

Development Of An Electronic Brainstorming Approach To Enhance Creativity Of Communication Arts Students In Visual Communication Design In A Thai Private University*

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Abstract

This research aims to develop an electronic brainstorming model to enhance creativity in visual communication design for Communication Arts students. This quasi-experimental research made use of pre-test and post-test to compare the results of creativity test of two groups of students using two brainstorming methods: online and face-to-face. Sixty second-year students from school of Communication Arts of a private university in Bangkok were selected using purposive samplings. The participants were divided into experimental and control groups; each group comprised of thirty students. The electronic brainstorming model was applied to the experimental group while the control group received traditional (face-to-face) brainstorming method in classroom. The data was analyzed using mean values and standard deviation in particular as follows, the six-steps of creative thinking process, the five-steps of electronic brainstorming session process, and the six-steps of visual communication design process. Research hypotheses were tested using independent sample t-test, and paired-samples t-test. In order to assess creativity in visual communication design, paired-sample t-test was conducted to see whether the scores on the pre-test and post-test are different. The results indicated that the mean post-test score ($M = 231.02$, $S.D. = 48.61$) was significantly better than the mean pre-test score ($M = 177.86$, $S.D. = 23.78$), $t(59) = -9.80$, $p = 0.00$. Moreover, independent samples t-test was conducted to compare the levels of improvement on creativity in visual communication design between the control and experimental groups. T-test was significant, $t(58) = 11.41$, $p = 0.00$. The results of the hypotheses testing showed that

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the students in the experimental group obtained better score on creativity test for visual communication. The result was statistically significant at 0.05 ($P < 0.00$). Major findings: (1) pedagogical affordance of electronic brainstorming makes a significant improvement in terms of creativity in visual communication design for Communication Arts students, and (2) electronic brainstorming model has considerable potential to improve creativity in visual communication design for Communication Arts students.

Keywords: 1.Electronic Brainstorming 2.Creativity 3.Visual Communication Design

Introduction

Creativity is a fundamental of life. The power of creativity and imagination in people is an important resource in a knowledge-driven economy (Robinson, 2001). Creativity is an individual skill of critical; it is part of a human characteristic component which leads people to excellent achievement in every area of behavior (Gerard J. Puccio. 2006). Creativity can be improved by teaching, learning, and practicing (Torrance E., 1965). In 1953, brainstorming had been developed by Alexander Faickney Osborn; in his view, brainstorming is a group technique for creativity to generate something new, normally used to sort and develop ideas. Brainstorming involves getting a group of people to spank out new ideas in a relaxed and informal atmosphere (Allen, Boost your Creativity, 2005). Brainstorming can make a huge number of ideas by amassing a list of ideas spontaneously contributing solutions for a specific problem by members. Brainstorming became a very popular way to generate new ideas. Brainstorming has also been proven valuable to boost creativity in people in organization, business sector, work place and education. The evolution of the teaching and learning process of people around the world has evolved to serve communication technology based learning. Information technology flows and connects people from different places faster and closer. This phenomenon changes people's way of living. Education rapidly changed through Internet technology. In teaching and learning context, Internet is an easiest tool that does not only change formats and nature of knowledge exchange. Technology not only turned the education to be more efficient and effective, but it also solved the limitations of the traditional form of delivering education such as changing from face-to-face group brainstorming to electronic brainstorming (Ertmer, 2012).

However, creativity boosting does not receive enough attention in the design of the curriculum for Communication Arts students in this university. To that end, the researcher decided to develop methods for learners and instructors to enhance students' creativity by implementing ICTs in the process of teaching and learning to pull out students' best potential in using creativity skill for academic and occupational purposes at their own pace and time as suggested by Puacharearn & Fisher (2004, cited in Toetenel & Rienties, 2016). The technology is also expected to help students to express their ideas among classmates freely when they are able to cover their identity using electronic brainstorming. The researcher also conducted another preliminary interview with six instructors who are also considered experts due their over ten years of teaching experience in the field of communication arts to confirm the result of their satisfaction. The experts' opinion shows that creativity is an important skill that is mostly required in the communication arts field.

Because of problem mentioned above, "development of an electronic brainstorming approach to enhance creativity of communication arts students in visual communication design in a Thai private university" recently created and would be a tool for communication arts instructors who are interested in improving students' creativity in visual communication design, also be used as a guideline for course implementation, curriculum and instruction design to enhance students' creativity in visual communication design.

Research Objectives

1. To investigate the effectiveness of the electronic brainstorming method in enhancing creativity in visual communication design.
2. To compare the difference between students using the electronic brainstorming method and students using the face-to-face group brainstorming method in improving creativity in visual communication design.

Research Questions

RQ1: To what extent is the electronic brainstorming method effective in enhancing student's creativity in visual communication design?

RQ2: What is the difference in the achievement of creativity in visual communication design between students using the electronic brainstorming method and students using the face-to-face group brainstorming method?

Materials and Methods

The development of the electronic brainstorming model was based on the creative thinking process. The study attempts to find out the effectiveness of the model and its capability to improve the students' level of creativity using different treatments: face-to-face and electronic brainstorming methods on visual communication design in Communication Arts students. This research comprises of five steps following ADDIE model: analysis, design, development, implementation, and evaluation. Each step is explained and describes the schematic of research method below.

Analysis: Electronic Brainstorming Model Design

1) An interview of six instructors/experts who have at least ten years teaching experience in the field of Communication Arts on students' creativity was arranged to examine the problem and their needs.

2) The researcher reviewed documents, literature and analyzed data.

3) Documents, literature and need assessment were reviewed to define variables used in creating the model and instruments.

Design: Tools Measurement

1) Basic data about the electronic brainstorming model and creativity was studied to prepare for the electronic brainstorming model to enhance creativity in visual communication for Communication Arts students.

2) A draft of the electronic brainstorming model for enhancing creativity in visual communication for Communication Arts students was developed.

3) A draft of the creativity test for visual communication was developed.

4) A draft of the creativity as product evaluation form for visual communication was developed.

5) Content validity of the test was conducted using the Index of Item Objective Congruence (IOC) by five experts who have at least ten years teaching experience in the field of Communication Arts.

Development: Electronic Brainstorming Method

1) The researcher ran a pilot study using the draft of the electronic brainstorming model for enhancing creativity in visual communication for Communication Arts students.

2) The pilot study data was collected, evaluated and tried out for reliability using Cronbach's alpha-Coefficient.

3) The draft of brainstorming model for enhancing creativity in visual communication for Communication Arts students was revised.

Implementation: Data Collection

The electronic brainstorming was implemented in real classroom environment with pre experimental design. The implementation employed two tools: creative thinking test for visual communication and creative product evaluate form for visual communication. The form was used by experts as rubrics to assess students' creativity.

Evaluation: Data Analysis

1) After the implementation, the result of the Post-test scores was analyzed using the Statistical Package for the Social Sciences (SPSS program) to examine whether the electronic brainstorming model have the ability to enhance students' creativity.

2) Conclusion and recommendations were presented using the analyzed results

Population and Sample

The research population consisted of 1,304 second-year students from the, School of Communications Arts in a private university in Bangkok.

The sample group consisted of 60 students from 1,304 second-year students of School of Communication Arts in a private university in Bangkok. All participants were undergraduate students who were enrolled in a digital photography course in the 2017 academic year.

They were selected by using purposive sampling. One class, consisting of 30 students, was randomly selected as a control group and the other class, also consisting of 30 students, was an experimental group. Students in both groups were tested to examine their level of creativity using the creativity test for visual communication before they participated in the electronic brainstorming methods.

Conceptual Framework

The conceptual framework of the study is developed from the literature review in the field of creativity theory, electronic brainstorming technique, communication theories and visual communication. The development of electronic brainstorming model was based on creative thinking process. The study attempts to find out the effectiveness of the method and its capability to improve the students' level of creativity using different treatments: face-to-face and electronic brainstorming method on visual communication design in communication

arts students. Figure 1 below, describes the relationship between creativity in visual communication design and the designed model.

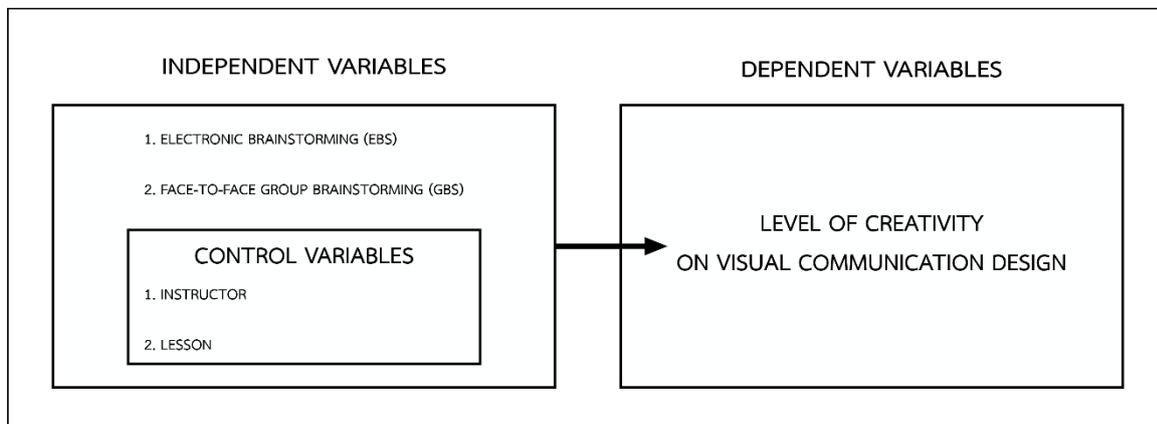


Figure 1. Conceptual Framework of Research

1) The independent variables in the study are the types of brainstorming method design including (1) electronic Brainstorming (EBS), and (2) face-to-face group brainstorming (GBS).

2) The dependent variables in the study are the students' levels of creativity toward the learning method including the level of creativity on visual communication design.

3) The control variables in the study are (1) instructor and (2) lesson.

The researcher was the instructor for both groups of students studying the same lessons in accordance with the visual communication design project.

The researcher was the instructor for both groups of students studying the same lessons. Each group consists of thirty students, both groups of students earned equal credits on visual communication design from the previous semesters. Their background knowledge on visual communication design is, therefore, similar.

Research Hypotheses

H₀1: Electronic brainstorming method does not improve the students' level of creativity in visual communication design.

H_a1: Electronic brainstorming method improves the students' level of creativity in visual communication design.

H₀2: There is no difference in the level of improvement on creativity in visual communication design between students who participated in the electronic brainstorming method and students who participated in the face-to-face group brainstorming method.

H_a2: There is difference in the level of improvement on creativity in visual communication design between students who participated in the electronic brainstorming method and students who participated in the face-to-face group brainstorming method.

Research Instrument

In this study, the creativity test for visual communication was used to measure students' creativity.

1) Content validity of the test was conducted using the Index of Item Objective Congruence (IOC) by five experts who have at least ten years teaching experience in the field of Communication Arts. Each expert was asked to evaluate whether the item measured the intended objective and assigned the IOC scores of this research = 1.

2) Reliability was tested by using Cronbach's coefficient alphas, this pilot study was conducted on thirty students. The score results were computed by the Statistical Package for the Social Sciences (SPSS program) in order to check reliability of the creativity test for visual communication. Moreover, for proper reliability measurement using SPSS software based on Nunnally (1978) recommendation, reliability of 0.70 or better for each section of the study instrument is considered acceptable. Reliability of this pilot study was shown higher than 0.70., as followed 0.71, 0.77, 0.91, 0.93, 0.91, and 0.75.

Collection of Data

All scores from pre-test and post-test in experimental groups and control groups was collected and analyzed by the Statistical Package for the Social Sciences (SPSS program). Score of creativity in visual communication design was collected using the creativity test for visual communication.

Data Analysis

The creativity test for visual communication were used to analyze the following procedure:

1) Basic statistics such as mean, percentage, standard deviation, and variance were calculated for score of creativity in visual communication design.

2) Statistics for hypotheses testing assessing interaction between the electronic brainstorming methods and creativity in visual communication design by using the paired-sample t-test and the independent samples t-test for testing hypothesis.

Results

The Results of this research study as follows:

1) For hypothesis 1, The paired-sample t-test was conducted to evaluate whether the scores on the pre-test and post-test are different. The results indicated that the mean of the post-test score (M = 231.02, S.D. = 48.61) was significantly better than the mean of the pre-test score (M = 177.86, S.D. = 23.78), $t(59) = -9.80, p = 0.00$. That means the experimental group (electronic brainstorming method) was effective in terms of its ability to improve the students' level of creativity in visual communication design. The first null hypothesis was, therefore, rejected.

Table 1

Means Summary for pre-test and post-test of creativity in visual communication design

	Mean	S.D.	N
EBS Pre-test	177.86	23.78	30
EBS Post-test	231.02	48.61	30

Table 2

T-test for mean difference between pre-test and post-test of creativity in visual communication design

	Mean Difference	S.D.	Sig.	N
EBS Pre-test and EBS Post-test	-53.16	42.00	0.00	60

2) For hypothesis 2, The creativity in visual communication design, the independent samples t-test was conducted to compare the levels of improvement on creativity in visual communication design, between the electronic brainstorming method and the face-to-face group brainstorming method. T-test was significant, $t(58) = 11.41, p = 0.00$. The result indicated that the electronic brainstorming method was effective in terms of its ability to improve the students' level of creativity in visual communication design was different from the

face-to-face group brainstorming method. That means the electronic brainstorming method was effective in terms of its ability to improve the students' level of creativity in visual communication design different from the face-to-face group brainstorming method. The second null hypothesis was, therefore, rejected.

Table 3

Means summary for the levels of improvement on creativity communication design between students who took and did not take the electronic brainstorming method

	Mean	S.D.	N
Took EBS	87.81	28.74	30
Took GBS	18.52	16.73	30

Table 4

T-test for mean difference of the levels of improvement on creativity in visual communication design between students who took and did not take the electronic brainstorming method

	Mean Difference	S.D.	Sig.	N
Took EBS and Took GBS	69.29	2.23	0.00	60

Discussion

By evaluating the electronic brainstorming method to enhance creativity in visual communication design, the evaluation was designed to determine the degree to which the electronic brainstorming method was effective in the Student's creativity as assessed by using the creativity test for visual communication.

The result of the paired-sample t-test and the independent samples t-test was compared between the experimental group and the control group. The experiment was conducted to evaluate the relationship between brainstorming methods (independent variable) and the level of creativity in visual communication design (dependent variable).

The result shows that, the experimental group students (the electronic brainstorming method) had the higher score in visual communication design creativity than the control group students (the face-to-face brainstorming method), was statistically significant and gained more improvement of in terms of creativity for Communication Arts.

The findings of the study were presented as comparisons of the results of enhance creativity in visual communication design with in both groups based on the review of previous literature and research that was studied and addressed the research hypotheses related to questions of this research study as follows:

1) The first hypothesis: “electronic brainstorming method improves the students’ level of creativity in visual communication design.” and research question one: “to what extent is the electronic brainstorming method effective in enhancing student’s creativity in visual communication design?” was supported by the finding of the study. This hypothesis expected that interaction of the electronic brainstorming method affects the students’ level of creativity in visual communication design, whether the scores on the pre-test and post-test were different. According to the result of this research, the interaction between the electronic brainstorming method and creativity in visual communication design showed that the mean scores of the creativity as person of student changed in the higher score. This indicated that students who took the electronic brainstorming method progress in creativity in visual communication design. This supported hypothesis 1. To answer this research question, the study showed that students who learned through the electronic brainstorming method improved in terms of creativity in visual communication design.

2) The second hypothesis: “There is difference in the level of improvement on creativity in visual communication design between students who participated in the electronic brainstorming method and students who participated in the face-to-face group brainstorming method.” Along with research question two “What is the difference in the achievement of creativity in visual communication design between students using the electronic brainstorming method and students using the face-to-face group brainstorming method ?” was supported by the finding of the study. This hypothesis expected that interaction between the electronic brainstorming method and the face-to-face group brainstorming method affected the students’ level of creativity in visual communication design. According to the result of this research, students who took the electronic brainstorming method had higher mean scores of creativity in visual communication design than students who took the face-to-face group brainstorming method. This supported hypothesis 2. To answer this research question, the electronic brainstorming method not only had a difference in achievement higher than students who learned through the face-to-face group brainstorming method, but the face-to-face group brainstorming method also had a difference in achievement and showed the student’s

demonstrated progress in creativity as product on visual communication design in lower achievement.

This research findings supported the research hypothesis and all of the null hypotheses were therefore rejected for the scale for this group.

Conclusion

1) An electronic brainstorming model: There are three elements that play important roles in the electronic brainstorming model to enhance creativity in visual communication design in particular as follows and have shown in the figure 2 below.

(1) The six-steps of creative thinking process; Step 1: preparation and problem-finding - gathering pertinent data to understand the logic of the situation and finding the obstacles. Step 2: data collection - collecting all of the relevant information. Step 3: incubation - letting up to invite. Step 4: illumination - flashing a fantastic picture in the mind as an idea. Step 5: productive - finishing the good work as the solution. Step 6: verification - evaluating the solution with critical and logical thinking.

(2) The five-steps of electronic brainstorming session process; Step 1: define the topic. Step 2: ask members to generate ideas. Step 3: record answers. Step 4: combine similar or redundant ideas. Step 5: document your session.

(3) The six-steps of visual communication design process; Step 1: introduction, data analysis, finalizing problem, generating concepts. Step 2: finalizing concept, generating ideas. Step 3: finalizing an idea, generating themes. Step 4: finalizing a theme, generating mood & tone. Step 5: finalizing mood & tone, and designing layout. Step 6: conclusion and presentation.

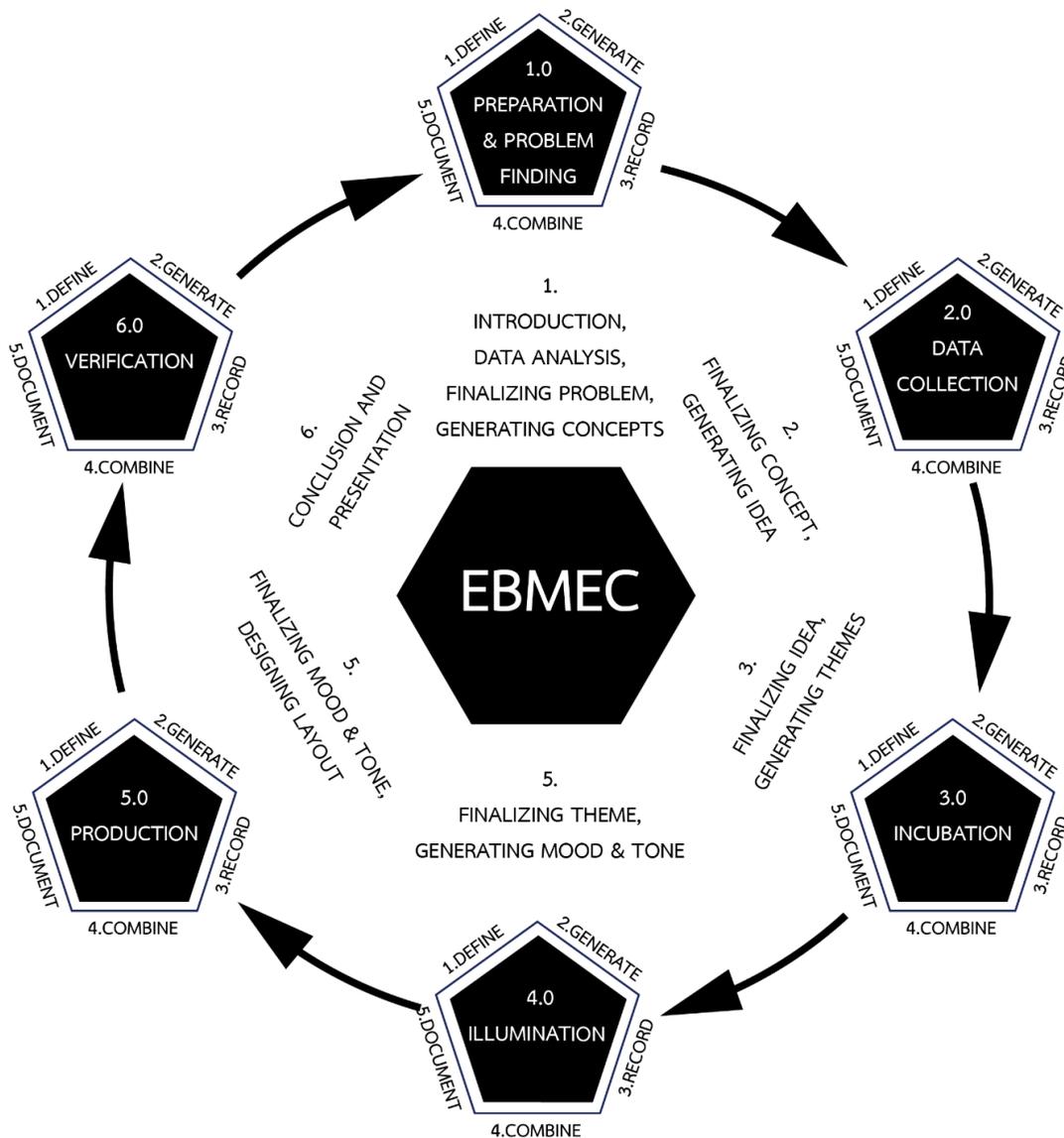


Figure 2. Electronic Brainstorming Model to Enhance Creativity of Visual Communication Design (EBMEC)

2) **The student’s creativity:** The creativity test for visual communication was designed to determine the degree to which the electronic brainstorming method was effective in reaching related hypotheses and questions.

According to the result the data analysis of this research showed that within the group, both brainstorming groups achieved a higher improvement in the level of creativity in visual communication design. The research also showed that when both groups were compared, there were significant differences between both groups in the means total scores found between the pre-tests and post-tests.

Furthermore, the results related to a greater improvement in creativity with the higher mean scores of the experimental group students, who took the electronic brainstorming method more than students who took face-to-face group brainstorming method with a more positive statistically significance in creativity in visual communication design. As shown in the results of the paired-sample t-test and the independent samples t-test showed statistically significant differences among two groups in total scoring comply with the studied of an e-learning for undergraduate students had the efficiency which learning achievement of posttest by using e-learning were statistically significant higher than pretest at 0.01 level (Parnpring, S., Bangthamai, E., 2015)

This research findings also show the reasons behind better improvement of the experimental group include (1) greater opportunity to interact among learners and (2) freedom to express themselves due to the covered identity.

First, the innovation of information and communication technologies including software applications that have emerged recently allow users to generate various ideas in a more comfortable interactive methods which can also be related to the idea of Jinda and Bangthamai (2017). In addition, effective and efficient learning environments impact student's creativity process because it is the process that requires time and collaboration. The participants using electronic brainstorming method could present and discuss their idea anytime and anywhere. Therefore, maximizing time for creativity activities is important to pull out students' best potential in using creativity skill for academic and occupational purposes (Toetenel & Rienties, 2016). Moreover, using the electronic brainstorming method helps students to make connections among themselves when generating and transferring diverse ideas. Consequently, greater chance of connection enables students to see and comment on other people's work leading to the chance to promote the idea that there is not always one correct answer. Finally, this leads to more opportunity to explore and accept other people's ideas and comments. This can also be related to the work of Bangthamai, Boonprasert, Na Ayuthaya (2016).

Second, their covered identity allowed them to express their ideas freely. These two factors could explain the higher improvement and proper to use for developing the creative product in visual communication design.

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