Journal of Fashion Technology & Textile Engineering

Research Article

Creation of Conceptual Fashion Design Process Model

Joe S AU* and Yu H AU

Abstract

In recent decades, the world of fashion and textile design has become increasingly close and reliant on one another. Fashion designers understand that the future of their profession lies to a great extent of the individual's ideas and meaning, not only depends on forms and materials. High-fashion has been referred to as "idea fashion", and idea makers have been labeled as "fashion conceptualists" whose work is epitomized by innovation and experimentation. Conceptual fashion design can also defined as a fashion help in "finding yourself, in presenting the authentic nature of your internal and external self. Not reflection on the observation and evaluation of others, but instead personal sensation and enjoyment, and fashion as a medium to achieve this.

Although designers have intrinsic talents that may not be bound by rigid rules, a systematic framework should be helpful to provide a more effective and efficient design process. The existing models of creative processes of other design disciplines to tend to illustrate the diversity of the process and provide a broad description of the design process, but no specific framework has been proposed for conceptual fashion design. As there is an obvious knowledge gap between the subjects of conceptual fashion design, this study seeks to identify the dimensions of creative success within this specific domain. A thorough understanding of the dimensions of creativity theories and, creative processes in different design disciplines will help to develop a rich background to the study of creative activities within the domain of conceptual fashion design. The present research attempts on 1) explore the identification of the innovative conceptual fashion design and its creative system, 2) develop a theoretical framework of design process that presents a series of creative actions and 3) develop a model of design process that is generic to both textile design and fashion design, by rationally integrating professional knowledge from different design domains into a systematic conceptual framework. Completed with regard to detailed investigation on design process of conceptual fashion design, these raise my interests on the investigation of the design process of developing conceptual fashion design and the creative thinking within the mind of conceptual designers. Finally, this study documented and tracked the emergence and development of conceptual fashion, exposing interdisciplinary practice at the edges of the fashion discipline.

Keywords

Conceptual fashion design; Conceptual design; Design process model; Fashion design process

*Corresponding author: Joe S AU, Associate Professor of the Institute of Textiles and Clothing at the Hong Kong Polytechnic University Room QT715, 7/F, Hunghom, Kowloon, Hong Kong. Tel: + (852) 2766-5529; Fax: (852) 2773-1432; E-mail: joe.au@polyu.edu.hk

Introduction

The past two decades see fashion and textile design increasingly reliant on one another. Some high-end designers react to the commercial focus of contemporary fashion, deviating from the traditional fashion cycles, seasonal restrictions, and market-led processes towards a more conceptual, experimental, and process-driven approach. This excellent collaboration of design work leads to the integration of design processes. A designer's job is prescriptive rather than descriptive. When scientists describe how the world is, designers suggest how it may be. All designers are "futurologists" to some extent [1]. Like the future, design can never be an end of itself. The design process becomes the way designers respond to this variable problem structure. A structured design process helps designers as markets become increasingly aggressive; companies' use of team formats for solving problems is increasing, and developing fashion products become more complex. Therefore, studying how controlling and varying these design processes is one of the most important skills a designer must develop. Models and theories of design process were proposed and studied by researchers in different design disciplines.

Torrance et al. [2] described design process as "one of becoming sensitive to or aware of problem…bringing together available information…searching for solutions…and communicating the results". Model of design process is system thinking in naming a particular approach to understanding and solving problems. It helps the designer in developing creative design thinking based on the building-up of ideas. The major fashion design models [3-5] were based on the theory of architecture and engineering design. The analytical framework was referred to Koberg et al. [6] for the elementary steps involved in the design process: analysis-synthesis-evaluation.

The Emergence of Conceptual Fashion Design

The past two decades see fashion and textile design increasingly reliant on one another. Today's fabrics, because of their way of production and applications, allow designers to have greater freedom to explore issues (for example, LED fabric) besides the conventional silhouette and style.

Fashion designers understand that the future of their profession lies to a great extent in the selection of fabrics. Advanced textile technology yields new aesthetics, tactile qualities and performance capabilities. Traditional crafts such as knitting, weaving, embroidery and intricate hand detailing are employed alongside sophisticated new treatments. High technology coating, laser-cutting, the latest microfiber fabrics, shape memory alloys and technical clothes are appropriated from industrial applications. Against this background, textile's engagement with innovative fashion design is surprising and yet the hybrid forms generate revolutionary results.

Increasing attention has been given to the revolutionary conceptual design in fashion industry. A number of influential designers had stepped out of the commercial side of fashion in reaction to the need for constant renewal. Those designers are characterized as Fashion Conceptualists. They embrace an innovative approach to fashion in keeping with their personal philosophies and approaches. Their "cultural shift, exploration and cross over"

approaches marked the growing acceptance of fashion as conceptually and culturally significant practice. These fashion conceptualists insist on a holistic approach to their collections, and this includes a key role in originating and overseeing the development of radically novel fabrics and fabric sculptures. Those collaborations leave an exciting mark on both fashion and textile practice. The collections showcase the integration of innovative fabrics and impeccable craft. Designers such as Hussein Chayalan, Issey Miyake, Zandra Rhodes, Dries van Noten, John Galliano and Vivienne Tam are characterized by this fashion dualism.

There is a rising attention of conceptual fashion design in the industry. However, the design process of developing conceptual design remains a mystery. The distinction between garment designers and fabric designers becomes blurred when one examines the activities of 'fashion conceptualists' and 'high-fashion' designers. There are few publications found in both academic and industrial fields which describe the phenomenon of creative design dualism and its integrative design process.

Design Process Reviewed

Creativity is a highly complex context [7,8]. Designers are always challenged by complicated thoughts during their creative process. Researchers and theorists devoted their effort to understand the subject of creativity. Models and theories of design process were proposed and studied by researchers in different design disciplines.

Model of design process is system thinking in naming a particular approach to understanding and solving problems. It helps the designer in developing creative design thinking based on the building-up of ideas.

Many fields such as education, psychology and philosophy use design processes to help develop creative thinking [9]. The major fashion design models [3-5] were based on the theory of architecture and engineering design. The analytical framework was referred to Koberg et al. [6] for the elementary steps involved in the design process: analysis-synthesis-evaluation.

Although the design process models which designers followed were similar and based on the similar concepts. Design processes maybe varied with respect to different factors and stages. The focus on each process also varies according to the design field, such as architecture design, industrial product design and fashion design. This study examines various stages within each design process and sorts them according to their commonalties and applies them to the proposed theoretical framework.

Design Process in Different Field of Design

As postulated by Belliver et al. [10] in his early writings on creativity, the concept of 'inspiration' or 'creative incubation' fore-fronted the important role of the subconscious in the stages of creative thinking, particularly when solving mathematical or scientific problems. Articulated by Bono et al. [11] in his encouragement of techniques of lateral thinking, Koestler et al. [12] posited creativity as a universal faculty, not restricted to special individuals, whereas theoretical physicist David Bohm et al. [13] positioned creativity within the quantum sphere, therefore attempting to reconcile the fundamental basis of both artistic and scientific creativity. Creative people are more open to incoming stimuli from the surrounding environment, and as a result are more receptive to new possibilities [14].

The various concepts of creativity such as rule-breaking, innovative juxtaposition and the four-stage process model of individual creativity (preparation, incubation, illumination and verification based on Poincare by Wallas et al. [15] form a useful background for this study into the creative processes of conceptual fashion designers who often involve several collaborators from different disciplines.

Gardner et al. [16] highlighted the problems related to creative process models build-ups. He identified five different types of creative activity which should be addressed to the construction of a creative process model [16]:

1) The solution to a well-defined problem;

2) Devising an encompassing theory;

3) The creation of a frozen work;

4) The performance of a ritualised work;

5) A high-stake performance.

Gardner et al. [16] argued that the items number 1 and 2 replicate the type of research process connected with scientific actions. The items number 3 and 4 are associated with artistic performance. And the last item indicates activities within a specific area.

Kneller et al. [17] indicated that the generation of ideas in each of these areas is based on a four-stage process of preparation, incubation, illumination and verification:

Preparation

In this stage, creative individuals have a capability to recognize the correct questions instead of the correct answers. The early proposal of problem-solving could cause a series of problem standoff instead.

Incubation

The second stage indicates a period when the creative individual seems to depart from the problem. He/She works on problem-solving at a subconscious level. This rest period may make available a chance to refresh the mind and expose it to other stimulations.

Illumination

The third stage typifies a fresh way of looking at a known problem or phenomenon in such a way that its essential features are grasped.

Verification

The fourth stage is produced as part of the creative process must be identified as useful.

Designers are always challenged by their limitless yet complicated thoughts and ideas during creative thinking and design processes. Inherent limitations of real situations of design and production further complicate their directions. A controlled design process is advantageous because it confines the complexities of design nature and thereby achieves optimum performance [18].

Literature on the creative process of design has mostly been confined to studies within disciplines such as product design and architecture design [19]. Design researchers have explored the process of design throughout history [20-30]. The models discussed in this study were selected because of their historical significance from different design disciplines (architecture design, engineering design and industrial product design, quality management and fashion design) and their continuously expanding framework of short

mnemonic devices, such as the 4Ds (define, design, develop, deploy), to elaborate schemes, such as Archer's 9-phase, "systematic methods of designers", which facilitate our understanding of the design process. And in recent years, Eckert et al. [31] and Worden et al. [32] have contributed to the design process debate in the contexts of fashion design and new media design respectively. A debate on a high commercial relevance to design innovation is a much sought-after commodity in the burgeoning 'creative industries'.

Fashion and Textile Design Process Model

The usefulness of applying a model of design processes to fashion and textile design has been explained and demonstrated by numerous educators [3,4]. Lamb et al. [4] advanced the development of a design process model in all types of apparel design. Their "Functional-Expressive-Aesthetic (FEA) Consumer Needs Model" incorporates stages of a design process model from the Koberg et al. [6], Hanks et al. [33] and Watkins et al. [3] models. Lamb et al. [4] provided a model of six steps for the creative process that includes 1) problem identification, 2) preliminary ideas, 3) design refinement, 4) prototype development, 5) evaluation and 6) implementation. Watkin's (1988) proposed a model of seven steps, adopted from Koberg et al. [6] as an essential tool to a successful design including the following stages: 1) accept, 2) analyze, 3) define, 4) ideate, 5) select, 6) implement and 7) evaluate. A variety of factors have been found to influence designers during the creative process and these must be understood in advance of proposing a model of design processes. Au et al. [34] outlined four major factors influencing Hong Kong fashion designers during the design process, including 1) aesthetic presence, 2) psychological satisfaction, 3) social attitude and 4) historical revival.

As shown above, the analytical framework of the creative process in fashion design is based on the concepts of 'analysis-synthesis-evaluation' developed in other fields of design. Besides the adoption from other fields, a variety of factors have been found to influence designers during the design process, such as historical, social, aesthetic, cultural, psychological, economical and technical [34,35].

Conceptual Fashion Design

There is an increasing number of fashion designers exploiting art, architecture, product and performance contexts as well as adopting conceptual-related and interdisciplinary methodologies in their production, which is illustrated in the works of designers such as Alexandar McQueen, Hussein Chalayan, Rei Kawakubo, Issey Miyake, Junya Watanabe and Vitor and Rolf. These designers have adopted a conceptual approach, and shown their works in galleries, and also non-traditional and emergent fashion spaces. They utilize a range of media and processes to communicate their ideas and continually extend their methodologies. These fashion conceptualists insist on a holistic approach to the design of their collections, which includes a key role in originating and monitoring the design concept, the development of radically innovative fabrics and its patterns and sculptures, and their method of communication with dramatic presentation. Besides the holistic approach to their design process, McRobbie et al. [36] has further explained the importance of creativity in the conceptual fashion design relative to "professional and managerial fashion design". McRobbie et al. [36] separated out discrete aspects of managerial, professional and conceptual fashion skills. Unlike 'professional and managerial' fashion, 'conceptual' fashion required 'inner qualities' such as creativity. She suspected that a commitment to notions of personal creativity gives young fashion

designers a utopian idea of "breaking down the distinction between dull work and enjoyable leisure" [36]. This new ideology of creativity enables fashion designers to break down "the distinction between dull work and enjoyable leisure" [36]. This explained the reason that most of the fashion conceptualists "see their work ideally as pieces to be hung on the wall, and more reluctantly as pieces of clothing" [36].

Methodology

The stratified random sampling technique was adopted in this study. This technique is used when the proportion of subgroups (strata) is known in the population and the selection is random yet from each of these strata. In this study, there were 2 groups of target sample populations involved. The first group included 50 fashion and textile design postgraduate students from the Institute of Textile and Clothing, The Hong Kong Polytechnic University. The age range of the respondents was from 22 to 45. They participated in the design process of their final-year project with 6 outfit collections. The second group included 50 competent designers with 2 to 15 years' (mean= 6.44) experience in the fashion industry. The age range of the respondents was from 23 to 50. They were entitled designers or assistant designers in their employed companies. A total of 100 respondents were invited to an in-depth interview, including 50 competent designers with 2 to 15 years' (mean = 6.44) experiences in fashion design and 50 fashion and textile design postgraduate students.

Data Transformation

In the first phase of analysis, the interview data were coded [37,38]. The coding process was designed to capture the relations identified with the design process of the students' final-year projects and the designers' collections. Hence, the turn-structured protocol data of the design discourse activities were coded in terms of the proposed design process model.

A statement was coded as ANALYSIS if it:

- Expressed a pre-determined design requirement or problem briefly, which was coded as 'ANALYSIS REQUIREMENT'

- Expressed a need, want or wish generated by the designers, which was coded as 'ANALYSIS GOAL'

- Expressed a concept directed to the designers' problem/requirement or goal, which was coded as 'ANALYSIS DIRECTION'

- Expressed influential factors generated by the external parties, which were coded as 'ANALYSIS INSPIRATION'

A statement was coded as SYNTHESIS if it:

- Suggested a possible or provisional design proposal in response to the brief, particular requirements, a problem or a goal, which was coded as a 'SYNTHESIS SOLUTION'

- Suggested a possible design collection without response to the proposed solution, which was coded as 'SYNTHESIS DESIGN'

- Suggested a possible design collection in response to the proposed solution, which was coded as 'SYNTHESIS DESIGN SOLUTION'

A statement was coded as EVALUATION if the outcome was:

- Negative – a problem arose from an evaluation in which a

solution was in conflict or inconsistent with an 'ANALYSIS', and then regenerated in the cycle of the design process

- Positive – if an agreement acknowledged a solution or design with a given 'ANALYSIS'

- Positive Repeat – an agreement same as 'Positive' to regenerate in the cycle of the design process for the next collection

Each reduced statement from the interviews was coded in categories/sub-categories: analysis requirement (AR), analysis goal (AG), analysis direction (AD), analysis inspiration (AI), synthesis solution (SS), synthesis design (SD), synthesis design via solution (SDS), evaluation negative repeat (ENR), evaluation positive (EP) or evaluation positive repeat (EPR). After coding the transcripts, the steps of the proposed theoretical framework were transcribed into a coding form.

Data Consolidation

Group I: Fashion and textile design postgraduate students

All predicted relationships of the students' design process were found in the data as follows:

- Analysis involving requirement (AR, 43% of all explicit statements)

- Analysis involving goal (AG, 90% of all explicit statements)

- Analysis involving direction (AD, 50% of all explicit statements)

- Analysis involving inspiration (AI, 92% of all explicit statements)

- Synthesis involving solution (SS, 94% of all explicit statements)

- Synthesis involving design (SD, 40% of all explicit statements)

- Synthesis involving design-related solution (SDS, 90% of all explicit statements)

- Evaluation yielding negative outcome and repeat (ENR, 96% of all explicit statements)

- Evaluation yielding positive outcome (EP, 60% of all explicit statements)

- Evaluation yielding positive outcome but repeat (EPR, 76% of all explicit statements)

'Goal' occurred more than 'requirement' (the number of outcome statements) in the analysis phase of the design process, showing that 'goal setting' was a dominant aspect of the postgraduate students' design process as compared with the requirement. Although there were more than 50% of utterances indicating that they had involved 'requirement' in their analysis processes, but 90% suggested that the postgraduate students paid more attention to setting up their 'goal' in the analysis phase of their design process.

There were half of the utterances indicating that they had involved 'direction' in the analysis phase of the design process, showing that the postgraduate students would consider setting up a direction for their collections, but didn't think 'direction' was a dominant aspect of their design processes. Instead, they believed that 'inspiration' was an important aspect which accounted for 93% of utterance agreements.

'Solution' and 'design' had similar roles in the design process. Above

90% of the respondents said that they had involved both solution and design in the synthesis phase of their design process, showing that the 'synthesis' phase was indispensable to the postgraduate students' design processes. Furthermore, the close percentages of 'solution' (94%) and 'design relates Solution' (90%) implied an inseparable relationship between them, which suggested that a design could only occur after the problem-solution, has been stated by the students.

'Evaluation negative' occurred more often than goals or solutions in the design process, showing that evaluation was not simply a judgement on whether a proposed solution was desirable. Instead, evaluation related a solution to the students' goals. The interrelationship between 'goal', 'solution' and 'evaluation negative' indicated that there was cyclical movement in the design process of the postgraduate students.

The negative and positive outcomes that emerged from evaluation were statements about the strengths or weaknesses of solutions in relation to the students' goals, comprising constraints which the students regarded as task progresses or self-challenges.

The data also indicated that the importance of 'goal', 'solution' and 'evaluation' in the conceptual design process of the postgraduate students. There were 90% of the statements coded as analysis goal (AG) and 95% as synthesis solution (SS), implying that it was important to generate solutions with reference to the individual goals in the design process of the postgraduate students.

The comparatively low percentage (40%) of the statement coded as 'design' in the stage of synthesis indicated that a design without solutions might not be the best outcome of *analysis*.

96% of the statements were coded as 'evaluation negative' and a surprising 75% coded as 'evaluation positive repeat ', which suggested that evaluation played a dominant role in exploring new solutions and designs for a number of reasons as follows:

- It produces outcomes that enable informed correction and further development to be made

- It produces outcomes that potentially connect multiple syntheses to a specific 'solution', thus building up evidence for newer solutions and designs

- Only through evaluation that designers are able to know whether and why a 'solution' is good or bad

Besides the explicit numbers above, the revision of the phase-based conceptual design process for the postgraduate students is shown in Figure 1.

Group II: Conceptual fashion designers

All predicted relationships of the conceptual fashion designers' design process were found in the data as follows:

- Analysis involving requirement (AR, 100% of all explicit statements)

- Analysis involving goal (AG, 96% of all explicit statements)

- Analysis involving direction (AD, 98% of all explicit statements)

- Analysis involving inspiration (AI, 98% of all explicit statements)

Figure 1: Conceptual design process for postgraduate students.
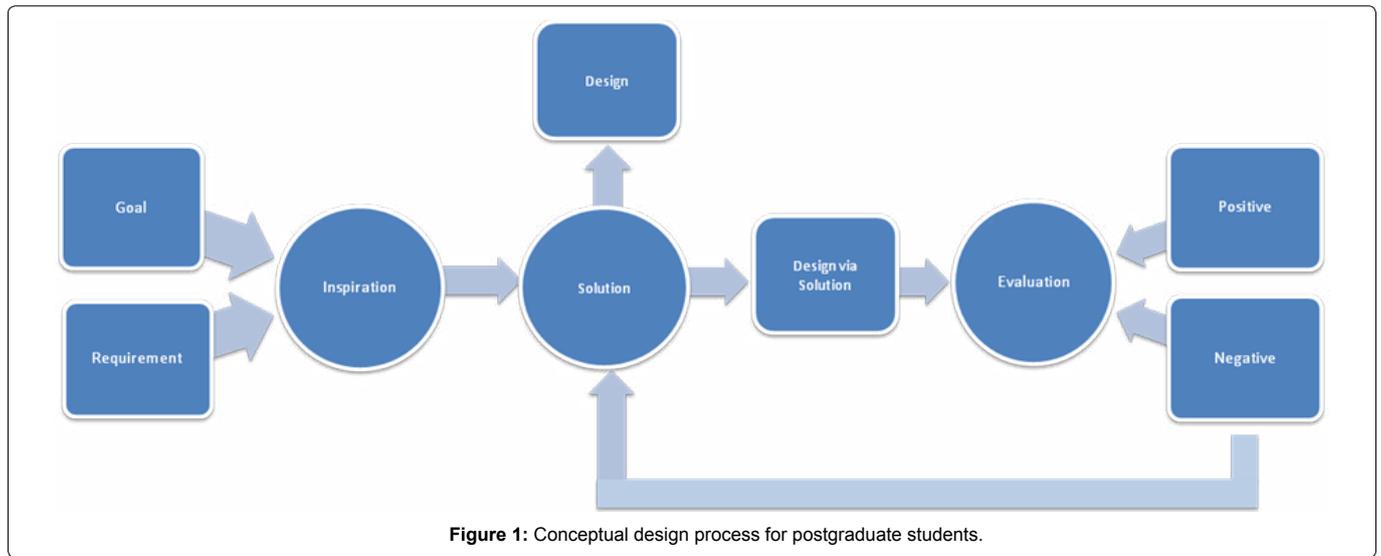
- Synthesis involving solution (SS, 100% of all explicit statements)

- Synthesis involving design (SD, 5% of all explicit statements)

- Synthesis involving design-related solution (SDS, 94% of all explicit statements)

- Evaluation yielding negative outcome and repeat (ENR, 96% of all explicit statements)

- Evaluation yielding positive outcome (EP, 60% of all explicit statements)

- Evaluation yielding positive outcome but repeat (EPR, 86% of all explicit statements)

The close percentages of "requirement, goal, direction and inspiration" indicated that these four sequential stages were highly related and played important roles in the analysis phase of the design process of the conceptual fashion designers.

However, 100% of the responses showed that 'requirement' was the most dominant aspect of the designers' design process in comparison with 'goal' setting. Although there were more than 96% of utterances indicating that the designers involved *'goal'* in their analysis process, 100% suggested that the designers gave priority to their project brief or requirement in the analysis phase of their design process.

'Direction' and *'inspiration'* accounted for 98% and 100% of the responses respectively, suggesting that they were highly significant aspects of the analysis process of the conceptual fashion designers. The designers reported that both direction and inspiration balanced out their endless creativity and business decisions. With theme and mood boards, the designers could know how much they could accomplish in each collection. The relatively low utterance number of "goal" suggested that the designers were more satisfied when fulfilling 'requirements' by their customers, companies or the market rather than their own needs.

Same as the results from the postgraduate students, *'solution'* and *'design'* had similar aspects of the design process. Above 90% of the respondents said that they had involved both solution and design in the synthesis phase of their design process, showing that the *'synthesis'*

phase was indispensable to the conceptual designers. Furthermore, the close percentages of *'solution'* (100%) and *'design via solution'* (94%) suggested an inseparable relationship between them. This also suggested that a design might only occur after the problem-solution has been stated by the designer. However, a relatively low percentage of 'design' (10%) showed that the designers would not generate designs without a proposed solution.

The data also indicated that the importance of 'requirement' and 'solution' in the conceptual design process. Since 100% of the utterances were coded as analysis requirement (AR) and synthesis solution (SS), the data suggested that it was an important process for the conceptual fashion designers to generate solutions with reference to the designer or company's requirements.

'Evaluation negative' was as important as *'requirement'*, *'inspiration'* and *'solution'* in the design process. *'Evaluation'* was not simply a judgement on whether a proposed solution was desirable. It also related '*Solution*' to the designers' '*Requirement*'. The interrelationship between *'requirement'*, *'inspiration'*, *'solution'* and *'evaluation negative'* indicated that there was cyclical movement in the design process of the conceptual fashion designers.

The negative and positive outcomes that emerged from evaluation were statements about the strengths or weaknesses of solutions in relation to the designers' *'requirement'*, comprising constraints which the designers regarded as task progresses or self-challenges.

The comparatively low percentage (10%) of the statement coded as '*design*' in the phase of *synthesis* indicated that a design without solutions might not be the best outcome of *analysis*.

100% of the statements coded as *'evaluation negative'* and a surprising 86% coded as *'evaluation positive repeat'* suggested that evaluation played a dominant role in exploring new solutions and designs for a number of reasons as follows:

- It produces outcomes that enable informed correction and further development to be made

- It produces outcomes that potentially connect multiple syntheses to a specific *'solution'*, thus building up evidence for newer solutions and designs

- Only through evaluation that designers are able to know whether and why a *'solution'* is good or bad

Besides the explicit numbers above, the revision of the activity-based conceptual design process for the conceptual fashion designers is shown in Figure 2.

Data Integration

This was the final stage where both quantitative and qualitative data were integrated into either a coherent whole or two separate sets (i.e. qualitative and quantitative) of coherent wholes. With the data collected and analyzed in the above sections, a systematic integration
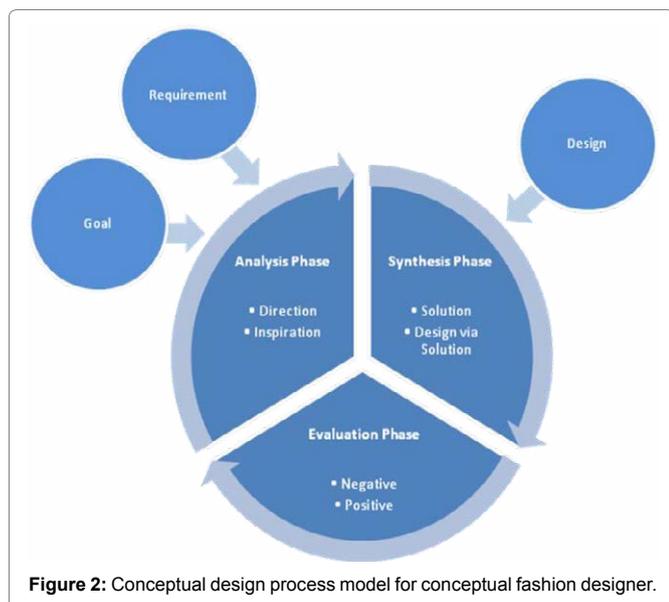

Figure 2: Conceptual design process model for conceptual fashion designer.

delivered a clear view of the design process of both the postgraduates and the conceptual fashion designers. The expansion of the archetypal three-phase process has transformed into a four-phase cyclical design process model in this section (Tables 1 and 2).

Conclusion

This study adopts Johnson et al. [39] mixed research process model and extends it into eight distinct steps, including 1) determining the research question, 2) determining whether a mixed design is appropriate, 3) selecting the mixed-method or mixed-model research design, 4) collecting the data, 5) analyzing the data, 6) interpreting the data, 7) legitimating the data and 8) drawing conclusions. The research data were collected and analyzed using Johnson and Onwuegbuzie's model for further integration and development of the conceptual fashion design process model.

Although some of the research findings supported the research conclusion from existing literature, but it was an initial study carried out a theoretical framework and developed a model of design process that is inclusively to conceptual fashion design. The contributions of this study raised from the findings were 1) demystified the identification of conceptual fashion design and its creative system, 2) the formation of theoretical framework of design process in conceptual fashion, and 3) the developments of model of design process that is generic to conceptual fashion design, by rationally integrated professional knowledge from different design domain into a systematic model.

The existing models of creative process of other design disciplines tend to illustrate the diversity of the process and provide a broad description of the design process, but no specific framework has been proposed for conceptual fashion design. The worlds of fashion and textile design have become increasingly close and reliant on one another. Today's fabrics, because of the way they are produced and the

Table 1: Information generated and the design process of post-graduate students.

Design Phase	Design Stage	Examples of information generated
Investigation Phase (Analysis)	Requirement	Self-fulfillment, school project, build-up portfolio, self-mission
	Direction	Design innovation, self-satisfaction, color orientation, design modification, material orientation, production orientation, quality orientation, customer orientation, market orientation & cost orientation
	Goal	Self-interested/satisfaction, overcome obstacles in past design, fulfill market trends; satisfy school project, new technology or materials, basic design, high quality design & cost minimization
	Inspiration	Designers' preference, lifestyle, fashion trends, social, cultural & historical, new technology, magazines and books, fashion show, brainstorming, exhibition & performance, music, past design style, photography, travel, architecture, multimedia, functional, religious & sports
Interaction Phase (Synthesis)	Pictorial	Collages, sketches, computer-aid applications, mood board, theme board, drawing, illustration, fabrication, free-hands
	Written	Historical study, idea-trees
	Memory	Childhood memories, slide-show, experience
	Expression	Individual attitude, emotion & feeling
	Verbal	Telling story
Development Phase (Synthesis)	Design	Silhouette, fabric texture, pattern arrangement, line balance, material composition, pattern balance, sizing & fitting, theme & mood board, structure/proportion, comfortability, environmental issue, quality, price consideration, functional, design with attention of details, usage of color, designer's attitude, emotion & feeling, shape, aesthetic & visual appeal of design, usage of material
Evaluation Phase (Evaluate)	Negative	Sizing & fitting/silhouette, fabric/material composition, model trial, color composition/arrangement, designer's attitude & preference, patterns composition/arrangement, repetition, professor's advices, comments & opinions, technical problems, details arrangement, brief assigned, aesthetic, innovative design, level of satisfaction, market trends, cost of design
	Positive	Model trials, garment performance, styling/accessorize, project requirement, professors/peers evaluation, experimental outcome, repeat evaluation, alteration, perfect color arrangement, perfect silhouette, perfect materials arrangement, perfect patterns placement & perfect sizing
	Positive Repeat	Design is a repeat process, overcome obstacles in next design, prolong design, prolong inspiration, improve existing design problems, start from fresh/new ideas

Table 2: Information generated and design process of conceptual fashion designers.

Design Phase	Design Stage	Examples of information generated
Investigation Phase (Analysis)	Requirement	Fulfill designer brief, balance of own style & customer needs, customer orders, high quality design, company's line plan, market needs, self-satisfaction & customer appreciation
	Direction	Design innovation, market orientation, customer orientation, cost orientation, quality orientation, design modification, material orientation & production orientation
	Goal	Satisfy company/customer requirement, company image establishment, design/maintain own style, design new styles, balance budget & time, high quality design, deliver message, fulfill market needs, cost minimization, improve the existing design problems, modification past design, basic design, fully utilize new materials, seek for new technology/material & fulfill self-interest
	Inspiration	Culture/social/history, designers' preference, lifestyle, movie/television/music, books/journal, nature/basic, travel, color/texture, environmental protection, architecture, performance/dancing/body movement, childhood memories, visual stimulation, internet, snap-shot/photography, religious, fine art, window display, politics/news, philosophy/theory, trends & past design
Interaction Phase (Synthesis)	Pictorial	Collage, sketches, mood board, theme board, fabrication, illustration, computer-aid application, drawing, prototype, sculpture, photographs
	Written	Line plan, writing
	Memory	Childhood memories, slide-show, experience
	Expression	Individual attitude, emotion & feeling
	Verbal	Telling story, meeting with departments
Development Phase (Synthesis)	Design	Silhouette, fabric texture, pattern arrangement, pattern balance, material composition, color arrangement, comfortable, sizing & fitting, shape & craftsmanship
Evaluation Phase (Evaluate)	Negative	Meet requirement/brief, sizing & fitting/silhouette, fabric/material composition, color composition/arrangement, patterns composition/arrangement, customer/department advices, comments & opinions. Model trials, quality, innovative design, level of satisfaction from customers, designer's attitude & preference, technical problems & details arrangement
	Positive	Customer/model trials, garment performance, styling/accessorize, meet brief/requirement, customer/department evaluation, experimental outcome, repeat evaluation, design details, perfect color arrangement, perfect silhouette, perfect materials arrangement, perfect patterns placement, perfect sizing
	Positive Repeat	Prolong from inspiration, cyclical design process, carryover season to season, prolong from solution, material & fabric repetition, prolong from goal

applications they are designed for, allow designers greater freedom to explore issues other than simply the conventions of silhouette and style. Fashion designers understand that the future of their profession lies to a great extent in the selection of fabrics. Advanced textile technology has yielded new aesthetics, tactile qualities and performance capabilities. Traditional crafts such as knitting, weaving, embroidery and intricate hand detailing are employed alongside sophisticated new treatments. High technology coatings, laser-cutting and the latest microfiber fabrics, shape memory alloys and technical clothes are all being appropriated from industrial applications. Against this background, textile's engagement with innovative fashion design is surprising and yet the hybrid forms that result are revolutionary. Not only the subject of fashion design and textile design has become more diverse, collaborative, and interdisciplinary, some high-end designers are further react against the commercial focus of contemporary fashion, moving away from the traditional fashion cycle, seasonal restrictions, and market-led processes towards a more conceptual, experimental, and process-driven approach. The work of designers such as Alexandar McQueen, Hussein Chalayan, Rei Kawakubo, Martin Margiela, Issey Miyake, Junya Watanabe and Vitor & Rolf have adopted a conceptual approach, and have shown their work within galleries, non-traditional and emergent fashion spaces. They utilize a range of media and processes to communicate their ideas and continually extend their methodologies.

There were limited literature and systematic models which describe the conceptual design process can be found in both academic and industrial fields. The significant models of design process in fashion and textile design were adopted from the fields of architecture design, industrial product design and engineer design. The process archetype continuously expanding framework from short mnemonic devices, such as the 4Ds (define, design, develop, deploy), to elaborate schemes, such as Archer's 9-phase, "systematic methods for designers" facilitates the understanding of design process.

It has been established from the consideration of the models studied that three primary cognitive processes are accessed: analysis, synthesis, evaluation. The "Analysis" phase produces the "Requirement, Goal, Direction and Inspiration" as the output of investigating and clarifying the key design issues and problems involved in attaining the goal in the task situation. This output then provides input for the "Synthesis" phase. The "Synthesis" phase processes the "Solution and Design" as output, but there is a continuous "Artwork and Prototype" cyclic process before "Solution" generates into "Design" and the "Evaluation" phase can produce an 'Outcome'. The 'Solution and Design' output is depicted as the input to the "Evaluation" phase. An evaluation is negative if the proposed solution conflicts or is inconsistent with a design requirement creating sub-problems or new problems. If the proposed solution is confirmed as consistent with a design requirement, the result of the evaluation is considered positive and will lead to the "Outcome" of the process. However, a negative outcome indicates that further work on the proposed solution is required.

References

1. Lawson B (2006) How designers think: The design process demystified. (4th edtn), Elsevier/Architectural, Burlington, US.

2. Torrance EP, Myers RE (1970) Creative learning and teaching. Dodd, Mead & Co., New York, US.

3. Watkins SM (1988) Using the design process to teach functional apparel design. Cloth Text Res J 7: 10-14.

4. Lamb JM, Kallal MJ (1992) A Conceptual framework for apparel design. Cloth Text Res J 10: 42-47.

5. Regan CL, Kincade DH, Shelden G (1998) Applicability of the engineering design process theory in the apparel design process. Cloth Text Res J 16: 36-46.

6. Koberg D, Bagnall J (1981) The universal traveller: A soft-systems approach to creativity, problem-solving and the process of reaching goals.

7. Mumford MD, Gustafson SB (1988) Creativity Syndrome: Integration, Application and Innovation.

8. Perkins DN (1988) The possibility of invention. In the nature of creativity (edited by R.J Sternberg). Cambridge University Press, New York, USA.

9. LaBat KL, Solkolowski SL (1999) A Three-stage Design Process Applied to An Industry-University Textile Product Design Project. Cloth Text Res J 17: 11-20.

10. Belliver A (1956) Henri Poincaré ou la vocation souveraine.

11. Bono E (1977) Teaching Thinking.

12. Koestler A (1975) The Act of Creation.

13. Bohm D (1998) On Creativity.

14. Carson S, Peterson J, Higgins D (2003) Decreased latent inhibition is associated with increased creative achievement in high functioning individuals. J Pers Soc Psychol 85L: 499-506.

15. Wallas G (1926) The Art of Thought. Harcourt Brace, New York.

16. Gardner H (1994) The creators' patterns. In dimensions of creativity, MIT Press, Cambridge, Massachusetts, USA.

17. Kneller GF (1966) The art and science of creativity. Holt Rinehart and Winsotn, San Francisco, California, USA.

18. Chapman WL, Bahill AT, Wymore AW (1992) Engineering Modelling and Design. CRC Press, Boca Raton, Florida.

19. Partridge D, Rowe J (1994) Computers and Creativity.

20. Archer LB (1984). Systematic methods for designers. in cross developments in design methodology, John Wiley & Sons Ltd., New York, USA.

21. De Groot AD (1969) Methodology: Foundations of inference and research in the behavioural sciences.

22. French MJ (1985) Conceptual design for engineers.

23. Kim SH (1990) Essence of creativity: A guide to tackling difficult problems. Oxford University Press, New York, US.

24. Lawson B (1990) How Designers Think (2nd edtn). Butterworth-Heinemann, London, UK.

25. Suh NP (1990) The principles of design. Oxford: University Press, New York, US.

26. Pugh S (1991) Total design: integrated methods for successful product engineering. Addison-Wesley Pub Co., Workingham, England.

27. Roozenburg NFM, Eekels J (1995) Product deisgn: Fundamentals and methods. Wiley, New York, US.

28. Ulrich KT, Eppinger SD (1995) Product design and development. McGraw-Hill, New York, US.

29. Cooper RG (1987) New products: What separates winners from losers? J Prod Innov Manag 4: 169-184.

30. Pahl G, Beitz W (1996) Engineering design: A systematic approach. Springer, London, New York.

31. Eckert C, Stacey M (2001) Designing in the context of fashion- designing the fashion context. Delft University Press, Delft, Netherlands.

32. Worden M (1994) Family Therapy Basics.

33. Hanks K, Belliston L, Edwards D (1977) Design Yourself! William Kaufmann Inc., Los Altos: California.

34. Au SCJ (2003) A Comparative analysis of contemporary european and japanese designers.

35. Stone E (1999) The Dynamics of Fashion. Fairchild Publications, New York.

36. McRobbie A (1998) British fashion design: Rag trade or image industry. Routledge, London, UK.

37. Cross N (1992) Research in design thinking. In research in design thinking.

38. Burns RB (1994) Introduction to research methods (2nd edtn). Longman House, Australia.

39. Johnson RB, Onwuegbuzie AJ (2004) Mixed Methods Research: A Research Paradigm Whose Time Has Come. Edu Res 33: 14-26.

Author Affiliations   Top

Institute of Textiles and Clothing at the Hong Kong Polytechnic University, Hong Kong