

Influential Elements of Creativity in Art, Architecture, and Design Creative Processes: A Grounded Theory Analysis

Ahmad Fakhra, IIT Institute of Design, Chicago, USA, ahmad@id.iit.edu

Judith Gregory, PhD, IIT Institute of Design, Chicago, USA, judithg@id.iit.edu

Abstract

Creativity in art, architecture, and design was investigated in this analytical study through the qualitative research methodology of grounded theory. A data set comprising published interviews with eighteen eminent creative artists, architects, designers, and leaders of creative organizations was analyzed to generate an initial grounded theory model for the creative process phenomenon of generating creative insights. Five influential elements to the creative process were identified from the analysis: sources of creativity that yield creative insights; strategies that instigate creativity; influential factors that drive creativity; individual and collaborative modes of working; and characteristic qualities of creative results. The analysis presented is part of doctoral research in progress in its early phase.

Keywords

Creativity, Design process, Design pedagogy, Art, Architecture

Creativity has been defined by cognitive psychologists as “the result of convergence of basic cognitive processes, core domain knowledge, and environmental, personal, and motivational factors which allow an individual to produce an object or behavior that is considered both novel and appropriate in a particular context” (Ward & Saunders, 2003, p.862). It is regarded as the quintessential element to the process of innovation, which is where creative ideas are actually implemented (Mumford and Gustafson, 1988; Amabile, 1996). A common approach to the study of creativity was presented by Runco (2004) in his review of creativity research in the past twenty years through the discussion of four creativity elements: the creative person, process, product (results), and press (pressures on creativity). In this study, creativity in art, architecture, and design is investigated with a primary focus on creative processes following grounded theory methodology and a generative research approach in the early phase of doctoral research that aims to foster creativity in design process and design studio pedagogy.

In cognitive psychology literature on creativity, creative processes have been approached through various theoretical and scientific models of cognitive processes. Some cognitive models include the generative and exploratory sets of processes of the Geneplore model (Finke et al., 1992, Ward et al., 1997) and the analytic-evaluative processes of Basadur (1995), Houtz et al. (1979), and Perkins (1981). Other cognitive models are concerned, variously, with the idea formation processes of random variations and combinations and the evaluation processes of the chance-based theories of Campbell (1960) and Simonton (1988), the interaction between the primary processes of problem finding, ideation and judgment and the contribution of the secondary components of knowledge and motivation by Runco and Chad (1995), and other

processes involving perception and information encoding discussed by Mumford, Baughman, Supinski, and Maher (1996) and Smith and Carlsson (1990).

In contrast to cognitive psychology, Demirkan and Hasirci (2009) argue that creative processes in design research have not been investigated as much as would be expected. They remark: "Although creativity is considered as one of the key concepts in design, designers neglected to make research on creativity for many years" (Ibid., p.294). Christiaans and Venselaar (2005) suggest that reliance on concurrent verbal protocol analysis in mainstream design research poses difficulties for inquiry into processes of creativity. They also point to the need for design research methods that can correlate the performance of designers - creative results - with the nature of design activities - creative design processes.

In this research, grounded theory methodology was employed as a qualitative research approach in this early phase of research of creative processes by examining commentaries and perceptions of exceptional creative achievers. Grounded theory is defined as theory generated from data systematically obtained and analyzed through the constant comparative method (Corbin & Strauss, 2008). The creative process phenomenon of generating creative insights is interpreted from grounded theory analysis of the initial data set comprising texts of published interviews with eighteen eminent creative artists, architects, designers, and leaders of creative organizations. Five interrelated elements of creativity that have influence on the creative process were identified through the analysis. The five elements are: sources of creativity that yield creative insights; strategies that instigate creativity; influential factors that drive creativity; individual and collaborative modes of working; and characteristic qualities of creative results.

Research aims and questions

This discussion presents a grounded theory analysis of reflections on creative process by well-known creative achievers currently active in the domains of art, architecture, and design. This initial study is part of the early phase of doctoral research that aims to develop a theoretical and conceptual understanding of creativity in design and design processes and to propose creativity-informed methods and strategies to foster creativity in design processes in the context of design studio pedagogy.

This grounded theory analysis is guided by three research questions: What are the major sources of creativity in creative practices? What are the common influential elements of creativity in the creative processes of artists, architects, and designers? How could better understandings of creative processes from creative practices help inform design pedagogy on how to foster creativity in design studio environments? Although the doctoral inquiry is focused on understanding the creative process in design, the creative processes in art and architecture are also examined based on the assumption that artists, architects and designers employ similar cognitive and creative processes as they produce creative results.

Research Approach and Methods

Data set

Published interviews with eighteen creative individuals and leaders of creative organizations well known for their creative achievements in art, architecture, and design domains were selected for this grounded theory analysis. The data set presented in Table 1 includes five artists, nine architects and designers, and four leaders of creative organizations. The creative individuals and organizations were selected by the process of theoretical sampling (Corbin & Strauss, 2008), which is achieved by constituting a heterogeneous sample of people who have experienced the phenomenon (of creative processes, in this case) and thereby best contribute to the development of its theory.

Data sources

The data sources from which the data set was constituted are published texts of in-depth semi-structured interviews and reflective writings of eminent creative individuals. Table 1 lists the creative individuals, their creative domains, and their data sources. Funtagawa (2002) and Meyers and Gerstman (2007) are the two major sources of most of the interviews with the selected creative individuals. In addition to these collections, Lindsey (2001) provides a second source for Frank Gehry, and Catmull (2008) is the source for Ed Catmull's own commentary.

The published interviews are a feasible alternative for what could be a very challenging task of scheduling on-site and/or in-person interviews with these hard-to-reach creative individuals. In Funtagawa (2002) and Meyers and Gerstman (2007), it was advantageous to have a group of diverse creative individuals responding to a similar set of questions so that answers could be easily compared and analyzed for patterns. It was possible, for example, to compare the creative process of a photographer and a sculptor to that of an architect or an automobile designer. Another advantage is that the content of these books provides appropriate quantity and quality of creative individuals' reflective commentaries in response to the research questions.

Category	Name	Creative domain	Data Source
Artists	Chuck Close	Painting	Meyers & Gerstman, 2007
	Dale Chihuly	Glass sculpture	Meyers & Gerstman, 2007
	Julie Taymor	Film, opera, & Broadway-show directing	Meyers & Gerstman, 2007
	Ilana Goor	Sculpture & jewelry design	Meyers & Gerstman, 2007
	Ken Heyman	Photography	Meyers & Gerstman, 2007
Architects & Designers	Karim Rashid	Industrial & interior design	Meyers & Gerstman, 2007
	Milton Glaser	Graphic design	Meyers & Gerstman, 2007
	Roland Heiler	Industrial design	Meyers & Gerstman, 2007
	Arata Isozaki	Architecture	Funtagawa, 2002
	Daniel Libeskind	Architecture	Meyers & Gerstman, 2007
	Frank Gehry	Architecture, interior, & furniture design	Funtagawa, 2002 Lindsey, 2001
	Tadao Ando	Architecture & interior design	Funtagawa, 2002
	Steven Holl	Architecture & furniture design	Meyers & Gerstman, 2007 Funtagawa, 2002
	Zaha Hadid	Architecture, interior, & industrial design	Funtagawa, 2002
	Organizations with creative leaders	BMW - Chris Bangle	Automobile design
Infosys - Nandan Nilekani		IT consultancy	Meyers & Gerstman, 2007
Morphosis - Thom Mayne		Architecture and interior design	Funtagawa, 2002
Pixar - Ed Catmull		CGI animated motion pictures	Catmull, 2008

Table 1. Data set of eighteen creative individuals and data sources

Grounded Theory Procedures

The research methodology employed to analyze this initial data set is grounded theory. In this qualitative method, the analytic process is based on immersion in the data and repeated sortings, codings, and comparisons that characterize the grounded theory approach. Analysis begins with open coding, based on the examination and sorting of text into categories. Corbin and Strauss (2008) describe open coding as the process of “[b]reaking data apart and delineating concepts to stand for blocks of raw data. At the same time, one is qualifying those concepts in terms of their properties and dimensions” (ibid., p.195). Analysis of key quotes guided the development of code, category, and subcategory labels. Open coding ends when categories are saturated, i.e., when no more new information can be added to categories. In this study, 12 major categories were developed: expressions of creativity; perception in creativity; creative process; creative habits; creative work environment; motivations; inspirations; influences; characteristics of creative results; individual and collaborative modes of working; and creativity contexts.

Open coding is followed by axial coding, which is the process of relating categories to their subcategories and testing their relationships against the data (Corbin & Strauss, 2008). Derived from the analysis, axial coding is presented as a diagram that identifies: 1) the core phenomenon of the creative process of generating creative insights; 2) the sources of creativity that yield creative insights; 3) the strategies or actions that stimulate creativity; 4) the contextual and intervening conditions that affect creativity; and 5) the attributes of the creative results as qualities ascribed to creative processes.

The final step is selective coding. It is the integrative process of selecting the core category, systematically relating it to other categories, validating those relationships by searching for confirming and disconfirming examples, and filling in categories that need further refinement and development (Corbin & Strauss, 2008). Alternatively, propositions or hypotheses may be specified to state predicted relationships. In this study, selective coding is represented through the narrative descriptions of the five elements identified earlier through axial coding.

Throughout the grounded theory process, analytic and self-reflective memos are generated in response to the process of open, axial, and selective coding. Analytic memos are related to the process of writing down questions, ideas, and speculations about the data and the emerging theory. Self-reflective memos are related to writing personal reactions to the narratives found in research data (documents, texts, other kinds of evidence). During the writing process, memos provide a firm base for reporting and reflecting upon on the research and its implications (Corbin & Strauss, 2008).

Results of Grounded Theory Analysis

Figure 1 presents the grounded theory model for the creative process phenomenon of generating creative insights, based on analysis of the data set. The model presents five interrelated elements that play important roles in the creative process. The five elements include sources of creativity that yield creative insights, strategies that instigate creativity, influential factors that drive creativity, individual and collaborative modes of working, and characteristic qualities of creative results.

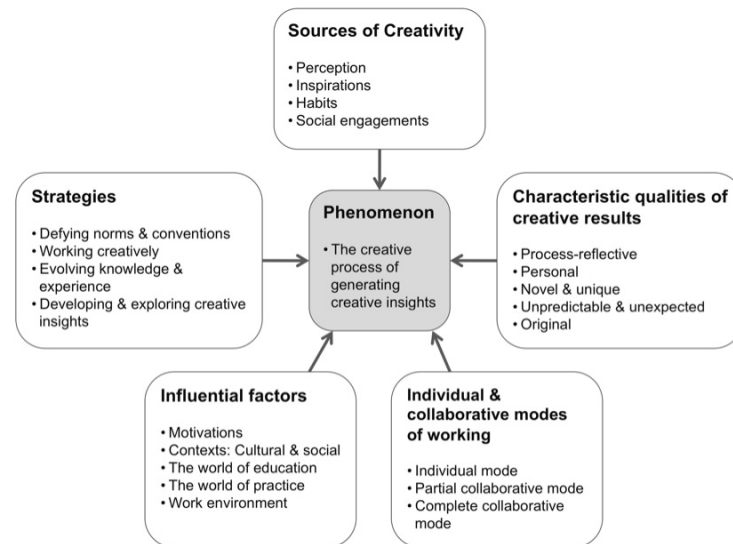


Figure 1. Five influential elements of creativity in art, architecture, and design creative processes derived from grounded theory analysis

The creative process phenomenon of generating creative insights

There is a general consensus among the creative individuals about what characterizes and constitutes a creative process. In general, the creative process is characterized as open ended, where anything is possible, and organic and non-linear, in which the process is not precisely planned and does not follow any pre-existing path. Creative process is perceived to be unpredictable where insights can emerge unexpectedly through mistakes or what Ilana Goor, a multi-media artist, calls “happy accidents.” Dale Chihuly, a glass sculptor, considers accidents to play an important role in his creative process. He reports: “What may start as an accident sometimes becomes a valuable exercise and, by trying it over and over, can turn into something that you can control. So you might say that a lot of our work is the result of sort of controlled accidents” (Chihuly quoted in Meyers & Gerstman, 2007, p.38). This kind of work requires not only the ability to have a prepared mind to “see” or recognize the precursors of insights, but also the ability to choose what is important and worth pursuing as well as the ability to take risks.

The creative process is also perceived as a gradually evolving process where insights at the beginning of the process are not pre-conceptualized but rather emerge and constantly evolve – and are sometimes transformed into something completely different towards the end of process. This is expressed in relation to the process of iterations and reiterations with constant editing and refinement that requires lateral thinking, open mindedness, and flexibility for adapting to constant changes. Chuck Close, a painter, explains: “As I move along, I may do something that is wrong before it is right. Then I say to myself, ‘Well, what do I need to do to move it closer to what I want?’... I put some color down, do something to it, and if I don’t like those colors, I put in some other colors so my paintings gradually evolve to what I want... This is a very different thought process than conceptualizing something and then just executing it” (Close quoted in Meyers & Gerstman, 2007, p.140).

Sources of creativity that yield creative insights

Four sources of creative insights emerged from the data as major categories. These categories are perception, inspiration, habits, and the social engagement. In *perception*, creativity is conceived through the ability for the creative person to see, literally, more

than what others see and the ability to perceive problems, challenges, projects, reality, and future, among others, differently than other people. These abilities are derived from the creative individual's cognitive capacity to break out of the habitual and preconceived ways of thinking, to see patterns of potential opportunity across many disparate things, to visualize a future by bridging gaps between different things that are unrelated, and to imagine and envision something new that is beyond the given for a particular project.

Other accounts for having different perceptions are related to the sudden acquisition of insights through new experiences of places or people. Daniel Libeskind, an architect, reports: "It was that instant encounter with the physical wall (of Ground Zero), with the sky, close to the bedrock, close to the space where thousands had died, and I saw the world in a different way" (Libeskind quoted in Meyers & Gerstman, 2007, p.52). Libeskind also comments: "It is often that I meet people by accident, or by chance, who give me a new way of seeing the world" (Ibid., p.51).

Inspiration is found to be another source for creative insights. Creative ideas, concepts, visions, and solutions are oftentimes stimulated as a consequence of either changing one's perception in response to experiences or meeting people – as mentioned above – or receiving new information from sources of inspiration. Three sources of inspiration are expressed by creative individuals in the data set. The first source is *process driven* where insights are surfaced through the incidents of mistakes and accidents. These incidents usually result through experimentations; drawing and prototyping; working with others; and from what annoys and what does not work during the process. The second source is *project specific* where insights are inspired through the discovery of a current project's sets of signs that are found, for example, in an architectural site or product constraints. Creative insights are also inspired by the knowledge and experiences gained from previous projects on which one worked or from successful precedential projects developed by other designers and artist.

The third source of inspiration is realized through the *direct encounter with the world*. This includes what creative individuals see or experience by coincidence such as objects, light, people's names; what they experience in their profession such as buildings, spaces, and products; what they engage with themselves, such as art galleries, music, reading a poem; and also what they experience through travel. Thom Mayne, a creative leader at Morphosis, remarks: "Traveling became a continual source of insight... there have been so many important moments for me... visiting the Mayan structures at Chitzen Itza and Coba... La Tourette... the densely layered spaces of the Saone House in London... this is the first time I had ever experienced architecture through smell and sound prior to vision" (Mayne quoted in Funtagawa, 2002, p.400).

The third source of creative insights is found to be originated through different *habits*. Ideas, concepts, visions, and solutions that sometimes emerge through the habit of externalizing ideas and first creative impulses through either intensive project-specific sketching at early stages of a process or through routine drawing such as the architect Steven Holl's one-hour morning paintings; open-ended drawing of ideas and observations from real-life experiences and thoughts, or from imagination. Chris Bangle, a creative leader at BMW, gives an example: "Like any designer, I take notes on what I see and think and make a lot of drawings. I fill my sketchbooks on what I see in life, what I think of and what I hear. I often sketch an idea that I think relates to something important at the moment and then I go back into the sketchbooks to refresh myself years later" (Bangle quoted in Meyers & Gerstman, 2007, p.168). These paintings, drawings and sketches are all considered second-memory banks of insights as well as references for future projects.

Other insights are developed through the habit of regular involvement and immersion in different creative cultures such as visiting art museums and galleries; attending concerts, theatrical performances, public lectures, and conferences; and experiencing buildings, spaces, and products. Other habits include collecting things of interest, being curious by reading about everything, and keeping busy with work as well as escaping time from work to do different things such as speculating, traveling, and meditating.

The fourth source of creative insights is rooted in the *social engagement* with other people. Different types of people reported as sources of insights. These are creative individuals admired by the artists, architects, designers and leaders of creative organizations who are influenced by throughout their careers; people they work collaboratively with whether in their own work environment or work environments of others; people they design for, such as clients and end-users; people they leisurely hang out with such as artists, musicians, and writers; and other people randomly encountered from life.

Strategies that instigate creativity

The phenomenon of the creative process of generating creative insights is explored here in relation to the strategies that the creative individuals developed to instigate creativity. Four core strategies were identified: 1) defying norms and conventions; 2) working creatively; 3) evolving knowledge and experience; and 4) developing and exploring creative insights.

Defying norms and conventions consists of three groups of strategies. The first group involves following and searching for new paths. Creative individuals expressed the importance of stepping beyond existing boundaries and rules to develop their own creative paths, alternatively defined as a different track of thinking and approaching problems and challenges marked by unconventionality that distinguishes the creative individual from others. One of their strategies includes not imitating others and staying away from influences that could blind the mind from thinking differently. Close explains: "The people who have been the biggest influence on me have contaminated my work, have contaminated my life and they have been hard to purge. When you love something, you want to incorporate it into your work. But then it's not your work – it's that other person's work" (Close quoted in Meyers & Gerstman, 2007, p.137).

The second group of strategies is focused on challenging perception. Having the ability to be creative by "seeing" things differently involves the ability to break out or escape from the habitual or preconceived ways of thinking and working to discover things that are not apparent; and the ability to have a "prepared mind" to recognize and take advantage of accidents as they often lead to new insights. Perceiving differently also involves an ability for "visualizing a future that others don't see." Nandan Nilekani, a creative leader at Infosys, continues to elaborate: "In business, success comes when you see something – you see a pattern, and maybe you look at different things that are not really related – and when you look across those things you suddenly see a kernel of an idea" (Nilekani quoted in Meyers & Gerstman, 2007, p.55).

The last group of strategies under the core strategy of defying norms and conventions are related to having the courage to do what others normally avoid doing. These strategies involve audacity for taking risks; making mistakes; working with new, unconventional, or unfamiliar things; discarding used-up ideas even after spending a lot of time on them; and breaking rules. Strategies for dealing with rules include reinterpreting, ignoring, challenging, moving around, and not learning rules. For,

example, in design creative processes, some individuals break the rules first to free their minds from conventionality, to discover new ways for approaching a challenge, and to find a creative insight; and then, they solve pragmatic problems later.

Strategies for *working creatively* represent the second core strategies that emerged from data analysis and they consist of two groups of strategies. The first group is related to the general means of approaching creativity in design practice. These strategies include combing and finding a balance between instinct and logic; experimentation and practice; and inspiration and pragmatics. They also include developing universal codes and guiding questions, those which help stimulate creativity without controlling the creative process, such as asking open-ended questions to locate the problem and asking questions nobody else can answer to generate a problem rather than to solve it. Other strategies also include taking time off from work allowing for incubation. Libeskind comments: "It's not a time of escapism, but a time that I use to create buildings – which I do when delving into a poem, doing some music, walking on a street or just lying under a tree" (Libeskind quoted in Meyers & Gerstman, 2007, p.55).

The second group of strategies, however, involves specific strategies for working creatively with others. These strategies include forming teams with individuals that complement each other with balance in talents, skills, and in some cases gender; assembling interdisciplinary incubation teams that work well together; forming committees of creative peers that help teams with feedback on work in progress; and forming daily review sessions where everyone can share their work and comments and feedback on others in a positive way. Ed Catmull, a creative leader at Pixar, describes some benefits for the daily reviews: "Showing unfinished work each day liberates people to take risks and try new things because it doesn't have to be perfect the first time" (Catmull, 2008, p.70).

The third core strategy is focused on *evolving one's knowledge and experience*. Domain-specific as well as other types of knowledge and experience are found to play an important role in creativity. Across all creative individuals; some strategies include learning from bad work; immersing oneself in the field to gain up-to-date knowledge; learning through the bodily experience with buildings, spaces, products, music, and art, among others; and exposing oneself to different cultures, societies, and domains through travel and forming relationships with others such as artists, designers, and musicians. Some creative leaders such as Mayne from Morphosis and Catmull from Pixar stress the importance of maintaining strong academic contact for many reasons including staying close to innovations happening in academic research communities and attracting exceptional talents.

Strategies for *developing and exploring creative insights* constitute the fourth set of core strategies emerged from the grounded theory analysis. Some strategies for developing creative insights include working with initial gut ideas and other ideas generated through the different sources of creative insights. This includes, for example, ideas from the unconventional perception of "seeing" beyond the given; the habit of collecting interesting things and going to museums; the social engagement with artists, musicians, and co-workers; and the inspiration from an "angle of light that fell on a wall at a certain time of the day" (Libeskind quoted in Meyers & Gerstman, 2007, p.46).

Strategies for exploring with ideas, on the other hand, include testing and experimenting with the initial gut insights and selecting the ideal concept(s), idea(s), or solution(s) after developing a large number of alternatives. They also include discarding insights that do

not work or evolve into creative ones even at later stages of the process; exploring insights through iterations; and involving others in the process.

Influential factors that drive creativity

Three types of interrelated factors were identified from the data analysis to have influences on creativity. These factors are: motivation; the contexts of culture and society; the contexts of the world of education and world of practice; and the work environment. The three factors are discussed here in parallel, for their possible mutual influences.

Three types of motivations emerged: intrinsic, extrinsic, and a combination of both. Intrinsic motivations are considered as the inner drive of passion, desire, curiosity, joy, thrill, and excitement for creating new things, seeing things manifested, and “living the dream.” Extrinsic motivations include gaining confidence and support from others whether through public and private commissions, social acceptance, validations and acknowledgments, or success. The third type of motivations, however, emerges as the inner impulse and desire triggered by something in the culture or someone in society. This includes the pride and original contributions to the domain culture and society, the new experiences and positive influences on people’s lives, and the creation of value whether business or social.

The three motivational factors of creativity can be nurtured or diluted through the three contextual factors of culture, society, and the world of education and practice. Some contextual examples given by the creative individuals include market and business support or resistance, in some situations, to innovation; society’s conformity in schools, work, and the way of life; society’s misconception and lack of understanding of the importance of time and fund investments in creativity; and the social consensus among creative communities for innovation. From the context of education and practice, there is a common agreement among many creative artists, designers, and leaders that the cultural context peripheral to education is as important as education itself. Motivations in this context can be nurtured through the students’ exposure to different disciplines in and outside of school and the students’ involvement with design practice culture and society.

In the work environment, however, a supportive environment is considered one that prioritizes creativity over authority of precedents, encourages interdisciplinary and democratic engagement and collaboration with others, and inspires learning and exploration. In Pixar, for example, Catmull explains: “What we do is to construct an environment that nurtures trusting and respectful relationships and unleashes everyone’s creativity. If we get that right, the result is a vibrant community where talented people are loyal to one another and their collective work, everyone feels that they are part of something extraordinary, and their passion and accomplishments make the community a magnet for talented people coming out of schools or working at other places” (Catmull, 2008, p.66-67).

Individual and collaborative modes of working

Three types of modes of working emerged from the grounded theory data analysis: individual mode, partial collaborative mode, and completely collaborative mode. In general, working individually or collaboratively with others depends on several factors such as personal preference of whether collaboration can to be perceived as productive; the desired type of contribution whether it is for a task or idea contributions; and the nature of the process itself whether it requires one or several individuals. It is more

common for artists to work individually than designers. In some cases, working individually is perceived to be more productive, e.g., Goor comments that “[w]hen you’re with other people, it’s wasting time. It’s alright to talk and laugh and eat with them, but when you do something on your own you start really thinking and new ideas are developed” (Goor quoted in Meyers & Gerstman, 2007, p.210). For others, it does not make any sense to collaborate, for example, in taking photographs, painting, or sculpting except for collaborative type of projects and labor-related tasks and assistance.

In contrast to artists in general, designers tend to work more collaboratively with others. This collaboration, however, is partial for the majority of designers and the extent to which others are involved in the process varies. Most designers prefer working individually at the beginning of the process to focus and generate their own ideas through what they do best such as experimentation, sketching, and rapid prototyping and then involve others throughout the different stages of the process. Karim Rashid, an industrial designer, explains: “After the sketch stage, I sit with my senior staff, show them my sketches and tell them about my ideas. Then after listening to their opinions and their feelings about them, we edit them down to maybe five, six, or seven best ideas... Their [the interdisciplinary team’s] contributions include defining and refining my ideas, doing the computer aided drawings, handling the presentation renderings and a lot of other follow-up tasks” (Rashid quoted in Meyers & Gerstman, 2007, p.232). Other designers, on the hand, only collaborate with others at certain stages such as the initial idea generation and problem definition stage or when there are specific needs or goals to be accomplished at different stages.

In creative organizations like Pixar and BMW and for some designers, on the contrary, creativity is always produced through a completely collaborative mode of working. Roland Heiler, an industrial designer, contrasts himself from other solo designers: “As for myself, I’ve always been a team player. I’m not one of those designers who like to point to a product and say, ‘Hey, look what I’ve created’” (Heiler quoted in Meyers & Gerstman, 2007, p.118). The creative individual’s role in this mode of working, however, is shifted from being the individual sole creator to more of a creative leader. Some of the leader’s roles include bringing a fresh set of eyes to the team; providing the means for ideas to propagate and grow; building common understanding in the work place with a consistent design strategy and a clear vision; establishing clarity, accuracy, and coherence between designers and the others; and being sure to acknowledge the effort of everyone in the team.

Characteristic qualities of creative results

“Embedded in the work itself are indications of the process. You can see what colors are underneath and you can see what colors are on top... You see it unfiltered and untranslated, as decisions being made in front of your eyes” (Close quoted in Meyers & Gerstman, 2007, p.140). Close is reflecting on the qualities of his creative paintings. Process-reflectiveness emerges as one of the qualities of creative results that mirrors the creative process through which it is conceived. Other qualities are expressed as being individual or personal, in which the work reflects the unique thoughts and feelings of the creative individual; novel and unique, in which the work does not resemble anything that existed before; and unpredictable and unexpected, which reflect the expectations that drive the process. It includes the 'nuance of originality' as Rashid expresses it: “My agenda is that I need to do something original or I don’t sleep at night... Every project I work on must have some nuance of originality. The nuance could be that I find a new production method, or a new function, or a new material, or a new

book. But for me, there needs to be some level of originality” (Rashid reported in Meyers & Gerstman, 2007, p.229).

Conclusion

The phenomenon of the creative process of generating creative insights in art, architecture, and design was investigated in this study through grounded theory analysis of data set of published interviews with well-known creative individuals. The creative processes of eighteen creative individuals were examined in relation to the different elements that play influential roles in creativity. Through the systematic qualitative research methodology of grounded theory, five influential elements of the creative process were identified: sources of creativity, creativity-oriented strategies, contextual and intervening conditions, individual and collaborative modes of working, and the attributes of the creative results.

This initial study is part of the early phase of a doctoral inquiry on fostering creativity in design pedagogy and design practice. The findings from this analysis of the commentaries and reflections of well-known creative individuals in art, architecture and design, and creative organizations will be brought together with future studies to originate creativity-informed methods and strategies that foster creativity in design processes and design studio pedagogy. The grounded theory analysis contributes to the basis for discourse analysis regarding creative processes, that will be developed based on synthesis from the interdisciplinary literature on creativity. The discourse analysis framework will inform empirical research protocols and analysis to understand creative processes in design pedagogy as well as foster creativity.

References

- Amabile, T. (1996). *Creativity in context*. Boulder, Colorado: Westview Press.
- Basadur, M. (1995). Optimal ideation-evaluation ratios, *Creativity Research Journal*, 8, 63-75.
- Campbell D. T. (1960). Blind variation and selective retention in creative thought as in other knowledge processes, *Psychological Review*, 67, 380-400.
- Catmull, E. (2008). How Pixar fosters collective creativity, *Harvard Business Review*, 9, 64-72.
- Christiaans, H. H. C. M., & Venselaar, K. (2005). Creativity in design engineering and the role of knowledge: Modeling the expert, *International Journal of Technology & Design Education*, 15, 217-236.
- Corbin, J. & Strauss, A. (2008). *Basics of qualitative research: Grounded theory procedures and techniques* (3rd ed.). Newbury Park, CA: Sage.
- Demirkan, H. & Hasirci, D. (2009). Hidden dimensions of creativity elements in design process, *Creativity Research Journal*, 21(2-3), 294-301.
- Finke, R. A., Ward, R. A., & Smith, S. M., (1992). *Creative cognition: Theory, research, and applications*. Cambridge, MA: The MIT Press.
- Futagawa, Y. (2002). *Studio talk: Interview with 15 architects*. Shibuya-ku, Tokyo: A.D.A EDITA Tokyo Co., Ltd.

Houtz, J. C., Montgomery, C., Kirkpatrick, L., & Feldhusen, J. F. (1979). Relationships among measures of evaluation ability, creative thinking, and intelligence, *Contemporary Educational Psychology*, 4, 47-54.

Howard, T. J., Culley, S. J., & Dekoninck, E. (2008). Describing the creative design process by the integration of engineering design and cognitive psychology literature, *Design studies*, 29, 160-180.

Lindsey, B. (2001). *Digital Gehry: Material resistance digital construction*. Basel, Switzerland: Birkhauser.

Meyers, H., & Gerstman, R. (Eds.). (2007). *Creativity: Unconventional wisdom from 20 accomplished minds*. New York, NY: Palgrave Macmillan.

Munford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation, *Psychological Bulletin*, 103(1), 27-43.

Mumford, M. D., Baughman, W. A., Supinski, E. P., & Maher, M. A. (1996). Process-based measures of creative problem-solving skills: II. Information encoding, *Creativity Research Journal*, 9, 77-88.

Perkins, D. N. (1981). *The mind's best work*. Cambridge, MA: Harvard University Press.

Runco, M. A. (2004). Creativity, *Annual Review of Psychology*, 55, 657-687.

Runco, M. A., & Chand, I. (1995). Cognition and creativity, *Educational Psychology Review*, 7, 243-267.

Simonton, D. K. (1988). *Scientific genius: A psychology of science*. New York: Cambridge University Press.

Smith, G. J. W., & Carlsson, I. M. (1990). *The creative process: A functional model based on empirical studies from early childhood to middle age* (Psychological Issues, Monograph No. 57). Madison, CT: International University Press.

Ward, T. B. & Saunders, K. N. (2003). *Creativity*. Retrieved January 4, 2010 from <http://cogsci.uwaterloo.ca/courses/COGSCI600.2009/creativity.ward.2003.pdf>

Ward, T. B., Smith, S. M. & Vaid J. (Eds.) (1997). *Creative thought: An investigation of conceptual structures and processes*. Washington, DC: American Psychological Association.

Author Biography

Ahmad Fakhra

An architect and interior designer currently pursuing his Doctor of Philosophy in Design degree from the Institute of Design, Illinois Institute of Technology, Chicago, Ahmad Fakhra is a scholar employed by Kuwait University College for Women as a prospect interior design educator for the newly established Art & Design Department.

Judith Gregory, PhD

A member of the Design Research Faculty of the Institute of Design, Illinois Institute of Technology, Chicago, Judith Gregory is Faculty Co-Director of the Doctor of Philosophy in Design Program.