Regulating Creativity and Management Constraints in Design Practice

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ABSTRACT:

Managers and producers regard designers are people difficult to work with, in particularly when it comes to the balancing of creativity, budgeting, timing and producing. It is not new to see designers at work may take advantage of stretching their time to the fullest to generate idea, waiting for the particular spark for inspiration and intuition. This empirical study examines whether there is a system applicable to design practices and how it would nurture design students to self-regulate creativity and management constraints. For a better understanding of the issue, interviews were conducted with design practitioners, design teachers and students. Findings reveal that the major management constraint that hinders creativity is time. Respondents further show that budget, work environment, client, management and communication style have significant influences on creativity. Implications of this research suggest that the "Stage-gate model": a management method commonly adopted in the new product development industry resemblances design process and has its significances during the planning, developing and controlling stages in design practice. Thus, stage-gate model should be introduced to design students to raise their awareness of the constraints and limitations when working with different stakeholders.

KEYWORDS:

Design Education and Management, Stage-gate model, Business constraints

1. INTRODUCTION

Very often, designers are being seen as heretics, wild horses or egoists; management and business imperatives seem are not applicable to design professions. The myths that creativity is associated with "irrationality or divine madness" and, designers are "opposed to the rules and boundaries of common sense and reason" (Bilton, 2007, p. xiv) are still the notorious images of designers to most of the people. It is common to hear designers arguing that excessive controls will hinder their creativity. Seeing this '*déjà vu*' as a norm, managers

and producers in general assert that there are high uncertainty and risk when working with designers, especially when confronting tight resources and deadlines. In a study, Amabile finds that creative people are less likely to explore new solutions if external control is high, this would reduce creativity and thus productivity as a result (Amabile, 1988). On the other hand, it is also argued that creative people think with both sides of their brains, they have the ability to think irrationally and rationally, to think cross boundaries and to merge different thinking styles. In views of the above, it is asserted that designers are having the capabilities to regulate their distinctive working and thinking patterns to mediate creativity and management constraints. Following this vein, this paper argues that, by applying the "Stage-gate model": a management method in the new product development industry to manage, direct and accelerate their innovative efforts (Cooper, 2001), designers would be able to balance creativity and management constraints while at the same time it encourages idea generation in design practice.

2. THE DISTINTIVE ATTRIBUTES OF DESIGNERS

Designers are people who take high risks, the creative process is introverted and solitary, and solutions are unpredictable. Idea generation is a process to unveil the unknown. Csikszentmihalyi and Getzels assert that "the unknown is a place of ambiguity, complexity, and sometimes, utter darkness. It takes guts to go there; it means losing our foothold for periods of time; it makes us vulnerable, and many of us find it too uncomfortable to bear. Making quick decisions can be the road back into safety, but that is unlikely to lead to new discoveries. In order to reach a higher level of consciousness and possible crystallization, we must endure the complexity and ambiguity for as long as it takes" (Csikszentmihalyi and Getzels, 1976 in Friis, 2012, p.4). Amabile also expresses her view that creativity is characterised by consistent discovery of new cognitive pathways to solve problems (Amabile, 1988). Unfortunately, uncertainty is the major psychological barrier for designers. There is a tendency for designers to continue trying out different solutions and burns up the time and resources of the project. However, it comes to reality that how much time is allowed for accomplishing the project is not the decision of designers or a design team; instead it is given by the client or manager. Similar to the writer's blockage, designers tend to have designer's blockage resulted from their personal characters as the perfectionist (one seek for perfect solutions and leads to heavy block in the work process), the pleaser (influenced by what others like and value, and afraid of no appreciation of the work and thus hinders the free expression) and the pusher (who rushes to get thing done without coming up with creative solutions) (Friis, 2012). The process of idea generation is like a leap into the void. There are a lot of uncertainties and recursions and these can slow down the project and increase cost (Bruce, 2009). Studies suggest that creativity can be encouraged by providing appropriate working environment and conditions to creative people. In addition, providing

freedom to allow for specific working style and personality is also crucial (Amabile, 1998, Forbes & Domm, 2004, Fisher & Amabile, 2009). Nevertheless, it is noticed that this freedom is with limits, it is "a sense of control over one's own work and own ideas: a freedom from having to meet someone else's constraints" (Forbes & Domm, 2004, p.4). It is also realised that idea generation takes time, and time is designers' biggest enemy. Page and Dahl find that time is one of a major constraint that influences the creativity of the solution (Page and Dahl, 2005). Apparently, influences of time, internal self-pressure and external pressure from stakeholders tend to reduce freedom of creativity. Because of the heavy involvement of human capital, creative work is volatile, dynamic and risk-taking in nature (Bilton, 2006; Jeffcut, 2009). Hence, working with designers resemblances the experience of walking on thin ice, every little step means uncertainty.

3. IS CREATIVITY MEASURABLE?

Design practice draws on knowledge from art and design, consumer psychological, management and marketing strategies. Creativity allows designers to express their self-talent or vision, as the design profession is about communicating ideas, images and experiences to the audience. Creative product has to be novel or difference; it has to fulfil the purposes of meaningful, relevant and effective and to satisfy the consumers' demand for amusement, ornamentation, self-affirmation and social display (Jeffcut, 2009). Cropley & Cropley contend that "in the case of functional creativity there can be no discussion of creativity without first dealing with the issue of effectiveness (Cropley & Cropley, 2005, p. 173). Novelty and effectiveness are the prime criteria in design profession to serve for the business purpose. Dahlén also argues that creativity has to fulfill a few criteria in the business discipline, which makes it measurable and manageable. First, creativity has to be novel and meaningful (Dahlén, 2008). Novelty refers to the new and surprise element; it must contribute to the field that was not existed before. Secondly, success in business is always the ultimate goal, so it is rational to look at creativity results to define creativity in design profession. It has come to sense that this novelty element has to serve a purpose and be meaningful. Dahlén further claims that creativity product novelty and marketing novelty to a large extend affect customer satisfaction, they draw attentions and increase sells (Dahlén, 2008). In design practice, the most important capital is creativity that generates from human. However, unlike other measurable business professions, creativity, as an input in design practice offers no guarantee on the outputs. The correlation between inputs and outputs in design practice is relatively weak because creativity largely depends on the creativity of designers as well as subjective interpretations of the target audience. It is not surprising for many investors that design profession is synonymous with risky business. Therefore, for the mangers and clients, there is always a dilemma that whether it is possible to balance creativity and the effectiveness of management imperatives.

4. USING STAGE-GATE MODEL TO REGULATE CREATIVITY AND MANGEMENT CONSTRAINTS

There are myths that cast doubt on the management of designers because designers take high risks, the creative process is introverted and solitary, and creativity could not be managed. Managing designers require the soft side of management, which is the management of creative performance through individual and organisational approaches. The stage-gate model encourages creativity while it balances creativity and management constraints. It plays the role to regulate the creativities and management constraints. Stage-gate model (Cooper, 2001) is a widely adopted risk management method in the new product development industry to manage, direct and accelerate their innovative efforts. It provides a systematic approach to visualise, develop and launch product development projects by the application of processing management and quality management. By making go or kill decisions, the stage-gate process is an uncertainty-reduction process in an incremental manner, every stage requires more resources than the previous ones, and each gate reduces uncertainty by evaluations and decisions (Sloane, 2007, Cooper, 2001). Stage-Gate model (see Figure 1) breaks the innovation process into a number of distinct stages, each stage consists a set of discrete, identifiable, cross-functional and parallel activities. A gate is found before entering to next stage. These gates are served as checkpoints for go or kill decisions to control quality of the whole production process.

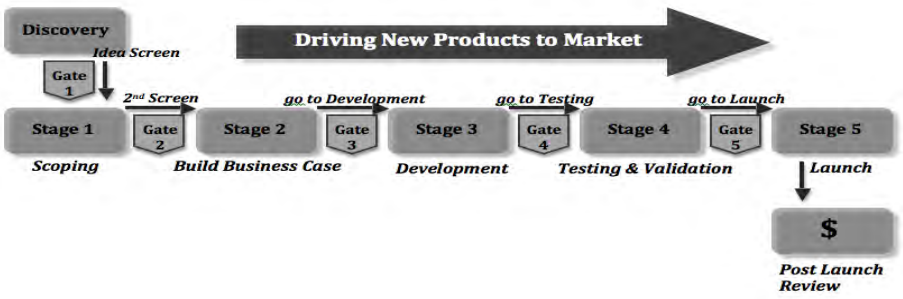

Figure 1. Stage-Gate Model (Cooper, 2001)

The Stage-gate model divides a new product project into distinct, cross-functional stages. In each stage (Discovery, Scoping, Building Business Case, Development, Testing and Validation and Launch) information is gathered to go through the next decision making gate. Gates is an entry point to a new stage, it provides a checkpoint for go or kill and prioritisation decisions, they serve as quality control monitors in the project. In each gate, ideas are screened with reference to the criteria such as business strategy, feasibility, opportunities, financial returns and market attractiveness set up by the management. If an idea fails to fulfill any criteria, the management may kill it or go back to the previous stage for moderation.

Presumably, stage-gate process allows the creative project teams to visualize the idea before development and market launch as well as to create a concrete description and goals to ensure deliverables. Stage-gate model has been widely adopted as a risk management method in the new product development industry; however, study of its adaptability in design practice is still sparse and thus it brings forward the main research question of this study: What are the creativity and management constraints in design practice and whether the stage-gate model is able to regulate the constraints while at the same time encourages idea generation?

5. THE EMPIRICAL STUDY

This empirical study adopts the "expert judgment" technique by Dempster as an evaluation method (Yager and Liu, 2008). The nature of this method is qualitative, using a combination of interviews and case studies. Data was collected from three different groups, two experts from design industry and two experts from design education sector followed by a focus group interview with four design students. The experts were selected by the use of a number of pre-determined criteria as suggested by Dempster, these included: 1) a minimum of seven years of direct work experience in the respective creative industries, 2) experience at a senior level of business management on top of the content creation or manufacturing input segment in the production process, 3) experience in working as a member in the creative project teams, and working alongside with other specialised creative workers and 4) experience in managing the whole production process and the management of creativity throughout the production process. Face to face interviews were conducted with a structured questionnaire addressing interpretations of creativity and constraints, the characteristics of designers, the approaches to regulate creativity and management constraints, and the adaptability of stage-gate model in design practice. The additional focus group was composed by four design students and aimed to collect their views on creativity and management constraints. The characteristic of stage-gate model was explained to the experts and the students. They were asked to draw out their design process, and then similarities and differences were identified by comparing it to stage-gate model. For analysis, data collected from the interviews were transcribed from the voice recordings. They were sorted and arranged according to the interview questions for a general reflection of the information and the meanings. The data was then categorised for comparisons to generate theme for analysis (Table 2, Table 3). Comparisons of the stage-gate model to the design process models illustrated by the interviewees are presented in Figure 2, 3, 4, 5, 6, 7, 8 and 9.

6. FINDINGS AND DISCUSSION

6.1 DESIGNERS THINK AND LOOK AT THINGS WITH DIFFERENT PERSPECTIVES

Interviewees interpreted that creativity as "being different", as "problem solving", to "question established norms", to "create something not existing", with "no limits and boundaries" and creativity "stimulates and [makes] impact". Their responses indicate that designers have "different mind sets", they are "bold", "rebellious" and "critical", while at the same time they are "self-challenging", are "problem solvers" and "deep thinkers". Their works need to "surprise and fascinate" others. These responses coincide with the literature review that designers possess distinctive attributes; they "oppose[d] to the rules and boundaries of common sense and reason" (Bilton, 2007, p. xiv). Designers think and look at things with different new perspectives and may be that is the reason that why managers and clients find them difficult to communicate with, without mentioning to manage them for business effectiveness. Table 1 shows the summary of the key responses.

	Interpretations of Creativity and Designers' Characteristics	**Constraints to Creativity**
Practitioners	• To build and improve existing thing • To solve problem • Self-challenging • Deep thinking	• Market and cost • Internal factors: mood, emotion, health • Practical factors: skill proficiency, clarity of thoughts • External factors: client's change of mind, deadline, budget • Client's needs • Target audience's taste • Time such as deadline • Time as matter of self-discipline • Allocation of time for research, evaluation and experimentation during design process • Technical problem • Production time • Personal habits
Teachers	• Being different • Rebellious • Critical • Question established norms	• Work with boundary • Achieve aim under limited resources • Compromise with team • Marketing concern • Personal factor: mood • Uncertainty of requirement and expectation • Time for planning • Time to a certain extent is a constraint to creativity

		• Stuck in design process • Not aware of possible solution • Benefit of stakeholders • Mood • Communication and relationship between boss, client, teammates • Physical condition • Experience and skills
Students	• Transform existing things • Surprise and fascinate people • Differs in times and needs • Contextualize to fulfill trends • Create something not existing in the market • Stimulate and give impact to target audience • No limit, no boundary • Work with boundaries set by stakeholders • Bold, cross-over, mix and match • Different mind sets	• Problem raised during design process • Feasibility • Fulfill requirements of tutors and end-users • Tutors and peers' comments • Practicality • Budget • Preferences of stakeholders • Time and budget • Do not know when to stop • Not enough knowledge, skills and theories on the subject • Personal problem: mood

Table 1: A summary of views on interpretations of creativity, designers' characteristics and constraints to creativity

6.2 TIME, BUDGET, RESOURCES, CLIENTS AND MANAGEMENT APPROACHES ARE MAJOR CONSTRAINTS TO CREATIVITY

In general, both the design practitioners, teachers and students asserted that time was a key constraint to creativity. The practitioners looked at time in the aspects of "deadline", "self-discipline", "time allocation for research, evaluation and experimentation" as well as "production time" during design process. The teachers regarded time as "time for project planning" and they contended that "time to a certain extent is a constraint to creativity". To the students, "time" was their biggest constraints, they always had to meet assignments and projects deadlines and there were times that they "do not know when to stop". The responses coincide with Page and Dahl's study that time is a major constraint that influences creativity (Page and Dahl, 2005). Findings also reveal that budget and resources could hinder creativity and quality is being compromised in time/cost prioritised projects. The practitioners further agreed that budget, cost, market, clients and audience's needs as constraints to creativity. They suggested that there was a need to accommodate creativity

and quality under tight schedule, cost and the clients' needs. For example, practitioner A said that in Hong Kong, budget plans were predetermined and inflexible, "clients are too practical and design business always just looks for workable and marketable outcomes". Providing a more in-depth analysis, practitioner B proposed that there were three factors that constituted constraints to creativity (a. internally: the designer's mood, emotion and health; b. practically: skill proficiency, clarity of thoughts; and c. externally: client's change of mind, deadline, budget). Similar to Page and Dahl's findings, consumers' specific goals and decisions are always one of the designers' major constraints (Page and Dahl, 2005). Similarly, the teachers also regarded resources, personal matters and communications with stakeholders as the major constraints to creativity. They had to work "within boundaries", "compromise with team" and to "benefit stakeholders". Responses from the students also show that "budget", "fulfil requirements", "preferences of the stakeholders", "feasibility" and other people's comments influenced creativity. Interestingly, the practitioners, the teachers and the students contented personal mood as a constraint and it was closely related to the distinctive attributes and characteristics of designers. In sum, the findings highlight that other than time, stakeholders such as clients and target audiences were obstacles to creativity, either from their conservative attitudes to creativity or marketing positioning. The above further confirmed an earlier study by Ng and Yeung (2013), revealing that time, budget, clients and management's attitudes and approaches will hinder creativity in a range of creative industries.

6.3 HUMANISED ENVIRONMENT, OPEN MANAGEMENT AND COMMUNICATION APPROACHES TO REGULATE CREATIVITY AND MANAGEMENT CONSTRAINTS

The summary in Table 2 highlighted the importance of management approaches to provide "open", "flexible" and "humanised" environment to nurture creativity. Management could enhance creativity by motivating designers to communicate and discuss with others during idea generations. The practitioners claimed that "rich culture such as European countries with freedom to experimentation" and "flexible environment" nurtured "confidence" so as to "generate comfortable feeling and better design". Teachers also regarded "humanised environment", "the setting of studio and classroom" and "open-minder leader" provided grounds for "research" and thus enabled constructive critiques and the sharing of professional views. Students also agreed that "humanised environment", "diversity backgrounds of teammates" allowed "brainstorming for inspiration and stimulation". Surprisingly, while they preferred "playful and relaxing environment" they expressed the view that they also liked "competitive environment for motivation" to balance out creativity and business imperatives. In sum, the above point out that although there are significant influences of management constraints to creativity, good quality of work is still possible if

humanised environment and open management and communication were provided.

	Approaches to nurture and regulate creativity and business constraints	**Stage-gate Model and Design Process**
Practitioners	• Exposure to art • Be passionate • Interested in everything • Research • Environment (rich culture such as European countries with freedom to experimentation) • Flexible environment • Confidence generates comfortable feeling and better design	• Very important • A systematic design process is definitely important
Teachers	• Critique for constructive comments • Share professional points of views • Discuss with others • Meditation for inspiration • Research the subject • Open space • Setting of studio and classroom • Humanised environment • Open-minded leader • Time for idea development	• Very important • Related to project planning • Process of elimination • Objective thinking • Design process promotes teamwork
Students	• Surrounded by interesting things and people • Brainstorming for inspiration and stimulation • More space, both physical and intangible • Diversity backgrounds of teammates • Competitive environment for motivation • Playful and relaxing environment • Humanised and fun environment • Flexible time	• Very important • Biggest issue to design students • Promote good time management, pushing ourselves to keep track of work • Not only good for outcomes but also the process • Helps to implement project smoothly • Constant remind us the aims of the project

Table 2: A summary of views on approaches to nurture and regulate creativity and business constraints, and views on stage-gate model and design process

6.4 DESIGN PROCESSES RESEMBLANCE STAGE-GATE MODEL

Making reference to the summary in Table 2, all the interviewees agreed that a systematic design process was definitely important to "promote good time management, pushing ourselves to keep track of work", to "help to implement project smoothly" and also provided

"objective thinking" in the "process of elimination" during idea generation. Patterns of stages and gates were found in all design processes as described by the interviewees: the Practitioners, Teachers and Students (see Figure 2, 3, 4, 5, 6, 7, 8 and 9 for their illustrations). In general, they commonly said that all design processes started with a concept formation stage, either it was from clients, teachers, self-researched or generated from managers. Although the design processes differed from each other within the design practices, they resembled the process of the stage-gate model.

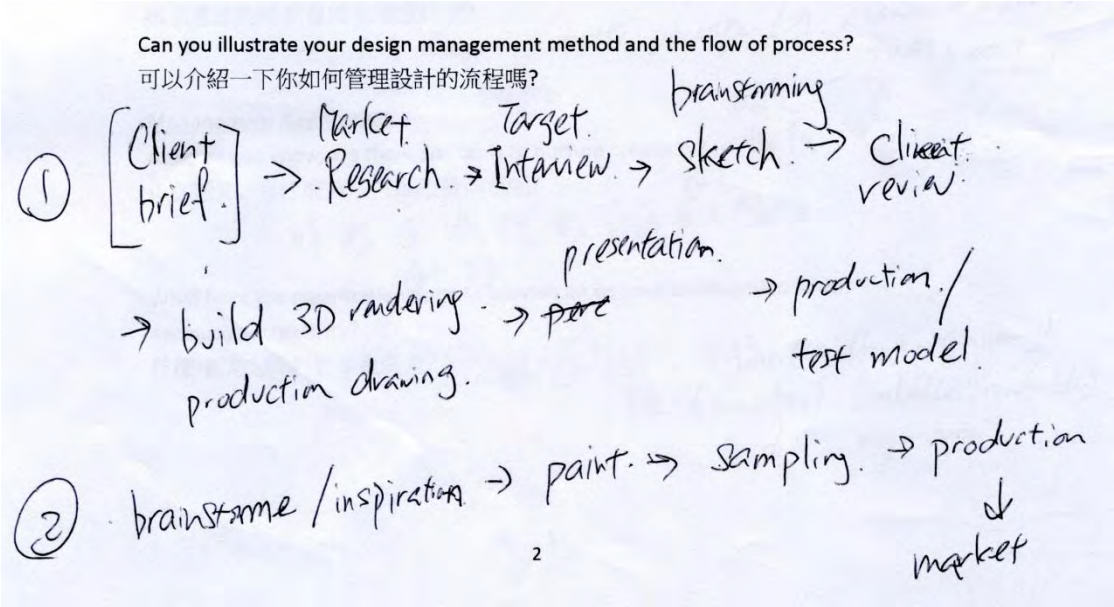

Figure 2: design process as described by Practitioner 1

Further mapping the stage-gate model with the interviewees' illustrations of existing production process shows that that the two models are comparable and similar in nature. For example, Practitioner 1 mentioned that "the stages of my design process and that in this model are very similar in nature (Figure 2). For examples, client's review is same as 'screen', rendering and production drawing is same as 'development'". Likewise, Practitioner 2 said that in "design process, we have 'iterator design pattern'" which is very similar to the stage-gate model (Figure 3).

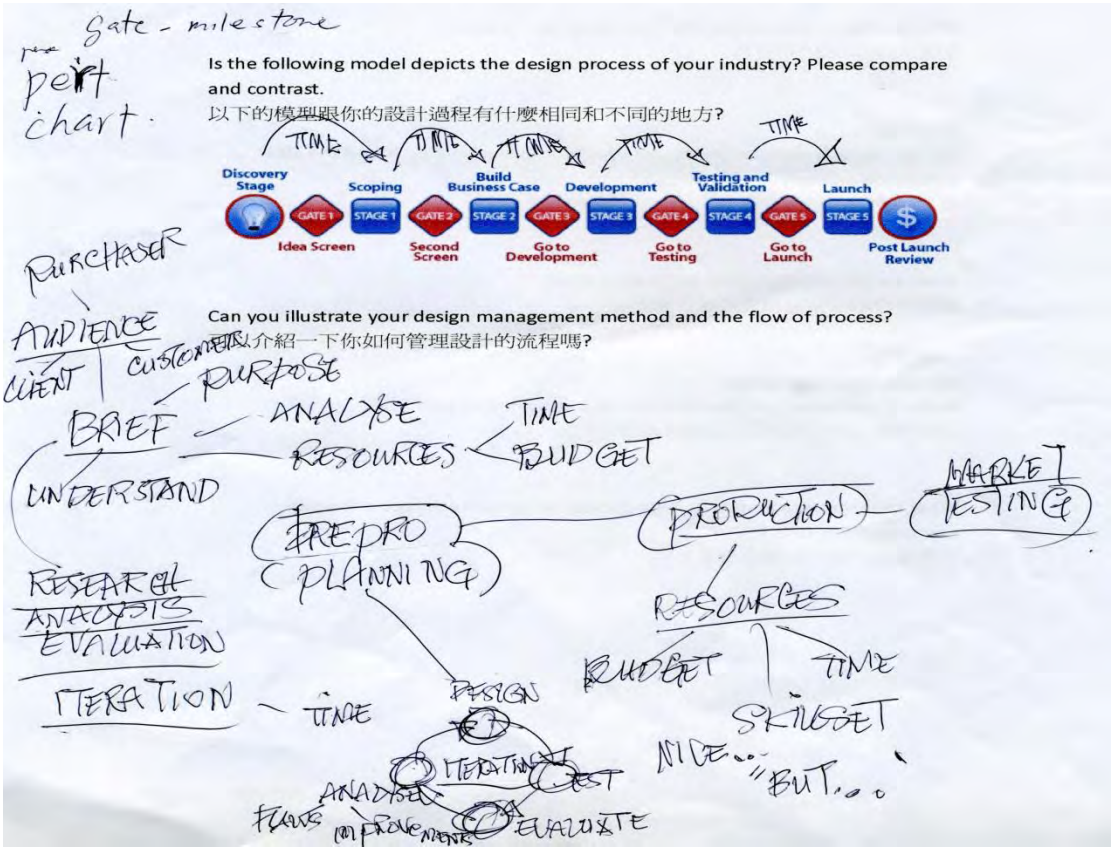

Figure 3: design process as described by Practitioner 2

Teacher 1 also regarded the two models "are quite similar" (Figure 4). He carried on by saying that "we first do research, including data collection. Then we draft layouts. With the layouts, there followed by review, refine and redo. Review is like 'screen' in stage-gate model. After refinement and redo, we produce layouts, and this process goes on and on, like stages of 'go to development', 'development', 'go to testing' in the model. Finally, we have execution, which is similar to 'go to launch' or 'launch'". In the same sense, Teacher 2 also said "the stage-gate model and my design process are very similar" (Figure 5).

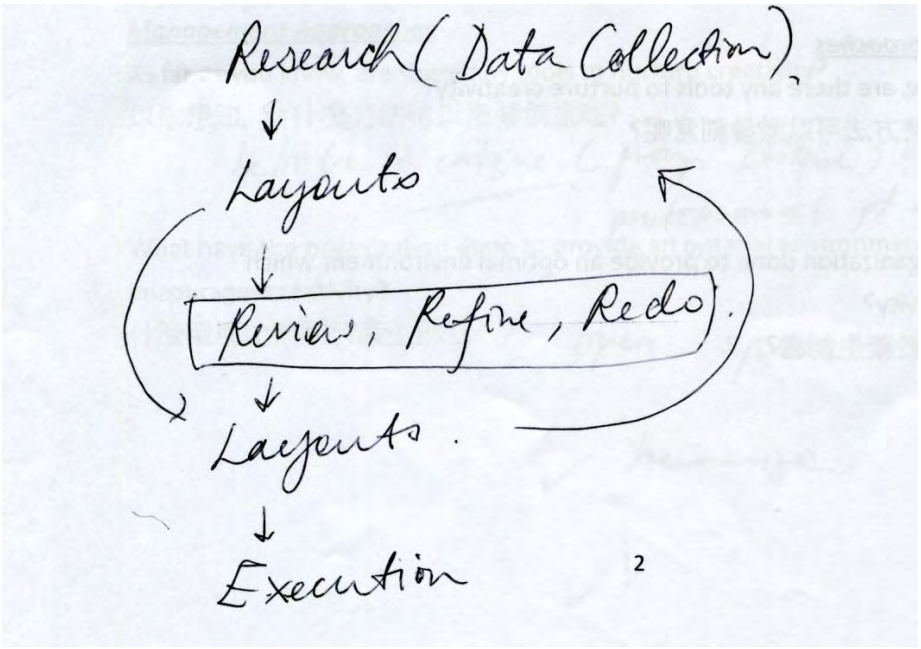

Figure 4: design process as described by Teacher 1

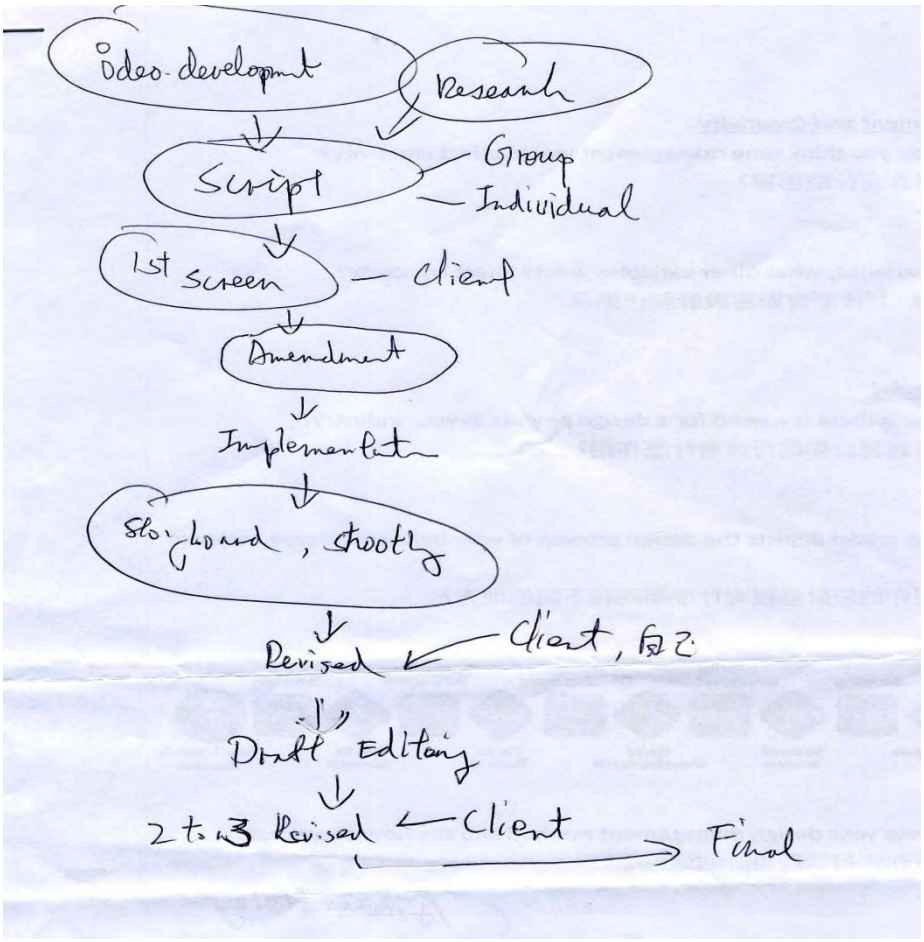

Figure 5: design process as described by Teacher 2

Although the students did not make much comments in the comparisons of their design processes to the stage-gate model, their illustrations showed that the processes they had been using were more or less the same as the stage-gate model (Figure 6, 7, 8 and 9). A noteworthy point in the students' illustrations reflect that although they have a strong sense on the design development process, they did not emphasise much on the 'gates'. Out of the four students, there was only one student (student 4) mentioned the approval needed (the gate) from tutor (Figure 9). It reflects their lack of industry experiences and it may be a result of not being made aware of the real-life management constraints during their design studies.

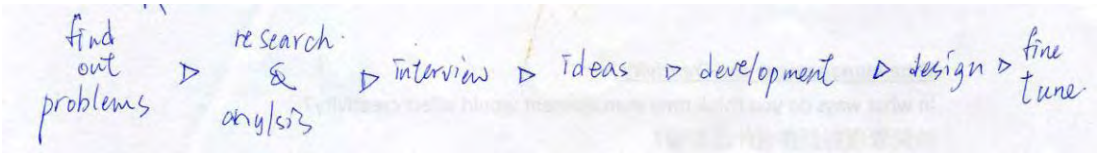

Figure 6: design process as described by Student 1

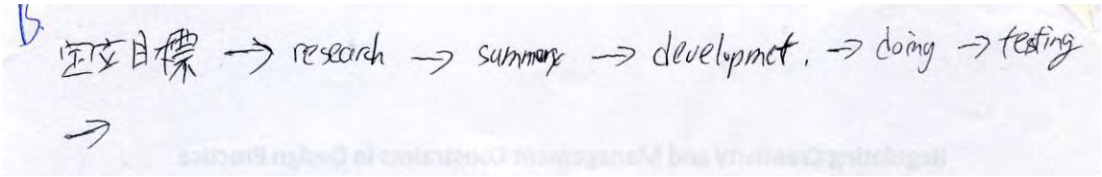

Figure 7: design process as described by Student 2

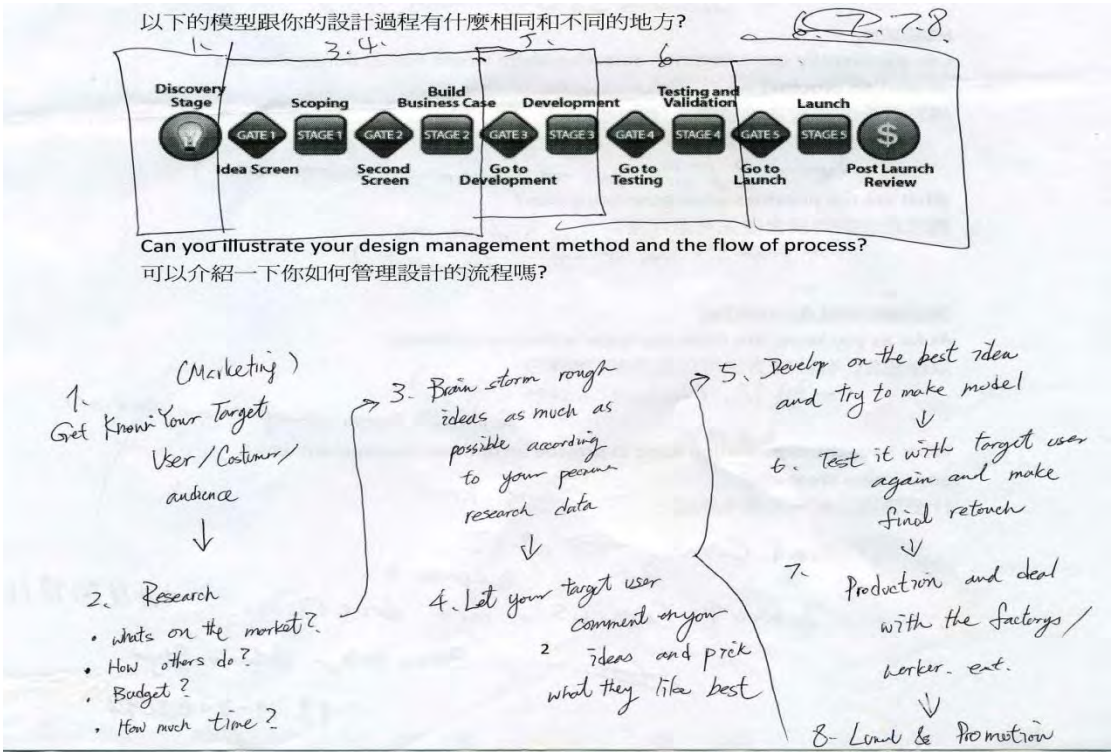

Figure 8: design process as described by Student 3

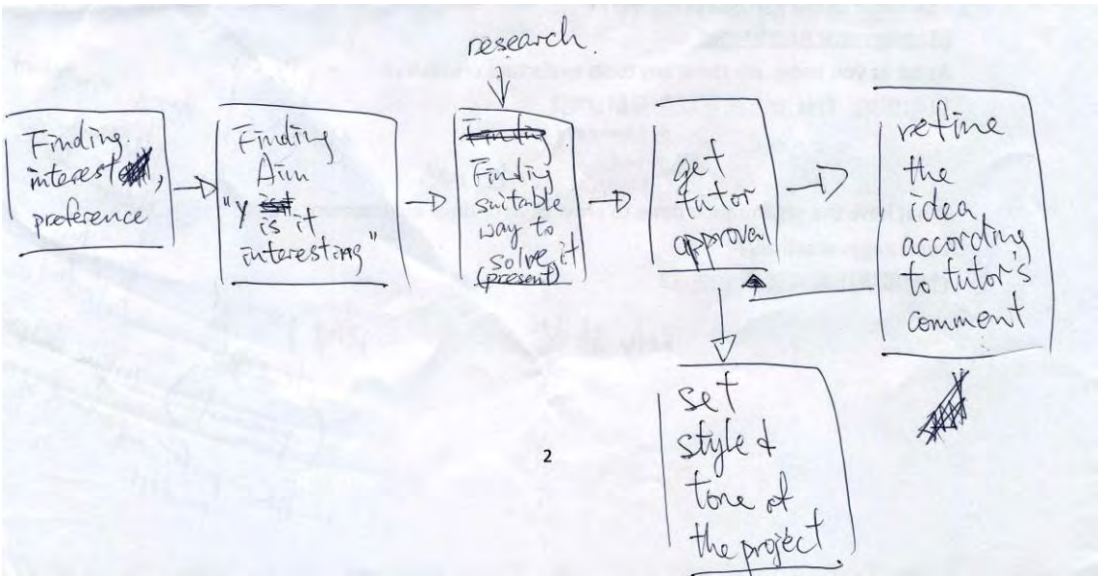

Figure 9: design process as described by Student 4

In sum, the overall findings reveal that alternative forms of stage-gate model already existed in design practice, without explicitly aware by the interviewees. The findings also show that the design processes as described by the participants were similar to the process of the stage-gate model. Comparison of their existing design processes and the stage-gate model suggested that their functions and practices are similar and it would be feasible to modify and apply the stage-gate model to regulate the creativity and management constraints in design practice. The above findings further indicate that if design projects are regulated effectively by a process model, time, budget, resources, client and management approaches may not always lead to the lack of creativity.

7. CONCLUSION AND IMPLICATIONS

To conclude, this study reveals the major constraints to creativity and recommends the possible applications of the stage-gate model to regulate management imperatives. There are a few implications and suggestions for the design practitioners, teachers and students in planning, managing and controlling design projects. Firstly, time buffers should be included to reduce time pressure on designers and allow rooms to perform creativity. Secondly, stage-gate model should be adopted for early recognition of failures in each gate. It also allows time and resources for recovery actions to ensure the quality of design projects. By identifying the variables which influence creativity, managers could adopt an open management approaches to accommodate designers' distinctive characteristics and provide a humanised environment for better communication and performance. The stage-gate model should be introduced to design students to raise their awareness of the constraints and limitations when working with different stakeholders in real-life design practice. Furthermore, the stage-gate model, with modification and adaptation, will be able to regulate

the creativity and management constraints in design practice. The limitations of this study are on the small sample size of the participants/respondents as well as the "expert judgment" technique. A larger sample which covers a wider range of practitioners, teachers and students will enhance the reliability of this study. Additional data collection method should be used to triangulate with the data from "expert judgment" technique to avoid subjectivity. Last but not least, future research should be carried out on testing the effectiveness of the stage-gate model in design practice. To provide more reliable results on the possible benefits of applying the stage-gate model, a comparison to the unstructured design approaches raised by the participants in this study may also provide interesting results.

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