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Capstone Experience Purposes: An International, Multidisciplinary Study

ABSTRACT

Capstone experiences (CEs) serve a variety of purposes in higher education as places to apply academic skills, explore post-graduate life and employment, and achieve a meaningful undergraduate event. This study investigated the purposes of CEs through a content analysis of institutional course syllabi/course outlines/module outlines and catalog/calendar descriptions at five institutions of higher education: a large public research university in Canada, a large public teaching university in the U.K., a large public research university campus in the U.S., and two medium-sized private liberal arts universities in the U.S. Using the CE purposes found in a review of scholarly literature as a research guide, the authors analyzed 84 institutional documents. CE purposes that appeared in the sample at lower percentages when compared with published studies included oral communication, a coherent academic experience, preparation for graduate school, preparation for life after college, and civic engagement/service learning. Implications for practice include the need for instructors and administrators to consider revising CE documents to better reflect the content and goals of the courses and to address the requirements of other audiences (e.g., program reviewers, accreditation evaluators). Moreover, the results of this study may assist educators in considering reasons for omitting explicit purposes from CE documents and/or justifying the inclusion of previously omitted purposes.

KEYWORDS

undergraduate capstone, syllabi, module outline, catalog, calendar

INTRODUCTION

In seeking to create a meaningful university education, some institutions have developed Capstone Experiences (CEs), which are intended to provide both a culminating and transitional experience for college seniors (i.e., students in the final year of their undergraduate education) (Kinzie 2013). CEs include a broad range of courses and activities, including those whose titles do not include the term *capstone* but instead reflect their function (e.g., research projects, design projects, independent studies, and internships). Though some scholars point to capstone courses as far back as the 18th century in the U.S., most U.S. colleges and universities have only adopted them in the last 40 years (Hauhart and Grahe 2015). Levine (1978) reported three percent of four-year colleges and universities offered capstone courses, and by 2011, the number of capstone courses at institutions across the United States had risen to 89 percent (Padgett and Kilgo 2012).[1]

CEs have been identified as a "high impact practice" (Kuh and Schneider 2008) and a "transformative" part of undergraduate education by providing both a culminating and

transitional experience for college seniors (Kinzie 2013). Most experiences have several purposes, which may include improving communication skills, preparing for employment, or reflecting philosophically on undergraduate education (Lee and Loton 2019). These purposes may also align with broader departmental, college, and university values such as diversity, ethical inquiry, research, and service (Henscheid, Breitmeyer, and Mercer 2000). However, since CEs often reflect the contexts and needs of individual institutions, stated capstone purposes[2] may vary considerably across institutions and disciplines (Henscheid, Breitmeyer, and Mercer 2000). Perhaps because of this disparity, few studies have attempted to identify specific purposes of CEs across institutions and disciplines (Young, Chung, Hoffman, and Bronkema 2017). Furthermore, even fewer studies have sought to describe CE variations across countries (Lee and Loton 2017). The present study responds to calls for additional research with a content analysis of CE purposes in syllabi/course outlines/module outlines and catalog/calendar descriptions across a convenience sample of five institutions: a large public research university in Canada, a large public teaching university in the U.K., a campus of a large public research university in the U.S., and two medium-sized private liberal arts universities in the U.S.[3]

Syllabi are the documents disseminated to individual classes of students; they provide information about institution and instructor policies, course purposes, topics, and assignments. Naming conventions for syllabi differ at institutions across the globe. For example, the U.S. and Canadian postsecondary education systems use *syllabus* or *course outline*, and the U.K. system uses *module outline*. While syllabi are primarily written by instructors, they often contain information influenced or prescribed by the instructor's program, department, and/or other administrative bodies (Goodwin et al 2018; Zablith 2016). Institutions also often use syllabi to document learning purposes for reviews by accreditation agencies (Kilpatrick, Lund Dean, and Kilpatrick 2008).

Catalog descriptions are synopses of courses/modules that serve as brief introductions to the topics and purposes. A course catalog may also be known internationally by other terms including *bulletin*, *program of studies*, *curriculum guide*, or *registration guide*. The U.S. postsecondary education system uses *catalog* or *bulletin*, while the Canadian system uses *calendar*.[4] These documents serve as short summaries for classes and may be written by program administrators and/or instructors. Students and advisors may use catalogs/calendars to assist them in making decisions about whether to register for a course/module. Moreover, "As the official declaration of an institution's programs and curricula, the catalog serves as a quasi-legal contract between the institution and a student. As a public record, the catalog verifies and supports the legitimacy of the academic enterprise …" (Melonçon and Henschel 2013, 46-47). However, the brevity of catalog descriptions can lead to confusion about course purposes for both students and their advisors (Dong and Pardos 2019).

Syllabi and catalog descriptions signal an opportunity to study CE purposes at various institutions. Both genres are often defined by the hierarchical structure of strategic planning in institutions of higher education (Delprino 2013). For example, accreditation agencies often evaluate college and university programs by reviewing the relationships between an institution's mission statement and the course purposes listed in a specific program's syllabi (Hinton 2012). Furthermore, administrations may mandate that instructors include the catalog description in their syllabi (Grose-Fifer, Brooks, and O'Connor 2019). Investigations of CE syllabi and catalog descriptions across disciplines, institutions, and countries can provide a description of purposes at a given moment that allows comparison within and among these educational contexts. Therefore, the results of our research offer an organized sample of purposes to administrators,

program coordinators, and instructors as they consider ways to investigate and improve curricular planning for existing CEs or create new opportunities for transformative undergraduate events. Without meaningful planning, evaluation, and alignment, CEs may not meet programmatic and university goals (Ferren and Paris 2013; Henscheid, Skipper, and Young 2019). Thus, this study may broaden and deepen educators' understanding and knowledge of underused or disregarded capstone purposes. Additionally, the results of this study may assist educators in considering reasons for omitting explicit purposes from CE documents and/or justifying the inclusion of previously omitted purposes.

CURRENT KNOWLEDGE ABOUT CAPSTONE EXPERIENCES

Studies of CE purposes have been informed by various research methods and participant samples including case studies of individual programs, theory building based on educational best practices, surveys of administrators and faculty, and content analyses of institutional documents. Several projects have sought to describe instructional practices and course purposes through single-case examples of CEs in the context of a discipline or institution (e.g., Brown and Benson 2005; Frazier, LoFaro, and Dobler 2018; Magnanti and Natarajan 2018). In the last decade, the proceedings of the Capstone Design Community Conference (2020) have contributed hundreds of single-case studies outlining purposes and pedagogical strategies for engineering CEs that are often linked to professional organization accreditation criteria and career readiness. In the discipline of psychology, Grahe and Hauhart (2013) analyzed 619 departmental webpages and 120 administrator surveys to describe pedagogical choices and organizational strategies. Participants and documents identified CE purposes such as "a bridge to graduate study," and "a reason and opportunity to review and integrate learned material" (283). In a broader case study, Schermer and Gray (2012) surveyed faculty and students at four liberal arts colleges to collect data about CE characteristics, mentoring activities, and departmental policies. The authors reported several "benefits" including "development of skills in writing and oral communication, critical thinking, and research; an increased interest in research; an empowering sense of academic self-confidence and achievement; and development of project management skills" (1).

In contrast to the abundance of results from studies of single institutions, disciplines, and programs, research about CE purposes *across* institutions, programs, and disciplines has been relatively sparse. In the first study of its kind, Levine (1978) analyzed 270 college and university catalog descriptions from 1975 and found that only three percent of the documents offered CEs "designed to cap the general education experience by application of different student majors to a common problem" (18; see also Henscheid, Breitmeyer, and Mercer 2000). In another multi-institutional study, Cuseo (1998) analyzed the proceedings from the first four years of the Senior Year Experience National Conference hosted by the National Resource Center for the Freshman Year Experience and Students in Transition (USA). Cuseo provided a "descriptive synthesis … of the essential goals of Senior Year Experience programming" (1998, 21), which included purposes such as fostering "coherence and relevance … between general education and the academic major" and "improving seniors' career preparation and professional development" (22).

Henscheid, Breitmeyer, and Mercer (2000) surveyed 707 administrators and directors at public and private U.S. institutions with CEs and found that the respondents perceived the primary purpose of the courses to be "integration and synthesis with the academic major" (11). The study authors also reported that nearly three-quarters of the CEs were "discipline or department-based" (9). Barefoot, Griffin, and Koch (2012) queried 527 chief academic officers

at four-year colleges and universities in the United States about "student success initiatives" that included questions about "special academic/transition seminars" including "senior seminars/capstone courses" (1). The authors found that 90% of respondents noted that "the senior seminar is most often linked to proficiency in the major or the integration of general education and the major" (18). Additional main purposes included "creation/presentation of original research or artistic expression" and "career readiness" (18). However, only 51% of the participants indicated that they measured whether the purposes had been met. Young et al (2017) surveyed 383 institutional administrators in the U.S. and found that "Private institutions used senior-focused campus-wide activities more often in all institutional efforts except participation in national surveys and grant-funded projects" (19). Lee and Loton (2019) queried representatives at 171 Australian institutions and 45 non-Australian institutions predominantly from New Zealand (n=20) and the U.S. (n=17) and performed a content analysis of open-ended response questions to find a wealth of CE purposes in the domains of "knowledge, skills, personal development, quality assurance, preparation for post-graduation and meeting external requirements" (5).

Other studies have relied on general academic and experiential knowledge provided by institutional representatives. For example, the Boyer Commission recommended that CEs should include a project in which a student addresses a significant research question, allows for "collaborative effort whenever appropriate," and uses "communication skills to convey the results" (Boyer 1998, 27). The experience should also serve as a "bridge" to graduate studies and/or a support for a professional career through an emphasis on analysis, team-building, and problem-solving" (27). More recently, the Association of American Colleges and Universities (AAC&U 2014) used teams of educators and education professionals from over 100 post-secondary institutions across the U.S. to develop 16 value rubrics that identify core purposes for senior CEs. Purposes noted in the rubrics included civic engagement, critical thinking, and ethical reasoning.

Research Question

Hauhart and Grahe (2015) observed that "there is a need for additional multi-discipline, multi-institutional studies to more fully explore the variation of capstones …" (see also Padgett and Kilgo 2012; Young et al 2017). Toward the goal of contributing CE data that spans institutions, countries, and disciplines, our efforts focus on the following research question: Do capstone experience purposes as stated in a sample of catalog descriptions and course syllabi reflect purposes identified in previous studies?

METHODS AND MATERIALS

The method for this project consisted of two stages. The first stage was to identify a list of CE purposes from the results of scholarly research whose primary goal was to collect, enumerate, and describe those purposes. Second, guided by the list of CE purposes identified from the literature in the first stage, we used thematic analysis to discover and categorize CE purposes from a collection of catalog descriptions and course syllabi from five institutions of varying sizes, missions, and countries. Each of these steps is detailed in this section.

Stage one: Gathering CE purposes from comprehensive scholarship

Reporting on a comprehensive set of CE purposes across disciplines, programs, and institutions has been very limited (Lee and Loton 2019; Padgett and Kilgo 2012).[5] We performed

an inclusive search of databases including ProQuest Education Journals, Google Scholar, and Educational Resources Information Center (ERIC) using the following keywords in various permutations: *undergraduate*, *course*, *class*, *capstone*, *design*, *independent study*, and *internship*. The search returned six studies that addressed the criteria for inclusion: literature addressing comprehensive, multi-institutional research across disciplines. The identified studies used quantitative, qualitative, and mixed research methods to analyze large samples of college and university administrators and instructors in a 21-year time span. The vast majority addressed U.S. institutions (see table 1).

Table 1. Studies included in review of comprehensive scholarship about CE purposes

Author(s)	**Year**	**Method(s)**	**Sample**	**Sample Size (n=)**
Cuseo	1998	Qualitative: "descriptive synthesis" of conference papers (21)	Proceedings from the first four years of the Senior Year Experience National Conference (1990-1994)	NA
Henscheid Breitmeyer, and Mercer	2000	Quantitative: Survey "to identify and compare senior seminars and capstone courses across American colleges and universities" including type of institution, enrollment size, and institutional selectivity (5)	Administrators and directors at public and private U.S. institutions with CEs	707 (256 public; 451 private)
Padgett and Kilgo	2012	Quantitative: Survey that "focused on both course- and project-based experiences to examine the current types of capstones being offered (4)	Chief academic, executive, and student affairs officers; career services representatives at regionally accredited, not-for-profit institutions in the U.S.	276
AACU	2014	Delphi technique[6]	Teams of faculty and other educational professionals from institutions across the U.S.	NA
Young, Chung, Hoffman, and Bronkema	2017	Quantitative: Survey "to collect evidence about institutional attention to the senior year and expand knowledge about specific types of culminating experiences" (13)	Chief academic, executive, and student affairs officers in the U.S.; and respondents to previous National Resource Center surveys	383 (182 public; 201 private)

Lee and Loton	2019	Quantitative and qualitative: Content analysis of open-ended responses to survey questions derived from review of scholarly literature and publicly available documents from post-secondary institutions	"educators working with capstones" (4)	171 Australian institutions and 45 non-Australian institutions

Stage two: Sampling and analysis of catalog descriptions and syllabi

Catalog descriptions and syllabi were collected in three countries from five institutions in which the authors were active, including large and medium sized, public and private, and research and teaching oriented (see table 2) and then investigated using thematic theoretical analysis.

To manage data volume and address differing institutional constraints, researchers provided at least five but no more than 20 samples of each document genre from their institutions. Documents were categorized according to disciplines established by the Classification of Instructional Programs in the U.S. and Canada (Classification, n.d.) and the U.K. Joint Academic Coding System (Higher Education, n.d.). Because of the varying CE offerings at each institution, the documents were grouped into five disciplinary clusters for further analysis: general education, humanities, business, STEM, and social sciences.

Table 2. Institutions that provided documents

Institution	Undergraduate Student population	Type	Setting	Public/ Private	Country
University of Guelph	19,000	Comprehensive research	Urban	Public	Canada
Boston College	9,000	Liberal arts	Suburban	Private	U.S.
University of the West of England	22,000	Comprehensive teaching	Urban	Public	U.K.
Elon University	6,000	Comprehensive teaching	Suburban	Private	U.S.
Penn State Harrisburg	4,000	Comprehensive research	Suburban	Public	U.S.

Since each institution had distinct means of storing, disseminating, and granting use of the documents, no uniform method of sampling could be achieved. Challenges included individual negotiation for—and access to—documents at each institution. For example, since the structure and hierarchy of disciplinary units was unique to each institution, researchers requested syllabi from each administrative unit at each institution with varying results. Consequently, searches at the institutions returned varying quantities and categories of both document genres (see table 3). Researchers used judgment sampling, which "occurs when units are selected for

inclusion in a study based on the professional judgment of the researcher … to deliberately select units … that are best suited to enable researchers to address their research questions" (Maul 2018, 914). Sampling resulted in the collection of eighty-four documents: 50 syllabi and 34 catalog descriptions (see table 3). Sampling and data collection methods for each institution are outlined in the subsections below.

Table 1. Document genres by institution

Document	University of Guelph	Boston College	University of the West of England	Elon University	Penn State Harrisburg
Syllabi	19	10	12	5	4
Catalog Description	9	10	0[7]	5	10

University of Guelph

The researcher obtained all documents from public-facing, online resources. Syllabi are publicly available at the University of Guelph by institutional mandate. Not all departments offer an undergraduate capstone course, while some departments' majors are closely related and share a CE course. The University of Guelph undertook a campus wide identification of high impact practice courses in 2017. As part of that process, all CE courses were identified (n=124). The University of Guelph based researcher used this list to create a judgment sample of syllabi (n=19) and catalog descriptions (n=9) from a cross-section of departments (n=34) and from all disciplines in which the documents were available, while restricting results to no more than one syllabus per department.

Boston College

Course descriptions and syllabi are publicly available online for capstone seminars at Boston College. Capstones are offered as university-wide, general education courses. Thus, they do not serve specific departmental purposes, although about a quarter are cross listed in their instructor's department and satisfy the requirements to major in that department. The Boston College researcher used judgment sampling to select ten syllabi and their corresponding catalog descriptions to represent a variety of disciplines.

University of the West of England

Syllabi (n=12) were collected from the University of the West of England using judgment sampling. The documents were drawn from 10 different subject areas that were selected from a variety of departments (n=14) within the four administrative units of the institution. Course instructors who responded to the researcher's request for syllabi self-identified their CEs, and the syllabi forwarded for analysis were corroborated by the institutional researcher. If a course instructor replied saying they did not identify a capstone in their program, a further course instructor was contacted from the same department.

Elon University

All searches for documents were performed on the Elon University website. Syllabus and catalog information was generally publicly accessible. If the syllabus of a capstone course was not publicly accessible, the researcher contacted the instructor who was teaching it (or had taught

it) and requested the document(s). Capstone courses are a required component of all programs at Elon University, so judgment sampling was used to choose documents from each administrative unit that represented the five disciplinary groupings.

Penn State Harrisburg

Email requests for capstone syllabi were sent to the directors of the five administrative units that comprise Penn State Harrisburg. Unit directors either sent syllabi directly to the researchers or directed faculty members to respond to the request. The researcher received 11 syllabi. Seven syllabi for master's degree programs were removed from the sample for a total of four syllabi. For the catalog descriptions, the researcher used the term *capstone* or synonyms (e.g., design, independent study, internship, seminar) to search for undergraduate courses in the proprietary course catalog. The search returned 45 catalog descriptions from three administrative units: Humanities, Business Administration, and STEM. The researcher then used judgment sampling to find 10 catalog descriptions to represent the three administrative units at the institution represented in the initial search (humanities, n=3; business, n=3; STEM, n=4).

Theoretical thematic analysis

Researchers performed theoretical thematic analysis, which relied on reflexive and recursive open and axial coding based on the research question (Braun et al 2019) to describe the purposes in the documents. Coding was performed in teams of two and supported by NVivo 12. Before reviewing the documents, the team members discussed the capstone purpose and agreed on a shared interpretation of the term. The coders then independently coded each phrase. Disagreement between two raters was settled by a third rater for a final decision whether to include a passage in the analysis. Inter-rater reliability on all purposes was measured two ways: the raw score mean was 89.49%, and the Krippendorff's Alpha (Krippendorff, 2012) score mean was 73.82%.

In the first pass through the documents, researchers used open coding to discover the purposes (including synonyms and cognates) collected from the review of comprehensive scholarship. After completion of the search for purposes in the documents, axial coding used contextual analysis of passages that contained the purposes to ensure that the passage related to the purposes of the CEs. As part of the axial coding, researchers omitted purposes related only to classroom management and procedures (see Appendix). For example, syllabi references to classwork were not included in the purposes of *work*. Instead, researchers focused only on purposes that addressed issues related to *work* as post-graduation employment and/or career topics addressed in a CE.

RESULTS

Stage one: CE purposes from review of comprehensive scholarship

In our review of comprehensive scholarship about CE purposes, scholars noted several purposes of capstone courses across disciplines and institutions (see table 4). For our study, we organized these purposes into three broad domains: (1) *post-graduation life and employment*; (2) *academic skills* that transfer to post-graduation careers; and (3) *meaningful undergraduate event*. Though many of the purposes could be categorized in more than one domain, these classifications can assist in creating meaning and observations about the general purposes of capstone courses.

In the domain of *post-graduation life and employment*, course purposes included *civic engagement/service learning*, *leadership*, *career planning*, and *alumni recruitment*. Civic engagement/service learning entails the need to become a productive participant in local and national society in areas such as politics, religion, and community affairs (Padgett and Kilgo 2012; AACU 2014; Young et al 2017). Capstone course goals also reflected a need to consider students' leadership roles in civic, business, and professional life (Cuseo 1998; Gardner and Van der Veer 1998; Henscheid et al 2000; Padgett and Kilgo 2012; Young et al 2017; AACU 2014). Many courses also sought to prepare students through career planning, including job searches and the transition between college and becoming a fully independent member of society (Cuseo 1998; Gardner and Van der Veer 1998; Henscheid et al 2000; Lee and Loton 2019; Young et al 2017). Three studies also described goals related to development of students as alumni who would continue to support institutional goals including fundraising and recruitment activities (Cuseo 1998; Padgett and Kilgo 2012; Young et al 2017).

The second domain, *academic skills,* are those that have been developed in the first three years of a student's undergraduate education. *Oral* and *written communication*, *critical thinking*, and *problem solving* emerged as consistent themes across disciplines and institutions (Lee and Loton 2019; AACU 2014; Young et al 2017). Of note in four studies was an emphasis on preparation for graduate school (Cuseo 1998; Henscheid et al 2000; Lee and Loton 2019; Padgett and Kilgo 2012). The American Association of Colleges and Universities Value Rubric Development Project (AACU 2014) also proposed several categories that address the academic skills domain, including *global learning*, *information literacy*, *reading*, and *integrative learning*, which institutions can address in courses during the first three years to serve as guides to move toward the senior year experience.

The third domain, *meaningful academic event*, emphasizes the interrelationships among general education courses, major courses, faculty teaching, and university values (Smith 1998). For example, scholars described *integrative learning* as an opportunity to provide vertical alignment with earlier undergraduate courses and to provide a rationale for the capstone practice (Cuseo 1998; Henscheid et al 2000; Padgett and Kilgo 2012). Curricula that support a *coherent academic experience* ensure that students advance through their undergraduate classes in meaningful ways that scaffold learning opportunities from general education and introductory courses to advanced courses and that culminate with a CE that draws on the diachronic undergraduate curriculum.

We generated a list of purposes, including those discussed above, by collecting all purposes listed in the six extant, comprehensive scholarly studies. The full list and associated sources are shown in table 4.

Table 4. Capstone experience purposes identified in comprehensive review of scholarly literature

Purpose	Cuseo (1998)	Henscheid et al (2000)[8]	Padgett and Kilgo (2012)[9]	AACU Value Rubrics (2014)	Young et al (2017)	Lee and Loton (2019)
Alumni development	X		X		X	
Career planning	X					X
Civic engagement-service learning		X	X	X	X	X
Coherent academic experience	X	X	X			
Creative thinking				X		
Critical thinking			X	X	X	X
Ethical reasoning			X	X		
Financial literacy	X					
Global learning				X	X	
Independence			X			X
Information literacy				X		
Inquiry and analysis				X		X
Institutional resources				X	X	
Integrative learning	X	X		X		
Intercultural knowledge				X	X	
Leadership education	X	X	X		X	
Lifelong learning				X		
Oral communication			X	X	X	X
Preparation for graduate school	X	X	X		X	X
Preparation for life after college	X	X	X		X	
Problem solving			X	X	X	X
Quantitative literacy				X		
Reading				X		
Reflection				X		X
Student engagement					X	
Study skills					X	
Support networks					X	
Teamwork			X	X	X	X
Written communication	X		X	X	X	X

Stage two: Theoretical thematic analysis of purposes in syllabi and catalogs

In the document sample, the research team coded 29 purposes found in the initial review of six capstone studies (see table 5). The mean of purposes per document was 6.9. No document addressed more than 15 of the purposes, while 28 documents addressed one to five purposes, and

five documents did not address any purposes (see table 5). The most addressed purpose was *inquiry and analysis* (60% of all documents). No passages that related to three purposes from the literature review were identified*: institutional resources, study skills*, and *financial literacy*.

Table 5. Capstone experience purposes rankings in all documents

Rank	Purpose	Documents (n=84)	%
1	Inquiry and analysis	50	60
2	Written communication	43	51
3	Student engagement	42	50
4	Reading	40	48
5	Critical thinking	35	42
6	Reflection	33	38
7	Oral communication	29	35
8	Teamwork	28	33
9	Career planning	26	31
10	Integrative learning	26	31
11	Problem solving	25	30
12	Independence	21	25
13	Ethical reasoning	20	24
14	Support networks	17	20
15	Intercultural knowledge	15	18
16	Coherent academic experience	14	17
17	Creative thinking	13	15
18	Leadership education	11	13
19	Preparation for life after college	8	10
20	Global learning	7	8
21	Civic engagement/service learning	3	4
22	Information literacy	3	4
23	Preparation for graduate school	3	4
24	Alumni development	1	1
25	Life-long learning	1	1
26	Quantitative literacy	1	1
27	Financial literacy	0	0
28	Institutional resources	0	0
29	Study skills	0	0

DISCUSSION

This study analyzed a sample of syllabi and catalog descriptions intended to give students information about the purposes of CEs. The documents represented three countries and five institutions, including medium and large, research and teaching, public and private. The results of the study reflect the emphases in catalog descriptions and syllabi that instantiate purposes identified as important to administrators, faculty members, and their students in the domains of

post-graduation life and employment, *academic skills*, and *meaningful undergraduate event*. While limited in scope and sample size, this study generally supported conclusions of scholarly literature on CE purposes. On a granular level, though, some documents in our study did not reflect earlier scholarly research on several purposes.

Academic skills domain

The domain of *academic skills* encompassed nearly half of the total purposes in the documents. As expected, document authors focused on the skills that could be applied after graduation and well beyond the undergraduate classroom. Consistent with the studies in the literature review and other research findings, four academic skills purposes were addressed by 40% or more of the documents: *inquiry and analysis*, *written communication*, *reading*, and *critical thinking*. *Inquiry and analysis* (60%) as a purpose was ranked as "extremely important" in Lee and Loton's study (2019, 8), while Healey and Jenkins (2009) noted the strong role of these purposes in the undergraduate dissertation component of U.K. capstone courses. *Written communication* (51%) took a similarly high position as a top-five purpose for capstones in Padgett and Kilgo's (2012) research. Moreover, Young et al (2017) found that 36% of public institutions and 37% of private institutions listed writing as a purpose in capstone courses. *Reading* is a relatively new purpose according to the AACU Rubrics (2014), which note that, traditionally, "college professors have not considered the teaching of reading necessary"; however, "[e]ven the strongest, most experienced readers making the transition from high school to college have not learned what they need to know and do to make sense of texts in the context of professional and academic scholarship." This position is substantiated with 48% of the documents in our study advocating actively engaging with texts to address professional and academic ventures. *Critical thinking* (42%) also reflects other studies' findings as an important purpose (Padgett and Kilgo 2012, Young et al 2017; AACU 2014).

Two additional purposes in the academic skills domain, *oral communication* and *problem solving*, were coded in 30-40% of the documents. Though *oral communication* appeared as a purpose in 35% of the sample documents, this result is still substantially lower than findings in several studies (Hauhart and Grahe 2010; Hauhart and Grahe 2012; Henscheid et al 2000; Padgett and Kilgo 2012; Schermer and Gray 2013). *Problem solving* (30%) and *creative thinking* (16%) support Young et al's (2017) findings from their U.S. survey of CEs in 314 public and private institutions. *Global learning* (8%) fell about 10 percentage points lower than Young et al's (2017) results.

While there is good alignment between the literature and our results for a majority of the purposes in this domain, there are two notable differences: *oral communication* and *global learning*. Given the importance placed on these two outcomes by the literature, it may be worthwhile for instructors and administrators to determine whether these outcomes should be foregrounded in their student-facing documentation. Alternatively, if further study indicates that capstones (intentionally) do not address these purposes, then researchers may wish to investigate why studies have placed higher importance on them where institutions do not.

Post-graduation life and employment domain

Post-graduation life and employment comprised 16 purposes and focused on skills that scholars have proposed are necessary for personal success after the undergraduate experience. The purposes ranged from the general *preparation for life after college* to the more specific *teamwork*, which was coded in one-third of documents and is a common purpose in the literature

on CEs (Karagozoglu 2018; Kim 2017; Lee and Loton 2019). The AACU Value Rubrics noted that teamwork should be evaluated as a process more than as a product (2014). Toward that goal, documents in our study outlined several approaches to monitoring team behavior including mindfulness exercises, weekly team meetings with the instructor, and addressing the ways that professionals work in teams.

While the *academic skills* domain in our study generally substantiated extant literature on the importance of several purposes, the opposite results occurred in the *post-graduation life and employment* domain documents in our study. Indeed, several of the most highly regarded purposes in our review of literature achieved some of the lowest percentages in the sample, suggesting that institutions, administrative units, and curriculums may not have considered preparation for students' futures as an important goal of their courses. Several studies emphasized the importance of *preparation for graduate school* (e.g., Cunningham et al 2015; Cuseo 1998; Gardner and Van der Veer 1998; Henscheid et al 2000; Young et al 2017), while other scholars have indicated the importance of *preparation for life after college* (e.g., Fernández, Lundell, and Kerrigan 2019; Martin 2018). However, only four percent of the documents in our study addressed the former purpose and 10 percent addressed the latter. Instructors may instead have chosen to address those purposes in *career planning*, which was coded in 31% of the documents. Additionally, only 4% of documents in our study addressed *civic engagement/service learning*, though this category was highlighted as an important purpose in several studies (e.g., Bringle et al 2016; Mackenzie, Hinchey, and Cornforth 2019).

Meaningful undergraduate event domain

Though only four purposes comprised the domain of *meaningful undergraduate event*, nearly one-third of all documents in our study addressed *student engagement*, *reflection*, *integrative learning*, and/or *coherent academic experience*. By far, *student engagement*, which appeared in 50% of all documents, was the most-coded purpose in the *post-graduation life and employment* domain and nearly doubled the *student engagement* percentages presented by Young et al (2017). Definitions of student engagement encompass not only "the time and effort students devote to educationally purposeful activities" (Doing 2010) but also how instructors create and implement curriculum that focuses on these activities (Coates 2010; see also Wang and Bohn 2018). Documents in the sample used *student engagement* in various ways: to involve students, occupy their time, or engross them in the course content and activities. Documents also addressed various means of participation to measure student engagement including reflection exercises, class discussions, and attendance both in class and during outside projects.

Thirty-nine percent of all documents in the sample included reflection assignments, making *reflection* one of the most prevalent purposes among all domains. Gardner and Van der Veer (1998) noted that "opportunities for reflection on the meaning of the college experience" are an important theme in several chapters in their edited collection (7). However, reflection as a purpose is conspicuously absent from Young et al's (2017) large study of U.S. institutions and is only briefly addressed in Lee and Loton's (2019) work. Including reflection as a purpose in CEs has been advocated and studied in many scholarly articles in the ensuing decades (e.g., Cyphert, Dodge, and Duclos 2016; Huang-Saad et al 2016; Landis, Scott, and Kahn 2015). In the discipline of engineering, for example, Marsolek and Canney (2016) argued that "Reflection is a strategy that helps students to gain a deeper understanding of an educational experience, which can be broadly related to three areas: technical knowledge, understanding of themselves as learners, and development of their personal and professional identities" (1). Several documents

in our study foregrounded reflection as a course purpose. For example, a catalog description from Boston College begins with "This course starts with students reflecting on their education at Boston College." A syllabus from Elon University includes a paper assignment with "autobiographical reflections." And an engineering syllabus from the University of Guelph asks students to "prepare a reflection on project management and work."

Integrative learning has been a hallmark of capstones and emphasizes the incorporation of previous material that students have mastered into a new topic, task, or framework (Star-Glass and Ali 2012). Lee and Loton (2019) argued that *integrative learning* is an essential part of "agency and personal management" (13) and thus empowers students to create their own learning experiences (see also Stephen, Parente, and Brown, 2002). Nearly one-third of all documents in our study addressed integrative learning. *Integrative learning* may have elements similar to a *coherent academic experience* in that the purpose asks students to use information from previous undergraduate classes. However, *integrative learning* also had a transitional component that looked toward a future career. For example, a business course at the University of Guelph maintained that "Students will be challenged to integrate their knowledge of organizational behavior and the various human resource functions to develop strategic solutions to organizational issues."

Coherent academic experience, also known as "cumulative curriculum" (Kain 1999; Smith 1998), as a capstone purpose appears in "courses or interdisciplinary classes and projects attempting to link the general curriculum to the major" (Gardner 1998, 15). Documents coded with this purpose adhered to this definition. A catalog description from Elon University described an English course "as a capstone experience that will require you to integrate and extend the skills and knowledge that you have acquired in previous literature courses." A syllabus from Penn State Harrisburg stated that "Each student will synthesize the experiences and understandings developed through prior courses in the undergraduate art education program." And a University of Guelph animal biosciences syllabus indicated, "This seminar course integrates discussion on selected current global, national and regional issues in the equine industry, building upon knowledge gained in earlier courses." While one study noted that only about 5% of 864 responding institutions listed *coherent academic experience* as a primary purpose, this amount placed it in the top five overall purposes listed (Henscheid et al 2000). However, *coherent academic experience* was only coded in 17% of all documents in our study. Furthermore, 11 of the 14 documents were catalog descriptions, which indicates a possible disconnect between administrative/curricular purposes and instructor purposes.

Methodological Limitations

This study provides a description of student-facing documents and their purposes for CEs and therefore does not identify disciplinary or national differences. Our future research will use this same sample to analyze the individual contributions of disciplines (or disciplinary groups), institutions, and countries. We encourage other interested researchers to draw upon additional larger and broader institutional samples. Furthermore, this study was constrained by the review and analysis of a relatively small and uneven sample of documents that represented only written communication with students and cannot account for oral discussion of purposes that may occur in classes. The study provides a first glimpse into this topic, and we invite other researchers to perform a broader and more systematic sampling and analysis of institutional documentation. The methods we used to define the categories and to sort observations into categories may be a useful reference point for additional observational and descriptive studies by other researchers.

Studies of CE purposes are also continually challenged by semantic issues among instructors and administrators (as document authors), and the scholars who study the documents (Devlin 2013; Hammer et al 2018). Our method encountered the same issues. The variations in percentages that we did find may in part be due to the definitional differences among the various studies on which we based our work. For example, semantic discrepancy may account for the relatively low percentages of documents in our sample for some of the purposes in the *post-graduation life and employment* domain such as *preparation for life after college* since other purposes (e.g., *career planning*) overlapped with these examples. Furthermore, document authors might have assumed that *any* university course should work to prepare students for their post-graduation lives and so feel no need to state the topic overtly in a written description.

Implications for educators

The areas in which our study found differences with previous research may reflect a lack of vertical coordination among administrators, who provide curricular planning and guidance, and instructors, who implement the curriculum in the classroom. For example, *a coherent academic experience* was found in a relatively small number of documents. Furthermore, omission of purposes in documents may occur because instructors believe that students may not need this information to have a successful CE. Instructors may simply not think it necessary to explain and justify their pedagogical choices and university goals to students. As Hammer et al (2018) observed, "Perceiving teacher intention for a given unit is further complicated by a general tendency towards implied or tacit communication of expected student learning outcomes" (740).

Other purposes that were not as prevalent in documents in our study may have been omitted by instructors and/or administrators because of their ubiquitous place in education. For example, *oral communication*, while coded in more than one-third of all documents in our study, may also be viewed as an implied purpose in most face-to-face courses and thus may be omitted in course purposes. Moreover, a single purpose identified in a written document may indicate that a fuller class discussion could or would entail other purposes in that domain. For example, a document in the post-graduation life and employment domain may have only included language about graduate school (and thus could only be coded as *preparation for graduate school)*. However, the breadth and depth of the assignments and class discussions may very well address other purposes in the domain such as *preparation for life after college* or *career planning*.

Administrators and instructors should consider whether this information would benefit students as they work to complete the course. Additionally, since we did not identify any passages in the document sample that addressed *financial literacy*, *institutional resources*, or *study skills*, our study suggests that instructors and administrators might consider re-evaluating the roles of these purposes in their programs to add them or to justify their omission during strategic planning.

CONCLUSION

CEs serve a variety of purposes as places to apply academic skills, explore post-graduate life and employment, and achieve a meaningful undergraduate event. Our study used a set of purposes established by previous scholarly research to explore the purposes of CEs in five institutions represented by three countries and several disciplines. As definitions of purposes for CEs evolve, instructors should consider using syllabi to better reflect institutional and programmatic missions in their descriptions of learning outcomes for their students.

Furthermore, catalog descriptions, which are often written or edited by administrators, often act as curricular guides for instructors as well as brief introductions for students to use in choosing their courses. Consequently, authors of these documents should consider ways to better signal intended course content to instructors, students, program reviewers, accreditation evaluators, and other audiences.

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NOTES

1. We found no evidence of equivalent data for other countries.
2. We use the term *purposes* throughout this article. In addition to *purposes*, scholars have used *goals*, *aims*, *outcomes*, and *objectives* interchangeably in the literature about CEs. Scholars in the U.S. also use the terms *seminars, experiences, classes,* and *courses* interchangeably.
3. This paper is the first stage of a larger project. Later stages will seek to determine whether (1) student and faculty perceptions of purposes are consistent with that documentation, (2) if the differences among disciplines are purposeful, and (3) how disciplines, countries, and institutions can learn from each other's best practices.

4. This paper uses *syllabi* and *catalogs* as aggregate terms.
5. Young et al (2017) note that large, multi-institutional surveys such as the National Survey of Student Engagement have had sections devoted to CEs. However, the goals of those projects were wide-ranging and limited to student rather than institutional data collection.
6. The Delphi technique is "a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem" (Linstone and Turoff, 1979, p. 3). Furthermore, "By obtaining the consensus of a group of experts using the process, researchers can identify and prioritize issues and develop a framework to recognize them" (Habibi, Sarafrazi, and Izadyar, 2014).
7. Catalog descriptions are not published at this institution. The University of the West of England system does not have a cognate for the U.S. and Canadian versions of the catalog/calendar.
8. Henscheid et al (2000) only included the "Number One Goal of Senior Seminars and Capstone Courses" at institutions in their survey results. Respondents stated that their capstone courses were "nearly four times more likely to focus on the academic major …. However, the second and third most frequently marked number one goals both concern the work world" (p. 11).
9. Padgett and Kilgo (2012) noted that the survey "asked respondents to report the three most important capstone or course objectives established within the culminating experience" (p. 12).
10. This passage was also coded as teamwork.
11. This passage was also coded as written communication.

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APPENDIX

Sample of Purposes Identified in Document Passages

Purpose	Genre	Disciplinary Group	Passage
Critical thinking	Catalog	Humanities	"Applied critical analysis of any aspect of society and/or culture from a contemporary feminist perspective."
Student engagement	Catalog	Interdisciplinary	"In this capstone course, students will critically reflect on the connections they have developed between their personal identity as engaged citizens and the impacts their contributions have made with the broader community."
Problem solving	Catalog	STEM	"This course is intended to establish the foundation for organizational and procedural understanding in construction engineering. The student will gain the knowledge necessary to apply engineering principles in analyzing economical approaches to construction problems."
Leadership education	Syllabus	Business	"This is done to provide students with an opportunity to gain experience in team decision-making with respect to leadership, work delegation and presentation of results."[10]
Ethical reasoning	Syllabus	Social Science	"Professional and Ethical Behaviour"
Written communication	Syllabus	General Education	"The papers you write will vary depending on the focus of our discussions."
Oral Communication	Catalog	Humanities	"As part of their final assessment, students will conduct research, formally present their findings orally to department members, and write an in-depth research project in Spanish."[11]