

From Emotion Concept to Spatial Experience: An Investigation into the Design Process of Diploma Interior Design Students at a Private University in Selangor

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ABSTRACT

This research aims to study the process of the interior design students in the diploma program in the process of converting an emotion concept into a spatial design product, which involves four creative processes, namely: sketching, abstract painting, pattern creation, concept model production. Though it has been recognised that emotion is a valid design motivator [1,7,9] little has been understood about the experiences of the interior design students at the diploma level in Malaysia with respect to the particular experiences of this translation process when it comes to a private university environment. The methodology used was convergent mixed-methods design with a single structured questionnaire containing closed items of 5-point Likert scale and open-ended reflective questions filled by all the target population of 25 students. Quantitative data was analysed using descriptive statistics, and non-parametric tests (Friedman and Wilcoxon signed-rank tests) were used, in line with the recommendations for robust small sample mixed methods educational research [5] and qualitative responses were analysed thematically. The results show that concept model-making activity is the perceived most effective of the three activities in achieving the emotion concept in space while the activity abstract painting is the lowest compared to the other two activities, namely pattern-making and model-making, and the activity of model-making is generally perceived as having the largest effect on the student's final design. The students' confidence in taking their ideas from 2D to 3D was also less than their confidence in creating an idea in the first place, which is again in line with other findings about the cognitive challenges of creating ideas in space using a tool-mediated approach [13]. Results of the qualitative analysis showed the value of visual reference platforms, and the great difficulty of making emotion literal. The results add to the emotion in design literature, and evidence-based recommendations are given to improve the emotion-based design brief pedagogy in the diploma program of interior design.

Keywords: emotion-driven design; design process; interior design education; mixed methods research; concept development

INTRODUCTION

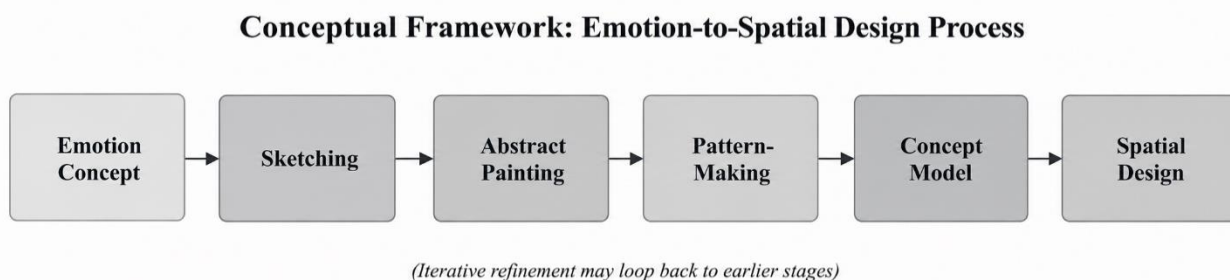
Interior design is no longer an art of the order of form, material and function, but it is an art that can impact a person's emotions when they are within a space. It has been argued that knowing designers' emotions and the emotions they evoke in their design process is essential for being able to produce designs that are meaningful to the intended users [7] and that the emotions are a crucial part of the design process, not just an incidental [1]. Specifically, in architectural education, the incorporation of emotional awareness in the design process is proved to be effective in enriching students' involvement in their own creative acts [9]. However, developing from an emotion concept to a final design that becomes a spatial experience is not a simple process for a student working at the diploma level in interior design. It engages the student in an external line of development, externalising an internal, often intractable, feeling in a series of sketching, abstract painting, pattern-making and concept model-making stages culminating in the translation of that feeling into a coherent spatial design.

There is a growing body of work on the use of emotion as a motivator for design, but few studies have examined how interior design diploma level students perceive the design translation process with respect to the context of private university in Malaysia. Most of the existing research on emotion in design has been based on the field of

architecture or other design fields, including fashion design [10] which leaves a gap of understanding regarding how the process of sketching, painting, pattern-making and model-making leads to a resolved spatial outcome for interior design students at the diploma level. This is also methodological—although mixed methods research can be used to reveal measurable patterns, this is not used to the same extent in educational subdiscipline research as it is to reveal the individual, lived experience and nuances of a learning process [5]. In the bigger picture of the local research under the private university sector in Malaysia, the current studies reveal that there is an emerging local interest in capturing internal experience of students in a structured inquiry using a survey method [6,8] which this study extends to the realm of emotion-driven design practice.

This study therefore aims to explore the experiences of the diploma interior design students at a private university in Selangor in the translation of an emotion concept to a spatial design output in the four design stages. Specifically, the study set out to identify the most impactful intermediate steps for students to articulate and conceptualise their emotional idea; to explore the relationship between the students' confidence in the creative process and their confidence in the resulting spatial translation; and to look at students' reflections on their work to identify the strategies and challenges that arise when moving from a concept of emotion to a completed spatial translation. The aim of this study is to give an empirical insight into this process and recommendations to enhance the learning about designing projects that involve emotion in interior design diploma programs by combining quantitative and qualitative data, which can be gathered in a single questionnaire.

Figure 1. Conceptual Framework of the Emotion-to-Spatial Design Process



LITERATURE REVIEW

Emotion is increasingly recognized in the design process as a valid and integral process and not a secondary concern, as evidenced by the increasing literature. In the design process, it is crucial to be aware of the designer's emotions which they are experiencing and communicating in their design work, as pointed out by Ho [7] in shaping work that connects with the emotion of the users, and by Biagioli et al. [1] that the emotions are not incidental but an integral part of the process of shaping and developing ideas. Juan-Vidal and Iñarra-Abad [9] go further and propose that: "conscious application of affective sensitivity in the design brief can improve students' significance of their design decisions". Rui and Firzan [12] characterize emotional design as an emerging trend in the recent interior spaces, while Ma et al. [10] demonstrate connections between emotional design and design processes in fashion design and explain the possibility of using emotional data visualisation for personalised design. This literature has provided evidence that emotion is a motivator in the process and product of design activities throughout a variety of design disciplines.

Regarding emotions as carriers of colour and atmosphere, there are a few studies about colour which suggest it is a powerful emotional carrier in interior-specific contexts. In a humanised approach, interior space design can be tuned via the use of colour to serve the emotional needs of the design's inhabitants as shown by Xu and Wu [14]. Moreover, Naz [11] found that colour in learning environment could be measured to affect the students' perception and feelings inside the space, and so colour is directly perceptible between abstract emotional intention and concrete space. The findings are particularly significant for the current study as colour was frequently employed as a means of communicating between the abstract painting stage and the pattern-making stage of the design process investigated.

In terms of processes of creating design concepts, externalising them and developing them with different tools and media, the study by Şekerci et al. [13] has proved that the cognitive loading of transferring the concept to

the spatial form is significant in terms of different levels and media; even though they are both used to form a spatial form, interior architecture students have different responses at a physiological level while working with manual tools or digital tools for spatial design. This pedagogical value of hands-on and exploratory approaches to learning is complemented by pedagogical studies for instance, Boonpracha [2] showed the value of implementing hands-on, sketch and model-based cultural product design activities for developing students' creative expression while Elaby et al. [4] illustrated that full-scale physical model-making was effective in strengthening creative design skills for first-year design students. The results described above suggest that the model-making process has an overpowering role in helping students to transform an abstract concept into a solved spatial form, a focus of the present study.

Research Gap and Methodological Context. But the research focusing on the relation between emotion-driven ideation and the use of emotion-comprehending design translation tools within the perspective of interior design at the diploma level is still limited. The overall methodological trend pointed out by Gierus et al. [5] have noticed that the subdiscipline of education research is less using mixed methods research as it can. They are also aware that studies in education that use the mixed methods approach are also numerous, but they lack rigorous integration between the quantitative and qualitative strands and assert that the studies that wish to have the two strands converge should be better designed with their instruments. It was noted that the popularity of survey-based studies of student experience has been increasing, with recent qualitative work conducted in Malaysia with respect to student experience in the creative and design-based fields (Ibrahim et al. [8] on Academic Stress and Resiliency among Engineering Students and Hambali et al. [6] on the Influence of Psychological Needs on Learner Motivation) indicating that there is a growing culture around this type of study in the country, but that it has been minimal in the creative and design fields. Notably both studies rely on measurable self-report constructs that can give an insight into the internal experience of students that would not be observable in the design studio setting; this could be directly applied to understanding the internal emotional and creative processes of students. The present study takes a stance towards this dual gap, employing a scientific, yet mixed methods approach using a questionnaire, wherein the closed and open-ended items are not complementary, but purposefully so.

METHODOLOGY

This study adopted a convergent mixed-methods design, which gathers quantitative data and qualitative data simultaneously with one structured questionnaire and then merged them at the analysis stage to observe the quantitative and qualitative aspects that can be measured during the educational design process [5]. The population for this study includes diploma interior design students at a private university in Selangor having gone through a design project based on an emotion concept brief. Since the entire accessible population of 25 students, total population was sampled and the 25 responses were kept for both strands of analysis, quantitative and qualitative.

A single researcher designed questionnaire was used that consists of five parts close-ended which includes rating the emotion-to-concept process at the four design stages (sketching, abstract painting, pattern-making, concept model-making) by using five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) to form the data of the concept-to-spatial-design translation process, challenges and enablers during the process together with open-ended reflective questions. The two types of data (closed and open-ended) were gathered in one administration and there was no separate administration for an interview stage, as both were considered as the quantitative strand and qualitative strand respectively.

The questionnaire was revised for the clarity of the questions and then obtained the internal consistency reliability for the multi-item subsections of Likert subsections using Cronbach's alpha, with a threshold of $\alpha \geq .70$ considered acceptable.

In quantitative data analysis, descriptive statistics (mean, standard deviation and median) and internal consistency reliability testing were conducted. Since the students' numbers were limited and the data (ratings) were ordinal (Likert) rather than interval (parametric), non-parametric tests were used to determine if there was a significant difference between the students' ratings at the four design stages, as would be done using parametric tests if the data samples were large and normally distributed. Subgroup comparisons were made with Mann-

Whitney U tests where appropriate (e.g., students with and without previous art or design experience). Qualitative responses were analysed using an inductive thematic approach that involved re-reading responses, organizing them into themes based on the ideas that arose and clustering them to represent the student experiences and challenges. The quantitative and qualitative data were then triangulated and quantitative patterns compared to qualitative themes for possible commonalities between the two types of data. Ethical approval and informed consent were obtained prior to data collection and anonymisation of participant identities was done throughout the collection of data and reporting process.

RESULTS & DISCUSSION

The questionnaire was filled by all 25 students. The majority were aged 20–21 (40%) followed by aged 18–19 (32%), predominantly female (72%), and drawn mainly from Semester 4 (44%) and Semester 6 (36%). Just over half (56%) reported that they had not taken any formal courses in art or design prior to the diploma. The most common emotions selected by the students as design concepts were exploratory or reflective emotions (curiosity, nostalgia) and soothing emotions (calm, comfort) across the sample.

Table 1. Demographic Profile of Respondents (N = 25)

Variable	Category	n	%
Age range	18–19	8	32%
	20–21	10	40%
	22–23	2	8%
	24 and above	5	20%
Gender	Male	7	28%
	Female	18	72%
Semester	Semester 4	11	44%
	Semester 5	5	20%
	Semester 6	9	36%
Prior art/design training	Yes	11	44%
	No	14	56%

In terms of emotion to concept process (Section B), the descriptive statistics were presented on the mean value, while the standard deviation was used to determine the level of agreement for each of the stages, it was observed that there is a good level of agreement for all four stages and the highest level of agreement was given for the concept model-making stage ($M = 4.20$, $SD = 0.82$), followed by the pattern-making stage ($M = 4.12$, $SD = 0.78$), the sketching stage ($M = 4.00$, $SD = 0.82$) and the abstract painting stage ($M = 3.72$, $SD = 0.94$). A Friedman test was used to determine if there was a statistically significant difference in the ratings given at the four stages of the experiment, $\chi^2 = 9.29$, $p = .026$. Follow-up Wilcoxon signed rank tests showed that the abstract painting was rated at significantly lower levels than pattern-making ($p = .008$) and concept model-making ($p = .017$) with no other pairwise comparisons being significant. The pattern is consistent with other research that found that students' creative design products were better when they were given a full-scale and physical model-making process [4] and hands-on and model-making activities had a positive effect on students' creative expression [2]. It also aligns with the neurocognitive evidence of how students interact with different design tools and phases is different and sometimes more effective, depending on the design tool [13].

Table 2. Descriptive Statistics for Section B Items (Emotion-to-Concept Process)

Item	Stage	M	SD	Median
B1	Sketching helped express initial emotion clearly	4.00	0.82	4
B2	Abstract painting allowed free emotional exploration	3.72	0.94	4
B3	Pattern-making translated emotion into repeatable elements	4.12	0.78	4
B4	Concept model-making visualized emotion in 3D	4.20	0.82	4

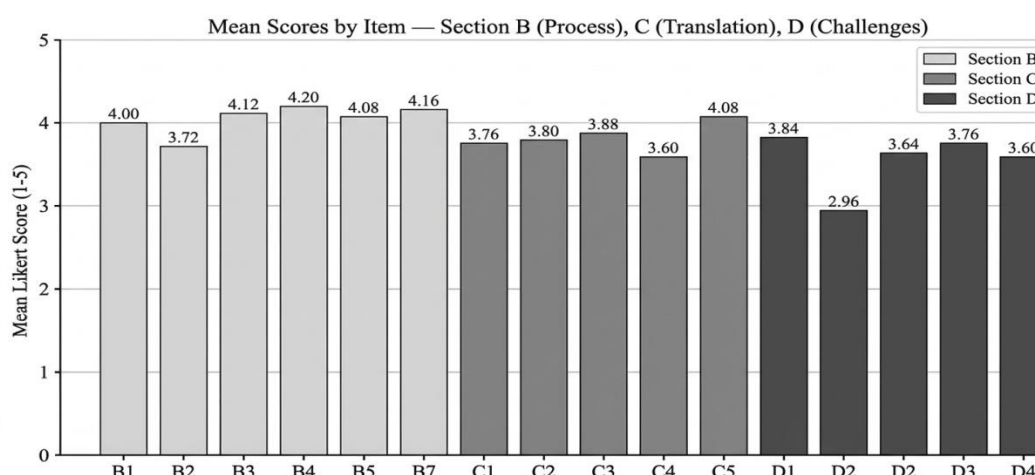
Table 3. Friedman and Follow-Up Wilcoxon Signed-Rank Test Results (Stages B1–B4)

Test	Comparison	Statistic	p
Friedman	B1 vs. B2 vs. B3 vs. B4	$\chi^2 = 9.29$	.026
Wilcoxon	B2 (Painting) vs. B3 (Pattern)	—	.008
Wilcoxon	B2 (Painting) vs. B4 (Model)	—	.017
Wilcoxon	All other pairs	—	> .08 (n.s.)

Note: Significant results ($p < .05$) are bolded

There is a concept-to-spatial translation (Section C, Translation) and Confidence-Competence Gap by referring to the mean scores on the process ratings were slightly higher than the mean scores for the emotion concept translated to the spatial dimension with the lowest (C4) being that of "easy to convert 2D ideas into 3D spatial decisions" ($M = 3.60$, $SD = 1.00$) on the entire Likert set. Feedback from the tutor (C5), on the contrary, was considered very valuable in terms of development of clarity of emotionality ($M = 4.08$, $SD = 1.04$). In the larger document, a lack of matching between confidence in idea generation (Section B) and confidence in being able to translate the idea into a spatial output mediated by a tool (Section C) mirrors the idea that initial idea generation is a different cognitive process than idea resolution and placing the idea in the 3D mediated context [3,13] and supports the argument that there should be more support provided in the initial ideation portion particularly at the 2D-to-3D translation point.

Figure 2. Mean Likert Scores by Item — Sections B (Process), C (Translation), and D (Challenges).



Reliability and subgroup comparisons through internal consistency of the process subscale ($\alpha = .898$) and translation subscale ($\alpha = .872$) values for this study exceeded the conventional cut-off of .70, which means the

questionnaire was reliable as a measurement tool for this study [5]. In both cases, there was a small, but non-significant, difference between those with and without previous formal training in art/drafting, with the students with previous training showing higher scores on the process subscale and the students without showing higher scores on the translation subscale (both $p > .30$, Mann-Whitney U tests). That the four-stage emotion-to-spatial structure can be similarly accessed to students with varying background of their art form is a comforting sign for such programmes that accept students from various backgrounds in their education.

Table 4. Internal Consistency Reliability by Section

Section	Items	Cronbach's α
B — Emotion-to-concept process	7	.898
C — Concept-to-spatial translation	5	.872
D — Challenges and enablers	4	.623
All Likert items combined	16	.924

Note: Significant results ($\alpha > 0.7$) are bolded

For qualitative data, the open-ended questions were analysed and some themes were drawn. Twenty-five students were asked about problems they had in expressing an abstract emotion in a physical or functional design element, and ten of them reported a problem, that was common and that was also identified quantitatively. Another theme was striking a balance between emotional expression, ergonomics and use. When it came to helpful tools, 14 of 25 citations were for Pinterest, and often along with a mood board, and less so for formal 2D & 3D software tools. The pattern indicates that students showed a strong inclination to visual inspiration platforms over structured design software and/or precedent research, which is an area that should be explored in pedagogical ways further. In terms of which stage most strongly influenced the final design, concept model-making was most often mentioned 16 out of 25 responses in Section B quantitative data was about concept model-making, which was not significantly different from the quantitative responses of Section B. Additionally, it was the only stage where the two data strands could be triangulated directly. When this transition from the students' idea to the spatial idea "clicked", they often report that this happens when they are experimenting with light, shadow or materials on the physical model, which is similar to the findings from other studies [11,14] that colour and atmospheric elements are important and influential means of communicating emotional intent in space.

Figure 3. Stage Identified as Having the Greatest Influence on the Final Design (Open-Ended Item E2)

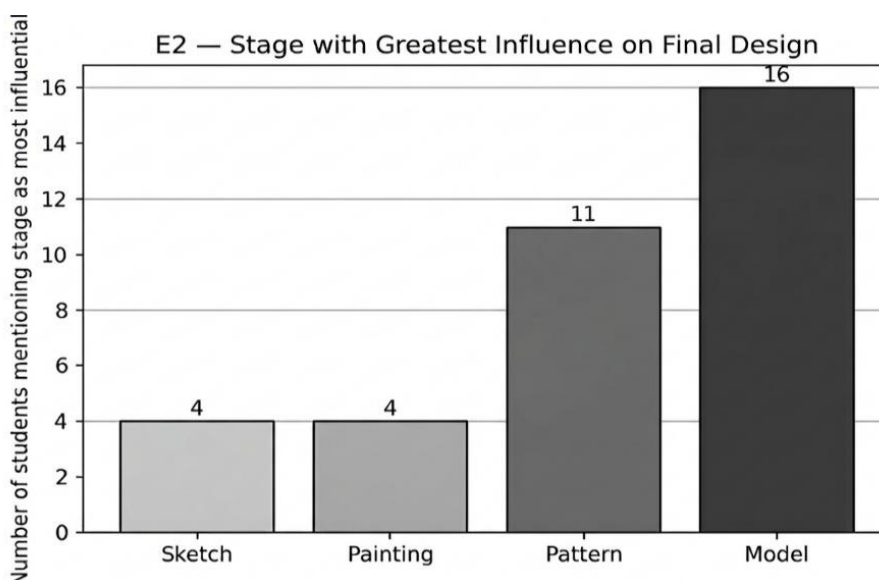


Table 5. Joint Display of Quantitative and Qualitative Findings

Design Stage	Quant. Rating (B Mean)	Qual. Mentions as Most Influential (E2)	Convergent Interpretation
Sketching	4.00	4	Valued for initial expression, but not typically decisive
Abstract Painting	3.72 (sig. lowest)	4	Weakest stage across both data strands
Pattern-Making	4.12	11	Rated highly and frequently cited as foundational
Concept Model-Making	4.20 (highest)	16 (most cited)	Strongest convergence — pivotal stage in both strands

The findings of this study collectively indicate that the critical moment in the emotion-to-spatial design process is the moment where the concept is modelled, and in their personal accounts, this moment in the design process is considered the more critical moment in the process, while the moment of translating from 2D to 3D is the more problematic moment and requires more pedagogical support.

Contributions Of The Study

This research contributes to the emotion-in-design and design education literature in several ways. In theory, it builds on existing studies of emotion as a driving force in design [1,7,9] and takes it beyond the context of which it has been studied, which is the diploma-level interior design studies at a private university in Malaysia. Previous studies on emotion-driven design processes in architecture and fashion design focused on the generation of emotion in a design process, but there is a lack of stage-specific evidence of emotion generation, refinement and/or disappearance across a structured four-stage creative process, which leaves the interior design education literature lacking in the level of detail that this study provides, in describing the "emotion-to-spatial" translation.

Methodologically, this study offers evidence of the benefits of using a single-instrument convergent mixed-methods design questionnaire to uncover patterns of statistics and individual reflective nuances in a small, well-defined education population. In the process, it directly tackles the observation that, compared to other areas of education subdiscipline research, the use of mixed methods research is not widespread and serves as another model that can be emulated by other design programmes and researchers, particularly when working in small groups, without having to conduct two separate data collection processes, one for interviews and one for artifacts. The contribution builds on the trend of research on student experience in Malaysia and the use of structured and survey method in general student wellbeing/motivation research that will be extended to the creative design pedagogy context [6,8].

The findings of the study have practical implications for design educators in good, evidence-based design recommendations. This result of previous studies on the significance of physical and full-scale model-making to knowledge building [2,4] suggests that curricula should be expanded or continued in studio time for the concept model-making stage. The relatively poor performance of abstract painting suggests, however, that it might be helpful to have the student's work more clearly defined, more prompted, or more directly related to the subsequent stage of pattern-making. The extensive use of a single visual reference system such as Pinterest, also indicates a learning moment in the curriculum to facilitate more structured approaches to design research and to not put students off from more exploratory "how to" research practices. Moreover, this study empirically tested a confidence-competence gap at the 2D-to-3D translation point, allowing design educators to have a concrete target to provide more instructional support, tutorials, or feedback structures in the studio environment.

CONCLUSION AND FUTURE RESEARCH

This study aimed to investigate the case of the translation of an emotion concept into a spatial design outcome by the 25 students of the interior design diploma program of a private university at Selangor, Malaysia by implementing a convergent mixed-methods design questionnaire. The results show that concept model-making is the perceived most effective and the most influential step in this translation process statistically and according to students' reflections, and abstract painting and the change from 2-D ideas to 3-D decisions regarding space are the most difficult ones. This study has contributed to the existing knowledge about emotion as an input for design [1,7,9] and the pedagogical value of model-based design activities [2,4] in the field of interior design in the diploma level education.

Like any research of this scale, there are several limitations to be noted. Although the sample was representative of the entire accessible population for this cohort, it did not extend beyond 25 students from one private university and the results presented here cannot be generalised across the population as the results are likely to be specific and context dependent similar to small sample, single-institution mixed methods educational research which is typical for such studies [5]. Moreover, all the data was obtained from a single self-report instrument which meant that the results reported were self-reported process and outcomes rather than independent of assessment of students' design artifacts.

This study could be continued in multiple of directions in the future. It would be useful to have a larger number of private universities in Malaysia in the study to determine the confidence–competence gap and to be able to apply the significance of the concept model-making to a wider audience. Independent assessment of students' design products (or instructor evaluations) may also be included in future studies to explore whether students' perceptions of the emotional translation they achieved is congruent with external judgements on their spatial design products. Structured digital tools were not implemented in the pattern-making or abstract painting regions of the design process, hence future research might investigate the use of these tools earlier in the design process to further explore whether the tools could help to decrease this translation gap identified in this study. Finally, to apply this questionnaire-based method of other creative design fields apart from interior design and to clarify whether the patterns observed here are interior design related or it is an emotion-based learning process that is a common design feature across all creative design fields.

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