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The Potential of Makerspaces within the University to Aid in Student Professional Development

Sophia M. Medina

Florida International University, smedi052@fiu.edu

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FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

THE POTENTIAL OF MAKERSPACES WITHIN THE UNIVERSITY TO AID IN
STUDENT PROFESSIONAL DEVELOPMENT

A thesis submitted in partial fulfillment of the

requirements for the degree of

MASTER OF ARTS

in

ENGLISH

by

Sophia Marie Medina

2021

To: Dean Michael R. Heithaus
College of Arts, Sciences, and Education

This thesis, written by Sophia Marie Medina, and entitled The Potential of Makerspaces within the University to Aid in Student Professional Development, having been approved in respect to style and intellectual content, is referred to you for judgement.

We have read this thesis and recommend that it be approved.

Shewonda Leger

Luke Thominet

Vanessa Sohan, Major Professor

Date of Defense: March 26, 2021

The thesis of Sophia Marie Medina is approved.

Dean Michael R Heithaus
College of Arts, Sciences, and Education

Andres G. Gil
Vice President for Research and Economic Development
and Dean of the University Graduate School

Florida International University, 2021

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ABSTRACT OF THE THESIS
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STUDENT PROFESSIONAL DEVELOPMENT

by

Sophia Marie Medina

Florida International University, 2021

Miami, Florida

Professor Vanessa Sohan, Major Professor

This thesis demonstrates the potential positive impact makerspaces can have among humanities students who are seeking to pursue careers outside of academia. Although multimodal composition is encouraged within the humanities, lack of experience, resources, and guidance becomes a barrier for students to gain many of the technological expertise required in professional environments. In addition, many students struggle to exercise the work skills necessary within a corporate or technical environment. The makerspace can create opportunities for student development while preparing participants with career skills, such as digital literacy, collaboration, creativity, and networking. Through interviews conducted with facilitators and a company project collaborator, I investigate a corporate makerspace to support how these spaces can aid students seeking to prepare for their future endeavors. My findings discuss themes, such as learning, peer-learning, networking, collaboration, and creativity. These themes help to determine how the makerspace can aid in professional development if implemented within the university.

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I. INTRODUCTION

The conversation on makerspaces has gradually made its way within the Writing and Rhetoric field as technology continues to advance every year. The makerspace is a physical designated space with the resources and tools that allows students to make different forms of creations they choose while obtaining new skills. Sheridan, Litts, Brahms, Jacobs-Priebe, and Owens (2014) define makerspaces as “informal sites for creative production in art, science, and engineering where people of all ages blend digital and physical technologies to explore ideas, learn technical skills, and create new products” (p. 505). In other words, makerspaces are dedicated to the process of inventing and making, ranging from physical creations —such as clothing design, paintings, sculptures — or digital/technological creations, such as images, videos, animation, 3D figures, and more. The kinds of resources that can be found within these kinds of spaces are computers, 3D Printers, access to online software (e.g. Adobe Creative Cloud) and more.

As makerspaces continue to make way into many educational and academic settings, the potential of these spaces in the university setting have begun to circulate among members in academia. While primary schools, educational institutions, and libraries continue to implement these designated spaces to enhance the skills of young children and adults alike (Geser et al., 2019), scholars have begun to research the impact they can have on student development within the university level, especially in terms with the development of new skills and preparation for those interested in marketing their degrees. Although makerspaces were first incorporated in educational settings, business have begun to implement these spaces within their own place of work (Rieken et

al., 2019). These spaces, known as corporate makerspaces (CMS), can usually be found in companies related to marketing, brand work, architecture/ interior design, and graphic design. Inspired by academic makerspaces, companies have implemented CMSs to invite corporate employees to work collaboratively with their fellow co-workers while coming up with new ideas and projects for their enterprise (Rieken et al., 2019). Therefore, it is essential for students seeking to pursue careers outside of academia to gain the proper experience to thrive within these professional settings.

People can see now, more than ever, that the world has completely transitioned over to digital forms of writing and mean-making. The COVID-19 pandemic has forced individuals to see that value of digital communication in a different way. The internet has become a primary source of communication, consumerism, and digital creation. Social media, content creation, blog posts, and online databases have become the inevitable successors of the print format. In addition, multimodal composition has become a norm within the workplace. This is because modern “white-collar” settings have moved away from bound forms of communication and transitioned to views that encourage mobility, mixing, and historical embedding (Spotti, 2011). Communication in these workplaces have begun to be characterized with the use of different modes (e.g., image, video), genres (e.g., PowerPoint presentations), online platforms (e.g., Instagram, Twitter), and media (Blasjo & Jonsson, 2020). Therefore, it is crucial that students who intend to pursue careers outside academia learn to adapt to these new professional climates.

Many graduate programs in the humanities, such as English Writing and Rhetoric, advocate students to produce multimodal or digital works within the field. Multimodality is the integration or combination of different modes and rhetorical resources – such as

text, still and moving images, music, photos – to make meaning. However, not many students choose to take the opportunity to produce multimodal works. On the basis of my experience as an English graduate student and speaking with my classmates, many do not choose to take the opportunity because they do not know how to start. According to Devoss (2013), students who come from disciplines such as English are very text-focused and text-heavy when it comes to producing works, such as documents. In addition, many students do not have the proper resources, experience, or technology compose multimodally, leading them to default to the standard academic paper.

Apart from the student experience, professors may struggle to evaluate multimodal composition effectively. Many evaluate this kind of composing by assessing whether their work delivers a message in terms of its rhetorical situation (Anderson et al., 2006). Teachers are forced to rely upon common quantitative forms of assessment which often rely on standard-based views of literacy (Cumming et al., 2012; Lewitt, 2003; Matthewman et al. 2004; Anderson & Kachorsky, 2019, para. 2). In addition, feedback is limited; many professors do not specialize in these modes or media, making it difficult to provide constructive criticism. Therefore, creating successful practices to promote multimodal creation requires professors to approach their students with a mixed skills approach, which many do not know how to do (Camiciottoli & Campoy-Cubillo, 2018). Ultimately, there are still questions in academia that remain unanswered regarding how multimodal elements should be observed within the classroom setting and what elements should be considered to value and assess them (Camiciottoli & Campoy-Cubillo, 2018).

The implementation of makerspaces within the university has the potential to enhance the learning experience of students while simultaneously providing them the

skills desired in many professional settings. As we see these spaces continue to make way in corporate and start-up businesses, there is even more reason to offer students the opportunity to experience them before entering their careers. With the makerspaces' emphasis on creating multimodal and multimedia works, participants in these spaces can learn to do so while attempting to draw on outside new media literacies to create compositions in a new way (Gollihue, 2019). The makerspace goes even further by giving students the ability to gain experience in essential entrepreneurial skills such as collaboration, networking, and digital literacy (Li & Todd, 2019). Moreover, university learning can be strengthened by contributing these skills required in the twenty-first century, enhancing creativity and innovation while promoting the university's connection to the outside world (Pettersen et al, 2019). Apart from student development, professors and facilitators of these spaces may see an enhancement of their own technical and digital skills (Li & Todd, 2019).

Implementing makerspaces in the university for higher education students is an area of study that is beginning to surface within the Writing and Rhetoric field. However, there is not enough research to support or understand how these makerspaces will or can function, especially when it comes to skill development. Therefore, I aim to bridge this gap within Writing and Rhetoric to reveal the values of the makerspace, and how it can serve the student community. I argue that the implementation of makerspaces in the university can help students transition into careers outside of academia while allowing them to market their degrees. Moreover, I will suggest that these kinds of spaces can give students in the humanities essential skills required in professional career fields such as

journalism, technical writing, and marketing through makerspace characteristics such as learning, collaboration, and creativity.

When conducting my research, I will seek to answer the following research questions: What is the makerspace and its characteristics? What are some of the conversations being had about the makerspace? How can makerspaces aid in student development, especially for Writing and Rhetoric students seeking work outside of academia? Does its characteristics aid in this student development? What are corporate makerspaces? How can the makerspace prepare students to participate in these CMSs? How does learning, peer-learning, creativity, collaboration, and networking take place within the makerspace? Can the implementation of makerspaces in the university be beneficial for students seeking to gain skills and experience for their future careers?

As more information and case studies on makerspaces continue to come to light, many reveal the importance of creativity, digital literacy, and collaboration within the professional world. In my thesis, I share an analysis on the results of an interview study I conducted with facilitators, employees, and collaborators who work in a real-life makerspace used for entrepreneurial purposes. The subject population consists of three facilitators and a company project collaborator. I chose to keep the population small to create limited exposure because of the COVID-19 pandemic. In addition, this is why I chose to hold these interviews through Zoom. Therefore, I chose to interview the owners of the space and at least one outside participant. The themes that I will review during these interviews will be learning, peer-learning, collaboration, creativity, and networking.

II. LITERATURE REVIEW

Background

The concept of the makerspace was developed by Seymore Paport, the father of the maker movement. He sought for potential learners to create tools, theories, and learning environments to inspire learners to create successful ideas through experience. (Ciecierski & Stylers, 2020). Created from Paport's ideals, the maker movement began to make its way among the U.S. The movement first began as a collective of people who enjoy do-it-yourself (DIY) projects and were eager to share their interests and skills with their community (Moore et al., 2020). Eventually, libraries and science centers began to adopt making as a pedagogy, which led to great traction for the maker movement.

Maker culture became an important part of the modern age, as it was characterized by highly electronic practices that privilege product over process and the individual contributions and effort of makers (Gollihue, 2019). The culture calls for participants to look back at DIY and how it positions individuals as producers, inventors, and multiliterate people of the digital age (Gollihue, 2019). As Dougherty (2012) states, "We all are makers: as cooks preparing food for our families, as gardeners, as knitters... people today may not treasure this ability out of the same sense of necessity as they once did, they are finding their lives enriched by creating something new and learning new skills" (p. 13). Dougherty, the founder of Make Magazine and a well-known figure in the maker movement, dives into what it means to be a maker within these spaces. He explains that maker culture is not set on one specific form of mean-making, but in multitude of forms. Although many of the examples of making he introduces would not

commonly be known as the practice of a particular skill or a form of creation, he argues otherwise.

The Core Values of the Makerspace

The makerspace is known as a space that is open to different kinds of making and creation, whether it be physical or digital. As a consequence of their multidisciplinary design, these spaces help to shift a focus on the importance of design and technology, engineering, and new media arts standards across art disciplines (Sheridan et al., 2014). Therefore, students and participants in these spaces have the ability to tinker and experiment with various forms of technology to create works that are entirely up to them.

Participants in the space are “makers” who “make;” This act consists of groups who share interests and involvement in technology and creation, aiming to enhance their expertise (Pettersen et al., 2020). Participants are given the opportunity to experiment with technology or design platforms to create or “make” their work, promoting multimodal composition while allowing them to take risks (Gollihue, 2019). In other words, individuals in the space have the freedom to make errors and to continue learning without suffering any sort of consequence.

There is an emphasis on freedom that results from the makerspaces fluid and subjective nature; although students have the ability to choose what they can create, they must also become responsible for their own learning practices in the makerspace and what they want to make. And while facilitators of these spaces are there to help whenever necessary, it is up to the learner or the maker to continue taking the proper steps to learn and create, requiring much experimentation and dedication. The make and learn themes

in the makerspace highlight the value people make on having freedom to choose what they make and learn. They can decide what to make, what to learn, and how involved they want to be in making and learning (Li & Todd, 2019), hence why it is considered an informal way of learning. However, this informal learning can be beneficial for people seeking intellectual development (Li & Todd, 2019).

The makerspace requires students to solve their own ill-structured problems, meaning that the problem or situation is “not well-defined, the problem description not clearly laid out, and the information necessary to solve the problem is not given in the problem statement” (Jonassen, 1997; Vongkulluksn et al. 2018, para. 8). Although this may seem like an inconvenience, students can ask their peers for help, promoting peer-learning. No participant comes into these spaces with same amount of knowledge and experience as another. As a consequence of the exploration of their personal interests, each participant comes in with their own sets of ideas to help guides one another during the making process (Irie, Hsu, & Ching, 2018). Peer-learning comes into play, as the makers begin to rely not only on themselves, but on others to help them overcome learning obstacles while advancing their learning experience.

Nonetheless, through the community made within the space, the makerspace does not only seek to improve the skills that students already have, but to provide them with entirely new ones. With a multitude of students coming into the designated space from many different backgrounds and experiences, each participant is exposed to a variety of passions and expertise. Dougherty (2012) explains how this phenomenon functions.

“Today’s makers enjoy a level of interconnectedness that has helped to build a movement out of what in the past would have been simply a series of

microcommunities defined by a particular hobby or activity. Although the movement is largely driven by the Internet, events [event makerspaces]... allow people to mix with many different groups. People take a little bit from here and a little bit from there, and the resulting mash up leads to some pretty exciting creations... Whether it is arts and science or crafts and engineering, they seem to belong together, connected by enthusiasm and a common passion” (p. 12).

As Dougherty states, the makerspace is made up of the community that forms in these spaces. Because of the diverse knowledge brought about from different groups of people, participants in the space are given the agency and free will to improve on their desired passions while branching out to different forms of making they have never experienced before. Dougherty reveals that because of the connected enthusiasm and passion among participants, no matter the form of creation, participant’s desire to create and learn. The fluidity within the makerspace and the informal interactions being held in them allows students to adapt across a multitude of disciplines (Sheridan, 2014). Therefore, the community within the makerspace is considered to be essential, as knowledge sharing and peer-to-peer learning help to function the makerspace (Pettersen et al, 2019).

In addition to community and the sharing of knowledge, students in the makerspace have the agency to make errors without suffering any consequences. Failure becomes a part of maker experience (Irie, Hsu, & Ching, 2018). For example, since students must overcome their own problems and struggles, the creative space provides them with a place where failure is possible without penalty (Tawfik et al. 2016; Gruen, 2018, p. 139). The lack of penalty allows them to gain confidence and overcome the fear of standard educational structures, which can prevent students from being inspired or

motivated to try something unknown to them (Irie, Hsu, & Ching, 2018). Participants are given the ability to observe and revise their mistakes. During a study conducted by Gruen (2018), student makerspace participants were interviewed on their experiences in a makerspace. One of the themes she discovered within their responses was the freedom of trial-and-error. According to her findings, focusing on how composition functions within these areas “provided opportunities for students to reframe failure as positive” (Gruen, 2018, p. 139). The agency brought about from this failure gives makerspace participants freedom to compose without expectation while seeking new forms of understanding (Stoller, 2013). Ultimately, failure becomes solely educative, aiding in the cultivation of a maker’s unique creative abilities (Stoller, 2013).

Corporate Makerspaces (CMS)

Makerspaces have been incorporated into corporate and business settings as a innovation driver for entrepreneurship (Rieken et al., 2019). The purpose for this space is to allow employees to bring their ideas to life by making them into a reality. Brought about from the industry 4.0 era, familiar among the engineering field as a time of technological advancements, these spaces are typically used to advance the knowledge of all its participants while creating a network system that allows for developing skills in manufacturing (Yemane et al., 2020). Other than company workers, individuals outside the company can be invited to participate in these spaces; some of these individuals include customers, clients, and suppliers (Rieken et al., 2019). Initially, the spaces were incorporated for employees to become accustomed to the digital and physical world by being introduced to new technologies (Yemane et al., 2020). According to Reiken et al. (2019), some scholars see these CMSs as essential for innovating during the twenty-first

century (Clark, 2014; Fox, 2014; Rieken et al., 2019). Corporate makerspaces were inspired by the makerspaces being placed in educational settings such as libraries and schools (Rieken et al., 2019). There is little research on CMSs, as research on the subject have only just begun. Rieken is one of the few who has been able to provide a literature review-based framework on the subject.

Writing and Rhetoric and the Makerspace

Researchers have come to understand just how crucial transitioning writing into other forms of media can be, as English departments must, as Yancey (2004) suggests “link what happens outside of school to what we might do inside” as “daily communicative, social, and intellectual practices are screen-permeated” (p. 305). With technology advancing every day, Shipka (2005) calls for Writing and Rhetoric to do more than just talk about visual communication and literacies, but how they can be incorporated. Therefore, she claims that producing work, outside of standard printed texts, can expand the imagination of student’s way farther than “our journals have yet even begun to imagine, let alone address” (Shipka, p. 282). Alexander and Rhodes (2014) support this claim, as they address how the composition field focuses much more on word processing and digital generation of text, advocating for a reimagined way of incorporating new media into the curriculum.

Writing and Rhetoric scholars have begun to see the impact makerspaces can make when it comes to student development and taking writing into different mediums. Although multimodal composition is only one way to allow students to experiment, the makerspace, and/or labs and courses constructed as such, can lead to the possibility of

writing students learning how to use tools and communicate with new modes and mediums (Beck, 2020). As many scholars call for a design approach within the curriculum (Shivers-McNair et al., 2018), the makerspace helps to put this kind of thinking into practice. In addition, some have begun to see the developments that these spaces can make for students seeking to acquire skills and entrepreneurial mindsets (Geser et al. 2019).

Some scholars argue that the makerspace may run a variety of risk when it comes to student learning and development. Gollihue (2018) argues that certain makerspace, depending on how they are implemented in the university can limit students, forming them into a certain kind of maker and while making in a specific way. Shiver-McNair (2016), on the other hand, mentions how many of these makerspaces can lack diversity, as they mainly consist of white males, although many commit to making these spaces inclusive for women and people of color. Although women have begun to situate themselves in technological fields, there remains a lack of them in these kinds of settings, as Shivers-McNair (2016) finds during an observation study on a makerspace.

There is still much more to learn about how the makerspace can aid in student development in Writing and Rhetoric. Although the conversation has already begun, there is still much more research that needs to be done within the field. Although journals, such as *Computers and Composition*, talk about the makerspace, much of the conversations are being held within journals in the education and business fields.

III. METHODS

I chose to conduct my interviews on a corporate makerspace is because of its similarities to the academic makerspace. In addition, since these spaces are already being incorporated in professional settings, it gives even more students a reason to get involved in a makerspace while still in the process of obtaining their degrees. I believe viewing the makerspace in a professional setting can help to support my claim that these kinds of spaces within the university can prove helpful when advancing the technical and professional skills needed to enter a career field outside academia. Although a CMS is used to create a product or work for a specific business, each employee in this space is in a constant flux of skill development that can aid in their future projects and endeavors. In addition, the owners of the space welcome outside creatives and associates to enter their studio to have a place to make, invent, create, and learn. As a graduate student, I have been participating in the makerspace since 2019. I was given a place to work while given the opportunity to learn new skills such as photo-taking, photo-editing, and Photoshop, where I learned to combine photos, text, art, and more. The facilitators offer help to the participants in the space by assisting them to make their creations, providing useful feedback, sharing ideas to further their work, and teaching them how to use technology and software, such as Adobe Photoshop, Lightroom, and more. Therefore, I believe viewing how these spaces are being used in the workplace can prove beneficial when considering implementing academic makerspaces within the university.

After receiving IRB approval for my study in Fall 2020, I set up the interviews by emailing informational letters to the business owners of a self-employed marketing/content production company who own a professional makerspace, also known

as a working studio. Located in the South Florida area, the employees use this space to create various forms of content, typically for advertising and brand work, while using many of the technological tools made available to them. In addition, they use the studio to enhance their skills while simultaneously gaining new knowledge from not only their fellow workers, but the collaborators and associates who participate within the space. The subject population consisted of three facilitators/employees of the space: the director of sales of operations, the creative director, and the video director. An outside project collaborator also took part in the study, making a total of four participants. Once each subject agreed to participate in the study, availability dates were discussed and two interviews were conducted during January 2021 via Zoom: one interview with the facilitators – pseudonyms: Andrew [video director], Dylan [the director of sales and operations], and Vincent [the creative director] – and one with the project collaborator, who was given the pseudonym Natalie. Each interview lasted for about an hour, where we discussed their experiences, ideas, and thoughts about their makerspace and how it benefits their work and skills. My study remained private and confidential. The company and the subjects were anonymized to reduce any risk against them and to guarantee their safety.

My study uses Grounded Theory (Strauss and Corbin, 1967) to analyze and interpret the participants' answers and determine how a makerspace aids in professional development. Using qualitative research characteristics, I held and recorded the discussions with the interviewees and transcribed the data. Afterwards, I coded them in search for themes of skill development – such as digital literacy, collaboration, and creativity – and makerspace traits such as the desire to learn, inspiration, community,

and peer-learning to support the points being made in my argument. Grounded theory helps to ensure that there is a clear connection between me and the subjects, while focusing to obtain data that would prove helpful in my study. Each person was given a clear set of questions that gave them the ability to comfortably speak about their makerspace and how it has proved essential in not only their work, but their skill development. Moreover, this theory helped to avoid any form of miscommunication or interpretation when recording and collecting their answers. The subjects were contacted once the data was collected and coded to confirm that what was said was not altered or misinterpreted in any way, as the theory calls for.

The questions asked during the interviews were the following:

- What are some of the key components that make up your makerspace?
- What does it signify for you?
- Can you explain some of the work that takes place within the space?
- When enhancing your professional/creation skills, did you find that the space aided in that process?
- How about those coming from outside the space?
- What would you say are some of the advantages of using the space? How about for those seeking to gain new skills?
- How does collaboration and peer-learning take part in the space? How about networking?
- Have you found that the space not only benefits you as a facilitator, but collaborators and others who come into the space as well?
- How does it affect the creative process and/or your professional work?

- Do you think adding spaces like yours in the university can be effective towards students seeking to learn creative skills such as photo editing, video editing, or programs such as illustrator and photoshop?

During the interviews, more questions were developed, such as how motivation and inspiration plays a role within the space and where it derives from.

Every question was asked during the interviews, and each participant shared their own thoughts and answers. Due to the conversation-based style of the interviews, each participant was willing to share the amount of knowledge and experience they have had in the space.

Coding

The interviews were analyzed according to how the interviewees described their experience and learning process within their makerspace. Themes such as the willingness to fail, experimenting, peer-learning, opportunity, inspiration, and creativity were highlighted various times throughout the interviews, similar to the findings outlined in Li and Todd's (2019) study. As they explain, "people were driven to participate in makerspaces activities for the opportunities to make, to learn, to hang out, and to engage in personal interests. Through makerspace participation, desired outcomes included producing tangible objects, developing Science, Technology, Engineering, and Math knowledge, gaining real-life skills, preparing for careers, having fun, working in teams, developing friendships, and generating new interests" (Li & Todd, 2019, p. 316). During my coding process, I was in search of these similar themes these scholars explain, specifically for how they aid in professional development. Moreover, I was in search of

discussions that revolved around collaboration, learning, experimenting, and skill development because of the importance of these themes in the makerspace.

Once each interview was transcribed, I reviewed the transcripts and coded discussions that revolved around the power of the makerspace and its influence on skill development. Each interviewee spoke on the effect of the makerspace on their work, their relationships, the strengthening of their personal interests, and its influence on continuous learning. Based on their personal stories and their own interpretations on the spaces influence, the themes of learning, peer-learning, networking, collaboration, and creativity were repeatedly reiterated throughout each interview. Due to this repetitive nature, I was able to highlight these key themes and determine how they aid in the argument I make, which is that makerspaces can aid in skill development for students seeking to enhance their career fields due to its traits.

Limitations

There were various limitations that appeared during my interview process. The time required to conduct the interviews and code the data proved to be another limitation. Because of the different time availabilities among the subjects and myself, the interviews were pushed back multiple times and could not be conducted as early as I had anticipated. As a result, the amount of time I had left to analyze and code the data was reduced. Therefore, I had to code the data faster than I initially expected in order to reach out to the participants in a timely manner to confirm their quotes and the results to ensure that the information was not misinterpreted.

The amount of time needed to transcribe the interviews was another issue that I faced. Although I used Temi, an online software used to transcribe recordings for users, there were many errors that appeared in the transcription. As a consequence, I had to repeatedly listen to each hour-long interview to confirm that everything said was transcribed correctly. Verifying interviews also reduced the amount of time I had to collect the data and analyze it.

As a result of the limitations of COVID-19 and the pandemic, I was unable to hold in-person interviews. Initially, I had planned to conduct the interviews as they were making within the space. To ensure their safety, I chose to hold the interviews through Zoom instead. As a result, I was unable to triangulate data through observations of the subjects as they were interacting in the space. Therefore, the data could only be conducted from what was said in the interviews.

Lastly, another limitation would be that I was unable to conduct interviews with an academic makerspace. Initially, I planned to interview the CMS along with an academic makerspace. However, the pandemic led to the immediate closure of schools and universities early 2020, which prevented me from being able to find a functioning academic makerspace at the time. Therefore, I was only able to conduct interviews with the CMS, as the space had plans to reopen no later than January 2021.

IV. FINDINGS

The data collected show the facilitators' and the collaborators' perceptions on the impact of their makerspaces on their skill development, their craft, and their work. Each interviewee discussed what about their makerspace gives them the ability to enhance their

skills while giving them the desire to continue participating in the space. Themes such as collaboration, peer-learning, creativity, learning, and networking were found.

Learning

Each interviewee was asked what their experience within the makerspace and its implications on their work and skill development. One common theme associated in each interview was the willingness to learn and the hands-on experience while exploring ideas without the fear of facing damaging consequences. Due to this freedom, each person was given the ability to attempt anything they desire to learn while experimenting with a specific product, media, or craft. In addition, they were given the ability to advance current skills while taking up entirely new ones as they so desired. According to the video director of the space, Andrew, the space symbolizes a kind of learning and play that is possible.

“The studio [makerspace] to me is kind of like a workshop. It is where everything kind of starts for me. It’s just been a place where every time I have an idea, I can physically do it... There is no limitation... One moment, I might think ‘it’d be really cool if I shoot [a video of] this orange.’ When I’m in that space and I have those ideas or random moments, I can do it. It’s a place to just let all my ideas and passions flow.”

Andrew referred to the makerspace as a kind of workshop that allows ideas and different kinds of making to take form. Due to the resources provided in the space and their ability to take advantage of it, no creative ideas are downplayed or turned away. Another interviewee, Dylan, explained the benefit of this, addressing how it aids in their

learning and skill development. “The studio [makerspace] gives me an environment where I could test and apply. I may not have the job as a brand strategist, a photographer, or a videographer, but these are skillsets that I've been able to build over time in the space.” Although recognized as the director of sales of operations, Dylan has been able to challenge himself by gaining and advancing his skills outside of his job position. If he chooses to practice taking photos or videos and editing them, he can do so willingly in the makerspace. He explained, “It [the space] gave us the opportunity to unlock skillsets within what we were already talented in and things that we didn't know that we needed to do and we continue to learn.” Dylan addresses how the makerspace has functioned to help him and his colleagues achieve new skills they were unable to do before owning the space. Therefore, this helps to support the claim that this kind of space can help to exemplify the potential of participants due to its flexible nature.

In relation to failure, the makerspace makes playing and experimenting possible without participants facing a penalty. This freedom allows users to make mistakes while making learning achievable. According to Vincent, the ability to fail is one of the reasons why they were able to enhance their skills in graphic design. “It [the makerspace] is a playing ground with failure; those experiences highlight all the things that you're challenged to fix moving forward. We're still, to this day, learning and adapting.” Without the makerspace, Vincent stated that he would not have been able to learn graphic design without the space. Although he has been able to advance his skills in the technological craft by being in the space alone, he still finds himself in a constant state of learning. “This space has really, for me as graphic designer, elevated my game because I've learned it here, but I still continue to learn it.” Vincent mentions how his graphic

design skills are constantly being challenged and adapted as he continues to learn within the space. As a result, learning for him seems function in a constant state; in other words, he is constantly advancing his skills event though he has been able to learn so much already.

Apart from their individual experiences as facilitators in the space, other makers and participants are welcomed to learn and make. Due to the fluid and comfortable environment brought about from not only the makerspace itself but the facilitators as well, participants are eager to take their making and learning much farther. Vincent explains, “When we created the space, the intention wasn’t just for us. We wanted people to come in there and feel inspired... Every time someone is there, if they’re going for the purpose of being creative or learning, they instantly get inspired. It’s nothing that we say, it’s just the room itself.” As Vincent stated, the “room itself” gives participants the desire to make or try something new. This is due to the encouraging atmosphere brought about from the space that values innovative ideas of participants and reduces the fear of failure (Geser et al. 2019). To back up this claim, I had the chance to speak to Natalie, the project collaborator, during my second interview. She is currently working on a campaign sculpture with the company. Before this project, Natalie was a recurrent participant in the space where she not only advanced her painting expertise but learned new skills such as photography and lighting organization. “In the studio, I was inspired to learn more than just working on my art. Actually, I didn’t even try to pick up a camera until I was there. I’ve learned so much when it comes to photography and lighting, and I’m sure that I’ll be learning more soon.”

Throughout the interviews, a common theme that arose is inspiration and drive. No matter the participant, whether they are a facilitator or a learning maker, the makerspace helps to provide a sense of opportunity where anything is possible. This is because the space helps to inspire development in other ways to learn, not only with skills, but the potential of the maker themselves and others (Culpepper & Gauntlett, 2020). The interviewees address that this has much to do with their development in the space. Natalie states, “You go in with this energy and this drive that you want to learn. You want to get everything you can possibly get from an experience. Sometimes you have trouble understanding what you’re doing and what is going on. But learning is everything. The more you know the more you can help someone else learn that same thing.” She identifies learning as an experience, done in accordance with the willingness to try something new or to advance a current skill. Due to obstacles that may arise when attempting to develop their knowledge, the space aids in fueling the desire to make and overcome the obstacles they may face. Once learned, they are given the opportunity to teach others that may find themselves in similar situations.

Peer-Learning and Networking

Learning does not only come from a single individual in the makerspace, but in the community it develops. Although, the willingness to learn derives from the individuals themselves, learning would not be made possible without others to aid in that skill-development. This is because the makers and facilitators in the space often share information, insight, and advice to help each other to resolve complications they may overcome (McGrath & Guglielmo, 2015, p. 47). Pettersen emphasizes the importance of

community within the makerspace when it comes to learning and solving problems. Learning becomes a social situation where people with common and various interests share knowledge and experiences, making the makerspace a community of practice. (Lave and Wegner, 1991; Wegner, 2002; Pettersen, 2019, p. 148)

Natalie addresses this aid in problem-solving and overcoming obstacles provided by their peers in the makerspace. She speaks about an experience during a time she was having complications with her art pieces, specifically on how to further the project and how she can branch out from their routine canvas and acrylic paintings. Andrew pitched an idea to use a wooden board and showed her how to use spray paint instead. “I’d never even thought to change the medium of my paintings nor the actual canvas. If it were not for that positive reinforcement and that push, I would have never thought to learn how to do it, at least not any time soon.” Natalie demonstrates how Andrew was able to help her in a time of uncertainty. Instead of sitting on the issue, she was able to go to one of their peers for ideas and solutions for their problem. In this situation, peer-sharing became essential in the contribution of knowledge to improve practice while also giving the participants an opportunity to discuss their difficult situations, an essential element that Moore (2020) demonstrates about the makerspace.

All of the participants in the interviews shared that the input and feedback of other participants is an essential part of their learning, especially when it comes to making art, graphic design, and content. It plays a critical role in their development. To support this claim, the design director of the company, Vincent states, “If it wasn’t for the space and my peers continuing to motivate and challenge me, I wouldn’t be able to do what I do now [graphic design]... We're able to turn our vision [work] into high quality by learning

and growing with and from each other.” Vincent reveals that the collective and casual learning in the makerspace aids in his growth as a designer. In addition, they are able to help the participants to grow and flourish whether through their creations and their skills. Everyone in the space becomes a part of each other’s learning process, demonstrating the critical role peer-learning plays within the makerspace.

The makerspace becomes not only an essential role in developing hands-on creation skills through peer-learning, but for networking skills as well (Koole et al, 2018). Many professional workplaces rely on this tactic to speak with potential clients and consumers; it has become a required skill for jobseekers to obtain in order to “better serve” their employers or future careers. As Hans-Georg Wolff and Klaus Moser (2009) suggest, networking has been defined to build and maintain contacts that enhance career success (p. 196), whether it be for future endeavors or for potential opportunities. In the makerspace, networking skills are developed through peer-learning. Due to informal interactions, common interests, and helpful conversations, participants create relationships with their fellow peers and makers.

The interviewees shared the effects the space has had on their networking skills. Due to collaboration opportunities and the location of the space, the facilitators have been able to build new relationships with other makers in their studio and businesses surrounding the area. Vincent states, “It [the makerspace] definitely helps us to network, especially since it’s a place that welcomes all people to come and be a part of it... it opens the door to network with somebody right now...” Although networking takes place within the space, another interviewee addresses that it doesn’t always guarantee that a person can expect some kind of goal from it. Dylan states, “When networking in the

space, what are you looking on the other side of that door? What's going to happen next? Right. That part of networking in the studio [space] currently remains ambiguous.”

Collaboration and Creativity

The makerspace mindset, a worldview that advocates for the gathering and collaborating of creative works and makings without limitations (Culpepper & Gauntlett, 2020, p. 264), relies on two essential elements required through various professional settings: collaboration and creativity (Culpepper & Gauntlett, 2020). The makerspace calls on individuals and participants to test their creativity through experimentation while expanding their works through collaboration. Moreover, it calls for those in the space to come together to share ideas when making while at the same time providing feedback to better their projects. Andrew states, “In the beginning, while in the collaborative space at first, I did a lot of things by myself. But, since you put yourself in this group situation, you naturally start questioning different things. You start asking questions, you start opening yourself up. That allows you to grow as a person and in your craft.” As Andrew explains, the space gives participants the opportunity to ask others the hard questions. Due to the community setting, peers are given the chance to provide their own input and share their ideas on how the maker can further their creations.

The community within the makerspace not only welcomes the opportunity for collaboration but enhances creativity, as one of the interviewees states. Natalie explains, “Creativity comes from the individual. But the people who participate in the space help to feed it by giving their own ideas and providing feedback, which a lot of the time helps to further that creativity.” As Natalie states, makers can take their creative ideas to another

level with the feedback of others. Their peers and fellow makers challenge them through teamwork while inspiring them to make moves that they may not have recognized or attempted before. The design director states “When you bring people into the experience, they teach you to think about something when you put it [the vision] out there with their response... It gives the people in the space the opportunity to show their own potential while giving feedback to others.”

In reference to pushing others to strengthen their creativity and collaboration skills, the facilitators of the space help the participants to see their own potential when it comes to making. Andrew states, “I like to leave memories with people, even if they don't come to create, to come into the space and do something... I've put people in a situation where they try to get creative and they grow from it. All of a sudden, they become interested and start expressing the creativity they didn't even think they had at that point.” The video director demonstrates the capabilities his role as a facilitator can have on those who enter the space. As he states, he motivates and guides the participants to get out of their comfort zone while trying something new. The growth he refers to is the potential development made within the individual, but the strengthening of their creative process. In addition, this growth allows them to learn more about what it is that they can do, even if they don't know what exactly that may be at the moment.

Collaboration and creativity are perceived by many individuals as something easily done. However, it can require much more practice to do it effectively. Vincent states, “A lot of people talk about collaboration, but when no one says how hard creative collaboration really is because you have to be respectful to everyone's vision. But sometimes you just have to enhance it. People need to learn how to let people enhance

their vision. That has been a big learning curve.” Vincent addresses how collaboration takes practice and learning, especially when it comes attempting to “enhance” the works of others. At the same time, makers must learn how to let others share their own ideas to enhance their work.

V. DISCUSSION

The interviewees responses help to support the beneficial capabilities the makerspace could have on student development if implemented within the university. This will aid in students to gain new opportunities in professional-work environments while preparing them to engage in makerspaces beyond the university. However, there are still some issues that may arise, as they may not necessarily guarantee success. Although students are given the freedom to participate as they wish, to make and tinker with resources and technology they have never used before, the problem still lies as to whether the student chooses to participate or not. Two out of the four participants agreed that although the makerspace provides opportunities to create skillsets desired in future careers, such as journalism, content writing, or marketing, the commitment to participate and learn relies on the student. However, each interviewee agreed that the makerspace can create the possibility for growth if a student were to do so willingly. Although the makerspace serves as a motivating space for participants to step out of their comfort zone and attempt anything they desire, the hardest part would be getting students to become involved.

Three of the interview participants also agreed that funding can be another problem when it comes to implementing a makerspace. Dylan addressed that although the

space brings in all kinds of opportunities, it cannot be done without the essential finances needed to obtain the equipment and resources for students to tinker with. Therefore, the problem remains as to where this funding would come from and whether the university would be willing to provide the students with that space.

As addressed in my introduction, many professional careers require that students have skillsets related to digital literacy, creativity, networking, and collaboration, which can otherwise be identified as the ability to work with others (Blevins, 2018, p. 22). The interviewees responses help to support the makerspaces' capability to create or enhance these skills in students, as much of these skills are practiced within the space. Due to its characteristics, such as informal learning, freedom to experiment and fail, and learning from others (Geser et al., 2019), the makerspace can be beneficial to English majors looking to pursue careers outside of academia. The space can lead them to gain expertise in skills such as photography, videography, graphic design, multimodal work, social media, and more. In addition, the makerspace can give students the freedom to learn whatever they please, whether it be digital or physical, if provided with the proper resources.

Each interviewee discussed how the space influenced many of the skills that they have today. The facilitators of the space also agreed that although they are usually the ones to aid others in learning, they themselves continue to learn from all those that enter their makerspace. Li & Todd (2019) discuss how the makerspaces capabilities help to enhance the skills of not only the people participating in the space, but those that help to function it. According to my findings, this is because everyone who enters the studio comes with their own sets of skills that they themselves have never taken the chance to

learn before while sharing their personal interests (Pettersen et al. 2019). Therefore, community has played a key factor in their continued professional development.

Although most of the interviewees use the space for their own professional work, the space is still used to give opportunity for those who reside outside the company. Due to its emphasis on creativity, making, peer-learning, and collaboration, the CMS functions like what an academic makerspace should be organized. It is important to note, however, that although this CMS is not made specifically for university students, many, such as myself, have been able to participate and take the opportunity to learn with the help of the facilitators and others making in the space. For example, I have been able to learn new skills such as photography while learning to combine my writing with different forms of media, such as audio, video, and photo. I have also been able to receive feedback from those in the space, in ways to further my work, as some participants come from a writing background.

Based on the results of this study, if students were to obtain their own makerspace, they could make advances in their multimodal composing practices as students could have fun with their work while creating meaningful ways learning without the fear of failure (Oliver, 2016; Culpepper & Gauntlett, 2020, p. 266). In addition, facilitators would become more involved in the students' development, which is considered to be an essential it comes to multimodal pedagogy and practice. (Anderson et al., 2006). However, the makerspace helps to bring communication to life, giving the students the opportunity to take their writing and implement it into unfamiliar forms of modes and media (Blevins, 2018). Ultimately, the characteristics of a makerspace –

specifically, its themes of learning, peer-learning, networking, and collaboration – can aid in a student’s development when it comes to acquiring new skills.

VI. CONCLUSION

The conversation on makerspaces has begun to circulate in Writing and Rhetoric, particularly in writing and composition journals such as *Computers and Composition* and *Composition Studies*, but there seems to be a gap that has not yet been bridged when it comes to how they can be implemented to aid those in Writing and Rhetoric, especially regarding professional development. As many other academic fields, such as education, continue to research and observe the impacts of these spaces, Writing and Rhetoric has yet to recognize how it can be useful among students and other writers looking to pursue careers outside of academia. The world continues to see communication transitioning into the digital realm; digital creation and creativity have never become as essential as they are today. Therefore, it is important that students learn to adapt to this professional climate while obtaining the skills necessary to take on these careers. Ultimately, makerspaces help to echo the move for Writing and Rhetoric to recognize and implement multimodal composition and new media.

Implementing the makerspace within the university can help humanities students to take their writing to more places other than academia. Therefore, students should be given the opportunity to prepare for these careers while they are still in the process of earning their degrees. Although multimodal composition gives students the opportunity to this kind of development, the makerspace can take this learning a step further without

setting up a student for great failure while simultaneously allow them to put their skills into practice.

The makerspace has already made way into corporate and business offices. This is more of a reason as to why their implementation in the university could be helpful. Through their participation in the academic setting, students would be getting the experience needed to participate in CMSs. I chose to conduct interviews with participants of a local CMS for my study for this reason, as they have many similarities. Although used for different purposes, they contain many of the characteristics, specifically regarding learning, peer-learning, collaboration, and creativity.

My work does not represent the full range of experiences and capabilities of the makerspace if implemented within the university. In addition, the makerspace is not the only answer in furthering students professional and skill development. However, I do hope that my work aids in igniting the conversation and bridging the gap between the makerspace and Writing and Rhetoric. In addition, I anticipate that my research will bring more attention to makerspaces that already exist, such as Florida International University's Digital Writing Lab, Edge Lab, and Outreach. I hope that sharing how the makerspace can aid in skill development through the willingness to try, experimenting, and the freedom to fail while working with others can push writing students to further their skills, especially when it comes to current career expectations.

Further questions arise when considering the implementation of makerspaces within the university for student development. How can we get students intrinsically motivated to participate in the makerspace without making it seem like a requirement? Moreover, how do we get them to understand what it is exactly and how it relates to their

careers? As stated before, the conversations on the makerspace are still in their initial stages within Writing and Rhetoric. Therefore, many students may not understand what it is exactly. Where would the funding come from to implement these spaces within the university? How can we further our research on the impacts of the makerspace, specifically when it comes to student development? Ultimately, I am hopeful that my research can help the future of Writing and Rhetoric, while bringing conversations to light on how the makerspace can help students to experiment with their writing in new media.

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