Enhancement of Students' Soft and Hard Skills in an Interdisciplinary Immersive Learning Environment

Melodie Griffin, Rebecca Rudolph, Jordan Patterson and Jennifer Palilonis

Ball State University, Muncie, IN 47304
mkgriffin@bsu.edu, rjrudolph@bsu.edu, jpatterson4@bsu.edu, jageorge2@bsu.edu

Abstract. This paper chronicles a study focused on students' perceptions of the development of soft skills in an interdisciplinary, immersive learning class. The project outlined for the course was collaborative and interdisciplinary, involving development of an immersive and interactive, multimedia exhibition for a special collection of artifacts. Upon completion of the course, students were surveyed to explore how the course design affected perceptions of the development of hard and soft skills, including creativity, critical thinking, and problem solving. Based on these findings, this paper also discusses how the structure of a specific learning experience affects students' perceptions of authority, collaboration, individualism, groupthink, motivation, and balance of structure in informal learning.

Keywords: Project-based learning, immersive learning, soft skills development

1   Introduction

During the past 20 years, most universities have implemented interdisciplinary learning structures to provide students with 21st century soft skills. According to [12] specific soft skills include critical thinking, teamwork, problem solving, collaboration, creativity, and innovation. Although the value of specific soft skills is dependent upon the environment or problem space in which they are applied, many scholars argue that soft skills are harnessed or enhanced through interdisciplinary collaboration. Interdisciplinary collaboration is defined as a student group comprised of "various disciplinary backgrounds" and as group work that applies student expertise to address complex tasks, projects, or problems [1]. To address both interdisciplinary collaboration and soft skills development, project-based learning (PjBL) models are also used by many university instructors. Project-based learning models allow students to apply their disciplinary skills, while gaining soft skills as they work in these collaborative projects.

Recent research on interdisciplinary, project-based classes primarily focuses on the enhancement of students' soft skills by collecting data and input from teachers. This includes observational notes and tests given to students. Test scores have demonstrated that interdisciplinary, project-based learning enhances most students' soft skills [16]. reported students improved test scores and demonstrated improved cogni-

tion after participating in an interdisciplinary project. These tests focus on the effect of PjBL on students in the classroom, as well as their soft skills development and the importance of PjBL in preparing students for workplace responsibilities and expectations.

This paper reports student perspectives on the development of soft skills after completing an interdisciplinary, immersive learning class. The project was highly collaborative and interdisciplinary and involved development of an interactive, multimedia exhibition for artifacts from a special collection located in the archives of a mid-sized, Midwestern university. Students were surveyed to explore two research questions: **RQ1:** How does an interdisciplinary project affect student perceptions of the development of 21st century soft skills, including creativity, critical thinking, and problem solving? **RQ2:** How does the structure of a specific learning experience affect students' perceptions of authority, collaboration, individualism, groupthink, motivation, and balance of structure in informal learning? The goal of this case study is to provide an example of an interdisciplinary classroom structure in a collaborative learning environment focused on enhancing students' soft skills of the 21st century.

2   Review of Literature

Understanding the nature of project-based learning and the development of soft skills requires examination of several interrelated fields of study. This section works to define soft skills, examines how learning is enhanced through the development of these skills, and explores extant literature focused on student perceptions of soft skills development.

2.1   Defining soft skills

In contrast to technical or "hard" skills that are knowledge based, soft skills are the behaviors and traits used in environments and situations. Soft skills positively contribute to social interactions, work performance, and career opportunities. Additionally, the importance of soft skills depend on the field, environment, or audience [15]. According to [12], highly valued soft skills include critical thinking, teamwork, problem solving, collaboration, creativity, and innovation. These skills are relevant to many disciplines and industries in the workplace. The importance of soft skills continues to increase, becoming a focal point in work environments and classrooms.

Soft skills have become important criteria for employers, and soft skills complement employees' technical skills when tackling large projects. One survey of more than 250 technical leaders found that a lack of soft skills among employees is a major reason for project failure. The survey contends that soft skills paired with technical skills can to improve team collaboration and individual productivity. In turn, projects are more likely to succeed and increase profits [2]. Another survey of 49 business executives attempted to define the top 10 most important soft skills among respondents. Of the 512 skills mentioned, communication, courtesy, flexibility, integrity, interpersonal skills, positive attitude, professionalism, responsibility, teamwork, and work ethic were mentioned most often. These results demonstrate that businesses expect and prefer employees to possess certain soft skills as they enter the workplace,

but that not all soft skills are equally desirable by employers [14]. With this demand for soft skills in the workforce, [15] argues that "educators have a special responsibility regarding soft skills, because during students' school and university time they have major impact on the development of their students' soft skills."

2.2 Learning structures and enhancement of soft skills

For several decades, interdisciplinary collaborative learning structures have been implemented in higher education to enhance the development of soft skills among students [3]. Interdisciplinary Collaborative Learning (ICL) provides the opportunity for people from different disciplines to "contribute insights from his or her discipline, and learn in similar ways from others" [7]. It also offers a way for people from diverse demographic and disciplinary backgrounds to work together and enrich learning and problem solving. ICL is built from principles of both Experiential Learning Theory (ELT) and Constructivist Learning Theory (CLT). Experiential Learning Theory (ELT) is "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" [8]. Constructivist Learning Theory (CLT) is "the idea that learners construct knowledge for themselves--each learner individually (and socially) constructs meaning--as he or she learns" [6]. Generally, interdisciplinary collaborative learning allows students to learn from experiencing, communicating, and participating in an action using both theories.

Project-based Learning (PjBL) emphasizes self-learning as students work on a project. The project includes interactive discussions, team cooperation, and practical activities to ensure students gain an understanding of content and organization [18]. Most often, teachers act as facilitators while students take on team roles. This allows students the opportunity to structure team roles, collaborate on problem-solving tactics, and enhance their soft skills by working with a diverse team. In 2011, a survey on PjBL and its effect on soft skills in the workplace measured the participants' perceptions of PjBL on five areas: teamwork, project management, communication skills, interpersonal skills, and problem solving. The study found that PjBL does contribute to the development of soft skills pertinent in the workplace and that employability skills can be learned both in the workplace and in the classroom [10].

Alternatively, Problem-based Learning (PBL) is a subset of PjBL. [17] described PBL as focused, experiential learning organized around the investigation and resolution of messy, real-world problems. Students are engaged problem solvers, seeking to identify the root problem and the conditions needed for a good solution, and in the process becoming self-directed learners. [5] interviewed five STEM Academy educators about the most successful practices educators can do to foster problem-based learning environments. They found that working in teams, organizing their thoughts, communicating with team members, solving a problem, presenting their findings orally, and evaluating their success through a written document were the most important and significant according to their interviewees. When these practices are implemented in a PjBL structure, students are required to work outside of their comfort zones by collaborating with a diverse team to work toward a common goal in unison.

2.3 Student perceptions of soft skills

A student's self-efficacy, perception of learning, and self-regulation affect learning environments as well. In a study on self-efficacy and personal goal setting, researchers found that students able to self-regulate their learning experience were more likely to achieve specific performance goals [19]. A student's perceptions about any element in their learning environments will determine their overall motivation for that element. One example of self-efficacy and self-regulation is the relationship shown between the Internet and its user. [11] explain that students' perceptions and attitudes toward the Internet shape their motivation to participate in Internet-based learning environments. The Internet also allows for autonomous discussion in which people have the ability to participate as much or as little as desired. Multiple studies have shown that "students work collaboratively with colleagues to pool their knowledge and skills, share the results of their inquiry, engage in peer teaching, and ultimately solve the problem" [4]. Whether on the Internet or in the classroom, self-efficacy results from students' engagement in what and how they are learning and contributing knowledge.

3 Project Design

The project outlined for the course was collaborative and interdisciplinary, partnering 13 undergraduate students from seven majors (journalism, communication studies, history, fine art, English, telecommunications, and computer science), and 11 graduate students from three master's degree programs (media design, digital storytelling, and architecture) to develop an interactive, multimedia exhibition for artifacts from a special collection in the university's archives. Led by a faculty member from a media design graduate program, the project allowed students to explore innovative approaches to storytelling and to create multimedia presentations. Students also engaged a number of cutting-edge technologies for experimentation, including: a 7-foot by 5-foot interactive, touchscreen wall with 32 points of touch; a 55-inch flat-surface touch table with 80 points of touch and a 4K display; four iPad Pros + display kiosks; virtual reality gear for developing immersive multimedia experiences; and mobile devices for augmented reality development. Students were divided into five smaller teams, each focused on a different aspect of exhibition design. Teams were structured as follows:

Physical exhibition design: Graduate students from an architecture design build program led the development of designs for a physical exhibition. Their work included a virtual reality experience in which users can explore the exhibition in a virtual space, a physical scale model of the proposed exhibition, and a full-sized prototype for an augmented reality display, which represented one area of the larger exhibition.

Small-screen interactive multimedia storytelling: Interaction design students and writers developed four multimedia presentations for small touch-screens focused on different topics related to the collection of artifacts.

Large wall screen interactive collection: Interaction designers, researchers, and writers developed an experience for a large interactive wall screen that allows multiple

users to explore artifacts from the collection in digital form.

Interactive table top design: Videographers, writers, and designers developed an interactive video series features guest speakers related to the collection. Users can explore video interviews with experts to learn more about the collection. This highly engaging series also allows users to customize the viewing experience to address the skills and ideas they care most about.

Augmented reality storytelling: Developers, programmers, and writers created a novel augmented reality experience allows users to uncover rich storylines associated with artifacts from the collection. Using a smart device, exhibition visitors can unlock digital content, including video clips, audio, animation and more to enrich and enliven the exhibition experience.

When necessary, the professor provided students with resources, tools, and lectures that would help them understand and connect the concepts pertinent to the activities outlined above. For example, the class explored interaction design principles, cross platform storytelling strategies, and research methods, to name a few. However, it's important to note that the interdisciplinarity of the class ensured that each project team included students who brought relevant skills and talents to the project. Because of this, hard skills and topical knowledge were secondary learning objectives. Rather, the primary learning objective for this course was to develop important soft skills, including critical thinking, teamwork, problem solving, collaboration, creativity, and innovation.

To facilitate this learning, the professor engaged students in collaborative brainstorming sessions, design thinking strategies, problem-based learning initiatives, and creative problem-solving activities. At the start of the semester, student teams engaged in design thinking sessions to foster creative ideation about how to approach exhibition design, storytelling, and technology integration. Additionally, each project team engaged in weekly scrum sessions attended by the professor to update project progress, assign new tasks, and discuss challenges and new ideas. Scrum meetings represent a common practice "used in agile project management that emphasize daily communication and the flexible reassessment of plans that are carried out in short, iterative phases of work" (Dictionary.com).

Likewise, the interdisciplinary nature of the course, as well as the collaborative team structure for class meetings required heightened communication among team members and with the professor and key stakeholders outside the class, such as library representatives and university administrators. To foster stronger communication skills, students were regularly required to prepare brief progress presentations for which specific ideas were required to be communicated. Furthermore, the interdisciplinarity of each project team was deliberately structured so that students would be forced to think beyond their individual perspectives, engage creatively with people from different backgrounds and areas of expertise, and communicate ideas in ways that everyone could understand, regardless of disciplinary background. Student teams were ultimately given the autonomy to make decisions for project deliverables.

4   Methodology

To explore the efficacy of this approach to immersive learning, this study applied a mixed-methods strategy to address the aforementioned research questions. These methods were designed to measure students' perceptions of this interdisciplinary project. Participants included four graduate and 13 undergraduate students from majors outlined above. Student participants were enrolled in a class that spent 16 weeks collaborating on the special project described above. To understand students' perceptions of their interdisciplinary class structure and how the project affected their creativity, critical thinking, and problem solving, participants were given a survey and individually interviewed during the final weeks of class. The survey included 101 questions adapted from three independent surveys by [9, 17, 13]. These surveys measure the skills and relationships among participants within their working environments. Participants were also individually interviewed in 15- to 20-minute sessions. Interview questions were designed to understand personal perceptions about the development of soft skills.

5   Results

Data is grouped into categories that characterize student perceptions, including authority, mutuality, autonomy, self-esteem and self-efficacy, communication, collaboration, creativity, critical thinking, and problem-solving.

5.1   Authority: Perceived relationships with leaders and stakeholders

Survey Results. The majority of participants agreed that authority – both internal (the professor) and external (project partners) – effectively provided feedback and evaluations. Likewise, they responded positively to questions about their relationships with individuals and/or other student teams involved with the project. These findings also show participants strongly agreed that their ability to exert control, power, or decisions in the project were reinforced by both external and internal authority figures.[1]

Interview Results. This structure of authority was flexible, as some participants expressed an ability to execute autonomy in their work. However, depending on team dynamics, participants varied on their opinions about the authority roles within the project. P9, a graduate student team leader, said it was difficult to come up with assignments for her undergraduate charges. P8, an undergraduate student, said she initially thought undergrads would have more control over the project design, as she was told that this was a student-run project. Most other student participants said having a designated team leader was helpful. P5 was able to rely on the professor and team leader when needed. P2 said usually in group projects "everybody kind of divvy's up what they're good at" and having a team made it "really nice to know that we all had

---

[1] In the interests of space, a full set of bar charts that illustrate response averages for all survey questions can be viewed by visiting: https://bit.ly/2SBAdlT

that point person to fall on instead of kind of just looking at each other like 'oh what the heck do we do now?'"

5.2   Autonomy: How students view their individualism

Survey Results. Responses to questions about student autonomy indicate participants felt enabled to pursue individual goals and objectives while working toward the project's mission. Overall, responses to survey questions show participants perceived a high level of autonomy both within their small teams and across teams. Students generally agreed that their individual contributions and ideas were valued and applied, small teams worked successfully to achieve team goals and meet overarching project goals, and communication among groups about their progress was satisfactory.

Interview Results. Three participants said they needed opportunities to show off their own skills during the project. Additionally, P8 said it was important to feel heard and appreciated and that individuals should be able to see their own work and efforts in the results of the project. These feelings contributed to participants' overall feelings of importance. P2 expressed similar feelings but said it was "really cool" to see the results of everybody's efforts come together in a tangible product.

5.3   Mutuality: How teams respect each other's expertise

Survey Results. Survey results indicated that participants perceived a strong shared relationship between teams and team members, including high levels of understanding, respect, and support among teams and individuals while working toward project objectives. The majority of participants agreed that this mutuality – a high respect for one another's expertise – was necessary in order for teams and individuals to achieve the project's goals. Likewise, participants responded positively to questions about their teammates' individual contributions and expertise as it related to the project. Findings also demonstrate that participants strongly agreed that it was important for teams to share information across teams to strengthen goals and objectives of the project.

Interview Results. Comments made by more than half of participants revolved around appreciation for collaboration with students with different expertise. P7 noted that interdisciplinarity doesn't happen in a focused field where everyone is studying the same thing. A class that involves students from multiple majors, on the other hand, lays the foundation for a variety of ideas and fosters alternative forms of thinking. Several students said this helped them broaden their perspectives (P1; P2; P5; P6; P7). For example, P2 said that the interdisciplinarity provided by the project fostered a divide-and-conquer strategy through which teams got more done through the division of labor. Four participants saw this interdisciplinary collaboration as beneficial because it gave them opportunities to practice their own hard skills, as well as learn new hard skills from their teammates. However, this structure also created negative feelings. For example, some students felt there was an initial lack of clarity about their roles (P1; P2; P6; P8), as well as uncertainty about whether labor was equally

distributed (P2; P6). Finally, P3, P5, and P8 expressed frustration about working with people who were assigned similar tasks as them.

### 5.4   Self-esteem and self-efficacy: How students view themselves

Survey Results. The majority of participants indicated high levels of self-esteem and self-efficacy while working on the project. In addition, participants reported that they appreciated the ability to work toward team goals rather than working individually. Although they were less focused on building lasting relationships with their class-mates, students were generally committed to teamwork throughout the project.

Interview Results. Two participants who felt confident in their overall team contribu-tions stated that they saw an increase in their productivity and time-management skills. They attributed this to how they perceived their team's reliance on each other and their team's reliance on other teams. P4 and P7 felt motivated to showcase their own trustworthiness by practicing new time-management strategies to increase their productivity. P4 stated that the project "has taught me the importance of (time-management), and in the last few weeks I actually bought a daily planner and marked out my hours; and I'm actually on time and getting stuff done now."

5.5   Communication: Verbal and nonverbal

Survey Results. Overall, results indicate that participants felt their team members communicated well with one another and with other teams. Likewise, the majority of participants agreed that communication – both verbal and non-verbal – among teams was necessary to effectively build and maintain working relationships. These working relationships also depended upon the levels of trust teammates had in one another. This trust was built through effective verbal and nonverbal communication among students within and across teams. Fig. 1 shows participants perceived there to be a high level of team reliance, trust, and mutual respect.

Interview Results. P8 was the only participant that expressed frustration over not being able to communicate problems with the professor through email or meetings. According to this participant, this lack of communication contributed to her confusion and lack of understanding about the project as well as her role in it. More than half of participants commented that they felt like sometimes they were "not on the same page" with their teammates or other teams. A few participants stated that their under-standing of their roles, as well as the roles of other teams, did not make clear sense to them until the end when teams were brought together to present their work.
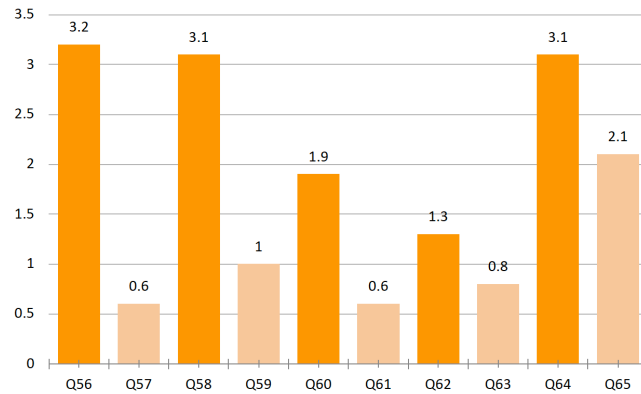
Q56 The individuals who represent my team are trustworthy.
Q57 Individuals on my team take advantage of other individuals that are vulnerable.
Q58 Individuals can count on everyone on my team to meet their obligations to the project.
Q59 Individuals can count on everyone on my team to meet their obligations to the project.
Q60 My team will work with other teams only if they prove they will work with us.
Q61 My team will find ways to punish other teams that do not keep their word.
Q62 If individuals treat my team unfairly, they will leave the project.
Q63 My team will pursue its own interests even at the expense of other teams.
Q64 My team has a duty to meet obligations to other teams/individuals.
Q65 Developing relationships with other teams/individuals is the most important part of collaborating.

Fig. 1. Ten questions explored students' perceptions of how communication

5.6 Collaboration: How students view collaboration among teams

Survey Results. Participants responded positively to questions regarding their teams' ability to work in cooperation with others to achieve goals. Generally, participants felt their teammates were well-trained, able to work with other teams, and able to accept ideas and work from all individuals. Fig. 2 illustrates the results of survey questions regarding collaboration among teams and individuals.

Interview Results. When asked: "What are some skills you have learned, gained or improved upon, by being on this project?", three participants said that it was challenging, at first, to learn how to collaborate with the different kinds of people an interdisciplinary project brings. However, according to P5, when obstacles arise in the project, having a collaborative team, with diverse skill sets, can create "collaborative problem- solving methods." P2 and P10 reported that their team relied either on other teams or their own teammates to accomplish their goals first in order for them to begin working on their own goals. P9 said having a diverse skill set can create a better product.
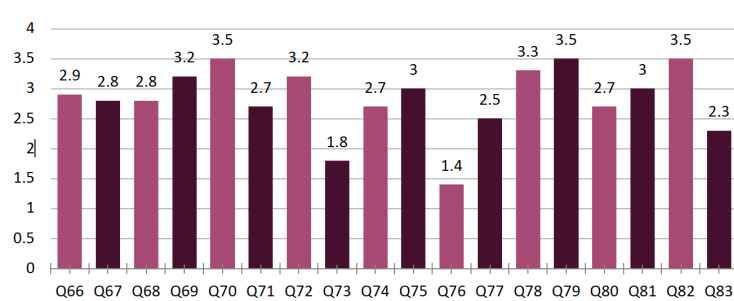
Q66 Individuals on my team are well-trained.
Q67 Individuals on my team are able to work closely with individuals from other teams.
Q68 Individuals on my team demonstrate a great deal of autonomy (freedom).
Q69 Individuals on other teams respect the work done by my team.
Q70 Individuals on my team are very positive about their goals and objectives.
Q71 Individuals on my team need to cooperate with other individuals
Q72 Individuals on my team are positive about their contributions and accomplishments.
Q73 Individuals on my team must depend upon the work of people in other teams.
Q74 Individuals on other teams think highly of my team.
Q75 Individuals on my team trust each other's professional judgement.
Q76 Individuals on my team have a higher status than individuals in other teams.
Q77 Individuals on my team try to understand capabilities, contributions of other teams.
Q78 Individuals on my team are extremely competent.
Q79 Individuals on my team are willing to share information, resources with other teams.
Q80 Individuals on my team have good relations with people in other teams.
Q81 Individuals on my team think highly of other related teams.
Q82 Individuals on my team work well with each other.
Q83 Individuals on other teams often seek the advice of people in my team.

Fig. 2. Eighteen questions explored students' perceptions of how collaboration affected team dynamics and project development.

5.7 Creativity: Individuality and expression

Survey Results. Participants expressed that the project design and outcomes fostered high levels of creativity. Average responses to questions about the degree to which the project required and allowed them to engage in individual creativity were high among participants. From these results, participants felt they were allowed and encouraged to assert individual creativity in order to meet the project's goals and objectives.

Interview Results. Participants did not explicitly express the implementation of creativity as a cultivated soft skill. Instead, they often connected creativity to the enhancement of hard skills like creative writing and design. However, some more subtly mentioned that they often needed to think of different ways to implement their skill sets in order to collaborate. P6 discussed how learning new hard skills from her teammates helped her think of other ways she could implement both her old and newly learned hard skills in other areas of her studies, interests, and future career options.

5.8 Problem solving: Process of resolving issues

Survey Results. Participants expressed that the project design and outcomes promoted high levels of problem solving. The majority of participants strongly agreed that the project required and allowed them to engage in individual and team-mediated problem solving throughout various phases of the project.

Interview Results. Participants' answers varied when discussing problems their teams faced. This variance appeared to be determined by the student's perceptions of how well they thought their team collaborated and communicated. P8 expressed negative views about her team leaders, indicating that the lack of diversity in the team leader's skill sets made it difficult for her to understand the goals of the project or how her skills (different from her leaders) could be used. In comparison, multiple participants said they practiced and enhance their own hard skills and learned from the differing hard skills of teammates. P5 said: "I had help from (the professor) and I was able to reach out to (grad student team leader) ... It's mostly how I solve my problems…by reaching out and asking for advice and realizing I don't have to do everything completely 100% on my own because this isn't an independent project this is a collaborative project. So, you have to have collaborative problem-solving methods."

6 Discussion

Results illuminate how the project design engaged students in the practice and development of key soft and hard skills, as well as where the project design fell short. For the most part, surveys and interviews yielded similar results. However, it is important to note that while survey results demonstrated that students were generally positive about the experience, interview results revealed more detail about students' perceptions at various stages of the project. Thus, interview results provided a more holistic view of the positive and negative experiences students had over the course of a semester. Overall, three recommendations for the development and practice of project-based learning can be drawn from this research.

(1) Project-based and/or immersive learning should be designed to accommodate students from a variety of disciplinary backgrounds to ensure a collaborative environment in which students can complement and compromise together. Furthermore, when students from different backgrounds collaborate toward a shared goal, opportunities for them to learn from one another increase. For example, in the project outlined for this study, strong writers were able to learn new technology and design skills, while architecture students learned new storytelling skills [P1; P2; P6; P8]. This collaborative environment led students to rely on one another over time as they built relationships and formed an understanding of others' abilities. Ultimately, the collaborative environment not only fostered better teamwork, but it also allowed students to form new hard skills along the way. Thus, the development of soft skills – such as interdisciplinary collaboration and communication – led to the development of new hard skills – such as design or writing – and vice versa.

(2) Instructors must foster an environment that equally allows each student to contribute and practice existing hard and soft skills in the context of the collaborative experience. The chance to practice soft skills in a project-based environment creates conditions that help students enhance these skills. P9 said, "I was able to practice my video editing skills and my video coloring skills. There was something that allowed me to spend more time on learning that skill because it was for a project and because there were people relying on it." However, when students were not given individual autonomy to practice their skills in ways that were meaningful to them, they often felt confused about how they fit in to the overarching aims of the project [P8]. Skills can still be enhanced when students are unsure of their project role but the student's journey developing these skills may be more difficult. When asked what skills she learned, gained or improved upon during the semester, P8 said that coming into the project, she thought her academic writing skills were strong. However, the project needed writers who were adept at a more conversational writing style. At first, this made it difficult for her to find her place in the storytelling team. After the project was complete, P8 said, "I think writing like a conversationalist is much more relatable. I can take that into a history perspective and say somebody is going to read something that I write and genuinely be interested in it. I think that's a big thing. You want to be formal in your writing and this project pushes you to be almost informal in a way. It is important, but you don't want to bore someone." This experience shows that although P8
found value in what she learned by the project's end, she struggled a bit more along the
way because she felt that her existing skill set as a writer was not valued as much as skills exhibited by her teammates. Thus, instructors must form a strong understanding of the skills each student brings to the table so the project design can effectively accommodate and value their expertise.

(3) Emphasis must be placed on soft skill development as a core learning objective so that students are conscious of those activities as key requirements for success. Results suggest that for a project-based course to be successful, soft skills of collaboration and communication must be strong. Students must know from the start that they will be expected to solve problems and address project goals by engaging in frequent, respectful, and motivating dialogue. Furthermore, they should understand that their success in these areas will be measured and monitored as part of class assessment. P5 said when she experienced a problem with her writing, she was expected to collaborate with teammates and think critically about her approach, rather than try to solve the problem alone. P1 said collaborative problem solving required her to communicate ideas clearly so she could reach solutions that everyone agreed to. Students clearly knew that project success depended on how well they collaborated and communicated.

6.1 Limitations and future work

Often, large-scale, interdisciplinary projects involve fewer students. We acknowledge that the small number of participants is a limitation of this study. Future research could engage a greater number of respondents to provide more robust data about the intersections between hard and soft skill development in project-based courses.

References

1. Amey, M. J., & Brown, D. F.: Breaking out of the box: Interdisciplinary collaboration and faculty work. IAP. (2006)
2. Bancino, R., & Zevalkink, C.: Soft Skills: The New Curriculum for Hard-Core Technical Professionals. *Techniques: Connecting Education and Careers (J1), 82*(5), 20-22. (2007)
3. Brassler, M., & Dettmers, J.: How to Enhance Interdisciplinary Competence— Interdisciplinary Problem-Based Learning versus Interdisciplinary Project-Based Learning. *Interdisciplinary Journal of Problem-Based Learning, 11*(2), 12. (2017)
4. Dunlap, J. C.: Problem-based learning and self-efficacy: How a capstone course prepares students for a profession. *Educational Technology Research and Development, 53*(1), 65-83. (2005)
5. Harris, K. S., & Rogers, G. E.: Soft skills in the technology education classroom: What do students need. *Technology teacher, 68*(3), 19-24. (2008)
6. Hein, G.: Constructivist learning theory. Institute for Inquiry. Available at: http://www. exploratorium. edu/ifi/resources/constructivistlearning.html. (1991)
7. Ivanitskaya, L., Clark, D., Montgomery, G., & Primeau, R.: Interdisciplinary learning: Process and outcomes. *Innovative higher education, 27*(2), 95-111. (2002)
8. Kolb, D. A.: *Experiential learning: Experience as the sources of learning and development.* New Jersey: Prentice Hall. (1984)
9. McFadyen, A. K., Maclaren, W. M., & Webster, V. S.: The interdisciplinary education perception scale (IEPS): An alternative remodeled sub-scale structure and its reliability. *Journal of Interprofessional Care, 21*(4), 433-443. doi:10.1080/13561820701352531 (2007)
10. Musa, F., Mufti, N., Latiff, R. A., & Amin, M. M.: Project-based learning (PjBL): Inculcating soft skills in 21st century workplace. *Procedia-Social and Behavioral Sciences, 59*, 565-573. (2012)
11. Peng, H., Tsai, C. C., & Wu, Y. T.: University students' self-efficacy and their attitudes toward the Internet: the role of students' perceptions of the Internet. *Educational studies, 32*(1), 73-86. (2006)
12. P21. Partnership for 21st Century Learning. Retrieved September 13, 2016, from http://www.p21.org (2012)
13. Rice, G.: Individual values, organizational context, and self-perceptions of employee creativity: Evidence from Egyptian organizations. *Journal of Business Research, 59*(2), 233-241. (2006)
14. Robles, M. M.: Executive perceptions of the top 10 soft skills needed in today's workplace. *Business Communication Quarterly, 75*(4), 453-465. (2012)
15. Schulz, B.: The importance of soft skills: Education beyond academic knowledge. *NAWA Journal of Language & Communication, 2*(1). (2008)
16. Thomson, A. M., Perry, J. L., & Miller, T. K.: Conceptualizing and measuring collaboration. *Journal of Public Administration Research and Theory, 19*(1), 23-56. (2007)
17. Torp, L.: Problems as possibilities: Problem-based learning for K-16 education. (2002)
18. Tseng, K. H., Chang, C. C., Lou, S. J., & Chen, W. P.: Attitudes towards science, technology, engineering and mathematics (STEM) in a project-based learning (PjBL) environment. *International Journal of Technology and Design Education, 23*(1), 87-102. (2013)
19. Zimmerman, B. J., Bandura, A., & Martinez-Pons, M.: Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American educational research journal, 29*(3), 663-676. (1992)