

# Effectiveness of Introducing Emotional Concerns in Undergraduate Design Curricula

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**Abstract**—Scholars generally recognize that satisfying users' various demands for creative and interesting design outcomes is one of the main challenges in the current design industry. After completing an undergraduate design curriculum, designers are expected to create design outcomes that are both innovative and user-friendly. Thus, to equip designers with the ability to generate innovative ideas, design education should include training on cognitive thinking. Using ideas from cognitive thinking can leverage an individual's tacit knowledge. Most studies have advocated rational education methods, and most educators teach design students through problem-based methods that focus on building problem-solving skills. However, many design students cannot resolve their design problems through human-centered approaches. This implies the presence of other hidden factors that hinder the design process of these students. Some research on emotion in design has identified emotional concerns as a possible key factor for enhancing the decision-making and creativity of learners. However, few studies have explored the relationship between design curriculum and emotion. In response, this study examined the relationship between emotion and design curriculum to help educators recognize the need for introducing emotional concerns in the study of design, which can equip undergraduates who are entering the constantly-changing design industry. A field experiment was conducted to determine the effectiveness of applying emotional concerns concepts in design curricula, and the evaluation of emotional concerns was discovered to be necessary from a learning and education perspective. Hence, educators should be aware of and understand the nature of emotion in design and how its power might be taught when constructing a design curriculum.

**Index Terms**—emotional concerns, design curriculum, design process, decision-making

## I. INTRODUCTION

When constructing a design curriculum, the challenge is to equip design students with lifelong skills that will enable them to succeed in an ever-evolving society. Facing these education challenges, scholars have called for a much stronger emphasis in design curricula on a balance between teaching and learning. Previous studies in psychology have demonstrated that emotional concerns affect individuals' creative strengths and decision-making. The achievement of design education thus relies on not only knowledge and skills but also the emotions of the learner. Identifying hidden factors such as these can

facilitate design students' design-making and problem-solving skills and improve their design abilities as a result [1]–[4]. Although certain scholars have explored approaches for helping design students, they have been forced to engage in cross-disciplinary research because of the lack of research or prior investigation regarding creativity in the extant design literature. According to the insights derived from psychological studies, scholars have proposed that emotional concerns are involved in designers' thinking processes. Emotional concerns are elements that potentially affect how design students generate ideas and manipulate their design processes. Therefore, this study proposed a strategy for emotional concerns development. A field experiment was conducted to determine how educators can help design students manipulate their design process and thus explore the relationships between design, emotional concerns, and design-learning ability.

## II. THE CHALLENGE OF THE CURRENT UNDERGRADUATE DESIGN CURRICULUM

Educators have indicated that effectively improving design processes and outcomes are the major challenges in current design curricula. To overcome these challenges, it is essential to enhance design students' project experience [5] and increase their familiarity with various creative techniques and problem-solving skills. Some design scholars have thus introduced problem-based teaching and learning to design curricula [6], [7]. However, educators still face problems, such as which method to use to provide a “creativity-stimulating environment,” to “structure the (design) process,” and “deliver and request information in an appropriate manner.” (p. 10) Understandably, there is a need to encourage students' creativity and innovation skills. Newly developed technology has led to students using various new media in their daily lives and in their education. Such a media-driven environment presents new challenges for students who must learn and understand numerous different types of methods. Educators, therefore, are responsible for teaching new problem-solving approaches and practices in an innovative way that both requires teacher–student interaction and retains student attention. Additionally, design is a method that can be used to create knowledge. Therefore, methods of simulating humanized design have a spill-over effect that supports self-learning and even lifelong learning skills.

Some design educators, such as [8], have emphasized knowledge construction in design, indicating that design knowledge and skills should be acquired in stages. Design students learn from contextual problems provided by learning materials and through the support of their instructors. Studies on design education have suggested studio-based pedagogy as a method for cultivating the abilities of design students. This method prompts students to develop their conceptual understanding of design and the design process, and fosters their thinking as designers [9]-[14]. Reference [15] agreed with this approach, and investigated how educators can prompt design students to think like designers and emphasized the studio setting that an educator prepares. Educators were encouraged to combine project-based work with open-ended problems.

The core of problem-based learning is collaboration and personal reflection [16], [17]. In addition to these design teaching methods, some educators have investigated how new methods in design education should be developed [18]. Reference [19] suggested that before designers begin problem-solving, they must understand the nature of the problem. This understanding is regarded as self-awareness and is an essential skill for a designer if they are to positively begin a design project. Berman [20] defined a similar concept regarding the importance of designers' understanding the nature of a problem; Berman also expanded the scope of this understanding, stating that social aspects do not provide a solution to a design problem but constitute strategic communication tools. Reference [21] analyzed the shift of the leading role in teaching from the teacher to the students. This shift was discovered to lead to learner motivation becoming a major concern in developing, monitoring, and assessing instructional effectiveness in the teaching and learning process. Moreover, [22] indicated that designers' self-awareness and self-management are skills for managing conflicts, and noted that designers tend to ineffectively manage design tasks. Reference [23] proposed that contemporary designers must confront and respond to the challenge of creating an environment that supports, enriches, and celebrates human activities. Creating such an environment requires the satisfaction of a combination of social, cultural, and economic needs. These demands require designers to assume responsibilities and then make decisions regarding these responsibilities.

### III. CURRENT AFFECT OF CREATIVE TRAINING IN LEARNING PROGRAMS

Since the 2000s, education scholars have examined how emotional concerns affect training in learning programs. Reference [24], investigated the relationship between social interactions and emotional intelligence, and learning activities focused on emotional concerns have since been introduced in a more systematic way [6]. Emotion intelligence is a concept developed from Darwin's theories regarding emotional expression as a means of survival, which refer to the "ability to monitor and discriminate the emotions of others" [25], [26]. Emotional concern is regarded as one of the factors that

affect the application of learning methods, such as problem-solving. The concept of emotional intelligence captured the attention of educators and has been widely adopted in various disciplines. This has led to the introduction of some emotion-related concepts (e.g., emotional literacy, critical emotional literacy, and emotional creativity), which are all popular topics in current educational practices in the United Kingdom [27]. Emotional concern is regarded one of the aspects of educational policy through the concept of emotional intelligence, which is currently regarded as a key aspect in primary and secondary curricula in the United Kingdom. Design methods (e.g., problem-solving and creativity) have been adopted in certain courses as a tool to help learners understand the concept of emotional concerns and recognize emotional changes in themselves during learning. Previous studies discovered that emotional literacy strengthens learners' creativity and decision-making ability. According to Reference [28], emotional literacy is based on positive emotionality, and positive feelings should be promoted during the learning process. Reference [28] also proposed that positive emotions help learners make more effective decisions and be more creative. The concerns of [28] regarding positive emotional concerns have been adopted in the field of education during curricula reform, aimed at strengthening the problem-solving skills and creativity of students. Although designers' professional experience is crucial, they believe that creative skills can be nurtured in design schools. Some scholars have attempted to increase the creativity of students through project-oriented pedagogy, which is operationalized as specific courses offered to design students.

Emotion also affects appraisal and judgment during decision-making. Stimuli from the external environment provoke an emotional response and guide the thinking process of an individual over time [29]. This thinking process involves motivation and appraisal for judgment and responses [30]-[32]. Reference [33] described emotion as the sequence of reactions toward external stimuli that shapes a person's perspective. After an event, a person's intrinsic emotion and goal lead to an appraisal that subsequently affects the person's ability to control their response. Similarly, Reference [34] observed that appraisal was generated as a result of an attributed cause, which then directed a person's response including their decision-making and actions.

### IV. AFFECT OF EMOTIONAL CONCERNS ON DESIGN CURRICULA

Based on the psychometric approach in learning theory, Ho explored emotional concerns in design from the design student's perspective and demonstrated how emotional concerns relate to decision-making during the design process [7]. Ho also proposed an in-depth model that elaborated on the findings of a literature review and his empirical studies to illustrate how a design student's emotions affect their design process; specifically, he discovered that stimuli in the daily life of design students affected their emotional response and initial processing of

a design problem. Such stimuli involve technological, social, and cultural factors that together comprise a person's individual experience and elicit emotional changes. These changes affect the initial processing of the task before the thinking process begins in the working memory, with internal factors in the design process considered (including information processing and material allocation). When considering internal factors, long-term memories, such as individual experiences, values, missions, learned knowledge, and skills, are recalled and used as references in decision-making. Hence, a judgment and corresponding response are generated. Stimuli in daily life thus elicit the emotions of designers, which leads them to implement various decisions that are affected by internal factors and hence change the entire design process.

#### V. FIELD EXPERIMENT TO DETERMINE THE EFFECTIVENESS OF INTRODUCING EMOTIONAL CONCERNS IN AN UNDERGRADUATE DESIGN CURRICULUM

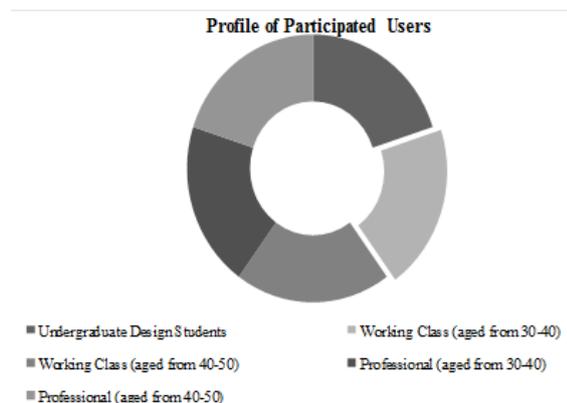


Figure 1. Participant demographics.

A set of field observations and interviews with Hong Kong-based designers and users were conducted to determine the accuracy of the model that describes the role of emotional concerns in design, and the effectiveness of the proposed guideline was evaluated. The field observation conducted was a structured observation. The participants were randomly invited designers from the Hong Kong design industry, all of whom had no more than 1 year of work experience. They were divided into two teams and assigned a design task. Sixty local Hong Kong users were then invited to participate in one part of the study. Because it was crucial to generalize the research and gain input from a wide section of the population to understand how people identify the features of creative design outcomes, participants with diverse educational backgrounds and ages were recruited. The demographics of the participants (illustrated in Fig. 1) were as follows:

- 12 were undergraduate design students;
- 12 were randomly recruited members of the working class, aged between 30 and 39 years;
- 12 were randomly recruited members of the working class, aged between 40 and 49 years;

- 12 were randomly recruited professionals, aged between 30 and 39 years; and
- 12 were randomly recruited professionals, aged between 40 and 49 years.

#### A. Research Process

The study was conducted in two parts. Stage 1 consisted of the field observations, with the objective of observing the manipulation of the design process experience in designers who either had or had not been introduced to emotional concerns. Thirty designers for the field observation and 60 users for the design experience assessment were invited for interviews, which were recorded. The 30 designers were separated into two groups: Design Teams A and B. Design Team A received a lecture on how emotional concerns affect the design process, which described the skill of reorganizing according to emotional concerns and how to record emotional changes during the design process. Design Team B worked without the introduction lecture on emotional concerns.

In Stage 2, users' assessment of designs from each design team was recorded. The feedback of the users was then analyzed to determine whether the professionals' emotional concerns were delivered effectively through their design experiences. Some of the questions asked of designers in Stage 1 were as follows:

1. What was the design objective of your task?
2. What did you expect the team to accomplish?
3. Approximately what percentage of the design objective was accomplished?
4. On a scale of 1–100, how satisfied are you with the design outcome?

To collect feedback from users during Stage 2, some questions about the users' experiences were asked while they assessed the design outcomes:

1. Do you know what the design objective was in this design task?
2. What did you expect the design to accomplish?
3. Approximately what percentage of the design objective was accomplished?
4. On a scale of 1–100, how satisfied are you with the design outcome?

#### B. Research Result

The 60 invited users assessed the 30 design outcomes, scoring each (100 = highest score; 1 = lowest score). Users successfully identified the design task or a similar task from the design outcomes created by Design Team A more frequently than they did for the outcomes produced by Design Team B (Fig. 2). Users also considered the design outcomes from Design Team A to have accomplished the design objective more than the design outcomes from Design Team B (Fig. 3). Moreover, the average satisfaction score evaluated by the designers from Design Team A, who had been introduced to emotional concerns, was 76 (Fig. 4), and the corresponding average satisfaction score evaluated by the users was 74 (Fig. 5). In addition to these scores, the users indicated that the design solutions generated by Design Team A were much more creative, and that the

visual and audio elements included were much more satisfying than those in the Design Team B–produced outcomes. Field observation of the design processes of the two teams also confirmed that Design Team A more easily generated creative designs.

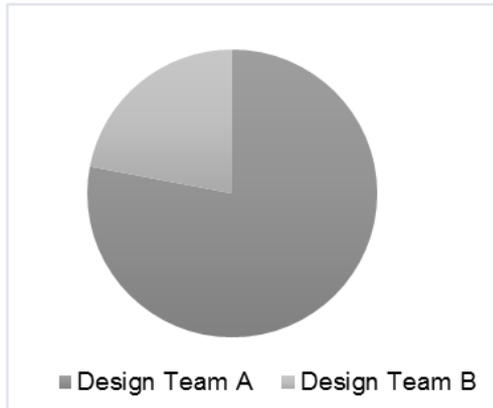


Figure 2. Percentage of users that correctly identified the objective of the design task

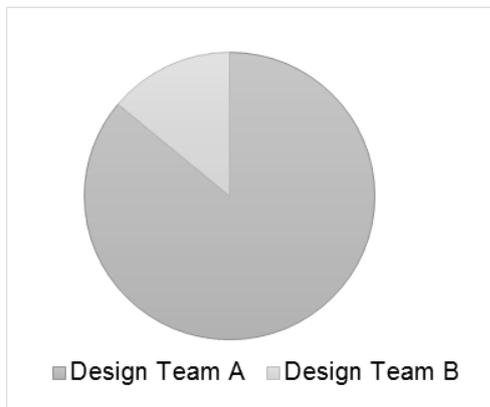


Figure 3. Percentage of users that considered the design objective to have been accomplished.

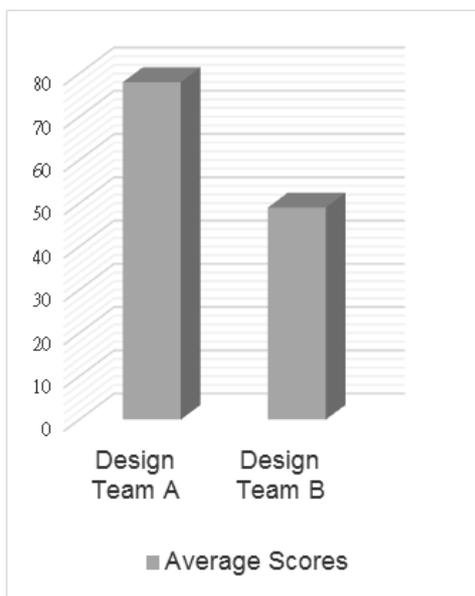


Figure 4. Average satisfaction score as evaluated by the designers.

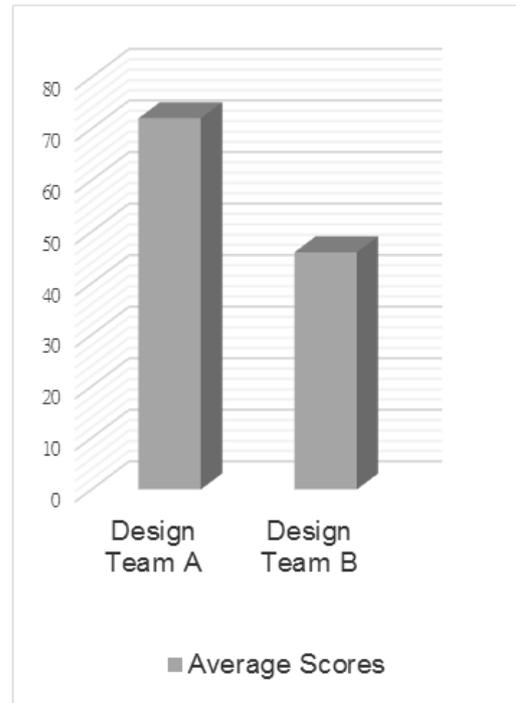


Figure 5. Average satisfaction score as evaluated by the users.

## VI. CONCLUSION

Design outcome quality is of increasing concern in the study of design given how much knowledge drives modern society. Creative and innovative design stimulates economic and social changes, in addition to improving daily lives. Giving designers a competitive edge, education is regarded as central for enhancing skills related to creativity and innovation. Some scholars have hence begun to explore additional methods to increase design students' learning abilities, including brainstorming and the organization of thoughts and actions. The utilization of different sensory elements, such as audio and visuals, were discovered to affect the level of satisfaction with a design. More stimulating and engaging experiences with a design outcome generally have a considerable effect on design satisfaction. This provides an alternative approach to the existing method of design, which emphasizes the satisfaction of design functions and often ignores a design's creative worth. Researchers have also revealed that, at the center of a design curriculum, emotional concerns should be addressed and have the potential to enhance the effect of a design experience on an individual's memory. Studies on design and emotional concerns have demonstrated how design solutions can intentionally elicit the emotions of users. Design has thus shifted from its focus on generating attractive outcomes to providing proper design solutions that satisfy users' needs in an innovative way and give the user a full experience. Designers are facing more difficulties than previously, for example, the speeding up turnaround working, originality design concept. This study was a first step to aid the learning and introduction of emotional concerns as a method of

enhancing design-learning abilities. In short, educators should have a strong awareness and in-depth understanding of the role of emotion in design and how it may be utilized. Judgment of the originality of an outcome and an unexpected design experience are related to emotional concerns. Therefore, the evaluation of emotional concerns should be considered during design education. This study provides a preliminary understanding of how emotional concerns can be a crucial element of a design curriculum.

#### ACKNOWLEDGMENT

The author wishes to thank all those who participated in this study, in addition to the conference organizer, review panels, and journal that accepted the paper.

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