

- Designing and Characteristics of Personal Experience: An Exploration of the Potential Influence of the Design Task Environment on the Experience of Designing

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Abstract: The current study is a response to the expression of a decreased interest in architecture by a group of students. Following that discovery and the critical rationalization that outcome decision on the design experience is based on a total experience accrued and retained, an emergent investigative question was constructed: What are the characteristics of experience in the task environment of designing that contribute to formulating a general impression about designing? A generalized understanding of the nature of that experience might facilitate the ability of designers/instructors of designing to structure the design process for effective outcomes. For the current study, the researcher turned to Csikszentmihalyi's "flow" model. A mixed method was used. Fifty-five students of architecture were asked to rate themselves on questions addressing their retained impression of the design experience. A contingency table was used for association and initial data reduction; Fisher's test was used for post-hoc assessment. In addition, accompanying qualitative work (via interview and observation) was conducted for explanatory purposes. Results of the study are instructive. Primarily, truncation of control in the design environment is suggested as having consequences for the design experience. A skill-challenge dyad is also seen as related to experience--interpretation constructed through "optimal arousal" and self-efficacy. Perception of control is possibly conditioned by the notions of constraints in the environment and agenda-outcome control. An interesting phenomenon is "tilting at control," when some respondents seemed to operate under an illusion about control. Both control and skill-challenge are elements of the task environment that are modifiable and can contribute to qualifying the nature of experience in the design environment. The lessons offered are useful for practitioner, teacher and student.

Key words: *control, design, flow*

1. Introduction

The current study evolved indirectly out of a personal experience. In a relatively short period of time, several students of architecture the author had met on a travel visit to their college indicated, at different points in time, their increasing loss of interest in continuing to study architecture. Some questions about designing, learning and the cultures of different design professions were asked. One of the intriguing questions that emerged was this: For the designer, is the experience of designing made up of a series of micro-temporal experiences which occur only during the act of designing and are retained or forgotten as isolated pieces of experience, or is designing personally known

(codified) as a resilient, complex, networked and whole experience that is durable and definable by certain resilient attributable characteristics--attributable to the phenomenon as a whole and not fragments of it? That is, do designers retain a schema of the design experience from which they draw conclusions about the experience of designing? The former, a fragmented personal "knowledge" of designing, might apply to a person who engaged in designing sporadically. Based on widely-accepted views of the working mind as a networked system, the latter model is assumed in the current study. The latter model suggests a rich and retained impression of designing that has been consigned to memory, though constantly undergoing modification. It may be seen as a reasonable source of the indication of a designer's disposition towards designing. A plausible assumption is that a retained total impression that is "positive" is more likely to form a foundation for continuing interest in designing than cause discouragement. The emergent investigative question is this: What is the nature of the task environment of designing that molds a retained impression of designing? Specifically for this investigation, what is the nature of that task environment among students under studio conditions? For the current study, the researcher turned to Csikszentmihalyi's model of flow as a framework for investigating the nature of the design experience.

2. Csikszentmihalyi's model of flow

Flow, according to Csikszentmihalyi [4, 5, 6], is a qualitative compound of experiences which is so rewarding that the actor is in complete involvement with the activity. It is characterized by such experiences, goals and qualities as the following:¹

1. Merging of action and awareness
2. Centering of attention/narrowing of consciousness
3. Loss of self-consciousness/transcendence of individuality
4. Control of actions and environment
5. Clear goals and unambiguous feedback
6. Autotelic in nature
7. Matched skill & challenge
8. Clear goals
9. Positive affect [10, 11]

Based on the foregoing, a model for the current study was hypothesized as follows:

Table 1: Proposed antecedents and outcomes of the positive design experience

Antecedents (of the positive design experience described by flow characteristics)

1. Perceived control of ideas, actions and infrastructural conditions (e.g. physical environment, tools)
2. Matched skill and challenge
3. Clear goals
4. Clear feedback

Consequences (of the positive design experience described by flow characteristics)

5. Concentration on task at hand
6. Transcendence of self [(i) biological (e.g. self that is aware of hunger), (ii) rational (e.g. self that is aware of its being in the world and its relationship to the world--such as time passing; self-confidence in action)]
7. Positive affect

3. Conceptual issues

The current investigation attempts to examine how the experience of designing is represented in terms of the characteristics of flow. It does not seek to identify flow, per se, but uses the constructs of flow to interrogate the design experience. It is reasoned that anyone who can make a cumulated categorical statement about designing in the positive direction of the characteristics of flow, but makes the statements while outside the flow moment itself, has likely formulated a schema of designing that is positive as flow is positive. That person is probably less likely--than a person who has a cumulated experience of designing negative to the characteristics of flow--to see designing as an undesirable enterprise. An assumption is that what is instructive might reside in the latent possibilities that underlie observed phenomena (such as what might underlie a student's frustration with designing).

Since designing usually occurs over a period of time, other life experiences are meshed with it and outcome impressions have these phenomena built into them. So, the objective is to explore model-defined characteristics of the task environment of designing that persist, even with other experiences factored in. The flow constructs are here used to funnel loose facets of experience into a moment and, in so doing, oblige the respondent to think and resolve that thought into a decision (of interest to the researcher).

Following, is a fundamentally qualitative exploratory investigation that attempts to derive a picture of how designing is seen by the designer as a total phenomenon. It partly describes the nature of the designer's encounter with designing with the expectation that a generalized understanding of the nature of the experience might facilitate the ability of designers and instructors of designing to structure the design process for effective outcomes. If experiential circumstances that surround designing are understood, it might be possible to enhance the design experience by introducing appropriate conditions.

The researcher employed a model of antecedents/outcomes in Table 1. If there were clear positive scores on both antecedents and consequences and there were positive associations between antecedents and consequences, the students' problem would be suggested as existing outside the design task environment defined by these constructs. In any other case, further answers must, at least, be sought within this defined task environment.

4. Data collection

Fifty-five students of architecture, who were currently enrolled in active studio for the semester, were asked to rate themselves on a 26-question, five-level scale (with a "0" for "unsure") about their retained impression of the design experience (i.e. the experience looked at as a whole, as compared to sampling moments of the experience during the act itself). The assumption was that overall or outcome decision on the design experience (for example, liking designing, disliking designing, having interest in designing, losing interest in designing) is based on a total experience

accrued over time rather than isolated momentary impressions that are provided by a time/experience-sampling strategy. The twenty-six questions represent indicators distributed over the seven factors in Table 1.

A mixed method was used. Survey data were collected over a two-week period and were mixed with qualitative observations and informal interviews. After data collection, survey responses were dichotomized into positive or negative categories according to their direction on the questions. Raw descriptive trends were observed. Following that, Cramer's V was used as a heuristic tool to reduce data, identify possible interaction effects and estimate strength of relationships. Cramer's V was used as an associational probe only, not for conclusive statistical assertions. Fisher's exact test was used for post-hoc assessment to identify where significant associations lay.

5. Results and Discussion

Results of the study are mixed, showing few significant associations between antecedent and outcome variables. As well known and articulated by Bernard [1], lack of statistical significance does not always imply the lack of informing data. The unique case/scenario is often as instructive as the typical or expected scenario. Some unique observations in the current study present issues of theoretical, rational and, perhaps, practical interest. Two are presented below.

(a) It is curious that associations between factors and variables that are expected to be positive and significant are largely not so. For instance, 94.5% (n=52) of respondents claim that when their design begins to fit together, it energizes them; 87% (n=48) say designing makes them happy about being creative; 81.8% (n=45) indicate that they get so immersed in designing that they lose sense of time. With strong positive outcomes such as these, it is of investigative interest that antecedents that are supposed to hint at such outcomes are not strongly correlated with the outcomes (as expected in a flow model). This curious phenomenon seems to lend evidence to the claim of disillusionment with architecture earlier mentioned by some students.

(b) In contingency table distributions, the dominant shift in the numbers of students answering "unsure" on any item is consistently towards a positive score. The following examples will serve to illustrate this point.

Cross tabulation of the variables, "*I know what I would not like my solution to be*" and "*when different parts of my design solution begin to fit, it energizes me*" (factors, "clear goals" and "feedback") yielded no statistical significance. Nevertheless, although n=6 respondents claimed they did not know what they would not like in a solution, all six (100%) indicated that they were energized when the design started to come together. Though n=7 said they were unsure about knowing what they would not like in a design solution, n=5 (71%) accepted that they were energized when the solution began to fit together. Observation of these pieces of data suggests that feedback (seeing design fit together) works in favor of the designer even when final goals (what solution will be) are unclear or fuzzy.

Cross-tabulation of the variables, "*adequate skill to represent my solution as it evolves*" and "*loss of sense of time while designing*" (factors, "matched skill-challenge" and "transcendence of self"), also yielded no significance. Of n=18 unsure of adequate skill, however, n=17 (94%) still lose sense of time while designing; of n=15 claiming no adequate skill, n=9 (60%) still lose sense of time. Whereas, of n=22 claiming adequate skill, only n=1 (0.05%)




dropped to not losing sense of time and only n=2 (0.09%) moved to being unsure about losing sense of time. Overall, these observations together represent a dramatic trend in a favorable direction. Consistently, these positive undercurrents are seen in the data set.


Given the observations described above, in an unorthodox way, the lack of statistical significance actually supports the view of the unhappy students mentioned earlier that a problem lurks somewhere within the total design task environment. Deeper examination of the data suggests that a plausible explanation of that "lurking" problem might lie in the character of the antecedent factor, "control." In the rest of the paper, attempt will be made, using field data, to explain the character and role of control in the design studio.

5.1 Implications of Character of control in the design studio

Of the four antecedent factors introduced, the only antecedent that seemed to have modest positive associations with outcomes was matched skill and challenge.

Table 2: Associations between matched skill-challenge (antecedent) indicators and certain outcome indicators²

Row label	Relationship	Construct indicated	Cramer's V (on 3x3 table)	Fisher's exact probability (on 2x2 table)
1.	(a) designing enables expression of my high creative capabilities vs. (b) lose sense of time while designing	matched skill & challenge  transcendence of self	0.371 p = .004	p = .032
6.	(a) have adequate level of skill to investigate design problem vs. (b) if listening to music, mind focusses more on design than music	matched skill & challenge  centering of attention/concentration on task	0.333 p = .016	p = .027
7.	(a) designing enables expression of my high creative capabilities vs. (b) when designing, feel happy about being creative	matched skill & challenge  positive affect	0.450 p < .001	p = .005

10.	(a) have adequate level of skill to investigate design problem vs. (b) when designing, feel happy about being creative	matched skill & challenge  positive affect	0.327 p = .019	p = .027
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Nevertheless, skill-challenge itself was not too successful. Score on one indicator was low: only n=22 (40%) indicated they had adequate skill to represent/illustrate their conceptual solutions. The same indicator had 32.7% "unsure," by far the highest in the entire survey. As Csikszentmihalyi [5] argued, when challenge overwhelms skill level, anxiety arises.

Ellis [7] also argued that people seek an optimal level of arousal in their environment by adjusting novelty and complexity of input in that environment. Mannell and Kleiber [9, p.195] summarized:

Each person has a level of arousal that is optimal, ideal, or psychologically comfortable and that person is in a continuous process of seeking and avoiding interactions with the environment to maintain this comfortable level....Arousal below or above the optimal level is experienced as unpleasant.

Finally, the concept of self-efficacy is likewise instructive. Bandura [1, p.3] described perceived self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments." In that regard, action can be related to the idea of personal control.

In the current study, the control factor is so pervasive that it devalues the performance of other antecedents. This, in the end, is not surprising because the issue of control is inherent in the circumstance of the studio.

5.2 Control of actions and environment

Generally, a low level of association was observed between the antecedent factor of control and outcomes. One explanation may be the general attrition of control. To begin with, 96.4% (n=53) of respondents in the survey reflected upon (and from) the studio experience. Under studio conditions, students do not experience an unlimited degree of control. Since perceived control is a given antecedent, it is not unreasonable to conclude that some students may have been affected negatively by their inability to exercise more control over things. One student indicated that the obligation to leave the studio and attend other classes always truncates the experience of designing. For him, those other classes inhibited the total experience of designing. In the larger picture, this is also about control over one's day-to-day life.

For another student, the issue of control was manifested structurally in the studio process as self-pacing. In an effort to systematize the studio, some instructors would break a full semester's project into several different parts, each with a due date. According to this student, each one of those parts invariably assumed a life of its own, becoming a mini-project that must end with a relatively significant, displayable product. For instance, consideration of building material is part of any building project. If a separate investigation of building technology was assigned (e.g. as a one-week project), however, full concentration got devoted to that aspect alone as the due date approached.

What would normally be investigated and communicated within the context of the total work became an isolated project in itself, with its extra demand on time and other resources to make it a "substantial" end product. When several such mini-projects were strung together, the cumulative effect on time, resources and even interest and morale was taxing. Ultimately, the consequence of all this was that it prevented each individual from working at her or his own pace, from devoting more or less attention to each aspect of the project as she or he saw fit. It was an indication of the abdication of control.

A second instance of self-pacing is described by the conflict that sometimes occurs between instructor and student when the former suggests to the latter that she or he is moving too fast in designing. It is essential to recognize the instructor's possible intention of slowing down the student in order to give room to a fuller blossoming and richer interrogation of the design problem. It is equally essential, however, to recognize the possible frustration to the student. Sometimes, argued some students, a compelling, obvious and exciting design solution would emerge very, very quickly. On those occasions when that occurred, it became frustrating to be held back. In itself, the issue represents a difficult fine line that has to be navigated. It is one, however, that has consequences for the perception of the studio task environment.

Another control-related issue was the sometime unspoken (and sometimes unintentional) "leaning on the student" by the instructor. In one instance, a professor suggested a solution to a design problem as it was done by a well-known architect. A student pointed out that the solution was formally interesting but did not actually function well with day-to-day operations based on the nature of the work of the users of the facility. In fact, a week later, a real-life "client" that was brought into the studio, untold of what had been said before, commented on the difficulty of working with a model such as the one used by the well-known architect. Nevertheless, in subsequent class meetings, the studio instructor kept using the very same solution as an interesting and innovative model. In the view of the student, something was being said about what the instructor "would like to see me copy," based on what he seemed to like, even if it had potential functional problems. The situation suggests a kind of the *demand characteristics* phenomenon, a threat to validity in empirical or theoretical work, whereby what is desirable to the person "in control" is transmitted through a variety of signs to the participant or subordinate. In yet another situation, solutions to a space use problem were being discussed by a group of students and a studio instructor. Both parties proposed solutions. When one solution was proposed by two students, the instructor sat back and then said in a changed and serious tone, "This is something we do not pay enough attention to. I will not let you off the hook easily on that solution." The solution itself was quite feasible, only more costly--but one that made sense in a downtown location, where space is at a premium and high cost may sometimes have to be accepted in exchange for the ability to create quality spaces. While total consideration of all issues is important in coming to a solution and while the instructor's point regarding cost was a relevant one, the coarse, vaguely veiled threatening tone regarding the solution he did not prefer was a message. Although the instructor added, "You are free to do the design as you please," the students quickly agreed that their proposed solution was not such a good idea after all.

Despite all the foregoing, an intriguing observation was made regarding control. Among some students, there seemed to be a latent struggle to find (perhaps assert?) control. To the question whether the student had a choice in selecting the specific design problem described in the survey, 27% (n=15) of those who provided a definitive

response indicated that they did. This is interesting, given that only 3.6% (n=2) indicated that they drew on work done outside the curricular studio. Studio problems, as they were, were generally specified by studio instructors. A possible explanation for this remarkable discrepancy is what may be described as "tilting at control," where the respondent falls or acts to fall under the illusion that control arose from the self. That might be understandable, given that a high proportion of respondents found designing to be something positive (and, hopefully, desirable)--87% (n=48) felt creative when designing; only 3.6% (n=2) felt sad when designing; only 7.3% (n=4) claimed not to feel a deep connection with what they were creating in designing--and so, they might be acting to assume or assert ownership (via control) over something they treasured.

5.3 Agenda and outcome control

It is relevant here to distinguish between agenda control and outcome control [8, 12]. The person with agenda control determines what will be done while the person with outcome control determines how to go about doing it. In the studio, the instructor wields agenda control; the student may have a degree of outcome control. As Seligman and Miller [12] reasoned, it is possible to conceptualize agenda control as a zero-sum game. Thus, when one party exercises agenda control, the other party loses some control. This may be the predicament faced by the student. When the studio instructor, using teaching objectives, semester length, practical circumstances and other things, sets the studio agenda, the student is constrained to operate within the given framework, no matter which way she or he would have preferred to handle the design problem.

5.4 Constraints in explaining the studio situation

Ultimately, control in the studio condition may be viewed in terms of constraints. Different models of constraint exist. It is evident that the degree of control a student wields in the design studio is defined, among others, by external, structural, antecedent and environmental constraints, terms depending on the model of constraint applied. When constraints delimit degree of control, it is not surprising that a student (or any individual) will experience some degree of frustration.

6. Conclusion

It should be realized that, although students were the subjects in the current investigation, the emergent questions and perspectives, upon careful reflection, apply to practicing professionals as well. There are actually certain similarities in practices engaged by both populations. For instance, in the architecture studio, students may feel partly constrained by the so-called imposition of the design problem by the design studio instructor. In practice, however, the architect is often similarly "constrained" by the client in terms of the design problem--unless the architect is only conducting "paper architecture." Certainly, the practicing architect could choose to accept only problems that interest her or him, but the practicality of such a business approach would be open to question.

The mitigation or yielding of agenda control, which characterizes the studio student's situation is similar to the situation faced by the practitioner. For example, it is not unnatural that, upon being introduced to a design problem, the designer begins to formulate an image of desirable parts and wholes. When a client or client group is subjected to a survey, however, and a concrete program is defined, it is equally not unusual for the designer to have to either

modify some of her or his earlier ideas for a solution or eliminate them completely in order to comply with the "imposed" program.

Issues of control of actions, antecedent factors and outcome experiences exist in the task environment in which designing takes place. The lessons they offer are both literal and metaphorical, directly perceived or suggested. The consequence of all these on the designer's perception of designing may be positive or negative, trivial or compelling. For the designer herself or himself, for the teacher of designing, and also for the student of designing, awareness of what constitutes relevant factors at the conditional point of the task environment is valuable because the opportunity to create appropriate conditions in the task environment may also serve as an opportunity to modify the overall personal experience of the vocation for self or others. The cognitive milieu of inspiration, pleasure, curiosity, aesthetics, and creation--*kansei*--is not only affected by the intrapersonal, but also by the extrapersonal milieu in which designing happens.

8. References

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¹ Also see [3, 10, 11]

² For efficiency, a full table is not provided here.