

Design Thinking Uncovered through Students' Experiences and Participation: A Grounded Theory Study

¹Ruby A. Lorenzana-Mamaug

ABSTRACT--*Design Thinking as an extension modality has been introduced to the Isabela State University through the Learning Express Program in collaboration with Singapore Polytechnic and the Philippine Association for State Universities and Colleges. Filipino students have participated in this program as student buddies/counterparts of the students from Singapore to collaborate and apply design thinking to identify needs of the community and to offer their solutions to the unmet needs of the community. This qualitative study was conducted to better understand Design Thinking through the experiences and perceptions of the ISU students exposed in Design Thinking in their participation to the Learning Express Program as an extension modality and as an authentic teaching strategy. The study utilized the coding methods of the Grounded Theory in the analysis of the data from student participants. It was grounded on the study that the students perceived Design Thinking as an extension modality to be need-driven, human-centered, problem solving methodology that addresses the most pressing need of the community. Students engage in empathy, ideation and prototyping to help the community find solution to their needs. Students viewed it as stressful, challenging yet fulfilling teaching strategy that is authentic, collaborative and meaningful method to produce students who possessed the 21st century skills: critical thinker, creative, innovative, good communicator and empathic to the members of the society.*

Keywords-- *Design Thinking, 21st century skills, extension modality, human-centered, need-driven*

I. INTRODUCTION

Background of the Study

The implementation of K-12 curriculum caused drastic changes in the Philippine basic education forcing the revisions to curricula of the tertiary level. The revisions of the curriculum in different course offerings should be aligned to the K-12 curriculum to produce students possessing the 21st century skills. Kwek (2011) emphasized the need to promote 21st century skills and academic content knowledge as similarly important student outcomes. In this study, he outlined 5-core assumptions (Zhou, 2009) on what schools should teach for students to possess the 21st century skills as follows: (1.) Skills and knowledge that are not available at a cheaper price in other countries or that cannot be rendered useless by machines; (2.) Creativity, interpreted as both ability and passion to make new things and adapt to new situations; (3.) New skills and knowledge that are needed for living in the global world and the virtual world (examples include foreign languages, global awareness, and multicultural literacy, and knowledge to cope with the global world, and digital or technology literacy for the virtual world); (4.) High-level

¹ ruby.l.mamaug@isu.edu.ph, Isabela State University Cabagan, College of Education, Regional Center for Innovation and Teaching Excellence

cognitive skills such as problem solving and critical thinking; and (5.) Emotional intelligence - the ability and capacity to understand and manage emotions of self and others, the ability to interact with others, understand others, communicate with others, and manage one's own feelings. How can tertiary education provide for this learning?

Design thinking is an emergent strategy seen by some studies to address the need to produce a learner ready for 21st century skills (Valentim, Silva & Conte, 2017).

Design Thinking is human-centered problem solving with an emphasis on collaboration, empathy and co-creation to unlock creativity and innovation. The key to the process is empathizing with the user's needs to solve the problem.

Design thinking as an Extension methodology was first introduced to the Isabela State University by the Singapore Polytechnic International in 2015 through a Memorandum of Agreement to jointly conduct collaborative program designed for the Overseas Social Innovation Project Module dubbed as the Learning Express (LeX). LeX program is a socialminnovation project which is an international collaboration among four institutions – the Philippine Association of State Universities and Colleges (PASUC), the Isabela State University (ISU), the Singapore Polytechnic (SP), and the Singapore Polytechnic International (SPI) and the Local Government Unit. It is a joint program toward the training and exposure of the students on Design Thinking to help the communities.

The LeX program started its pilot episode in March 2016 and will run for three years for twice a year where 25-27 Singapore Polytechnic students and 25-27 ISU students will participate. Design thinking is a required subject for Singapore students, while DT exposure for ISU students is through a crash course for 3 days in order to participate in the Learning Express program. To date, only around 125 ISU students have been exposed to DT and participated in the LeX program. Based on the implementation of the LeX program and the overwhelming creative and innovative projects that the students have offered in different communities, it was then proposed in the recent curriculum revision of various course offerings that Design Thinking will be offered as a required institutional elective. Hence, the conduct of the study is deemed important to better understand the experiences and perceptions of ISU students in design thinking in the Learning Express Program.

Statement of the Problem

This study is guided by the following research questions:

1. What are the students' perceptions regarding Design Thinking?
2. What are the students' experiences during the implementation of the Design Thinking process and Learning Express Program?
3. What are the contributions of the Learning Express Program to the students and community?

Significance of the Study

This study is deemed significant to better understand the DT learning process and as an extension modality as perceived by the students. The findings and results of the study could help curriculum developers, policy makers and school administration to adopt design thinking as a teaching strategy aimed to address 21st century skill development among students. Similarly, the findings of the study could lead to the improvement in teaching design

thinking as the students find it stressful and challenging yet fulfilling. Teachers can improve the way design thinking is being taught and provide ample time for brainstorming as students find it the most stressful process.

Scope and Delimitation

This study was conducted in Isabela State University in October 2017- March 2018. The participants to this study were the purposively selected 20 students who participated in the Learning Express Program. The students were asked to answer open-ended questions.

II. REVIEW OF RELATED LITERATURE AND STUDIES

Design Thinking

Brown (2008) defined design thinking as a discipline that uses the designers' sensitivity and methods to match people's needs with what is technologically feasible and give a viable business strategy can convert into customer value and market opportunity. Stanford Hasso Plattner Institute of Design, also called "d.school" and whose teaching focuses on design thinking, perceives design thinking as a philosophy with good process ensures good ends and that problems can be solved through observation (Cahen, 2008).

The Singapore Polytechnic uses their own framework for design thinking in their course module. Design thinking is a required subject to all students in the Singapore Polytechnic. In the above framework, the Design Thinking (DT) methodology is consists of four iterative phases:

- A. Sense and Sensibility- gathering of baseline information to determine the current and future trends of the livelihood activity
- B. Empathy- community immersion for 3 days; ethnographic research, observation and interviews with the members of the community and persons involved in the livelihood project
- C. Ideation- brainstorming for the best possible solution to the need of the community
- D. Prototyping- make the solutions come into life and present to the community for feedback and further revision and for possible adoption of the solution or technology.

Related Studies

Design thinking is an emergent strategy seen by some studies to address the need to produce a learner ready for 21st century skills (Valentim, Silva & Conte, 2017). In this study, they discussed that design thinking offers a methodology built on a human centered approach through direct observation and identifying needs of the people. Valemtim et al (2017) managed to identify two perspectives from the data they gathered: the personal and collective. For personal, design thinking allowed students to understand the users and for the collective, it allowed students to work as a team to come up with solutions.

Mentzer (2015) in their study discussed that design thinking helps improve students creativity, problem solving and communication skills. It was also stated that design thinking teaches young students to work collaboratively and practice empathy towards others in their community.

Retna (2016) examined teachers perspectives, experiences and challenges faced when adopting design thinking. The results show that based on teachers perspective, design thinking improves students' creativity and problem solving.

These studies were all done abroad and none of the studies in design thinking is conducted in the Philippine setting. This observation made the researcher to conduct this study to present the actual lived experiences of a few Filipino students exposed in design thinking prior to the actual integration of the design thinking to a formal curriculum in the Philippines. The study could fill in the gap by seeking to understand the Filipino students perceptions and experiences in design thinking.

Definition of Terms

Design Thinking-it is a method used by the participants to identify and offer solution to the needs of the community

Learning Express Program- an extension program of the Isabela State University in collaboration with Singapore Polytechnic that uses design thinking methodology.

III. METHODOLOGY

Research Design

This study utilized qualitative research to provide significant insights on the lived experiences of the students exposed in the Design Thinking methodology and the Learning Express Program. Grounded theory was used to analyze the participants' in-depth account of their experiences in design thinking and Learning Express Program. In this particular study, Charmaz' and Glaser's Grounded theory helped the researcher come up with theory grounded from the data.

Sample

Purposive sampling was utilized in the study. Twenty participants of the LeX program were selected. These students had attended Design Thinking training prior to joining the Learning Express program. These students conducted the Empathy phase of the Design Thinking in 3 different barangays of Sta. Maria, Isabela together with their Singapore Polytechnic buddies to help the chosen communities in their livelihood projects. Participants provided written consent together with their parents consent when they applied for the program. It was also explained to them that they will be the participants to this study.

Research Instruments

The researcher-made questionnaire containing open-ended questions and their Learning journal was utilized for the purpose of this study to capture the lived experiences of the participants and the contribution of the Learning Express Program to their lives and that of the community.

Data Gathering Procedure

The data were gathered from the answers to the open-ended questions given to the participants written in a notebook together with their learning journal. The researcher also observed how the students behaved during their participation to the Learning Express program. To check the validity and trustworthiness of the data supplied by the participants, the researcher conducted in-depth interviews to two participants to talk about experiences to

the design thinking methodology. This was recorded using the phone recorder and the interviews lasted for 18 min and 31s for the first interview and the second interview lasted for 13 min and 34 s.

Data Analysis

The responses of the participants were analyzed using the qualitative statistical software Atlas Ti8. The responses were subjected to open coding and at the end of the open coding analysis, 67 codes were generated. The software also provided the data on the frequency of each code and the percentage of each code. The researcher then proceeded to axial coding and analyzed the 67 codes generated and re-grouped them together based on similarities into categories. The categories generated were then analyzed and given themes through selective coding. The themes were further analyzed and were used to model how students perceived Design thinking and Learning Express as reported based on their actual experiences.

Presentation, Analysis and Discussion of Findings

Based on the students' actual account on their actual and lived experiences in design thinking, codes were generated. Shown in Table 1 are the codes generated with the highest frequencies on how students perceive design thinking. These codes represent how students perceived design thinking based on their actual experiences.

Table 1. Students' perceptions and experiences on Design Thinking.

Code	Students' Perceptions and Experiences on Design Thinking	Frequency
1	DT addresses the unmet needs of the community.	14
2	DT is about giving innovative solutions.	11
3	DT is creating new ideas to solve a problem of the community.	10
4	In DT, you empathize with people.	10
5	DT is a challenging experience.	10
6	DT is learning out of the box; meaningful learning.	7
7	DT is an avenue to enhance interpersonal skills.	7
8	DT is an avenue to mold more resilient, empathic and innovative students.	7
9	DT involves social innovation.	6
10	DT is difficult but challenging.	6

The researcher then analyzed and grouped the above codes based on the research questions: 1. the perceptions of the students on design thinking and, 2. the actual experiences of the students during the implementation stage of the design thinking process.

The Perceptions of the Students on Design Thinking as an Extension Modality

The codes 1, 2, and 3 in Table 1 present how students view design thinking as it addresses the unmet needs of the community by giving innovative solutions. This was reflected on the answer of Student 4 and was backed up in the study of Cahen (2008) and Brown (2008) definition of design thinking.

“DT is a process which undergoes several phases. This is done thoroughly to come up with an innovative solution that addresses the user's needs. This allows us to enter the life of the user, experience what they do in their daily life while helping them to find innovative outcomes that would not just benefit us, but most especially benefit the community. It made us to think what's beyond our imagination and come up with an idea of creativity and inventive ways of solving real world complexities.”

Student 1 on the other hand, discussed design thinking as creating something new to address unmet needs of the community and the importance of each of the process to determine the deep need of the community.

“For me DT is about creating new or innovating new to address the unmet needs of the community. Young designers are actively participating to help the community in their problems. This involves a different process such as sense and sensibility, empathy, ideation and prototype. Each of the process is very important to know what would be their deep need of that community.”

Similarly, students viewed design thinking as a social innovation and builds upon understanding the community and empathizing with the people of the community as shown in codes 4 and 9 in Table 1. This was reflected in how Student 15 perceived design thinking process. Empathy is an important aspect of design thinking, you have to understand in order to provide the exact solution to the needs of the community.

“The main goal of this Design Thinking is to listen, observe and empathize to gain insights... I am impressed by how our group's careful observation and interviews that led us to empathize with the community people.”

Students also perceived design thinking as a good teaching strategy to enhance interpersonal skills, this may be attributed to the constant exposure to brainstorming, sharing of ideas and collaboration with others to come up with solutions as shared by Student 3.

“This experience gave me the avenue to enhance my interpersonal skills. It has taught me to place my feet to someone else's shoes if we really want to enter know and make their life story meaningful. I was so thankful that my experience in DT do not just taught me to become sociable and emphatic but it also taught me to know more deeply or about our cultural diversity and appreciate differences as well. I even learned from this experience that no boundaries could limit us to make connections from diverse people because in the end we still have this one unique thing which makes us in common. Indeed, there is unity in diversity. Overall, it went awesome, full of joys... a lifelong experience.”

Similarly, students viewed design thinking as an avenue to mold, resilient and innovative students. These findings were observed in Student 4. Design thinking allows students to learn and contribute a tangible project to the community. Design thinking perfectly captures an outcomes-based curriculum as students are exposed to real life learning and in the end produce an innovative solution as an output. This was the same observation in the study of Retna (2016), where teachers see design thinking contribute to the improvement of creativity and problem-solving skills of the students.

“DT is indeed a great avenue to mold resilient, emphatic, strategic and most esp. innovative citizen. DT will surely raise the bar of Philippine innovation and will perfectly impact the country's trade of businesses and social services. As young as possible ,every Filipino student should realize the essence of empathy while trying to address solutions on societal problems. Young people should internalize cultural understanding and should break the barriers between cultures.”

The Experiences of the Students in Design Thinking during Learning Express Program

The students perceived design thinking as learning out of the box, difficult but a challenging experience. These observations were noted in Student number 4 who described design thinking as very challenging and difficult. It was also noted in this utterance that the most stressful part in design thinking was brainstorming as it requires knowledge generation and vocabulary. Similar findings from Mentzer (2015) in their study where they discussed that design thinking helps improve students' creativity, problem solving and communication skills.

“DT is very challenging, difficult and brainstorming strategies to make the innovation to help the community develop their livelihood or lifestyle. In DT we need to be observant, to feel what they feel, experience what they experience during the community immersion. We make PERSONA to create a profile which will serve as a reference and inspiration throughout solution development. Brainstorming is the most stressful one and more knowledge and vocabulary. Then after brainstorming and sharing ideas and identify their needs we make prototype. DT is an avenue for big development of the community.”

Student 16 on the other hand, experienced sleeping late at night in order to generate ideas to come up with quality prototype.

“Conducting DT is quite hard because we really need to ensure that we gather all the important information needed to identify the problem in the community. Even though sometime we sleep late at night, at least we shared what we have learned that could help all the members to generate ideas of the shared ideas during ideation to come up with quality prototype. “

According to student number 18, design thinking process is hard, tiring yet fulfilling. The student also emphasized to think critically and empathize with the users in order to provide solutions. . This was also stated in Mentzer (2015) that design thinking teaches young students to work collaboratively and practice empathy towards others in their community.

“Each phase in DT gave me a remarkable yet difficult experiences that surely I share back home and at school. I learn how to observe and think critically using effective tools, to empathize in order to provide key solutions. The entire process is very hard, we exerted so much sacrifice. It is tiring yet fulfilling.”

Emerging Themes of the Study

The above findings of the study led to the formulation of the following emergent themes anchored on the data provided by the actual and lived experiences of the students:

1. Design thinking is a human centered problem-solving process with the goal to provide a social innovation to help community.
2. Design thinking as a teaching strategy provides for collaborative and meaningful learning.
3. Design thinking is an avenue for the 21st century skills development (critical thinker, creative, resilient, good communicator and empathic) among students.
4. Design Thinking based on Students' Experiences is stressful, challenging yet fulfilling.

Based on the emerging themes, the researcher came up with a framework in design thinking that is anchored on the students' perceptions and experiences in design thinking as an extension modality and as a teaching strategy (Figure 1).

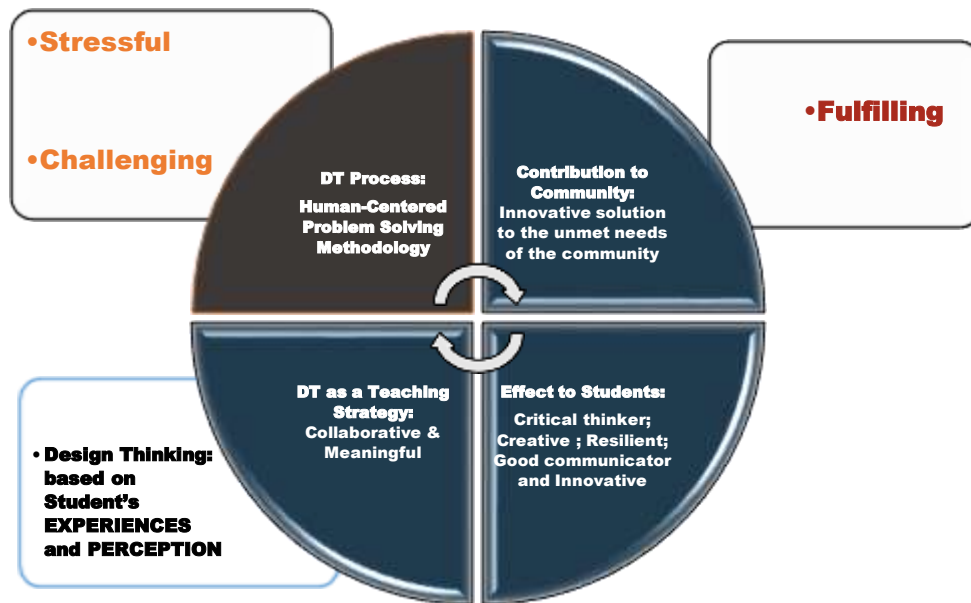


Figure 1. Design Thinking based on student perceptions and experiences: an Extension Modality and as an authentic teaching-learning process.

In Figure 1, design thinking is seen as a teaching strategy that builds on a process that is collaborative, meaningful and learning out of the box which students see as stressful and challenging. The end goal is the contribution as an Extension modality to produce a social innovation that addresses the need of a community and at the same time molds the students to become 21st century skills ready who are critical thinker, creative, resilient, good communicator and empathic in the process. The students may felt stressed and challenged but at the end of the whole process they emerged as fulfilled students and citizens with their great contribution to the target community.

IV. SUMMARY, CONCLUSIONS AND IMPLICATION

Summary and Conclusions

This study aimed to identify the perceptions and experiences of students in design thinking as an Extension Modality and authentic teaching-learning strategy. The study aimed to answer the research questions:

1. What are the students' perceptions regarding Design Thinking?
2. What are the students' experiences during the implementation of the Design Thinking process and Learning Express program?

Based on the findings of the study the following emergent themes were anchored on the data provided by the actual and lived experiences of the students:

1. Design thinking as an Extension modality is a human centered problem-solving process with the goal to provide a social innovation to help community.
2. Design thinking as a teaching strategy provides for collaborative and meaningful learning.

3. Design thinking is an avenue for the 21st century skills development (critical thinker, creative, resilient, good communicator and empathic) among students.

4. Design Thinking based on Students' Experiences is stressful, challenging yet fulfilling.

Implications of the Study

Based on the qualitative data, from the point of view of the students, design thinking used as an Extension Modality is a human centered problem-solving process to address the unmet needs of a community. Therefore, students become active participant with a tangible output at the end of the learning process. The design thinking allowed collaboration, meaningful and out of the box learning as evident in the brainstorming and prototyping activities. Design thinking facilitated the development and use of 21st century skills during the entire exposure of the students. Thus, design thinking is highly recommended as a subject or as a teaching strategy for the benefit of the students and as an Extension Modality to help the community. Although, students find it stressful and challenging they came out fulfilled with their social contribution to the community.

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