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Promoting Undergraduate Research Through Integrative Learning

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Educators in higher education often seek innovative pedagogies to include in their classrooms. This article describes an integrative learning experience and details the planning, implementation, considerations, and benefits of creating a major-specific undergraduate research day. The event created an opportunity for students to gain confidence and practice discussing their work during research poster presentations. The event also allowed them to integrate classroom activities and extracurricular experiences to make meaningful connections. Identifying the steps, considerations, and outcomes may inform educators considering implementing this technique. The description of the undergraduate research day is applicable across disciplines and is relevant to faculty and staff working with undergraduate students.

College educators often seek innovative pedagogies to include in their classrooms. Ideally, these methodologies integrate curriculum learning outcomes and skills sought by potential employers. Including new pedagogies may be challenging, but if educators understand practical aspects of incorporating such pedagogies, they may easily incorporate them while creating a positive experience for their students.

This article describes an integrative learning experience and details the planning, implementation, considerations, and benefits of creating a major-specific, undergraduate research day. Integrative learning can be defined as the process of creating connections between the skill and knowledge from curricular sources and experiences, links theory and practice, and uses a variety of viewpoints to aid student understanding of issues (Huber & Hutchings, 2004; Huber, Hutchings, Gale, Miller, & Breen, 2007). The pedagogy integrates lessons to help students make connections across curricula (Integrative Learning, n.d.). The description of the undergraduate research day is applicable across disciplines and relevant to faculty and staff working with undergraduate students. I will present my findings to the following questions:

- How do educators create an integrative learning experience that encourages students to combine curriculum, soft skills, and research?
- How do educators mitigate the risks involved in planning such experiences? What are some of the planning details and considerations needed for a successful event?

Background

The Bachelor of Science in Information Science (BSIS) program is a newer, small program in a College of Information and Communications. Forty-two students were declared majors in fall 2015.

While working with BSIS students, I realized most were comfortable presenting about a specific topic

usually related to an assignment. Most assignments had rubrics or criteria that provided specific guidelines and requirements. For example, an assignment may focus on a research topic that concluded with a final paper. While not uncommon, this type of assignment provides minimal engagement. Students seemed reluctant to start their own research projects or expand on class projects as they lacked detailed requirements and included more abstract concepts. It was unclear how such a project might help make meaningful connections between what was occurring in the classroom and their future careers.

I addressed this gap in confidence and meaningful connections by creating a major-specific research day, known as BSIS Day. The event created an opportunity for students to gain confidence and practice talking about their work during research poster presentations. It also allowed them to link classroom and extracurricular activities. Other benefits included fostering a sense of community by bringing together the faculty, staff, and students outside of the classroom and providing a chance to market the program.

Literature Review

This research is grounded in the intersection of three areas: 1) integrative learning, 2) undergraduate research, and 3) soft skills sought by employers. Published work in each area supports the benefits of an undergraduate research day and provides a foundation to the research questions.

Integrative Learning

Integrative learning is the first area guiding the study. The benefits of implementing integrative learning experiences are well documented in educational research and include the ability to make meaningful connections between curriculum, applied knowledge, and student experiences. The Association of American Colleges and Universities (AACU) and the Carnegie Foundation for

the Advancement of Teaching (2004) provided a Statement on Integrative Learning that encapsulates the rationale and goals of this pedagogy:

Fostering students' abilities to integrate learning—across courses, over time, and between campus and community life—is one of the most important goals and challenges of higher education. The undergraduate experience can be a fragmented landscape of general education courses, preparation for the major, co-curricular activities, and “the real world” beyond the campus. But an emphasis on integrative learning can help undergraduates put the pieces together and develop habits of mind that prepare them to make informed judgments in the conduct of personal, professional, and civic life (AACU, 2004, p. 1).

Integrative learning can be used to unite the sometimes fragmented undergraduate education. According to Boyer (1990), making and sharing these connections helps students professionally and personally: “The capacity to connect is central to scholarship broadly conceived—whether focused on discovery and creativity, integrating and interpreting knowledge from different disciplines, applying knowledge through real-world engagements, or teaching students and communicating with the public” (p. 2, as cited in Huber & Hutchings, 2004).

Integrative learning is just one piece of a complex learning experience. Students may have difficulties making these connections and require scaffolding or additional instruction. This instruction comes from the educator and the university infrastructure (Huber, Hutchings, & Gale, 2005). The university can include learning communities and other projects to aid students in creating meaningful connections (Gale, 2006). Assignments can be restructured to include reflection: a key factor in integrative learning that encourages students to make meaningful connections in their learning experiences (Mezirow, 1990).

Benefits of Undergraduate Research

This section reviews published studies illustrating the benefits of undergraduate research. This study looks specifically at the intersection of integrative learning and undergraduate research. Russell, Hancock, and McCullough (2007) discovered that students participating in undergraduate research positively increased their understanding, confidence, and awareness of research. These experiences also contributed to the students' desire to major in a STEM field (science, technology, engineering, or math). Participating in undergraduate research is beneficial for the retention and graduation rates of minority students (Barlow & Villarejo, 2004; Nagda,

Gregerman, Jonides, von Hippel, & Lerner, 1998). Other studies show that participating in undergraduate research can increase the perceived relevance of course works, confidence, and communication skills regardless of the student's major (Healey & Jenkins, 2009; Hunter, Larsen, & Seymour, 2007).

Soft skills

The final area directing the study is soft skills needed for employment. According to Heckman and Kautz (2012) soft skills are defined as “...personality traits, goals, motivations, and preferences that are valued in the labor market, in school, and in many other domains” (p. 451). Studies explored the importance of soft skills in higher education, in particular the ability to communicate both in writing and orally. An important component of leadership skills is the ability to effectively communicate with others (Adams, 2013; Crawford, Lang, Fink, Dalton, & Fielitz, 2011). Employers in the United States and Europe ranked writing and communication among the top three traits for employees with bachelors' and masters' degrees (Ghannadian, 2013). Identifying and cultivating the soft skills employers seek helps educators develop modern and marketable curricula.

Case Study and Pedagogy: BSIS Day

BSIS Day Goals and Outcomes

The goals and learning outcomes of BSIS Day were created based on feedback from instructors, our undergraduate advisory committee, and the existing mission of the undergraduate program. Other instructors observed students' reluctance to present or talk about research, as I had in my classes.

Based on this feedback, the short-term goal of BSIS Day was to create an event that allowed students the opportunity to present their research and make connections to course curriculum while developing confidence and soft skills. There were learning outcomes related to the goal: 1) introduce students to the research process, 2) create a poster that conveys their research and ideas, and 3) present their posters to attendees of BSIS Day. The long-term goal was to get BSIS students to participate in the university-wide undergraduate research day, which occurred the following semester.

Implementation

Planning BSIS Day was a year-long process. I kept observation notes and a journal to document the case study. The timeline is grouped into three phases. Each phase contains a description of the activities that

occurred along with key considerations and benefits I found relevant to the process. Early in the process, we established the goals and objectives of the event and secured approval and support from the administration.

Phase 1: 3-5 months before the event.

Defining research. The priority of the initial phase of the project was to help students define *research*. The University has an established Office of Undergraduate Research (OUR) that I consulted. They provided several definitions and examples that students could use as guidelines. The OUR intentionally used a broad definition to describe several research activities including: traditional research, internships, service-learning projects, and study abroad experiences (USC Office of Undergraduate Research, 2016). The definition allowed for activities in all majors to be considered a research activity. After obtaining permission from the OUR, resources were edited to be major specific. The only requirement about the research topic was that it has to be related to information science. Information science is a broad, interdisciplinary field so students with a variety of majors could find something fitting the criteria. In addition to the OUR research activities, BSIS students were encouraged to submit independent projects, group work, works-in-progress, and class projects. The flexibility of the definition allowed for more students to participate and integration of curriculum or personal experiences.

Promotion. Advertising and promoting BSIS Day was another key activity. The administration was eager to use the event as a marketing tool for the BSIS program and bring attention to the students' work. Staff created flyers, distributed them across campus, and sent materials to university listservs.

Information sessions. I created standardized materials and distributed them to the instructors teaching BSIS courses. The materials included definitions of research, examples of work, and step-by-step instructions for creating a poster. Instructors were asked to share the materials and discuss research in their individual classrooms, using their specific course curriculum. I also visited five classes to present about research and BSIS Day. Email listserv were used to share the research materials and details for the event. By attending the classes and sharing information over the listserv, the information was accessible to all BSIS students and others taking courses in the BSIS program.

Key considerations and benefits. It was beneficial to develop an explanation of research that students could understand and relate to their experiences. The Office of Undergraduate Research's definition allowed for a broad set of experiences to be discussed and is used in the university-wide research day. Asking students to define research at the beginning of our

discussions allowed me to better frame the conversation and talk about potential research posters. For example, a student described research as "hard" and "lab coats." Once I had a better understanding of their notions of research, I could address their concerns.

Phase 2: (3 months – 2 weeks from event).

Abstracts: writing and submission. Two workshops were conducted to help students with their progression in the research process. Faculty and staff covered abstract writing, outlined requirements for submitting an abstract, and offered students the opportunity to receive feedback from their peers and instructors. The workshops also helped create an environment where students could explore their connections with the curriculum. The process of providing feedback from peers, faculty, and staff created an venue where different perspectives of integrative learning were discussed and shared.

A Google™ form was created for abstract submission. The link was shared on the listserv several times prior to the deadline. We decided to cap the number of accepted submissions to ten, realizing it was an optimistic number. We received six submissions, all meeting the criteria, and accepted them.

Posters. After notification of acceptance I offered a workshop for poster design and printing. I also created a Microsoft PowerPoint™ template and distributed the file to the participants. Students were already familiar with the application, were comfortable creating content, and knew how to navigate the program. The file contained the college logo and the printing dimensions were set, so students could modify the appearance of the poster without worrying about print dimension or output settings. They were not required to use the template; however, five of the six students did. Draft posters were printed for editing purposes ensuring image quality and layout. Arrangements were made with the campus print services so students were not responsible for printing their posters. They electronically submitted their final posters, and the department took care of the printing cost.

Key considerations and benefits. There were 42 declared BSIS majors, approximately five students minoring in BSIS and about 125 students whom were non-majors taking our courses. While the event was shared with all the students in our classes, targeting our BSIS majors and minors was the best strategic option. It was decided 10 posters would be our goal based on the time we set aside for the day (three hours) and the available space in the building. I estimated we would receive about 15 abstracts early in the semester. As the abstract deadline grew closer and students' time commitments increased, I was hoping for two. In the end we had six submissions.

The number of posters, venue, and judges are important considerations when deciding on a realistic

size for the event. The venue may dictate the number of presenters and attendees. For our event it was important to replicate a setting similar to a professional conference. The presenters would be standing by their posters and talking to people about their work. The audience would be moving from poster to poster at different times. Fortunately, our building has wide hallways that accommodated this type of interaction.

It is important to note that printing costs may be a deterrent for participants. Efforts should be made to absorb the costs and not pass them onto the students. I recommend contacting the printers early in the process to determine deadlines for printing, accepted file formats, and submission guidelines.

The current décor in the hallways allowed for us to hang the posters on the walls from nails and hooks already there. Renting poster display boards is a significant addition to any budget. Had we not been able to use the building and existing hardware, the logistics of the event would have changed significantly. I recommend finding a venue and determining how the posters will be displayed early in the planning process.

Holding BSIS Day in our building encouraged the faculty, staff, and others to interact with the participants. Several participants commented that they liked having the event in our building because it was a familiar, comfortable place. The administration liked that the building was the backdrop for the promotional materials created during the event.

Four individuals were asked to serve as judges because of their roles in the community. The judges were from a variety of disciplines, but all were information professionals or had career paths similar to our students. For example, one judge was a graduate of the BSIS program and a student in our graduate program. Another judge was the Chief Information Officer for the State Library.

The other factors I found significant when establishing a manageable number of posters were manpower and the ability to provide feedback. Providing quality feedback for the students was important. Most students had not participated in a research poster event, so they needed quite a bit of feedback and guidance. The two most time-intensive activities were refining their research ideas and printing drafts of the posters. I recruited help from colleagues to provide the students feedback and refine their ideas. Printing draft posters also took a fair amount of time and feedback. Throughout the entire semester participants provided feedback to each other during each phase. Peer feedback seemed to increase confidence and foster a sense of community. I had not anticipated this effect, but I was pleased to see it among the students.

Phase 2 allowed students to work on several practical soft skills. Their writing and communication skills were refined during the proposal process. The creation of the posters allowed the participants to work

on visual communication skills. Finally, the practice of providing and receiving constructive feedback occurred during the proposal writing and poster sessions.

Phase 3: BSIS Day (Event Day). This is a timeline of the day. It describes what was occurring simultaneously and allows for better planning if this event is replicated.

8:30 AM – 9:00 AM: Breakfast was served while announcements were delivered. I privately met with the judges to review logistics and procedures. Each judge received a packet with numbered ballots. The ballots contained a rubric for evaluating the poster content, design, and the participants' communication methods.

9:00 AM – 11:00 AM: The judges were given two hours to evaluate the six participants. During this time faculty, staff, and students viewed the posters and talked with the participants. College staff interviewed and photographed the participants. The interviews and images were later used as promotional materials for the college.

11:00 am – 11:30 am: After the two hours, ballots were collected, and totals were tallied. The participants and attendees waited for a few minutes for the awards to be announced. Everyone received a certificate of participation (printed prior to the event), and the Best BSIS Poster Award (printed that day) was awarded to the student with the highest score from the judges. Incidentally, there was a tie for the best poster.

Key Considerations and Benefits. The constructive feedback offered by the judges was invaluable. The judges also encouraged students to continue participating in these types of events because they gained practical skills needed in the profession. They also had suggestions on how to continue their professional development through other opportunities like internships and professional conferences. After the event, several participants commented that it was helpful to hear from working professionals and were excited for the chance to network in a smaller, less intimidating setting.

In informal debriefings after the event, all the participants expressed an increase in confidence about presenting and talking about their research. They also reported a better understanding of what is required to present in a professional setting.

I would be remiss not to mention the important role the parents and friends played in the day. Two of the six participants had parents who attended. One family drove 10 hours to attend the event and support their student. Another family drove two hours to surprise their student and brought along his grandfather. Friends came to the support the participants. Simply said, this was important to the students. Although not anticipated in the beginning, the excitement was passed on to their parents. We do not often get to meet to the students' parents, so it was nice to be able to

celebrate their accomplishments, demonstrate the benefits of integrative learning, and share the information science major.

Phase 3 built on the soft skills from Phase 2. In addition to the skills, participants had to work on their presentation and networking skills. They refined their verbal skills by explaining their research. Students also dressed professionally and represented themselves in a professional manner during the event.

Conclusion

I proposed the following research questions:

How do educators create an integrative learning experience that encourages students to combine curriculum, soft skills, and research?

Integrative learning helps connect pieces of undergraduate learning. It can take classroom experiences, link them with practical experiences, and provide an opportunity to work on soft skills. BSIS Day provided a venue for that kind of growth. Students had to formulate their topics that linked curriculum, experiences, and research. They were able to work on important soft skills like communication by writing an abstract, creating a poster, and presenting their work. They also had to delve deeper into the curriculum for their poster presentations and make connections between their experiences and course work.

The skills acquired by the participants are considered favorable regardless of the discipline or major. Defining research broadly and focusing on major-specific issues allows events like this to be replicated across campuses and curricula. The logistics and planning are similar, while the content of the posters make each research day unique.

- How do educators mitigate the risks involved in planning such experiences? What are some of the planning details and considerations needed for a successful event?

Detailing the planning and logistics of the event may help educators wanting to replicate the event in their own departments. Identifying potential pitfalls may also help reduce risks. Finding useful resources and securing help from others will make the event a success and foster a sense of community. For example, editing resources from the Office of Undergraduate Research saved considerable time and allowed for a broad set of experiences to be showcased. Recruiting help from faculty and staff is important when guiding students through the research process. Their feedback and expertise add to the learning experience and the sense of community. The resources used to create and

display the posters should also be considered early in the planning process. This includes poster design, printing, and displaying.

The goal of BSIS was to allow students the opportunity to present their research while developing confidence and communication skills. Other benefits emerged from the event. A sense of community was created not only among the students, but also the students, faculty, staff, and administration. The location of the event and the judges enhanced the feeling of community for the school and students. The event also provided an opportunity to showcase the program.

Educators often look for pedagogies that allow for meaningful connections between curriculum, personal experiences, and careers. Integrative learning can provide groundwork for these connections. Creating an experience that brings together these connections is beneficial to the student. Understanding the practical aspects of creating integrative learning experiences will make it easier for all involved.

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