

Empathizing with Loneliness: Defining Technological and Design Requirements in Academic Education

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Abstract—Loneliness has been recognized as one of the major social problem of the 21st century. This study summarizes the ‘Jam week’ of Shenkar College of Engineering Design and Art. During the days of the Jam week, a four days’ academic hackathon-like course, students addressed challenges related to loneliness provided by five social organizations. The whole event was virtual and was handled through an online collaborative whiteboard platform (Miro) and Zoom meetings. The design thinking methodology served as the shared methodology according to which multidisciplinary teams of engineering and design students worked and proposed solutions in the form of conceptual videos and posters. During the event, the students were asked to fill a questionnaire, which examined their empathy development in three dimensions: skills, orientation and being. The findings show how this academic educational program fostered empathy in all three dimensions and leveraged creativity, which allowed interesting and innovative prototypes to develop, which included both technological and design aspects. This study highlights the need to foster new educational programs that involve students from diverse disciplines that cope with challenges of well-being. Such academic programs can enhance students’ professional skills and encourage collaborative human-centered solutions for well-being.

Index Terms—Requirements, empathy, design thinking (DT), loneliness

I. INTRODUCTION

Loneliness is one of the major problems in the 21st century (Lim, Eres, & Vasan, 2020). Loneliness decreases well-being (WB) which has been recognized as a major modern life challenge that is characterized by tension, stress, consumption of unhealthy food, and reduced physical activity (Johnson et al., 2016). The World Health Organization calls for an inclusive health concept that encompasses physical, mental, and social WB and not merely the absence of disease or infirmity (Schulte et al., 2015).

The paper describes a multidisciplinary annual educational event, entitled ‘Jam week’ at Shenkar, College of Engineering,

Design and Art, where students from the faculties of engineering, design and the school of fine art, addressed loneliness challenges, applying technology and design practices. This year the authors of this paper managed the entire event, which included 700 students, five external organizations (who presented their own challenges in regard to loneliness), and 50 Shenkar lecturers from diverse disciplines. 25 of the lectures were mentors of students’ teams and 25 of them acted as professional consultants for the teams. The teams addressed loneliness challenge of different populations: old aged people, Covid-19 hospital department, mentally challenged people, children with neurological problems, and Z-generation. All the teams worked according to the DT approach, mainly following the Empathy, Define, Ideation and Prototype stages. The event was virtual, and all the process was handled through Zoom and Miro¹, an online collaborative whiteboard platform. Videos explaining the DT and human centered design, including exercises to follow were previously taped and inserted into Miro, where there was a shared space for group activities as well as individual working places for each team. The solutions of the teams were presented through video pitch of 3 minutes and a poster. During the event the students were asked to submit reflections forms each day. These forms included empathy questionnaire that was developed according to the empathy model that will be presented in the next section.

This paper is organized as follows: related work regarding empathy model and the DT methodology is presented, followed by presentation of the results of the Jam week. The paper concludes with a discussion and suggestions for future research directions.

II. EMPATHY IN ENGINEERING

Empathy is considered a necessary professional skill for engineers in the 21st century (Walther, Miller, & Sochacka, 2017)(Penzenstadler, Schlosser, Haller, & Frenzel, 2009) and, as Hecker noted, it is among soft skills that "may have as great an

¹ <https://miro.com/>

influence over an engineer's overall career success as technical competence" (Hecker, 1997), p. 62), like active listening, showing concern, and having a positive attitude. Understanding the importance of educating engineering students to develop empathy skills is ever increasing (Rasoal, C., Danielsson, H., Tomas, 2012) as one component of emotional intelligence, alongside with self-awareness, motivation, self-regulation, and adeptness in relationships (Goleman, 1998). Yet, while recognition of the importance of empathy for contemporary engineering practice is growing, the literature provides hardly any guidance on how to foster empathy in undergraduate engineering programs (Walther et al., 2017). The literature does discuss other activities, such as role playing and peer reviews, that support the development of emotional intelligence and, hence, empathy seems to be a teachable and learnable skill as well (Riemer, 2016).

Previous research identified a reciprocal inhibitory relationship between social cognition - i.e. reasoning about the mental state of another person, and physical cognition - i.e. reasoning about the causal/mechanical properties of a system (Jack, A. I., Dawson, A. J., Begany, K. L., Leckie, R. L., Barry, K. P., Ciccio, A. H., Snyder, 2013). A follow-up study illustrated, for engineering work, the inverse relationship between non-technical concerns and analytical thoughts (Cech, 2014). Both studies show the importance of including empathy development in engineering programs, particularly in the context of design thinking and interdisciplinary learning.

According to Walter et al. (Walther et al., 2017), however, engineering educators wishing to integrate empathy training into undergraduate programs are challenged due to lack of conceptual clarity regarding the nature and purpose of empathy. To close this gap, they developed a model that conceptualizes empathy in three dimensions. The first dimension - skill - focuses on enhancing empathic communication, building relationships, and making decisions. The second dimension - orientation - captures a range of mental dispositions, assumptions, and personal values that influence the way engineers empathically engage with others. The third dimension - being - situates empathic skills and practices within a contextualizing framework of broader values like service to society, dignity and worth of all stakeholders, and integrating personal values and beliefs with professional goals and actions. Their model was used to develop the research questionnaire and analyze the findings presented later on in Section 4.

III. DESIGN THINKING

The case study outlined in Section V involved three DT perspectives: (1) mindset, (2) process, and (3) toolbox (Brenner & Uebernickel, 2016). From the mindset perspective, DT exhibits a combination of divergent and convergent thinking, a strong orientation toward both explicit and implicit needs of customers and users, and prototyping. From the process perspective, DT combines both a micro process and a macro process. The micro process consists of defining the problem, finding and synthesizing needs, generating ideas, prototyping, testing, and targeting for innovation. The macro process consists of managing milestones while developing prototypes that fulfill the defined re-

quirements. From the toolbox perspective, DT refers to the application of numerous methods and techniques taken from the design, engineering, informatics, and psychology disciplines (Dimitra Chasanidou, Andrea Alessandro, 2015).

Empathy is essential when practicing DT. Indeed, empathy-driven design differs from other user-centered design techniques in that all stakeholders are genuinely engaged and involved in the development of solutions that best fit their needs (Brenner & Uebernickel, 2016). To determine user needs, the persona tool is often used to analyze conversations with stakeholders, especially end-users (Dimitra Chasanidou, Andrea Alessandro, 2015). The real or imagined user persona is then further described using the four categories of the empathy map tool: Says (quotes and main terms), Does (observed behaviors), Thinks (assumed thoughts), and Feels (emotions). Additional DT methods include defining the identified gap or problem before conducting ideation, which includes brainstorming to allow divergent and convergent thinking, motivating team members to suggest multiple ideas without considering their feasibility to reduce criticism, and encouraging associative thinking that may lead to innovation (Dimitra Chasanidou, Andrea Alessandro, 2015).

The final step in the workshop consisted of creating prototypes of possible solutions to be examined by various relevant stakeholders (Dimitra Chasanidou, Andrea Alessandro, 2015).

The above mentioned DT methods and tools were practiced by the participants of the Jam event. The focus in this paper is on the development empathy among the students and the importance of involving students in multidisciplinary education while coping with social challenges.

IV. RESEARCH AND FINDINGS

The main purpose of Shenkar Jam week is to educate students to work with multidisciplinary teams and develop awareness and curiosity to other domains while realizing their responsibility to address social concerns in their professional career. Following this goal, the research defined the following research questions:

1. How did the Jam week influence students' empathy, including all dimensions of the empathy model?
2. How did the DT methodology influence the students' creativity?

To answer these questions, we developed a questionnaire that followed the empathy model. Our study examined the empathy development in all dimensions on Likert 5- points scale of agreement. For example, the following statements manifested the skill dimension: "I improved my listening skills"; the orientation dimension: "It is important for me to learn from other views and perspectives"; and the being dimension: "My profession has important values beyond the professional ones". In each statement, the students could add free text to elaborate on their choice. We also added a question related to their perception about their creativity enhancement during the event. We got 418, 401, 236, 215 replies during the 4 days of the event, at the beginning the higher number following decline toward the last day. The results of the questionnaire were analyzed by calculating the mean value for each statement per day. The following sections report on the study results.

A. Empathy Development

According to the questionnaire, students developed their empathy skills in each domain. It seems that after a very busy first day there was a decline in their overall ratings, which were extended towards the end of the event, as presented in Figures 1-3. Figure 1 presents the progress of agreement with the statement: "I improved my listening skills".

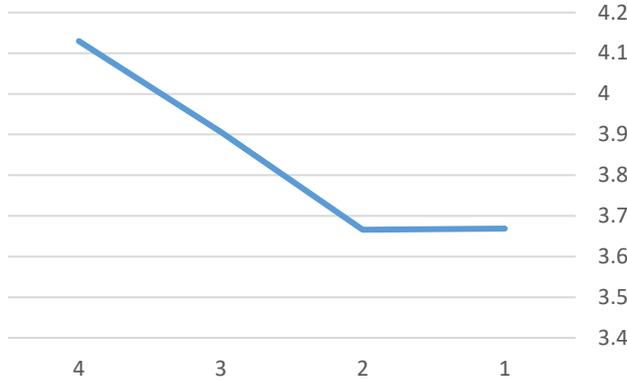


Figure 1: Development of empathy skill

In the free text students wrote: "I learned to understand what motivate people to think the way they do"; "I learned to listen and understand the problem before jumping into solutions".

Figure 2 presents the progress of agreement with the statement: "It is important for me to learn from other views and perspectives".

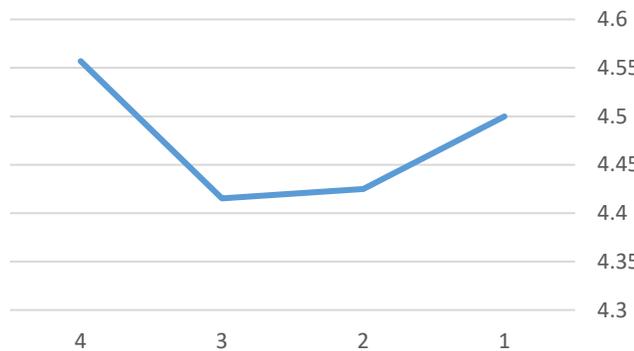


Figure 2: Development of empathy orientation

In the free text students wrote: "Everyone in the group came with his state of mind and contribute from their world"; "It opens the head and arouse curiosity opens new ways of thinking".

Figure 3 presents the progress of agreement with the statement: "My profession has important values beyond the professional ones".

In the free text students wrote: "In the deep emotional aspect, and everything that I create can influence the whole society"; "Values of thoroughness, thinking about others, users and their needs, considering safety and trust".

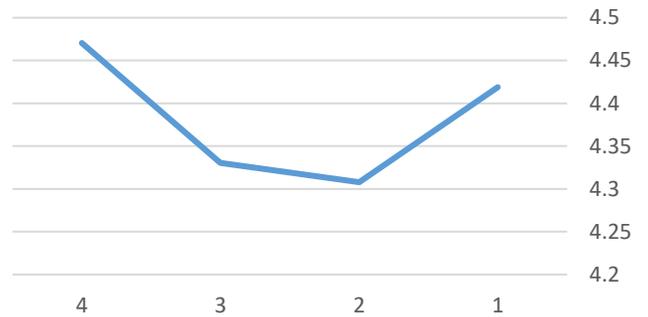


Figure 3: Development of empathy being

B. Creativity Enhancement

Figure 4 presents the of agreement with the statement: "My creativity has improved".

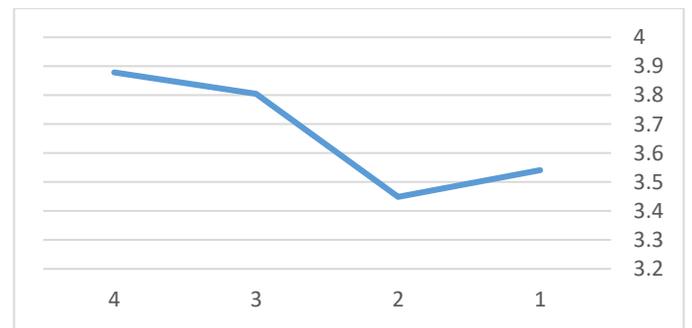


Figure 4: Development of Creativity

In the free text students wrote: "Engaging with people with design orientation sharpened my design talent"; "My creativity improved following the collaborative ideation process and leading the main idea".

V. CONCLUSION

The research leans on a unique educational event where students from diverse disciplines collaborated in order to solve the social challenge of loneliness. Manifesting the DT practice allowed the development of empathy and creativity, while recognizing the importance of the different professions to take social responsibilities. Following studies will study additional educational settings in facilitating this educational agenda.

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