Communicating the Value of a Transdisciplinary Degree: Comparing and Contrasting Perceptions Across Student Groups

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Abstract

Multidisciplinary, interdisciplinary, and transdisciplinary engineering and technology programs are growing in popularity and prior studies have identified advantages to students who participate in these innovative, boundary-crossing programs. Yet, challenges with these types of degrees persist, most importantly, whether stakeholders (e.g., students, university advisors and staff, and industry) recognize the value proposition offered via these degree programs, including but not exclusive to how to recruit students and pitch the value of the degree to future employers. The purpose of this study is to identify issues associated with communicating the value proposition of a transdisciplinary engineering and technology bachelor's degree. Personal elevator pitches, one of many tools commonly used to communicate a job seeker's value proposition, were used to discern the perceptions of the value of the transdisciplinary degree to employers. The exploratory findings contribute to efforts to continue to improve transdisciplinary bachelor's degree programs and their value proposition to students. First, the results indicate that students are able to leverage prior experiences as a means to showcase their value to future employers. Second, they are aware of the value provided by the completion of a transdisciplinary program prior to entering the workplace in the future. However, findings suggest challenges with the value proposition remain. In general, students aren't really sure what type of job to focus on. Finally, students appear to recognize more value in projects and extracurricular activities completed outside the classroom, than those completed within the transdisciplinary classroom. This information has proved beneficial for program staff as they continue to make programmatic improvements.

1. Introduction

Multidisciplinary, interdisciplinary, and transdisciplinary engineering and technology programs are growing in popularity and prior studies have identified advantages to students who participate in these innovative, boundary-crossing programs. Students develop higher levels of cognitive processing and critical thinking [1], report positive attitudes toward literacy [2], improve research skills [3] and display high levels of teamwork and leadership skills [4]. These findings are by no means accidental. A study by Borrego and Newswander [5] suggested that faculty are intentional about improving specific student learning outcomes when developing new multidisciplinary, interdisciplinary, and transdisciplinary programs. Through a content analysis of 129 successfully awarded interdisciplinary studies proposals to the National Science Foundation, the authors discovered five focus areas for student learning outcomes specific to interdisciplinary graduate education including content integration, teamwork, critical awareness, communication, and disciplinary grounding. Yet, challenges associated with these types of degrees still exist, such as the need to balance curriculum depth with breadth, offer stability and flexible simultaneously, and update recruitment and career placement materials [6, 7], to name a few. The purpose of this study is to focus on one aspect related to the challenge of

communicating the value proposition of a transdisciplinary engineering and technology bachelor's degree, to future students and their parents, current students, university faculty and staff, and future employers. Personal elevator pitches, one of many tools commonly used to communicate a job seeker's value proposition, will be used to discern the perceptions of the value of the transdisciplinary degree to employers. This paper will respond to the following research question: *How does the communication of a value proposition vary across transdisciplinary engineering and technology degree-seeking students?*

2. Background

There are many different tools that are commonly used to communicate a job seeker's value proposition to employers. These include resumes, portfolios, websites, application essays, elevator pitch, and cover letter. The literature has shown how these tools have been incorporated into the higher education classroom, either as modules integrated into core courses or more explicitly, in stand-alone career development courses [8-10], for both student empowerment and program assessment. Cambridge [11] conducted research investigating the role of e-portfolios at an academic department level and found the development of e-portfolios not only helps the student understand their own strengths and preferences but also provides a process for gathering artifacts for the purpose of programmatic assessment. Eliot and Turns [12] investigated the use of professional statements, artifacts, and reflections in students' ability to identify as engineers and future engineering professionals. The authors discovered that students developed both an external frame of reference targeting the expectations of future employers and an internal frame focused on individual values and interests. Abdulaal and colleagues [13] explored the implementation and deployment of a career orientation course originally piloted in a biology program but later offered across several programs throughout the college. Findings from mock interviews suggested an increase in confidence toward career preparation skills and ability to articulate one's experience and credentials for specific career opportunities. O'Brien and Bates [14] evaluated the delivery of a mentoring program to develop aviation student professional identity and characteristics associated with professional practice. Results indicated the development of professional competence through participation in an aviation-focused community of practice. Finally, Brown [15] described how student websites, in contrast to a traditional report and presentation, were used to demonstrate student competence in a first-year engineering course. The findings suggested an increase in student visual communication skills, creative thinking, and the ability to communicate to a more general audience. Although these examples provide great insight into the use of professional employability tools commonly used to communicate the job seeker's value proposition, little research has been done to investigate the use of the elevator pitch from an assessment perspective.

3. Methods

3.1 About the Program

In 2016, a research-intensive university located in the Midwest, U.S.A. received official approval to offer a new program with a focus on transdisciplinary and competency-based education provided through two different bachelor degrees: B.S. in Transdisciplinary Studies in Technology (BS-TST) and B.S. in Transdisciplinary Studies in Engineering Technology (BS-

TSET). Consistent with other programs offered through the university, each degree requires students to complete a total of 120 credits of which about one-third are general education credits. The remaining two-thirds are split between core credits and free credits. For the core credits, students are required to complete a Design-Studio course and ePortfolio course each semester. For the free credits, students enrolled in the BS-TST major can select any courses from across the university, while the students enrolled in the BS-TSET major are limited to courses offered through the School of Engineering Technology. In either case, the students are free to decide about one-third of the curriculum, which means they represent various pathways such as aviation management, industrial design, computer graphics technology, organizational leadership, and electrical engineering technology, to name a few. This approach to education allows students to integrate a variety of disciplines from humanities to technology and approach problem-solving from a more holistic and human-centered perspective. Each semester, the students get to experience learning from a variety of themes including Play, Transportation, Renewable Energy, and Food, to name a few. Throughout the program, students gain competency within the cluster areas of (1) create and innovate, (2) interact with others, (3) inquire and analyze, (4) engage in culture, values, and the arts, and (5) communicate. These competency clusters are further broken down in Table 1.

Table 1: Competency Clusters for Transdisciplinary and Competency-Based Education Program

Competency Cluster	Individual Competency
Create and Innovate	Systems Thinking
	Design Thinking
	Problem Scoping
	Entrepreneurial thinking
Interact with Others	Individual Contribution
	Give, Receive, and Act on Critique
	Leadership
	Emotional Intelligence
	Active Listening
Inquire and Analyze	Critical Thinking
	Quantitative Reasoning
	Qualitative Reasoning
	Information Literacy
Engage in Culture, Values, and the Arts	Cultural Engagement
	Arts Engagement
	Ethical Engagement
Communicate	Written Communication
	Oral Communication
	Visual Communication
	Integrated Communication

3.2 Participants

Students enrolled in the new program's ePortfolio course were required to participate in the research as part of their assignment. Six students completed the assignment including 4 females and 2 males. All participants were enrolled full-time at a research-intensive university located in the Midwest, U.S.A. One participant was a freshman and new to the university, two were sophomore level students, two were junior level students and one was a senior level student. The study design was approved by the university IRB #1808020877 as Exempt Category (1).

Introduction: We are all unique individuals with exciting experiences, ideas, and goals. The objective of this assignment is to construct a very concise and persuasive discussion about yourself, your ideas, and your future. If you maintain this pitch wherever you go, you have a powerful tool that may create valuable opportunities in your career. Imagine you get into an elevator, and as the doors are closing, an incredibly important person jumps in. This could be a world-renowned researcher in your field, the CEO of your company, a Nobel Laureate, anyone. You now have a minimal time between floors to talk with a person that could change your life. Whether you want to bounce an idea off them, seek a promotion, or pick their brain, having your elevator pitch ready will prepare you for a critical moment like this.

Directions:

- Presentation: For this assignment, you will create a concise three-slide PowerPoint presentation.
- Three-Minute Personal Elevator Pitch: The presentation must be supplemented with a narrated three-minute talk (+/- 30 seconds). This is an elevator pitch – a very concise summary of who you are, what you are doing, and what you want to do.
- Save As a Video: The narrated PowerPoint should be Saved As a video and uploaded to YouTube.
- Post Link to Blackboard: The YouTube link should be posted to the Blackboard submission document. Need help? Google it, email the instructor, or set up a meeting.

Suggestions for the Pitch:

1 Briefly introduce yourself, your interests, and your notable qualifications.
2 Share achievements and accomplishments you think employers will find particularly useful.
3 Explain what you are looking for (e.g. internship, part-time job, full-time job, etc…) and how you would be of value to the employer.

Figure 1: Three-Minute Personal Elevator Pitch Assignment Requirements

3.3 Intervention and Data Collection

The qualitative approach required the collection and analysis of a three-minute personal elevator pitch. During Fall 2018, students were required to develop a 3-minute personal pitch, showcasing

their value proposition in the form of "Why? What? and How?" to future employers. The assignment details are provided in Figure 1. The NVivo 11 qualitative analysis software was used to analyze the 3-minute personal pitch. Due to the qualitative nature of the research, the goal of the analysis was to explore potential themes within the data. All data documents were imported into NVivo and the researchers reviewed and analyzed the documents several times. The documents were coded and themes were identified. In addition, the codes were quantitatively displayed to investigate how personal pitches connected to the twenty program competencies.

4. Results

4.1 Qualitative Analysis

This paper addresses the extent to which personal elevator pitches convey and communicate the value proposition of a transdisciplinary engineering and technology degree, and how it varies across these degree-seeking students. Exploratory qualitative findings are explained here.

<u>Similarities Across Students</u>

Many of the 3-minute personal pitches done by students shared similar approaches. First, each student highlighted the many different opportunities that are available to them because of their knowledge and skills gained from being enrolled in the transdisciplinary bachelor's degree program, which they felt would set them apart from other applicants. Example student responses are as follows:

> Student 1 (Junior, Male): I like to think of myself as a transdisciplinary student because I really like to access all... what it means to be transdisciplinary. I was really trying to find a new thing that nobody's done before, and figure out how I can do it. I'm very interested in pushing physically, mentally, in pretty much all respects to see what I can create, what I can do, and how I can impact the world.

> Student 2 (Sophomore, Male): Transdisciplinary studies also focuses on the aspect of teamwork and how powerful teamwork really is. This is a skill that most majors miss out on and in my opinion, is one of the most important life skills.

> Student 3 (Senior, Female): There's a lot I bring to the table in terms of hard work and integrity. But my experiences have made me a very diverse and innovative thinker.

> Student 4 (Sophomore, Female): My first area of interest is engineering technologies. But then there's another side to me as well. The side that's more invested in the creative arts. Because of these two varying areas of interest, I believe I offer something special to any workplace.

> Student 5 (Junior, Male): A transdisciplinary designer will solve a problem for his stakeholder, or for their problem relative to time and space. Whereas other designer's solutions may eventually become additional problems, a transdisciplinary engineer or transdisciplinary designer's problem, solved, will only become a future monument of success.

Student 6 (Freshman, Female): No student at [university] has yet done a double major combining the [transdisciplinary bachelor's degree program] with an engineering degree. Although this path of study will most likely be the most difficult thing I have done up until this point in my life, nothing excites me more than taking on this innovative approach to my academic coursework.

Mixed Responses Across Students

Many of the three-minute personal elevator pitches had mixed responses among students. First, only three of the six students (Students 1-3) were clear in specifying what type of job they were looking to obtain, the other three students (Students 4-6) were somewhat vague in specifying their ideal job position. Example student responses are as follows:

Student 1 (Junior, Male): I'm very interested in joining a program such as FEMA or NIMS and working with a group of people who are familiar with disaster and figuring out an effective plan to mitigate disaster, to respond to the disaster, to act as disaster relief.

Student 2 (Sophomore, Male): I would like to have a paid internship related to cybersecurity, in the coming summer to allow myself to get actual real world experience of what a job I might have later on would look like.

Student 3 (Senior, Female): Upon graduation, I hope to apply for a few internships, to gain a little bit more work experience. As far as the job goes, I currently am thinking it would be great to work for IDEO and continue the route of innovative engineering and design.

Student 4 (Sophomore, Female): I feel like whatever career I end up in I should want to go to work every day. I should want to make a difference and what comes with making a difference and loving work is also a sense that I am improving myself.

Student 5 (Junior, Male): I am going to tell you why I would be a great addition to any design team.

Student 6 (Freshman, Female): Ever since I even knew what a job or career was, I have known I wanted a job where I can do something or help someone other than myself. To me, this is the most important factor of any job I acquire.

4.2 Quantitative Analysis

The coded qualitative analysis was quantitatively displayed to investigate how the personal pitches connected to the twenty program competencies. The findings are provided in Figure 2. In summary, students did a relatively good job of communicating their experiences and abilities related to oral communication, ethical and cultural engagement, leadership, and the individual contribution they offered to projects. However, students failed to discuss their abilities related to seven of the twenty competencies, including integrated communication, written communication, information literacy, qualitative reasoning, active listening, give, receive and act on critique, and systems thinking.
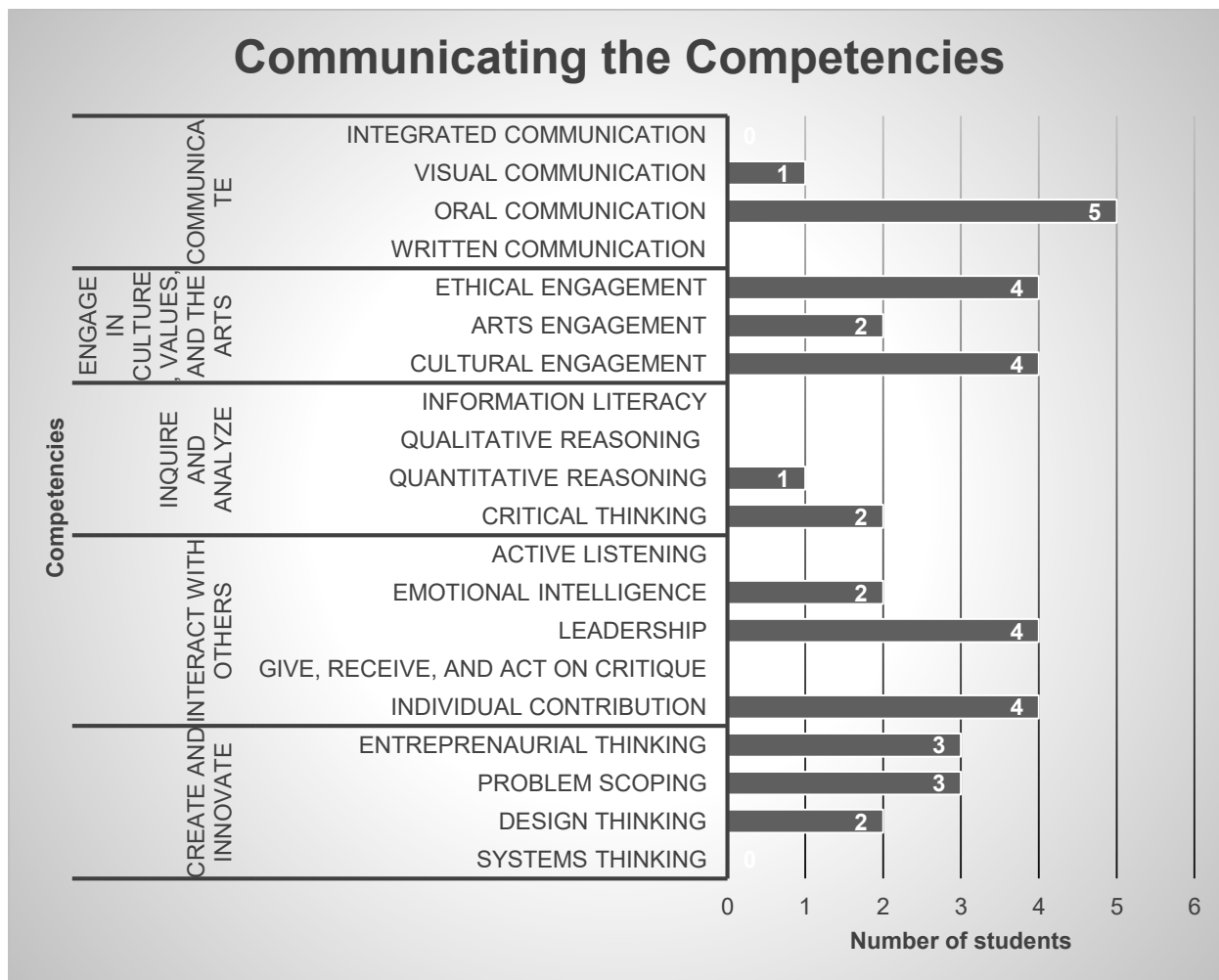
Figure 2: Quantitative Summary of Coded Data

5. Discussion

The exploratory findings suggest several key takeaways for continuously improving the transdisciplinary bachelor's degree program. First, all students highlighted the many different opportunities that are available to them because of their knowledge and skills gained from being enrolled in the transdisciplinary bachelor's degree program, which will set them apart from other applicants. This provides positive feedback in that students are cognizant of the value provided by the completion of a transdisciplinary program for entering the future workplace. Second, only three of the six students were clear in specifying what type of job they were looking to obtain, the other three students were somewhat vague in specifying their ideal job position. This leads the researchers to believe that, in general, students aren't really sure what type of job to focus on. In response, the program could be modified to incorporate additional career exploration learning activities to help students understand what opportunities might exist. Third, the quantitative analysis suggests that further inquiry is needed to better understand why students failed to discuss their abilities related to seven of the twenty competencies. Is it because students don't

recognize the importance of these competencies? Is it because students are not receiving opportunities to demonstrate these competencies in the classroom?

6. Conclusion

In conclusion, this 3-min personal pitch assignment provided valuable feedback and insights to the researchers towards continuously improving the transdisciplinary bachelor's degree program. Program re-design changes are currently underway to incorporate more career exploration, leverage campus resources including the center for career opportunities and the online career resource portal offered through the university library science faculty. In addition, course re-design is underway for the ePortfolio class, to provide opportunities for students to practice creating multiple professional employability tools such as a visual resume, online portfolio, website, application essays, elevator pitch, and cover letter.

Due to the smaller sample size (n = 10), the results cannot be viewed as conclusive. However, they do offer some insight into the benefit of career exploration learning activities into the multi-, inter- or trans-disciplinary classroom. Future research should investigate this approach across different disciplines, using a larger subset of students, and incorporate additional quantitative and explanatory data analysis.

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