ILLUMINATING THE LIGHT OF CREATIVITY
Development and Application of the Analytic Composition Method

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Abstract: Designers can rely on inspiration to achieve creativity, but also bear the risk of being abandoned by such inspiration. Because novice designers are short of systematic methods and experience, they are usually concerned about a lack of inspiration throughout their designing processes. The Analytic Composition Method (ACM), which was developed to solve such a problem, provides references for teaching and learning basic graphic design. This study applies this method to teaching activities through constrained design tasks, and selects three examples to demonstrate the development and application of this method. The results show that using this method as a tool for graphic design enables various sources of inspiration to generate different modes of thinking and creative expression.

Keywords: Analytic Composition Method (ACM), design method, design education

1. Introduction
The worst nightmare for designers is to be abandoned by inspiration. So where does inspiration come from? Basically, there are two ways to look for it: we can either look for inspiration with our sensibility or rationality. Using sensibility to obtain inspiration usually requires individuals to apply their sensory perceptions and their sentimentality. The flashing of an idea through one’s mind is an example of acquiring inspiration with sensibility. Using systematic design methods to create is the way to achieve inspiration with rationality. During the design process, it is not possible for someone to be under optimal conditions and have unlimited inspiration at all times. Design tasks often entail implementation time constraints, and too much reliance on “a flash of intuition” creates too great a risk throughout the design process. The incubation period of the creation process depends on the characteristics of the problem; therefore, it cannot be accurately predicted [1]. Rose specified that methods can encourage enthusiasm when properly applied [2]. Green and Bonollo stressed that design processes and methods can clarify thinking and strategy [3]. Lauer and Pantak suggested that the presence of methods can contribute to the success of designs [4]. What is most valuable to how is not where to look for a particular idea, but how to train the mind in the method by which all ideas are produced and how to grasp the principles which are at the source of all ideas [5]. Therefore, possessing a design method is valuable, especially for novice designers.

Psychological research contends that people employ previously acquired knowledge to resolve present problems. Therefore, a person capable of problem-solving must possess a substantial amount of knowledge and experience to facilitate the identification and presentation of meaningful problems and, thus, produce a framework for problem-solving. Subsequently, specific methods can be applied to solve similar problems [6]. Studies related to design thinking have indicated that design is an experience-oriented behavior. What about the sudden flashes of “intuition” that sometimes allow the expert to arrive at an answer immediately, an answer that the novice can find (if at all) only after a protracted search [7]? Novice designers can provide solutions to similar problems accurately and efficiently and become professional designers only through training and knowledge accumulated from experience [8-11]. Therefore, design methods may be dispensable for experts because, through their long-term knowledge accumulation and experience, they are not limited to certain methods and can develop their own model of creativity. However, methods can provide assistance to novice designers to reduce chaos during their early learning periods. This study developed the ACM to guide novice designers in breaking through their usual modes of thinking,
in constructing their own methods of composition.

2. Literature review

2.1 Inspiration and Design Methods

Designers have long employed various methods in response to the challenge of searching for inspiration. Numerous fields have recognized the emphasis placed on whether inspiration truly exists and, consequently, have conducted scientific research to determine relevant answers. When researchers studied the characteristics of creative thinking in the field of cognitive psychology, they paid much attention to intuitive cognition, which had characteristics different from knowledge-based reasoning [12]. They also described “critical insights” as the occurrence of inspiration [13]. There have been studies on “breakthrough thinking” conducted in the science field. Perkins studied different examples in the history of invention, and believed that breakthrough thinking did not reflect the abnormal operation of certain minds, but reflected the unusual structures that certain problems had [14]. He concluded that the characteristics of breakthrough thinking were a long search, little apparent progress, precipitating events, cognitive snaps, and transformation. In the design field, Archer found that breakthrough thinking also occurred in the process of design thinking [15]. He further described breakthrough thinking as a “creative leap” that contained unique creativity and functioned as the core of creative design. Additionally, protocol analysis was applied to the research of the process of creative design in the industrial design field, and the process of creative leaps and the creative development it stimulated were discovered [16-17]. Chiang and Wang presented multiple characteristics and the scheme of inspirational thinking with an analytical model [18-19].

Design methods originated from the need for solving complicated problems for the Space Race and military development of the 1960s [20]. They began to receive more attention from the field of design when the Conference on Design Methods was held in London in 1962. Debates on the logic and rationality of design postponed the development of design methods, and it confused designers as to whether these methods really worked [21]. In a later study, Jones mentioned that the over-application of methodology caused designers to rely on systematic procedures while solving problems [22]. Designers tended to look for answers by following fixed steps, and their autonomy was disregarded. In other words, the approaches that designers used to produce works actually obstructed their thoughts. Many recent design methods also place emphasis on their rational features, which diminishes the intuitive thinking of designers. As a result, design activities begin to become rigid, and designers are unable to let loose their creativity, since the complete and profound creation process cannot be accomplished.

According to research on inspiration conducted by scholars in the multiple fields mentioned previously, whether they are “critical insights,” “breakthrough thinking,” or “creative leap,” the discussions are a manner of thinking of leap phenomena. It is believed that the generation of inspiration is uncertain and unpredictable. Insights and creative leaps usually come after a long search, and they eventually direct designers toward solutions. These phenomena are different from logical reasoning or “rules of thumb”; thus, they are difficult for various fields of expertise to address. However, although the research has confirmed this method of application can shorten inspiration time, and design efficiency is improved, it is still unable to predict. It is unthinkable that every designer has the time to wait for inspiration in the design process. Can rational approaches help in achieving objectives when sensibility is unable to satisfy designers’ needs? Scholars of different fields emphasize that design methods are just tools used to assist designers. Design formulae and fixed patterns, which might oppress thinking, would never be the anticipated consequences of applying design methods. The methods of design should not be absolute or certain. In fact, they should be adjustable under different circumstances. They should function as a thinking mode or procedure for rational creative behavior that is employed to achieve design objectives. We believe that cognitive snaps have certain value, and that the purpose of developing design methods should be to compensate for the lack of inspiration.

2.2 Development and Characteristic of Graphic Design Education

Regarding the development of graphic design education, there are three major design movements in the West: Russian constructivism, the De Stijl movement, and Bauhaus [23]. Bauhaus was the first institution specifically established to provide design education. Although this institution existed for just over 20 years, it has influenced the design trends of all of Europe, and perhaps even the entire world. Bauhaus promoted the belief that the foundation courses for configuration training should be the foundation for all design fields. The processes of practical experience and teaching methods that inspire creativity
differ from methods used in the past when students simply imitated the teachers’ painting techniques. This highlights the differences in design education compared to other fields. Few fixed curriculum scopes or standard answers exist in design education; thus, relevant teaching strategies and course content designs possess greater flexibility, and additional difficulties may also be encountered during the teaching process [24].

In the past twenty years, numerous American graphic design programs have carefully developed structured curricula based on educational methods that exceed the superficial simulation of professional practice and the “aha” intuitive approach. This new development is another descendant of the Bauhaus movement, but by way of the “Swiss design” of graphic design.

Swiss design styles are simple and easily identified. Based on grid systems and near-standardized layout formulae, the Swiss design method produces highly functional and rational design styles. Designers organized images and text into geometrical grids [25]. Under the influence of this highly structured method and its emphasis on the prolonged study of abstract design and typographic form, these American schools began to structure their curricula carefully. Based on objectivity and rationalism, this educational system produced a codified method that was easy to communicate to students, giving them a foundation for a visual design process and composition that exceeded the superficial emulation of their heroes [26]. However, although emphasizing mathematical logic and rational thinking presents visual power and effects in artwork, affective thinking and the aesthetic values of the individual are neglected. The language of this requirement structure design can easily lead to a uniform artwork format.

Early graphic design education emphasized personal instincts and inspirations. The teachers often encouraged their students to review voluminous “samples” and “examples”, and complete the design tasks through emulation and personal talent. This idea’s reliance on personal intuition and creativity makes it difficult to formalize a codified educational method, relying primarily on image associations and being image-oriented. Image-oriented design and Swiss design are two distinct creative models. Image-oriented design follows affective thinking, whereas Swiss design follows rational thinking. When designers create artwork that conforms to image-oriented design, they generate creativity through intuition and imitation and do not follow regular thinking procedures; therefore, a systemized and fixed teaching model based on image-oriented design cannot be achieved. By contrast, Swiss design highlights mathematical logic. Artwork can be created through grid systems and formulae, generating an obvious thinking procedure. However, this design method constrains the divergent thinking of the creator.

### Table 1. Comparison of three methods of design

<table>
<thead>
<tr>
<th>Method Type</th>
<th>Source of inspiration</th>
<th>Mind Works</th>
<th>Operation Skill</th>
<th>Visual Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image-oriented</td>
<td>Image</td>
<td>Sensibility</td>
<td>Emulation</td>
<td>No specific style</td>
</tr>
<tr>
<td>Swiss design</td>
<td>Mathematical logic</td>
<td>Rationality</td>
<td>Grid systems</td>
<td>Simple, clear, standardized</td>
</tr>
<tr>
<td>ACM</td>
<td>Have detachable elements and can be arranged in sequence</td>
<td>Sensibility &amp; Rationality</td>
<td>Definition rules</td>
<td>Follow the source of inspiration</td>
</tr>
</tbody>
</table>

#### 2.3 Composition Methods of Graphic Design

Composition refers to the arrangement of elements and characteristics within a defined area. This arrangement can be both visually pleasing but, more importantly, used to convey specific information and meaning [27]. The composition of points, lines, and plane is the issue most frequently discussed, and there are two common ways to compose. One way is to multiple unit forms into a composition. The other composition approach is based on structure. Structure is to govern the positioning of forms in a design. It generally imposes order and predetermines internal relationships of forms in design [28]. In addition, Lupton and Phillips show how to build complex patterns around core concepts. Dots, Stripes, and grids provide the architecture behind an infinite range of designs. By composing a single element in different schemes, the designer can create endless variations, building complexity around a logical core [29]. In the music field, Hieber used music as source, stimulus, and influence for graphic image making. Building a visual vocabulary as an analogue to musical ideas and terms and using this experience to create a graphic identity and promotional applications for a musical ensemble [30]. Lin examined the relationship between music and shapes. By treating variations in pitch as the foundation of shape variation, the rhythm in the music could be visualized through shapes [31].

In addition, the world of geometry, algebra, and digital computing often provide inspiration and creative tools for artists and designers. The burst of strength from using the left and right brain (in addition to using equations) can simultaneously facilitate mathematical precision in art and design works. Day provided insight into the geometric
foundations of all repeated patterns, treating the anatomy, planning, and evolution of repeated ornaments in a practical manner [32]. He demonstrated the extent to which patterns are the essence of the ornamental arts. Escher (1898-1972) used math to create artworks that were quite fun. His works are filled with repeated geometric shapes, mirrors, and symmetrical and contradictory spatial structures. Among his artworks, the “Circle Limit” series was influenced by the mathematician Coxeter [33]. Inspired by the innovative use of color in Bauhaus art, Vasarely (1906-1997) developed his own abstract-geometric visual language, exploring the relationship between pure form and pure color. He was instrumental not only in provoking a school of thought based on the relationship between art and science but also in creating some of the most striking geometric paintings in the history of late Modernism. Vasarely did not use the reproduction method for his artworks in presenting nature to the eyes of the viewers. He used associated thinking and scientific methods to express the themes [34]. The Islamic culture is focused on finding beauty, harmony, and order from exquisite and repetitive geometric forms, thus becoming the bridge between science and art [35]. Shin used the book *Pattern Design* as a basis to incorporate math into pattern designs and created the ordering combinations called the “17 Kinds of Wallpaper Patterns” [36]. Hidekatsu, Yoshiaki and Kenichi developed an application software called “Thinking-Sketch”. This software is for creating design images through the mutual interaction between human users and computers [37]. In addition, functions, curves, surfaces, random numbers, fractals, and shape grammar or structural grammar can all be formed into compositions through mathematical operation methods.

3. Methodology

The ACM is developed for basic graphic design. Target audience of this study is novice designers. Construction process and procedures of ACM will be explained in this section. Three phases were presented in this study: pretest, design task, and feedback (Figure 1).

1. **Pretest**: The purpose of the pretest was to explore the participants’ background, starting point, and sources of inspiration.
2. **Design task**: The participants were instructed to complete a design task by formulating their own unique composition method using the ACM systemized design procedure. The design procedure comprised four steps: original object collecting, design unit forms, constructing composition rules, and application. After the participants completed their tasks, we selected and analyzed three representative examples to demonstrate the development of the proposed design method.
3. **Feedback**: After the tasks were completed, an open-ended questionnaire was used to obtain the participants’ views regarding ACM.

3.1 Pretest

Design departments in universities admit a variety of students from diverse backgrounds; thus, the aptitude and abilities of students differ significantly. A topic that warrants research is how teachers should adjust teaching content and methods according to various student characteristics to develop and stimulate students’ potential and passion for design [38]. Therefore, during the preliminary development of design methods, a pretest questionnaire was employed to understand the participants’ backgrounds and their starting point and sources of inspiration when undertaking tasks. The pretest results facilitated the establishment of a design method suitable for novices in the design field. The test sample participants were 61 freshmen from Yulin University of Science & Technology, Department of Digital Media Design.

A total of 57 valid pretest questionnaires were retrieved. The results showed that 30% of the participants had two years of design experience of less, and 70% had between three and four years. Therefore, during the process of developing a design method, discrepancies in entry behaviors should be considered, and a balanced technical threshold should be adopted for all learners. Regarding the inspiration sources when executing design tasks, 50% of creators design based on instinct and 50% reference external data. Visual data were the most commonly adopted reference type. Two participants reported referencing audio and gustatory data, and no participants claimed to have referenced olfactory and tactile data. For visual data, all participants had referenced imagery data, and other types of visual data had not been employed (Table 1). The questionnaire results indicate that novice designers tend to
search for inspiration through visual imagery data, which is consistent with the findings reported by previous studies, that is, designers tend to develop creativity through a substantial amount of visual simulation and image integration abilities [17][39-42]. Therefore, during the initial execution of design tasks, the participants were encouraged to collect data beyond imagery as inspiration sources to expand the diversity of their thinking and understand whether other types of information, aside from images, benefit design.

### Table 2. Results of the Pretest

<table>
<thead>
<tr>
<th>Items</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting Point</td>
<td>• 70% of the participants had between three and four years of design experience</td>
</tr>
<tr>
<td></td>
<td>• 30% of the participants had two years of design experience or less</td>
</tr>
<tr>
<td>Sources of Inspiration</td>
<td>• 50% of the participants design based on instinct</td>
</tr>
<tr>
<td></td>
<td>• 50% of the participants design based on data</td>
</tr>
<tr>
<td>Categories of references</td>
<td>• visual data: 57 person-times</td>
</tr>
<tr>
<td>(multiple choices)</td>
<td>• audio data &amp; gustatory data: 1 person-time of each</td>
</tr>
<tr>
<td></td>
<td>• olfactory data &amp; tactile data: 0 person-time of each</td>
</tr>
</tbody>
</table>

When initially developing the design method, we referenced various composition methods presented in previous literature. Of these, the composition methods regarding unit forms and structures were relatively easy for novice designers to execute because complex design knowledge and technique accumulation were not essential. Furthermore, a significant amount of creativity can be generated through various permutations and combinations, which facilitates training in divergent thinking while simultaneously considering disparities in entry behavior for the various participants.

### 3.2 Constrained Design Tasks

The ACM structure comprises three elements, the original object, unit forms, and composition rules, which possess characteristics that respectively influence the composition sequence, shape design styles, and dominate the layout. Each element can be a start or an end. Through a circulation operating model, diverse concepts can be derived. The operating method is dominated by the designer. In this study, the operating sequence began with an original object, followed by unit forms and composition rules. Application was also included in the model.

Guilford (1968) indicated that the cognitive behavior of creativity is a unique process that involves two primary cognitive processes: divergent production and transformation. Divergent production abilities are diverse and can produce various solutions to a design problem. Transformation abilities allow a person to convert or modify known knowledge and place it into a new problem environment to produce a new plan and derive a solution to the problem [43]. During the development of the design method, the participants were instructed to complete a design task independently. This task involved numerous constraints as well as the two cognitive processes mentioned above, and divided into the following four stages:

1. Data collecting: The object has to have detachable elements and can be arranged in sequence.
2. Design unit forms: Unit forms are acquired by decomposing and analyzing or further summarizing and organizing data. These unit forms can be independent or combined.
3. Constructing composition rules: This stage involved training for divergent thinking; thus, the participants were asked to develop at least two composition rules and record their composition order or sequence.
4. Design applications: Apply the composition rules to the 3D structure (lampshade). Eliminate the color factors by deleting partially captured, modified, or appropriate deletion elements.

The construction of unit forms and composition rules is associated with divergent thinking training. Users must continuously employ various unit forms and different arrangement effects to determine the optimal problem-solving method. Conversely, design applications (3D structure/lampshade), involve training for thought transformation; thus, users must transcend conventional rules and establish different combinations according to the given constraints, thereby creating new definitions and interpretations and employing alternative methods to solve problems.

### 3.3 Feedback

The questionnaire content included a comparison between intuitive creation and ACM, the advantages and disadvantages of ACM, what data beyond imagery can be applied to ACM, and what aspects of artwork completed using ACM can be extended and applied.

Most people regard intuition as the easiest means for creation. However, the creation of artwork using ACM
facilitates the production and replication of the same type of artwork because the layout conforms to the personally defined rules. When the original object and composition rules vary, artwork of the same style but with a differing composition and layout can be created. In addition, several people believe that, during creation, ACM provides better referencing for layout and facilitates idea expression through artwork. This is because the basic sources used for layout are derived from self-defined rules, and the sources of artwork ideas are derived from the detailed construction of each step. The participants responded that the advantage of the proposed method is the solution to troublesome composition problems. Previously, compositions were primarily based on intuition or imitations of imagery data. By contrast, ACM can determine new composition rules and complete design tasks without imagery data or inspiration. Moreover, data irrelevant to the design can be used to benefit layout. This is a novel experience for creation. Nevertheless, the disadvantages of using ACM are a longer adaptation and artwork completion time compared to that of intuitive creation. Some participants proposed referable directions for designs, such as developing unit forms from Japanese Gojuon or Chinese zhuyin fuhao, using these forms to sequentially compose images based on an extracted section of lyrics, and applying the completed work to objects or activities related to music. In another example, unit forms originating from ingredients and spices of recipes are arranged in an image according to cooking procedures. ACM can also be connected with various other concepts, such as computer programming languages, train timetables, SOPs for various devices, statistical diagrams, class schedule, food composition table, price list, arithmetic formulae, and schedules. The participants believed that the proposed method was applicable to decorative patterns, package design, outdoor billboards, 3D sculptures, indoor decorations, public art, etc.

The above discussion indicates that after learning ACM, the participants still considered intuitive creation to be easier than ACM. With an inspiration in mind, designers can create artwork with limited data and techniques. A number of the participants indicated that when inspiration or imagery data are lacking, ACM is a beneficial tool. This reasoning may support the development of the proposed method. Designers can rely on inspiration to achieve creativity, but also bear the risk of being abandoned by such inspiration. In addition, several participants mentioned that the proposed method facilitates the production of artwork with similar styles but different layouts. A minor change can generate diverse design projects, entailing a certain degree of derivativeness in completed artworks. During derivation, unexpected results frequently occur, increasing the interest. Many of the participants argued that composition cannot rely solely on imagery data or imagination. The use of data beyond imagery for design is a novel experience, which indicates that ACM transcends traditional design habits and composition methods that rely on imitation and extend designers’ reference scope from imagery data to data beyond imagery. Diverse stimuli may substantially benefit novices. Finally, after ACM training, many of the participants considered the feasibility of applying other data beyond imagery to designs, providing a direction for subsequent studies.

4 Examples and Analysis
4.1 Three examples

The sources of inspiration for the participation were divided into three major categories: text and numerical data, graphical information, and scenario information. Following are three separate examples of the three categories that explain the process of ACM development: there are winning numbers for Taiwan’s uniform-invoice lottery, structure of the human body, and the Powerpuff Girls’ narration.

Example 1: Winning numbers for Taiwan’s lottery

For this mission, text and numerical data were used by most of the participants because the composition method of this example was more representative of their modes of thinking. Therefore, this method was representative and specifically used for discussion. The participants organized the Uniform-Invoice winning numbers for January to December of 2008 as a source of inspiration. After decomposition and analysis, a total of 10 numbers were obtained (i.e., from 0 to 9), and unit forms were respectively designed for these 10 numbers. The participants employed arcs as the primary composition element and formed designs similar to flowers using crossed and overlapped lines. Occasionally, virtual spatial changes occurred at the junction between different unit forms, which created new forms. For certain design methods, unit forms were minimized and recomposed. To create imagery and spatial effects similar to that of a kaleidoscope, diverse colors were employed in vertical, horizontal, and mirroring arrangements to mimic the space or sense or space of a kaleidoscope. The placement sequence for the unit forms was based on the winning numbers of the Taiwan Uniform-Invoice lottery, and numerous adjustments were
made according to the participants’ personal aesthetic standards (e.g., some numbers were deleted). Rule 1 stipulated that a row must comprise five unit forms, and the remaining numbers should be placed in the following row until the entire image was filled. Rule 2 was derived from Rule 1, with the addition of gradation or shading effect. Furthermore, a mirroring method was used to repeat the composition of Rule 1 four times. The main framework for the lampshade was hexagonal. Three composition methods were presented in three different orientations to allow different aesthetic perceptions to be shown from various angles (Figure 3).

<table>
<thead>
<tr>
<th>Original Object</th>
<th>Winning Numbers for Taiwan’s Uniform-Invoice Lottery, Months 1-12, Year 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Month</strong></td>
<td><strong>Numbers</strong></td>
</tr>
<tr>
<td>January</td>
<td>92723649, 92137540, 92286943, 92463281, 92689945, 92815790, 92839738, 92863182</td>
</tr>
</tbody>
</table>

**Example 1: Winning numbers**

- **Rule 1:** A row comprises five unit forms.
- **Rule 2:** A row comprises five unit forms with gradation or shading effect.

**Design Applications:**

![Figure 3. Example 1](image)

**Example 2: Structure of the human body**

During the initial stages of the mission, we encouraged the participants to collect more data beyond that of the images. However, certain participants were still accustomed to find inspiration from imagery data. Consequently, this example can be compared to other examples to explain how various types of data affect the thoughts of a creator. Example 2 regards using the human body structure to stimulate creative inspiration. The participant disassembled the human body figure into 18 parts, and each part served as a unit form. The appearance of these unit forms were primarily referenced according to the structure and patterns of the human body. For example, six blocks were used to represent the six abdominal muscles, and five dots were used to express the five toes of a foot. Changes in the position of the limbs during human body motion were used as a basis for composition. Rule 1, the direct position was based on the location and size of the human figure to form compositions with human body characteristics. Rule 2, enlarge or shift the human body figure parts that exert more force during movement. For example, if the leg muscles exert more force during movement, the leg muscle figures were enlarged. According to personal aesthetic standards, certain body parts can also be shifted from their original positions and the background color and transparency levels could also be changed. For the lampshade, the contiguous and overlapping parts between the forms were eliminated to fulfill the structural requirements. Overall, torsion of the irregular shapes was used to illustrate a sense of dynamic movement (Figure 4).

![Figure 4. Example 2](image)

**Example 3: The Powerpuff Girls’ Narration**

The Powerpuff Girls is an animated series by the Time Warner’s Cartoon Network in the United States. The participant was instructed to select two narration segments from the cartoon as the source of inspiration. Because the narration segments themselves have story plots, they presented different styles when compared to the previous two categories and thus must be further discussed. The participant created unit forms based on the characters, objects, and movements that appeared in the second narration segment. The unit forms were sequentially arranged according to the story of the narration. The first narration mentioned the following: “Sugar… spice… and everything nice. There were the ingredients chosen to create the perfect little girls. But Professor Utonium accidentally...”
added an extra ingredient to the concoction… Chemical X! Thus the Powerpuff Girls were born!” Therefore, the form of the three characters comprised these four objects, and different colors were employed to differentiate between characters. Villains and other characters were presented using simplified figures. Actions such as punching, kicking, and bleeding were presented according to previous visual experiences. In Rule 1, the unit forms were repeatedly arranged in an inverted L-shaped orientation on the screen, and the dimensions of the figures were tapered from top to bottom to present the feeling of infinite repetition and the gradual distancing of sounds. In Rule 2, the narrated events were arranged from top to bottom in a z-shaped format in the sequence as they occurred in the narration. This arrangement method presented the sense of fierce fighting and speed, and contained the story plot in the manner of an illustration. The lampshades involved using Rule 2 with appropriate corrections. The arc lines express the fluidity of flying to the sky. The protagonists move upward along the arc lines, representing the light extension trajectory of the Powerpuff Girls as they battle Mojo Jojo (Figure 5).

Figure 5. Example 3

4.2 Design Examples Analysis

The implementation results of the constrained design tasks indicated that, under the ACM operation, different sources of inspiration created various modes of thinking, or even different creative styles. In Example 1, because numbers involve abstract concepts and do not provide concrete images similar to imagery data for reference, designers must create images using their imagination. For example, the participant selected a kaleidoscope as the imaginary object, and designed unit forms and composition rules centered on the image of a kaleidoscope. The unit forms were arranged in small fragments and processed according to the mirroring composition rule. The numbers 0 to 9 were used because numerical data can be easily obtained and controlled by design novices. With only 10 numbers (i.e., 10 unit forms), the designer can manage all data related to numbers and produce convenient concept derivations. In Example 2, ideas for the unit forms and composition rules were derived from the graphics. Subsequently, the graphic content is influential during the design process. For example, toes are represented by five dots, and the muscular lines of the thigh and calf are illustrated. In Rule 1, the unit forms were copied from the content of the photos; therefore, they had a humanoid image. However, after adjustments, Rule 2 changed into an abstract form of composition. Because data are figurative and products are abstract, even if the product is affected by the contents of the photos, they are merely emulations instead of plagiarisms because of the differences in forms of expressions. Example 3 presented a different mode of thinking when compared to that of Example 1 and 2. Ideas came from the story plot and the design of the unit forms, and the composition rules were affected by the protagonists and objects of the story. Therefore, Example 3 presented an illustration style with certain scenarios, and a story could be “read” through the composition. In this study, we found that different types of inspiration sources appeared to affect the creators’ thinking, or even formed different creative styles.

Regardless of whether these data had imagery characteristics or were simply a type of scenario; through conversion, the creators could arouse inspirations and proceed to complete the design tasks. In the past, compositions were based mostly on intuition or involved using image data as objects of imitation. However, by using the ACM, new composition rules can be found and design tasks can be completed even when there is a lack of image data or inspiration. The ACM also formed a set of standards. The standards established in ACM represent systemized design procedures. By operating ACM, each designer can develop a unique composition method through the systemized design procedures. Using the proposed method, each creator can produce miscellaneous artwork by
collecting original objects and establishing unit forms and composition rules. Once these elements are set, they can be referenced or replicated when successors want to create similar artworks in the future. Even if the standards are the same, under different operators, minute content changes can produce different results. Even the creators themselves cannot predict all of the results.

5. Conclusion

This study provides a graphic design method suitable for novice designers. Through constrained design tasks, we demonstrated how to use different sources of inspiration to create individualized unit forms and composition rules, to subsequently complete the lampshade task, and to exploit the creative design method. Through the implementation of the design tasks, most of the participants had broken through conventional imagery-dependent thinking habits and used data beyond imagery to stimulate creation. The examples in this study indicated that different sources of inspiration would create different modes of thinking, and even lead to different creative styles. If designers can use these characteristics effectively during the teaching and learning processes, then they might be able to reach their predetermined objectives more easily. In addition to pure shaping and structural training, the ACM can also be applied in other orientations to create illustrations or to serve as a bridge that converts planned compositions into three-dimensional compositions.

The ACM provided a clear explanation for the composition process. Similar to the varying characteristics of music, which can be easily read and understood through the interpretation of music scores, using the ACM would improve the understanding of both teaching and learning if a “score” for design could be established. Artworks created using the ACM as a tool may not become masterpieces because they needed to be modified based on the aesthetic experience of the designers themselves. The entire design process of this study also had some uncertainty and autonomy. However, this study is certain of the value of “a flash of intuition” inspirations. The ACM was developed to provide rational assistance during the lack of such inspirations and to turn the black-box design process into a glass-box design process. We also hope that different design methods can be developed through other sensory stimulations, and sources of inspiration can be expanded from visual to auditory, olfactory, gustatory, or even tactile senses.

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