A Survey and Analysis of Undergraduate Capstone Experiences at Hamline University

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What is a Capstone Experience?

Most broadly, a capstone course or experience “should enable the student to bring to a symbolic conclusion the acquisition of knowledge and skills that has preceded this final effort” while integrating and applying what students have learned throughout the major or college career. As such, the successful capstone experience will synthesize knowledge, insight, and personal development and will help bridge the transition from undergraduate student to college graduate. Successful capstone courses are both summative and transformational in that students will synthesize learning throughout the major (or college more generally) while recognizing and capitalizing on the capstone experience as preparation for life after college in a career or through further education.

Capstone experiences are generally offered as one of two types of courses: discipline-based courses, often including a major paper or presentation, or interdisciplinary courses aimed to synthesize the general education and the major coursework. Beyond this, the main product or project of a capstone course is often a senior thesis or research paper, exhibition, or performance; a comprehensive exam; career or transition preparation; or an internship. Capstone courses are usually credit-bearing courses required for either the major or the general education requirements.

Background

In 1998, the Boyer Commission made ten recommendations that transformed university education. These recommendations include what have become cornerstones in undergraduate education, including student research, interdisciplinary and integrated courses, and first-year experiences and capstone experiences. Around this same time, Gardner and colleagues published a seminal piece on senior year experiences. Following these two reports, the first National Survey of Senior Seminars and Capstone Courses was conducted in 1999, administered by the National Resource Center for the First-Year Experience and Students in Transition. The report that followed the survey laid the framework for understanding the variety of capstone courses offered at over 700 different institutions of higher education. Of these schools, nearly three-quarters offered at least some kind of capstone experience, with the vast majority (70.3%) being discipline- or department-based courses. Following this, roughly half of responding schools indicated the top goal for the capstone was to foster integration and synthesis within the academic major. Finally, the report found that most capstone courses are required for the major or general curriculum, run for a single term, enroll fewer than 30 students, and require a significant project or presentation.

The most recent comprehensive assessment of capstone experiences nationwide was conducted in 2011 in the National Survey of Senior Seminars and Capstone Courses. By this time, nearly 97% of participating schools offered some kind of capstone experience. Eighty-five percent of capstone experiences across institutions were discipline-based, about three-fifths included a senior research paper or art exhibition (65% and 58%, respectively), and almost half (47%) included an internship (see Appendix Table 1 for results from this report). The most commonly cited objective for capstones was to increase or improve critical thinking, analytical, or problem-solving skills. Regardless of school size or type, the vast majority of capstone courses enroll fewer than 25 students (with over 55% of courses at private universities enrolling under 15 students and another 23.4%, or nearly 80% overall with under 20 students). A large majority (roughly 75% overall) are taught by full-time faculty, with about half of private colleges requiring training for new instructors, particularly if the course is project-based.
Many capstone experiences do just this. High-impact practices expose students to diversity and engagement on and off campus and can offer the life-changing opportunity for students to better situate themselves in the context of the broader world, providing the tools and confidence to move to life beyond college. Many capstone experiences do just this.

There are several recent and ongoing efforts to assess capstone experiences, largely driven by initiatives from the Association of American Colleges and Universities (AAC&U). A large survey and assessment of capstones at four private liberal arts schools found increases in critical thinking, written and oral communication skills, and research and project-management skills by students in capstone courses. Beyond student outcomes, faculty also reported significant benefits and a sense of satisfaction from mentoring students in capstone courses.10

Through its Integrative Learning framework, the AAC&U emphasizes the importance of capstones, calling on universities to “engage students in signature work that will prepare them to integrate and apply their learning to a significant project.”11 Signature work is defined as “integrating and applying [student] learning to complex problems and projects that are important to the student and important to society.”12 Projects include community engagement, applied learning, independent study projects, team-based capstone projects, and e-portfolios.13

### The Benefits of Capstone Courses

Capstone courses provide students the opportunity to develop the kinds of skills necessary for success as they transition to life beyond college. The AAC&U commissioned a recent study of 400 employers and over 600 students with goal of understanding how prepared graduates are for work in today’s economy.14 Some key findings from this report include overwhelming endorsement from employers of the necessity for both field-specific and broad knowledge and the importance of applied learning projects. A vast majority of students and employers (70-95% across items) see value in internships, senior thesis projects, writing-intensive courses, collaborative research, and service-learning projects. In the 2016 Jobs Outlook Survey by the National Association of Colleges and Employers (NACE), employers identified trends they look for when hiring, with leadership, teamwork, and written, oral, and problem-solving skills as the top five most valued attributes in potential employees.15

High-quality capstone courses integrate coursework, experiences, and skills across the major and curriculum, and students recognize the value of the capstone course to help synthesize learning and prepare them for life beyond college.16 A recent Gallup poll identified six college experiences that are key to success in life after college and of these, two (engaging in a semester-long research project and completing an internship that applied course learning) are directly experienced in capstone courses.17 Additionally, several studies have attempted to formally understand student perspectives on the impact of capstone courses. Students generally recognize the benefits of their capstone projects. A review of qualitative responses from students show they recognize and appreciate the synthesized learning that takes place in capstone courses, they find value and pride in their capstone projects, and they see capstones as meaningful preparation for work or post-graduate studies.18

### Connecting Capstones and the Hamline Plan

Many benefits found in capstone courses are addressed elsewhere in the Hamline Plan, Hamline’s integrated undergraduate general education curriculum. The Liberal Education as Practice (LEAP) requirement includes learning outcomes related to integrative learning and personal development. The Independent Critical Inquiry and Information Literacy (Q) requirement requires students to frame and undertake a critical inquiry project by drawing on multiple perspectives. Hamline students develop and demonstrate their communication skills through Writing Intensive (W) and Speaking Intensive (O) courses. While Hamline undergraduates are exposed to the skills and experiences typically included in capstone courses (and valued by students and employers) via the Hamline Plan, Hamline does not have a formal or explicit capstone requirement that would provide a platform for these skills to be brought together in a summative, integrative experience at the end of every student’s Hamline career.

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**High-impact practices:**

- require active participation and concentrated effort from students.
- help students build substantive relationships through interaction with faculty and peers.
- include structured opportunities for rich and frequent feedback on student performance.
- provide platforms for students to engage across difference.
- challenge students to practice and reflect on what they are learning in new situations and applied settings.
- facilitate student reflection on personal growth and academic development.
Creating an Inventory of Capstone Experiences at Hamline

To begin the project, department chairs and program directors were asked to submit capstone course syllabi from their programs for the last two years (AY 2013-14 and 2014-15). From two email solicitations, roughly 60% of programs responded and provided nearly 50 course syllabi. To supplement missing information from non-response, information was gathered from Piperline to complete a rough inventory of capstone classes and experiences for 47 undergraduate majors and programs.

After receiving course syllabi and conducting research on “typical” capstone course offerings at other institutions, the Hamline courses were coded into six categories: internship seminars, topical seminars, original research seminars, applied or simulation seminars, reflection seminars, and an auxiliary “unknown” category. These categories generally reflect the common types of capstone courses described above. Further, the Hamline Plan letters offered in capstone courses were recorded and, to the extent possible, themes in the nature and type of assignments required for the courses were identified. Finally, Hamline’s Office of Institutional Effectiveness was solicited to provide relevant data gathered in the National Survey of Student Engagement (NSSE) and in Hamline’s annual Senior Survey.

Results

Despite no university-wide required capstone course, nearly every major and program at Hamline requires some sort of capstone or culminating project or course. Out of the 47 majors and programs included, 41 (87%) have an identifiable capstone course (see Figure 1). In line with this, 85% of Hamline seniors report they have or plan to complete a capstone course (see Figure 2, source NSSE). This 85% puts Hamline in line with other NACU schools (80%) and above average in our Carnegie classification (67%).

Regarding the kinds of capstone courses taught at Hamline in the identified capstone courses, 40% have as a primary distinction the completion of a major research project and an additional 21% are disciplinary seminar courses (that may or may not contain a final research paper or project, see Figure 3). Fifteen percent of capstone courses (generally those in Business and Education majors and programs) are simulation or applied courses designed to mimic running a business or classroom (student) teaching. These courses are designed to synthesize the learning throughout the major in an applied setting. Nine percent of capstone courses at Hamline are internship seminars. Based on a survey of the syllabi from these courses, internship seminars generally include coursework requirements tied to the internship site. Two percent (one major) was identified as a reflection-based course, focusing on individual reflection on one’s self and one’s vocation. Finally, 13% were unknown or some other type of course or experience.
However, majors and programs vary quite a bit with respect to other characteristics. In 79% of the programs with an identifiable capstone course there is a single capstone course requirement; 21% of majors and programs offer several different capstone course options (e.g. any 5xxx-level seminar course, results not shown). Further, where identifiable, the similarity across capstone course offerings within programs and majors was assessed. Results are shown in Figure 4. Roughly half of majors and programs (46%) offer capstone courses similar in both form and content while 7% of majors and programs offer capstone experiences that might differ quite a bit each time offered. Capstones that differ quite a bit are generally programs with different tracks within the major or those that identified a required a 5000-level elective as the capstone course. Capstones similar in form but not content tend to be senior seminar courses for which content might change semester to semester but the main assignments do not change. An example of a capstone offering similar in content but not form might be programs that require a final project but the form these take differ from course to course or by students within the course.

While primarily focused within majors, capstones are fairly well integrated into the general education curriculum at Hamline via the Hamline Plan (HP) distinctions offered in capstone courses. Figure 5 shows the number of HP components attached to capstone courses. Most capstone courses carry at least one HP letter (73%), with over 50% carrying two (31.7%) or three (29.3%) letters. Overall, five different Hamline Plan letters are included in capstone courses (W – Writing Intensive, O – Speaking Intensive, P – LEAP: Liberal Education as Practice, Q – Independent Critical Inquire and Information Literacy, and D – Diversity) with the W and Q being most common letters offered (57% and 49%, respectively). Figure 6 displays the frequency of HP offerings across programs.

Capstone course syllabi offered a sense of the kind of assignments required in capstone courses (beyond research papers or internships that would have been the distinguishing characteristic of course types). As observed from the syllabi, roughly 12% of courses required participation in the Career Development Center’s Practice Interview Program, 17% had some sort of reflection or reflective writing component, and nearly 70% required some form of student presentations. Results are shown in Figure 7.

Thus, in addition to the major projects completed as part of the core course requirements, in several instances, students are working toward personal reflection and development as well as beginning to transition to life after college with these kinds of capstone assignments.
Other Capstone Models

In addition to information about capstones nationally, capstone requirements at other member schools of the Associated Colleges of the Twin Cities (ACTC) were also researched.

Like Hamline, the University of St. Thomas\(^1\) does not have a stated capstone requirement. A brief survey of websites for several majors shows greater diversity than Hamline in whether or how capstone courses are offered across programs and majors.

Both Macalester College\(^2\) and Augsburg College\(^3\) have a capstone course required as part of the general education requirements. At these two schools, capstone courses are offered within the major, and a review of program websites suggests the courses tend to differ within majors in a manner similar to the diversity of capstones at Hamline.

Finally, St. Catherine University\(^4\) requires an interdisciplinary capstone course completed in the junior or senior year.

Summary

Capstone courses are a common feature at colleges and universities across the country. These courses may be discipline-based or interdisciplinary, and typically involve a thesis or research paper, exhibition or performance, internship, or comprehensive exam.

High quality capstone courses, experiences, or signature work projects require students to integrate and apply their learning throughout the major or general education requirements. In this sense, capstones are both summative and transformational. Indeed, students recognize and value the capstone experience to bring to a closure their college coursework and prepare them for life beyond college.

Without a university-wide capstone requirement at Hamline, nearly every program and major requires some form of capstone course or experience. These capstones are often tied to larger university efforts in the general education (Hamline Plan) requirements, but are not by design or implementation necessarily tied to major or university learning outcomes. Both within and across majors and programs, there is a lack of consistency in capstone requirements, projects, and student experiences.

While Hamline is doing many things “right” with respect to capstones, there is much room for improvement moving forward. This might include issues such as curricular changes a within majors, university-wide curricular changes in core requirements, some sort of common component or requirement across courses, ongoing instructor training or engagement, or even simply common course numbering and titles across programs.

Recommendations

Based on the above findings at Hamline and in accordance with ongoing initiatives and best practices outlined by the AAC&U, the following recommendations are offered.

For departments and programs:

- Review major learning outcomes and curricular objectives to identify goals to be fulfilled in a capstone experience.
- Establish assignments, experiences, or projects expected to be fulfilled by all students in the major as part of the capstone experience.
- Align capstone requirements with other Hamline Plan offerings in the major.

For CLOA and UCC (university-level):

- Articulate the value of a unique senior-year capstone course or experience (akin to the first year experience in the first year seminar).
- Clarify how capstone courses fit with current or new initiatives related to undergraduate learning outcomes and the Hamline Plan.
- Begin dialogue within colleges regarding how capstones fit into the current Hamline Plan.
- Determine whether and how capstone courses and signature works might be incorporated or required as a university-wide required course, experience, or graduation requirement.
- Identify mechanisms to support faculty in capstone course development.
Appendix Table 1: Capstone Course Types Nationally

<table>
<thead>
<tr>
<th>Type of senior capstone experience</th>
<th>Discrete senior capstone experience %</th>
<th>Primary senior capstone experience %</th>
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<tbody>
<tr>
<td>Discipline-based capstone course</td>
<td>84.7</td>
<td>59.6</td>
</tr>
<tr>
<td>Interdisciplinary capstone course</td>
<td>33.2</td>
<td>12.9</td>
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<tr>
<td>Comprehensive exam</td>
<td>20.1</td>
<td>2.4</td>
</tr>
<tr>
<td>Exhibition of performing, musical, or visual arts</td>
<td>58.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Internship</td>
<td>46.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Senior thesis or undergraduate research paper</td>
<td>64.6</td>
<td>12.9</td>
</tr>
<tr>
<td>Other</td>
<td>7.1</td>
<td>7.1</td>
</tr>
</tbody>
</table>

Note: Respondents were allowed to check “all that apply” for discrete senior capstone experience, while the primary senior capstone experience was directed toward the one senior capstone experience with the highest total enrollment on their campus.


Appendix Table 2: Included Majors and Programs

Accounting
Anthropology
Art History
Biochemistry
Biology
Business Analytics
Chemistry
Chinese
Communication Studies
Computer Science
Conflict Studies
Creative Writing
Criminal Justice
Digital Media Arts
East Asian Studies
Economics
Education
English
Environmental Studies
Exercise Science
Finance
Forensic Science
French
Global Studies
History
International Journalism
Latin American Studies
Legal Studies
Management
Marketing
Mathematics
Music
Nonprofit Management
Paralegal Studies
Philosophy
Physics
Political Science
Psychology
Public Health Sciences
Physics
Religion
Social Justice
Social Studies
Sociology
Spanish
Studio Arts
Theatre Arts
Women’s Studies
The work informing this report was funded by the 2014–2015 Assessment Fellow program of the Hamline University Committee on Learning Outcomes Assessment (CLOA) and supported by the Hamline University Center for Teaching and Learning. Recognizing the value of the capstone course as part of the undergraduate experience at Hamline, CLOA designated a Capstone Fellow to learn more about the capstone experience at Hamline. Specifically, the fellow was asked to 1) create an inventory of capstones at the program level, 2) to conduct a descriptive analysis of these summative courses across the university and to highlight the similarities and differences that might inform a unifying statement of the Hamline capstone experience, and 3) inform this discussion with external information on capstones outside of Hamline.

A full version of this report is available for electronic download at http://www.hamline.edu/offices/center-for-teaching-and-learning/high-impact-practices/capstone-report/.

Please direct all inquiries to ctl@hamline.edu.