

## Improving Creative Design Skills -The Effects of Past Experience on Apparel Design Education-

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### Abstract

This study explores factors that influence the development of creative ideas among apparel design students. This research is to understand how past experience (especially in art and design), influences the development of creative ideas in apparel design. The interaction between two related elements of student experience and work process is explored. A design process model based on Wallas's (1926) creative problem-solving process and Koberg and Bagnall's (1974) design process was used in the context of a beginning-level apparel design course comprised of Korean and Chinese students at a university in Seoul, South Korea. The results show that students with past experience in art and/or design performed differently than inexperienced students when faced with the same stimulation. Significant differences were also observed between experienced and inexperienced students in the development of creative ideas.

**Key words:** Experiential learning, Education, Design process, Problem-solving, Creative design

### I. Introduction

Each new design situation is unique and requires the creative application of problem-solving strategies. Designers retain existing ideas and generate new ones by drawing on a wide range of sources; ideas can be triggered by thinking about existing garment lines or identifying new lines for development (Regan et al., 1998). Such ideas are often based on a designer's past experiences. However, even when such experience is extensive, the collection of ideas – a process that derives inspiration from travel, art, books, magazines, collections, and websites – can still improve creative development. According to Csikszentmihalyi (1998), creativity is a cultural and social experience that includes

education, family expectations, and sociocultural forces. Since the attention that design demands is also required for other mental processes, including remembering, thinking, and feeling, designers invent themselves by paying attention to their significant memories, thoughts, and emotions (Csikszentmihalyi, 1990). Therefore, familiarity with the effects of past experiences of students in art and design can help instructors to better understand their work, improve their design skills, and fulfil their needs.

Taylor (1997) suggests that in postmodern society, it has become increasingly difficult for both students and teachers to manage new ideas through accumulated knowledge and experience. Apparel design is no exception, since top international designers exhibit their work in relation to continual and persistent shifts in runway trends. For this reason, apparel design educators need to optimize creative learning activities in the classroom. Taylor further proposes that educators should select appropriate instructive activities to help

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students develop their ideas.

Experiential learning can be an effective approach for developing new and innovative ideas in the learning process. Wurdinger and Carlson (2010), Weil and McGill (1989), Hutchings and Wutzdorff (1988), Kraft and Sakofs (1985), Kolb (1983), Chickering (1977), and Keeton (1976) all highlight the significance of active learning methods. It is known that people use experience-based trial-and-error processes to refine and improve their ideas and practices (Wurdinger & Carlson, 2010).

Apparel design instructors have extensive experience in design research and practical design creation; their classroom lectures on creative idea development are grounded in their design experience with specific cases. Koberg and Bagnall (1981) use the term preliminary ideas to describe the idea-development stage of the design process. This stage can involve sketching, brainstorming, performing research, conducting surveys, and holding question-and-answer sessions (Lamb & Kallal, 1992).

To promote creative reasoning, design education should provide a robust and reflective model of design thought (Eastman et al., 2001). Strong creative design exercises promote the development of industrial activities that require creative skills; however, the academic teaching of design does not often encourage creativity through novel idea development (Finke et al., 1996). This study investigates the influence of experiences in art and design on the development of creative ideas in apparel design and the promotion of creativity in beginning-level classes of apparel design through a design process model derived from those of Wallas (1926) and Koberg and Bagnall (1974).

## II. Literature Review

### 1. Creativity and Experience

A creative idea is one that is new, surprising, and valuable. The term idea is a kind of shorthand. Even in art, a new idea is sometimes an 'idea' in the ordinary sense, but it need not be a method for producing artefacts (Boden, 2010). Design activity is linked to creativity in that it involves the generation and reali-

zation of new ideas, as well as problem solving (Wong & Siu, 2012). Koberg and Bagnall (1974) describe design and problem-solving processes as follows: "If you were to suddenly imagine a truly unique idea, you'd automatically become a minority of one" (p. 16). In practice, designers must discover or invent a particular subject – so-called quasi-subject matter – that exists tenuously within the problems related to specific circumstances (Margolin & Buchanan, 1996). Designers should therefore develop solutions based on skills, knowledge, and experience so as to optimize their flashes of inspiration (Navinchandra, 1991; Regan et al., 1998). Each new design situation is in some way unique, requiring the creative application of strategies for posing and resolving problems (Hargrove, 2012).

Creativity occurs in the interaction between the internal thoughts and external environments that make up a person's sociocultural context (Csikszentmihalyi, 1996; Pink, 2009). Pink (2009) suggests that concerned interaction is an internal biological motivation, while external motivation derives from environmental forces. The behaviours observed in Pink's research (2009) pose interesting questions regarding internal and external motivation, because of the attainment of significant knowledge and efficient performance. His work affirms that past experience as positive feedback can have an enhancing effect on motivation. In addition, Bourdieu (2001) discusses cultural capital as a sociological concept. Cultural capital refers to nonfinancial social attributes, such as education, intellect, manner of speech, style of dress, and physical appearance. Bourdieu's (2001) cultural capital acts as a social relation, wherein all goods – material and symbolic – are extended to environmental forces. For example, parents provide their children with cultural capital by transmitting the attitudes and knowledge needed to succeed in the educational system. Under such circumstances, students might be able to more easily express their latent feelings.

To clarify the relationship between creativity and experience, it is necessary to understand the importance of experience (Tan et al., 2013). Creativity involves the production of novelty, and this process can be highly enjoyable, as evidenced by respondent accounts of how creative activities make them feel (Csikszentmihalyi, 1996). Creativity is not determined by outside

factors but by individual agency; thus, private experience is a significant factor in creative thinking. Creativity is dependent on the total configuration of a person's characteristics and the features of the task at hand (Csikszentmihalyi, 1996). As such, creativity occupies a high level in the hierarchy of needs (Tan et al., 2013). The link between 'flow', which Csikszentmihalyi (1996) defines as focused motivation, and previous experience depends on the complexity of the flow-producing activity, that is, whether it leads to new challenges and, hence, personal and cultural growth. In practicing and learning processes, flow refers to single-minded immersion; it represents, perhaps, the ultimate experience in harnessing emotions. The emotions in flow are positive, energized, and aligned with the task at hand. In particular, an individual's 'optimal experience' can help to develop creative activities that promote the creation of novel designs and improve performance (Csikszentmihalyi, 1996). In addition, the past plays a significant role in the work of clothing designers. Thus, design work can be affected by personal experience with style because the designer selects features from the past that he or she likes and incorporates them into contemporary designs.

## **2. Learning Creativity and Gaining Experience in Apparel Design Classes**

Design is a complex activity that involves people with different backgrounds and experiences (Badke-Schaub et al., 2010). Clothing is an example of applied design: even the most exciting, original idea must consider its practical application (Mete, 2006). A framework for aesthetic integration emphasizes the ways in which new things are reconfigurations and extensions of familiar environments and actions (Suchman, 2002).

Kvashny (1982) showed that creativity training that uses exercises is more successful than training that only transmits information. Designers use research and observation to gather background information about design; however, they must remain open to different ways of finding inspiration. Fashion awareness should become second nature to every clothing designer (Mete, 2006). Lee (2009) notes that apparel design is a hub for creation; this is especially true of fashion

since it relates to the space surrounding human beings. Stone (2001) and Mete (2006) have suggested that fashion designers are inspired by abundant sources from the past, while Martin Margiela argues that fashion design involves inspiration combined with technical know-how (Loschek, 2009).

Design educators face unique challenges as they work to increase the creative performance of their students. There is a need to develop creative alternatives to the existing practices typically used in apparel design courses. If educators can understand the effects of students' valuable experiences, they can implement more effective methods for improving creative design skills. The innovative nature of design can serve as a basis for improving design education in a way that embraces creative thinking (Hargrove, 2008). Creativity is a complex phenomenon that should always be considered in academic design work. This paper aims, therefore, to enhance the achievements of beginning students in apparel design by developing a process to connect them with students who have different backgrounds in art and design.

## **3. A Conceptual Framework for Apparel Design practices**

The approaches to creativity research differ by design fields; thus, it is best understood by considering various perspectives. The creative research procedures and decision-making protocols proposed by designers are largely analytic, shaped by the determinacy that follows from specific circumstances (Margolin & Buchanan, 1996). Various studies have provided evidence for domain differences in the creative personality, product, process, and press (Milgram & Milgram, 1976; Plucker, 1998; Runco, 1986, 2004). Most apparel design process models (Lamb & Kallal, 1992; Watkins, 1988) are indirectly based on engineering design process models (Jones, 1963; Koberg & Bagnall, 1974) and are intended for industrial designers and senior-level design courses. The form of the preliminary model was derived from Wallas's (1926) four creative thinking stages (preparation, incubation, illumination, and verification) and Koberg and Bagnall's (1974) seven design process steps (accept, analyse, de-

fine, ideate, select, implement, and evaluate). However, beginner- and junior-level students have difficulty following high-level design processes. Such students need specific stages and repetitive practices to help them navigate the problem-solving process. Thus, we developed the “design process” model for beginner-level apparel design students who are in the initial stages of idea development (Table 1).

**1) Primary Ideas Driving/Preliminary Design Analysis in Pre-design Stage**

A challenging new experience can be effective in influencing a student's future work. Additionally, challenging students by giving them opportunities for creative thought allows them to explore design processes and determine which is the best (Wurdinger & Carlson,

2010). Primary idea driving included the research sources (e.g., books, art, collections, magazines, websites, surveys, gallery or museum visits) used in the early stages, before the actual design took place. Images from the sources were analysed through background knowledge and past experience. In Preliminary design analysis, students selected a non-clothing image as Stimulation 1 or 2 and developed designs through sketching, collaging, and modelling. Sketches, in particular, functioned as goal images, which represented mental images; in other words, they helped make design plans visible (Margolin & Buchanan, 1996). In the drawing process, students continuously observed the images and made changes through repetition, scaling, deletion, and motif shaping. In addition to sketching, this stage involved design solutions, such as brain-

**Table 1. Time table and design process composition**

Design Process	Pre-Design				Design Development				Design Evaluation
	Problem Acceptance	Primary Idea Driving	Preliminary Design Analysis		Refining Design	Compounded Design Development		Evaluation	
Schedule of Work	P1 1week	2week	3week	4week					
	P2 5week	6week	7week	8week	9week	10week	11week	12week	13week
Project 1	Intro	Stimulation1 Stimulation2		Interim Critic	Stimulation3				Final presentation
	L1	L2	L3	L4					
Project 2		L5	L6	L7	L8	L9	L10	L11	L12
Design Requirement		Research & Survey -visiting museums and art galleries -online art resources -magazines, art books -travles	-brainstorming -idea sketching :repetition, scaling, deletion, and motif shaping -collage :cutting, pleating, and attaching -modeling	Research & Communication -visiting museums and collections -online fashion resources -fashion magazines -apparel design books -brainstorming		-material drawing -collage -juxtaposition -demonstration			

L1: Lecture 1 ex) L2 and L3

Stimulation 1 and 2: factors from non-clothing

Stimulation 3: a factor from clothing on a figure

storming and communication.

Studies of the creative thought process suggest that it depends on the student's personality traits, including openness to new solutions, immersion in the problem at hand, dedication, creative motivation, a questioning attitude, and an analytical approach (Kowaltowski et al., 2010).

## **2) Refining Design/Compounded Design Development in the Design Development Stage**

According to Koberg and Bagnall (1974, 1981), synergistic thinking involves control over the brain's two hemispheres, which tend to process input differently. Koberg and Bagnall (1974) characterize the left hemisphere as the 'analytical/intellectual/thinker' side and the right as the 'synthetic/sensuous/behaviour' side. Understanding how these hemispheres work together can help students understand the nexus between their innovative thinking and their actions and feelings during the design process. This understanding can yield new ways to elicit creative ideas and gain awareness through experience, by which students can improve their design skills. In Design refinement, students researched work by other designers that was relevant to their preliminary ideas, from preliminary design analysis in the pre-design stage.

Apparel design is a complex behaviour that involves relating bodies and materials in motion. In Compounded design development, students redeveloped their ideas into new designs by scaling up and down, assimilating, and deconstructing. After adding apparel images on the human's body as Stimulation 3, the students developed other design sketches. Design solutions were used in this stage as well. This step is similar to preliminary design analysis (material drawing, collage, juxtaposition, demonstration, etc.).

In design, a form of problem solving, reasoning proceeds from an objective and functional assessment of means or decisions; here, creative methods are important to incite original and effective solutions. Jones (1963, 1970) emphasizes the importance of methods that facilitate the search for ideas in the design process, such as criticism and decision-making. The researched materials can provide an impetus that leads students toward innovation. These activities should intertwine with

traditional design, drafting, prototyping, and testing activities to provide a foundation for greater quality and originality by using compounded raw ideas (Kowaltowski et al., 2010). Creativity training that uses exercises is more successful than training that simply transmits information (Kvashny, 1982). Designers utilize research and observation to gather background information about design; however, they must remain open to different ways of finding inspiration.

## **III. Methods**

### **1. Participants**

This study applied the design process model in a thirteen-week, one-semester course offered to 34 students (27 Korean and 7 Chinese) in a design studio at a major university in Seoul, South Korea. The participants consisted of 27 women and 7 men between the ages of 19 and 23, with a mean age of 20.

The freshmen participants – all fashion design majors without apparel design experience (e.g., pattern-making or draping courses) – did not know how to make clothing and could not distinguish apparel design from other types of design. Thus, the materials used in the design process included both clothing and non-clothing objects. At the beginning of the course, all 34 students were required to describe their backgrounds in art and apparel design. Those with less than one year of relevant background experience were differentiated based on Bourdieu's (2001) notion of cultural capital (i.e., forms of knowledge, skills, education, and advantages). To understand the relationship of different backgrounds and positive experiences of the participants in art or design, one author interviewed each student for twenty minutes at the beginning of the semester. All participating students expressed affirmative sentiments about art and design and were passionate and proud of their courses of study. In particular, participants were required to answer questions about their contact with artistic or fashion environments over a period of at least one year. Fourteen students had previous experience in drawing, architecture, metal art, visual art, the operation of an apparel shop, the graduation from art high school, and a fam-

ily art environment. None of the other 20 students had any such experience, nor did any of them engage in long, special practices in art or design. We refer to these two groups as the experienced group and the inexperienced group respectively.

## 2. Procedure

This study applied the design process model in a thirteen-week course including 12 lectures (L1 to L12) and involved two projects (Table 1). The participating students received directions from their instructor during the process. After learning the proper methods for examining resources, students individually looked for stimuli. The instructors also provided stimuli, within the limitations of the research resources, to achieve the goals of the study, and students used either the same images or different images in each practice. The former images were those of stimulus Project 1 (weeks one to four) of the pre-design stage, and the latter images employed different stimuli during Project 2 (weeks five to thirteen) at the pre-design and design development stages for both groups. In both projects, the students used various research resources (e.g., books, collections, magazines, films, art, and websites) to develop ideas throughout the steps of the design process model. All participants searched these resources for stimuli to employ in their projects. The students explored their ideas by making new shapes through repetition, scaling, deletion, and motif shaping; they used various materials that involved drawing, cutting, pleating, and attaching.

Every week, the instructor posed new questions and offered directions to the participants regarding the design process, the whole of which was observed and investigated. On the final step of the design process model, this study examined the last outputs, which were drawings, to ensure equitability among all students.

## 3. Evaluation

The whole design process was observed by the Korean instructors with a focus on the design approach and strategies. The outcomes of the study were examined by 47 experienced judges to justify the use of the

design processes of Projects 1 and 2. The results these processes were the students' drawings, which they presented in their design classes. The data were verified using seven-point Likert scales. The judges were divided into groups that evaluated ten different objects from the students' outcomes. They did not receive any information about the objects, the work processes, or the students' backgrounds. After the evaluations, the data were arranged by group. In addition, seven of the 47 judges were interviewed about its results.

The judges evaluated the objects in three steps: interim critique (4 week) of Project 1, and an interim critique (8 week) and an evaluation (13 week) of Project 2. The judges received a definition of creativity, based on McPherson (1963) and O'Quin and Besemer (1989, 2006). 1) It states that an idea should clearly overcome specific difficulties, 2) that the amount of experimentation should be linked to the achievement of novelty, 3) that the product should be useful and forward-thinking, and 4) that the product should satisfy a previously unfulfilled desire. Eleven characteristics were determined through the three dimensions of the Creative Product Analysis Matrix (CPAM) (O'Quin & Besemer, 1989): novelty, resolution, and elaboration and synthesis. The judges were asked to rate the eleven subcategories of the CPAM on a seven-point Likert scale (1=not at all, 7=very much): original, surprising, germinal, valuable, logical, useful, organic, elegant, complex, understandable, and well-crafted (Dacey, 1988). All eleven criteria were evaluated for the final outcomes of Projects 1 and 2. Only the total score for each design was used, derived separately from each of the two projects (Cronbach's  $\alpha > .751$ ).

## 4. Analysis of Results

The results of the independent *t*-test showed significant differences in the acquisition of creative design skills between the experienced group and the inexperienced group ( $t=-4.22$ ,  $p<.001$ ). An analysis of the results of the first project, using the same stimuli as Stimulation 1, showed that the experienced group had higher scores than the inexperienced group (experienced:  $M=4.38$ ; inexperienced:  $M=4.04$ ), as shown in <Table 2>.

**Table 2. Results of independent t-test on project1 (same image)**

Perceived values	Mean	S.D.	df	t
	1 <sup>st</sup> P/Same image			
Inexperienced	4.04	0.34	92	-4.22***
Past-experienced	4.38	0.45		

\*\*\*p<.001

The judges noted that the inexperienced students modified the original image repeatedly, employing the same motifs or shapes in repeated patterns:

*“The design elements used the same details and were applied to the whole design. This makes the design dull. In particular, the overall composition did not include any interesting elements. This idea is boring.” (Student A) (Fig. 1).*

In contrast, the experienced students took complex details from the first picture and modified them by scaling up and down or mixing them with other shapes to create new images:

*“Too many ornaments make a design complicated; however, the overall design is harmonious. [...] The graphical frame is related to a unique silhouette and details; however, it is of no practical use. [...] The design elements are applied not only through details; [overall, the] design is creative and dynamic.” (Student B) (Fig. 1).*

*“This design has a peculiar shape in silhouette, and [it has] novel, delicate details. From a logical viewpoint, there is a high value of arrangement, related to partial pieces.*

*[...] Additionally, this student used a screw shape in the whole design, not only as an attached detail, which makes for a more dynamic and innovative design.”*

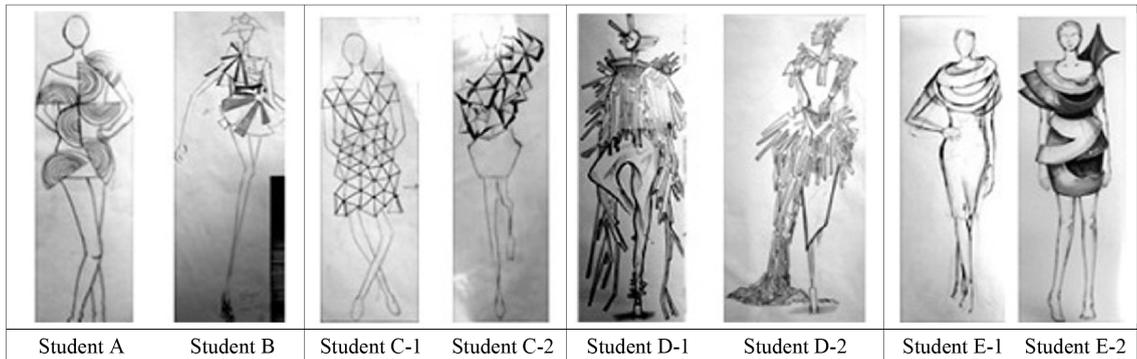
*“A better-crafted and more valuable design has been made through many variations of different patterns instead of the application of the same motif.”*

The final works of two students particularly illustrate the different perspectives of experience and inexperience and show how experience affected outcomes.

In the second test, the researchers observed the transfigurations of the students' work after adding apparel images to the mix. The students were required to use different non-clothing images (Stimulation 2), following the first step in the design process model (inexperienced: M=4.02; experienced: M=4.39, p<.001).

After Stimulation 2, the judges commented on the work of the inexperienced students as follows:

*“In general, the shape is not beautiful. It is merely a series of connected figures; thus, it needs to be developed more with other design elements. It is boring because of the lack of variation.”*



**Fig. 1. Students' outcomes.**

*“Triangle shapes are included in the clothing through the repetition of triangles with the same method. [...] This makes the completed clothing unattractive in my opinion.” (Student C-1) (Fig. 1).*

*“It merely repeats the same dull shapes [...] at various times. It might be improved with more enthralling design elements since the silhouette and the construction of the shape are not novel and simply boring.”*

*“I don't have any idea how this design relates to actual clothing. It should be supplied with more specific design elements and ideas.”*

The judges commented on the work of the experienced students as follows:

*“The idea is fascinating but monotonous as well. [...] This is fun because of the contrast between material and volume; however, the separated top and bottom make it unexciting. [...] What a creative top design! It has many unique details. There are too many details [...] it makes too heavy an impression, particularly at the top of the design, which hides other attractive details of the design.” (Student D-1) (Fig. 1).*

*“The shapes and silhouettes are not new and are really boring; [...] a change in fabric selection will create a totally different result.”*

*“This design has interesting shoulders with a kind of tube motif [...] despite being a bit plain. Moreover, a tube-shaped shoulder is not the most suitable aspect of the main piece.” (Student E-1) (Fig. 1).*

Some judges identified positive aspects in the same designs as well:

*“A creative top design with characteristic details is matched with simple pants, creating a chic and refined style.” (Student D-1) (Fig. 1).*

*“This design is absolutely new and novel. I have never seen it anywhere else; it has real individuality and is remarkable in its use of the branch shape. What a useful design this is!”*

For the specific examination of experience and practice, the researchers conducted a series of paired *t*-tests. There were significant differences between experience

and practice (inexperienced:  $t=-6.57, p<.001$ ; experienced:  $t=-14.46, p<.001$ ). All outcomes of the design development stage were higher than those of the pre-design stage in Project 2 (inexperienced:  $M=4.02$  to  $M=4.59, p<.001$ ; experienced:  $M=4.39$  to  $M=5.39, p<.001$ ). <Table 3> shows that design practice via the design process model for beginners improved the students' creative design skills. This means that the students successfully used the design process.

The judges described the final outputs of the inexperienced students as follows:

*“These designs make good use of the design elements. There is interest and balance; for instance, the top is asymmetrical and the bottom is structural. The elegance and feminine nature of the design make for a tense atmosphere. The origami technique is well used.” (Student C-2) (Fig. 1).*

*“This unbalanced design is distinctive and new, making it more beautiful. The use of triangle shapes in the whole garment is interesting and creates harmony in the design. The use of a diagonal line in the triangle shapes, extending to the all-over silhouette, is an advanced technique. This design also effectively pairs a complex top design with a simple bottom design. [...] The origami effect is a significant part of the design, giving it rhythm and elegance.”*

The work of the experienced students was described as follows:

*“It is so inventive and creates unexpected excitement. The asymmetrical design has a chic and balanced beauty with a sense of flow. The silhouette is focused on the human bodyline, and the design is sensual and has strong characteristics.”*

*“It is a glamorous and extraordinary design; the skirt in particular has unique details and an unusual silhouette. Understandable details and overall unification are arranged properly (Student D-2) (Fig. 1). [...] Different sizes and shapes among the various design elements make for a more attractive design, with a sort of sharp-pointed shoulder. Extraordinary design elements improve the creative and innovative aspects of the apparel.” (Student E-2) (Fig. 1).*

*“The emphasized bodyline has a voluptuous beauty in the design silhouette, which relates to its intense details and generally polished, elegant style, as well as the beauty*

**Table 3. Results of paired t-test on project 2 (different images)**

Perceived values	Mean		Mean difference	S.D.	df	t
	1 <sup>st</sup> P	2 <sup>nd</sup> P				
Inexperienced	4.02	4.59	-0.57	0.60	46	-6.57***
Past-experienced	4.39	5.39	-1.01	0.68	93	-14.46***

\*\*\* $p < .001$

of balance.”

“This design would be better and more effective if it used more various materials in the actual clothing. Such an excellent job!”

After Stimulation 3 was applied to the design, the judges observed improvements in usefulness and functionality, especially in the areas of construction, silhouette, human body shape, and movement. <Table 3> shows the importance of past experience for creativity and practice. From the pre-design stage with Stimulation 2 to the design development stage with Stimulation 3, the experienced group was enhanced by a factor of 1.01; however, the inexperienced group only grew by a factor of 0.57, as shown in <Table 3>. These results indicate that student experience was as important as their improved creative design skills. The achievements of the students with experience were greater than those of the inexperienced students via the compound stimulation of the design process model.

#### IV. Discussion

As Stone (2001) and Mete (2006) suggest, fashion designers are inspired by abundant sources from the past. Relatedly, Martin Margiela argues that fashion design involves a combination of inspiration and technical know-how (Loschek, 2009). Regardless of a designer's experience or knowledge, each new design situation is in some way unique and requires the creative application of problem-solving strategies (Hargrove, 2008).

This study has shown that experience can stimulate a designer's inspiration and influence his or her output. In particular, student design skills were improved through both various ideas and research and design practices. Moreover, each student's prior design-rela-

ted experience was shown to elevate his or her skills. Such experience was the most significant factor in the improvement of design results. Thus, in everyday experience, we can obtain more creative activity in the space between action and awareness when an experience is enjoyable (Csikszentmihalyi, 1996). Single-mindedness is necessary to arrive at clear goals and to receive constant feedback. Thus, people are often motivated by the enjoyment that comes from confronting challenges, which helps them discover new ways of being or feeling.

The interactive results of the two projects demonstrated the effectiveness of the design process model. Moreover, by supplementing an established idea with new images, students were able to explore the unknown in their designs. They were thereby encouraged to excel, and their work improved more than it would have without such stimulation.

Design educators face unique challenges as they work to increase the creative performance of their students. This discussion also supports Hargrove's (2008) finding that positive displays on the part of educators can be related to problem-solving practices, depending on student design backgrounds.

There is a need to develop creative alternatives to the existing practices typically used in apparel design courses. If educators are able to understand the effects of valuable student experiences, they can implement methods for improving creative design skills that are more effective. In addition, the findings indicate the critical role of design education in improving creative design skills. They also suggest that the incorporation of an art class into the apparel design curriculum prior to any actual design of apparel helps students at the beginner level to develop their design skills effectively. This suggests that research on creative cognition can lead to the development of new, effective techniques

to instruct students in enhanced creative thinking.

## V. Conclusions

Design is a complex activity that involves people with different backgrounds and experiences (Badke-Schaub et al., 2010). Clothing is an example of applied design: Even the most exciting, original idea must consider its practical application (Mete, 2006). Apparel design is a hub for creation; this is especially true of fashion, since it relates to the space surrounding human beings (Lee, 2009). This study identified the positive impact of previous design experience on the work of beginning design students. The problem-solving process model, developed by analysing Wallas's (1926) and Koeborg and Bagnall's (1974) design processes, was used in two projects of the apparel design studio. A framework for aesthetic integration emphasized the ways in which new things are reconfigurations and extensions of familiar environments and actions (Suchman, 2002). The interactive results of the two projects demonstrated the effectiveness of the design process; however, prior experience was found to be the most significant factor in improving results. Moreover, student design skills were improved with the aid of multiple ideas and research and design practices. Feedback was provided to students in the form of teacher critiques. It served as a guide to help the students improve their skills.

In both projects, the work of the experienced students contained more complicated images than that of the inexperienced students. This suggests that experience, especially in art and design, helps design students improve their creations. These results support the findings of other studies on the correlation between creativity and experience (Csikszentmihalyi, 1996; Hargrove, 2008; Tan et al., 2013; Taylor, 1997). This study also demonstrates that imagery exercises can help students explore new ideas for designing and building artistic objects. The innovative nature of design can serve as a foundation for improving design education in a way that embraces creative thinking (Hargrove, 2008).

This paper seeks to enhance the achievements of beginning students in apparel design by developing a

process that connects them with students with different backgrounds in art and design. Furthermore, it shows that cognitive processes can help educators improve the creative apparel design skills of beginning design students. A noteworthy strength of the study was the inclusion of the personality traits openness and motivation for creativity as covariates in the analysis. Previous studies in applied psychology and organizational behaviour have found these traits to be predictors of creativity (Boden 2010; Csikszentmihalyi, 1990; Pink, 2009).

Future research should examine idea development in advanced design courses to compare the evaluations of peers and professionals. A limitation of this study is that it did not differentiate the students according to their relative degrees of experience (among the experienced students), nor did it take into account cross-cultural contexts that were based on nationality. Such segmentation and cross-cultural awareness in future research will help us to understand different design contexts and conceptual design processes. Future research should also create subdivisions according to amount of experience based on analysis of demographics data when examining differences in achievement. In addition, this study only examined hand-drawn work. Future research could potentially analyse 3-D apparel designs created with fabric. Lastly, prospective research on creative work should be developed using different stimuli, such as clothing and other objects of apparel design.

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