .

Learning as a complex process

What has emerged from this model is a greater understanding of the complex nature of learning power – both in terms of the relationship of the learning agent with the Self, the inter-relationships between the dimensions of learning power ('intra-personal'), the relationships between learners ('inter' personal) and the relationship between learners and their contexts (inter-contextual). It has enabled the development of an agency-based concept of learning in a complex social ecology, where learning resilience is developed and achieved through Mindful Agency. In other words, taking learning as a complex process in which the 'Mindful Agent' is the driver of a journey of change provides a way of conceptualising both the 'lateral' and 'temporal' connectivities of learning and the development of an integral model.

Research in the field of interpersonal neuro-biology explores the connections between the brain, the mind and inter-personal relationships and it does this with the explicit purpose of developing new approaches to understanding and promoting human well-being. Siegel argues that '*a core aspect of the human mind is an embodied and relational process that regulates the flow of energy and information within the brain and between brains'* and that *'the mind is an emergent property of the body and relationships… created within internal neurophysiological processes and relational experiences'* (2012, p.3).

Energy and information flow is what is shared between people within cultures and this is also the 'subject matter' of learning. How a person-in-relation regulates that flow – how they select what matters, make sense out of it and apply it to their purpose – is a process of learning in any domain. This improved model of the internal structure of learning power provides a language for - and hence way of conceptualizing - how we can mindfully regulate that flow of energy and information.

Theories of agency share the view that organismic aspirations drive human behaviours and that humans are the authors and active agents of their own development (Little et al., 2006). The concept of human agency provides an organizing framework for different constructs – such as self-efficacy, grit, growth orientation etc – and it is a key concept for understanding learning as a complex process – a multi-layered model of the Self that moves from a particular (volitional) purpose to the realization of that purpose as performance.

Perhaps the most pertinent discussion of these findings is drawn from the field of self-determination theory. In a review of the field, (Vansteenkiste and Ryan, 2013) identify its fundamental organismic-dialectical meta-theory, which offers an understanding of the human being as an active integrator of meaning, developing an ever more elaborated and unified sense of self, which is in dialectical tension with the social contexts which either nurture or inhibit this active, integrating process. From this perspective 'human development and well being must be viewed as a dynamic potential that requires proximal and distal conditions of nurturance' (Ryan and Deci, 2002):3. These conditions of nurturance are based on psychological need satisfaction – the need for *competence* or a sense of effectiveness in interacting with ones environment, the need for *relatedness* which concerns the experience of love and care by significant others and the need for *autonomy* or the experience of volition and self-endorsement of one's activity (Vansteenkiste and Ryan, 2013, p.264).

They review the evidence for ways in which need frustration and need thwarting leads to passivity, fragmentation and 'ill being' whereas the experience of these needs being met appropriately is a harbinger of pro-activity, integration and wellbeing satisfied (Ryan et al., 2008). What is relevant to this discussion is what these researchers describe as resilience factors which can protect against these negative consequences and encourage the emergence of the positive ones. Two key resilience factors are (i) the capacity autonomously to regulate behavior, even under threat or pressure and (ii) awareness or mindfulness which supports the autonomous regulation of behavior. Part of that regulation is 'knowing' even when to engage.

This modeling of the internal structure of learning power supports the core tenets of self-determination theory with its basic assumption that people are pro-active organisms, inclined to shape and optimize their own life conditions towards increasing levels of self-organisation. This energy, or life force, is a 'given' of human nature: under optimal conditions human beings will learn, grow and change towards a coherent sense of Self-in-relation to others and to the environment. Whereas under sub-optimal or pathological conditions of need frustration or thwarting, people develop 'ill-being', need substitutions and compensatory behaviours, which include releasing self control and 'rigid' behavioural patterns, which function as a defensive script, which works against integration, coherence and autonomy.

The Openness to Learning scale and the two Relationships scales (Collaborating and Belonging), understood in this context, influence the development of Mindful Agency because they reflect the conditions or the social environment in which a learner is situated. If the needs for relatedness, satisfaction and competence in relating to ones environment are not satisfied, the evidence suggest that this can be harmful and pathogenic – leading to loss of authenticity, compensatory behaviours and 'rigid behavioural patterns' and mindsets (see Vansteenkiste and Ryan, 2013). This helps to explain the patterns of learning power in violent young offenders (which we discuss elsewhere Deakin Crick et al.) which led us to re-conceptualise resilience as a component of learning power.

The overall finding of this study is that the internal structure of learning power, identified through structural equation modeling, supports the notion of the development of Mindful Agency as a complex process, a quality which enables an individual (or a team) to deal with risk, adversity, disruption, uncertainty and challenge. It enables the individual (or the team) to 'bounce back' and be able to

continue without giving up or suffering more serious consequences of adversity, such as mental illness, dysfunctionality, or simply failure to achieve a purpose and flourish.

16. CONCLUSIONS

The articulated model presented here serves to link to and contextualise other related research. Self-determination theory connects Mindful Agency with autonomy and awareness but also incorporates the self-regulation of processes – the focus of meta-cognition and emotional self-management or, as many would frame it, emotional intelligence. These core capabilities explain a significant degree of variance on the remaining active dimensions – sense making, changing and leaning, creativity, critical curiosity and hope.

This analysis represents a significant advance over our prior understanding of learning power. Where previously learning power was described through seven dimensions, we had not fully understood the relationships between these dimensions. This work reveals the deep structure of learning power and presents a more articulated model it, placing Mindful Agency at the centre of the active learning power dimensions as the way in which we regulate the flow of energy and information over time in pursuit of a particular purpose. The relational dimensions and the Openness to Learning dimensions serve to moderate this process, either through inhibiting or enhancing it. In keeping with our understanding of learning as a complex process, this raises significant implications for the ways in which pedagogical practices nurture, frustrate or even thwart what is a natural human process of learning, growth and change towards a coherent narrative in which persons-in-relation are equipped to shape and optimise their own life conditions.

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