VISUAL DIARY AS A TOOL FOR IDEA GENERATION FOR GRAPHIC DESIGN STUDY PROGRAM

JACQUELINE SIM FEI CHIN

CULTURAL CENTRE
UNIVERSITY OF MALAYA
KUALA LUMPUR

2020

VISUAL DIARY AS A TOOL FOR
IDEA GENERATION FOR GRAPHIC DESIGN
STUDY PROGRAM

JACQUELINE SIM FEI CHIN

DISSERTATION SUBMITTED IN PARTIALLY
FULFIMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF ARTS (VISUAL ART)

CULTURAL CENTRE
UNIVERSITY OF MALAYA
KUALA LUMPUR

2020

UNIVERSITY OF MALAYA
ORIGINAL LITERARY WORK DECLARATION

Name of Candidate: Jacqueline Sim Fei Chin

Registration/Matric No: RGB120011

Name of Degree: Master of Arts (Visual Art)

Title of Project Paper/Research Report/Dissertation/Thesis ("this Work"):

Visual Diary as A Tool for Idea Generation for Graphic Design Study Program

Field of Study: Visual Art

I do solemnly and sincerely declare that:

(1) I am the sole author/writer of this Work;
(2) This Work is original;
(3) Any use of any work in which copyright exists was done by way of fair dealing and for permitted purposes and any excerpt or extract from, or reference to or reproduction of any copyright work has been disclosed expressly and sufficiently and the title of the Work and its authorship have been acknowledged in this Work;
(4) I do not have any actual knowledge nor do I ought reasonably to know that the making of this work constitutes an infringement of any copyright work;
(5) I hereby assign all and every rights in the copyright to this Work to the University of Malaya ("UM"), who henceforth shall be owner of the copyright in this Work and that any reproduction or use in any form or by any means whatsoever is prohibited without the written consent of UM having been first had and obtained;
(6) I am fully aware that if in the course of making this Work I have infringed any copyright whether intentionally or otherwise, I may be subject to legal action or any other action as may be determined by UM.

Candidate's Signature   Date:

Subscribed and solemnly declared before,

Witness's Signature   Date:

Name:

Designation:

VISUAL DIARY AS A TOOL FOR IDEA GENERATION FOR GRAPHIC DESIGN STUDY PROGRAM

ABSTRACT

This research is to explore visual diary as a tool that allows students to express their multiple creative views and their abilities in generating ideas. This tool has been integrated as part of the selected students' assignments and projects as a practice in the creative arts education. Many of them were taught to sketch, doodle and experiment in different drawing techniques. Nonetheless, many of them are facing the problem of lack of knowledge and understanding in the ideation process. The quantitative research design and procedures were employed in this study. A total of 35 visual diaries were selected, one each from a pool of 35 students in the graphic design program. The samples in this study were 35 *(N=35)* students who were enrolled to pursue the visual communication module in the first year of the graphic design program. The research was conducted at the researcher's university, being a private institution located in Kuala Lumpur. The main tool for data collection was an assessment rubric, namely, the Ideo assessment. The quantitative data from the Ideo assessment was analysed using descriptive statistics. From the findings, it can be concluded that through the visual diary, students have shown greater understanding in the design process and that continued efforts should be made to improve, develop, and explore ideas in using the visual diary as an instructional tool for the students' assignments and projects.

DIARI VISUAL SEBAGAI ALAT UNTUK GENERASI IDEA
UNTUK PROGRAM PENGAJIAN REKA BENTUK GRAFIK

ABSTRAK

Penyelidikan ini adalah untuk meneroka diari visual sebagai alat yang membolehkan pelajar untuk menyatakan pandangan kreatif mereka yang banyak dan menghasilkan idea. Alat ini telah diintegrasikan sebagai sebahagian daripada tugasan dan projek pelajar untuk berlatih dalam pendidikan seni kreatif. Ramai daripada mereka diajar untuk membuat lakaran, doodle dan eksperimen dalam teknik penggambaran yang berbeza. Walau bagaimanapun, kebanyakan daripada mereka menghadapi masalah kerana kurang pengetahuan dan pemahaman dalam proses ideasi. Reka bentuk dan prosedur penyelidikan kuantitatif digunakan dalam kajian ini. Terdapat 35 buku diari visual yang dipilih dari sekumpulan 35 pelajar dalam program reka bentuk grafik. Sampel dalam kajian ini adalah 35 (N = 35) pelajar yang mendaftar unit komunikasi visual dalam tahun pertama reka bentuk grafik. Penyelidikan ini dijalankan di universiti penyelidik, salah sebuah institusi swasta yang terletak di Kuala Lumpur. Alat utama untuk pengumpulan data adalah rubrik penilaian iaitu penilaian Ideo. Data kuantitatif dari penilaian Ideo dianalisis menggunakan statistik deskriptif. Dari hasil penemuan, dapat disimpulkan bahawa pelajar telah menunjukkan pemahaman yang sangat baik dalam proses reka bentuk dan terus memperbaiki perkembangan dan penjelajahan idea dan menggunakan diari visual sebagai alat pengajaran untuk tugasan dan projek mereka.

ACKNOWLEDGEMENTS

I would like to express my sincere honor, special thanks and appreciation to my supervisor, Dr. Roslina Ismail for her continued guidance and encouragement, without which this work would not been possible. For her unwaveing support, guidance and insightful advice helped me in my research writing of this thesis, I am truly grateful. I would like to express thank you for the accomplishment of this master study. Also would like to express my sincere gratitude to Associate Professor Dr. Abu Talib Putih and Dr. Sabzali for their constant support and motivation.

Besides, I am also grateful to the all the lecturers and staffs in the Department Cultural Center ,for their paitience , and kind support towards the succeful completion of my Postgraduate Master Program.

Most of all, I would like to express my gratitude and love to my husband, Kelvin , children Brendan and Shanice, for their patience and their unconditional loves and supports to me for my postgraduate studies. Lastly, I wish to thank two of my loving and supportive friends and sisters, Wang Chen Yong , and Dr. Maithreyi Subramaniam constantly provide me great moral and spiritual support.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

CHAPTER 1: INTRODUCTION

1.1   Research Background

Visual diary, also known as visual art diary, or art journal has historically been developed and practiced by many artists and designers. The earliest form of visual diary are evident through sketches and drawings from famous great masters, such as Leonardo Da Vinci and Michael Angelo, to name a few. These great masters and other artists have been drawing using sketchbooks, or can simply describe as a visual diary, as early as 14th to 15th century since the Renaissance and Baroque art period. Artists and designers, used visual diary mainly to record down their journey of making art processes or sometimes, to list down step by step of the engagement of making an art piece. In a visual diary they are able to experiment and express their thoughts and feelings through their imaginations.

The practice of visual diary is widely used in the secondary school art program and art studies for the art subject in high school. Admittedly, at the tertiary level in many creative arts and design program too has begun to encourage students to practice using a visual diary as a tool to develop the ideas and ideation process. For recent study, visual journaling has also been practiced and applied in many faculties and not only in the art and design course. It has been practiced and adapted in the field of psychology, as one of the vital methods to use in art therapy. It is claimed that this practice has helped many people to be overwhelmed by the artistic drawing, and by documenting the everyday art and design practices through the visual diary, which is a way to communicate their inner feelings and thoughts. Consequently, as Wolfe (2011) mentioned, visual diary can be used as a suitable resource for classroom and realistic success in the laboratory. Students should practice it as an important role in the classroom, improving critical thinking about procedures and actions to generate an in-depth knowledge and deep-thinking experiences.

Subsequently, the enhancement of these critical thinking, and the practice of in-depth learning, the visual diary can be perceived as a great tool for the academic assessment in helping students increase in importance of idea generation process. Nevertheless, there is a lack of information, explanation and practice for students of the creative arts faculty, such as, graphic design, multimedia design, fashion design and also other faculties such as, interior, building, and product design, to perceived the importance of the process of ideation, in the involvement of the design activities during the design problem –solving process.

According to Kowaltowski, Bianchi, & De Paiva, (2010), within the design process, the design method has been used in the last fifty years to increase the design value and the productivity stakes, especially in architecture. Design methods were explored in the 1960s to decrease design subjectivity, apply science understanding more efficiently, and use data productively for technology. The method Jones developed and submitted in the (1970) was structured on the basis of input, describing what the developers know or perceive as information. On the other hand, placed on the other side, shows what the developers intended to comprehend or perceive the information. This is one of the techniques that the developers need to follow. Included are lists of instruments related to creativity fascination, brainstorming, analogy and attribute list to help the developer eliminate and remove mental blocks.

The ultimate aim in creating and developing the design methods was to improve the process and the product outcome. Of importance was the added structure to the decision-making activity in the design process. As Kowaltowski, Bianchi, & De Paiva, (2010) again asserted, many studies have been made since the 1960s, which has led to the important influences to the understanding of process of problem solving.

The main advocates of this movement were Christopher Jone, Christopher Alexander and John Luckman in 1960s. In the 1970s era, a list of important studies and methods were distributed by the exploration study and professionals, namely, Geoffrey Broadbent, Nigel Cross and Omer Akin.C Alexander, who published "Pattern language". Apart from the above, in 1983, Donald Schon contributed to the understanding of design education, in his **book/journal or article**? entitled, "The Reflective Practitioner". In design, as a form of problem solving, the issue of addressing design as a whole, or part of it, is a further difficulty that an experienced designer will tackle through the recall of known design solutions and of travelling constantly with eye, mind and hand between the parts and the whole. Thus, design is not a grammatical construction of sentence, by a combination of part to form a whole. In design education, special attention must be paid to the difficulties of progressing from whole to part and part to whole in a conscious and efficient manner. Producing design that have combinatorial qualities must be a goal in studio pedagogy. Problem solving needs to be addressed through teaching methods and introduction of tools, especially to help students to overcome hurdles in moments of lack of progress, or what is colloquially called "being stuck" (Kowaltowski et al. 2010, pp.455 -456).

Visual diary or dairying, is an imaginative path for designers to share their encounters and individual reactions to life's occasions in visual and composed frame. Through choosing and orchestrating content and pictures, students can expand their comprehension of craftsmanship, improve the appearance of their ideas and give uplifted basic reactions to visual culture. It likewise urges designer to know themselves on a more profound dimension, considering individual qualities and difficulties, qualities and concerns, and wants and dreams for the future (Cummings, 2011).

As Bernabei characterized (2010), the visual diary is broadly utilized all through the planned procedure by experts, instructors and students. It is effectively a body to encourage accumulation, recording and impression of ideas, information and plan. Thus, the visual diary is a built-up appraisal practice in planned training. The customary type of training in visual diary and visual reasoning today is to maintain a visual diary in a sketchbook. Lupton (2012) contended that, this is a procedure of catching ideas as little illustrations every day, as portrayed in his book, Graphical Design Thinking: Beyond Brainstorming. Henceforth, there is a need to work on making visual diary by experimentation with materials and procedures.

In the past, the theater chief, Fleishman (2009) utilized the term imaginative revelation while talking about the connection between inventive process and learning. The author likewise focused on that and the requirement for documentation to be identified with the distinctive phases of the inventive procedure, along these lines portraying the connection between (workmanship or design) and practice. Mika Elo (2007) likewise recaps that an intelligent association with convention has been a piece of the act of craftsmanship in any event since the period of Romanticism, which has been tested and the documentation process is already in existence. Visual diary (Figure 1.1) is also known as art diary or process diary. It is used by artist, designer and student mainly in the creative design courses namely, industrial design, graphic design, fashion design, and multimedia design. The process of recording, collecting, documenting, and gathering any means of documentation, whether it is in the form of diary literature, photographing or sketching, each process can serve as a mode of reflection (Makela, 2011).

Scott (2010) mentioned that extricating significance from visual pictures, accordingly, necessitates that students accomplish something other than take a gander at the pictures; it requires the improvement of a visual proficiency, which implies that students will have

to translate the visual, in a manner that enhance, comprehension, in-depth consideration, correspondence, and learning. The training and learning about pictures in visual diary, is broadly composed and feature the significance of connection of visual, basic and innovative reasoning. Bernabei (2009) refered to visual diary as effectively a body, meant to encourage gathering, recording an impression of ideas, information and structure. Hence, the visual diary is a built-up evaluation practice in structure instruction.

Moreover, Cornett (2011) contends that basic reasoning takes an elevated spotlight on astute and talented utilization of ideas, methods, and materials. Investigation incorporates examining design examples, aggregating proof, and utilizing assessment criteria to make decisions. It is critical for designer and fashioner to be innovative in their reasoning. The job of the visual diary is to record every one of these stages and to encourage the reflection with each account (Kolb, 2001). Students utilizing the visual diary partake in the experimental learning circle which enhances their idea generation and research aptitudes.

A model proposed by Bernabei (2010), the essayist suggested that designer utilize the visual diary for the these reasons: gathering of pictures/content/for motivation, conceptualizing of ideas – both exclusively and with others, individual reflection and research of issues, approval of idea, enumerating and creating ideas. By refining specialized perspectives for comprehension and refining individual style, resembling market patterns and styles, a survey model was proposed to be used to investigate and characterize the substance of visual diary from idea generation.

A seven weeks assignment of visual diary was offered to first year students of the imaginative expressions program in visual depiction. This task encourages students to investigate drawing as a work of art and also to generate ideas (Figure 1.1). The practical ideas of this task are seeing, considering, and creating ideas at an early level.

Fig1.1 Visual diaries of students in Creative Arts Program. Photography by author in September, 2018

In view of perception and experience of this present reality, ideation is an important process in demonstrating different illustration topics. The topic of illustrations would require thinking about line, frame and space, esteem, observation, center, deception, and the expressive, passionate parts of illustration. The students took part in illustration practices and completed them in class and as homework. The final results of the course is an expansive sketchbook; in this situation this sketchbook will be the visual diary. All illustration practices, composition and completed illustrations and fine arts will be created in this visual diary.

The collection of visual diaries, were classified, and the contents analyzed. The strengths and weaknesses of the diaries were identified. Issues such as insufficient methods or information on the process of the diaries, including the lack of involvement in traditional and basic skill such as, sketching, drawing, doodling and collage were

addressed in this research. The prominence of this tool was highlighted to enhance student-learning experience, positively impacting creative thinking and to explore the design process in the private learning higher education in Klang Valley.

Visual diary is an essential task or task for students who are pursuing the foundation year. There is an ongoing research shared by, Clarissa, wherein she proposed, visual dairying for (self) training through workmanship instruction. The researcher recommended the utilization of visual dairying by connecting it to any instructive exercises in and outside the classroom and the effect of how craftsmanship is vital to assist students with growth and change

Design process group can be an explicit kind of problem-settling forum, which includes an arrangement of steps that can be examined and talk about while producing structure ideas (Jung & Charlotte, 2015). This can be further explained that ideation generation can be pursued and discuss verbally while developing ideas. Fashioners are regularly not certain on the best way to start the craftsmanship and design making approach. This procedure is imperative for the Design and Art discipline, as this procedure is an important certification towards one's imagination. It is applicable and essential for all other creative art disciplines.

Similarly, a research over the deficient data on the procedure of diary, including the absence of association in customary and essential expertise, for example, portraying, drawing, doodling and collection among the students at this private learning higher foundation level. Numerous designers are frequently uncertain on the most proficient method to start the design making approach. Likewise, there is also an absence of certainty about communicating ideas and in the revelation and research of this exploration. This procedure is essential for the students of Design and Art discipline, as this is an important stipulation towards one's creativity. Admittedly, this process of diary,

can be perceived as a manner of producing and communication ideas. This era of activities of creative concept, emphasize and focus on seeking out methods using techniques to discover greater and new ideas (Aurum & Gardiner, 2013).

1.2 Aims of the Research

The main aim of this study is to discover the main issue faced by the students in the future to be designers from the field of creative art, since many of them appears to be lacking in the knowledge in generating ideas and understanding the Design process. On the other hand, there is also lack of emphasis in design fundamental process. Design Process, is essentially an important soft skill for students in the field of Art, Design, Fashion as well as Architecture, in order to be creative and innovative. In addition, by discovering and analyzing this study, it is indeed an effort to study the visual diary as an instructional pedagogy instrument that can assist in improving the creativity, ideations and have greater understanding in the basic process of design (Scott, 2010).

Consequently, the aims of this research are threefold, namely, (a) to discover ideation generation process in the visual diary for graphic design study program, (b) to measure student's achievement in idea generation process using a visual diary and (c) to outline the importance of IDEO model in idea generation.

1.3 Objectives of Research

The objectives of this research summarize what is to be achieved by this study. This study's objectives define the aims of the study conducted in this research.

(i) To discover student's achievement for idea generation process in visual diary.

(ii) To analyze the mean scores of the visual diary assignment

(iii) To determine the effectiveness of IDEO model for ideation generation.

1.4   Statement of the Problem

There is an absence of comprehension in ideas creation. Imagination has dependably been at the core of business (Amabile & Khaire, 2008). Creative intellectual is particularly vital to design firms such as engineering, inside plan, visual design, scene engineering and industrial design (Huber, Leigh & Trembaly, 2010), has urged that there should be an increase of learner's understanding in creative processes to be applied in the classroom so that learners are able to perform effective creative thinking.

There is less accentuation in planned major process among the creative design practitioners. Jung Soo Lee (2015) asserted the improvement of structure ideas in the early attire design process: a pilot thinks about design specialists, guarantee that plan procedure is an explicit sort of issue solving that includes steps, such as to recognize, disclose, inquire and contemplate. Thus, this type of reasoning procedure, has been likewise drilled and examined in the item, building and designing plan fields.

In the plan operation, a lack of learning keeps the structure discipline down. Structure and planning are such broad concepts that they can imply to virtually any operation that involves changing, arranging or executing exercises and constructing and molding ancient rarities just like administrations, increased realities and social circumstances. The investigator focused on the structure ideation of significant products in this research, and the definition of ideation pursues the point of view of the item plan. Different significant portrayals of the structure operation have provided the subjective scientific way to cope with design. Design process models suggest creating a structure arrangement through progressive specific scheduling phases. Ideas are developed at the beginning of the operation, marked as, the duration of structuring applied or age (Howard, Culley &

Dekoninck, 2008)

According to the review from Horst Rittel (1972), Design thinking is a holistic concept for designing cognition and learning that allows students to work successfully in multidisciplinary teams and bring about positive, design-driven worldwide changes. As a problem-solving strategy that has been attempted and tested with socially ambiguous problem environments, it deals with every day-life-problems that are nevertheless hard to fix–"wrong issues," as it was called. Hence, Design thinking is an integrative concept for designing cognition and learning that enables students to work successfully in multidisciplinary teams and bring about positive, design-led worldwide change. As a problem-solving strategy that has been attempted and tested with socially ambiguous problematic environments, it deals with every day-life-problems that are nevertheless hard to fix–"wrong issues," as it was called Design thinking".(As cited in , Rauth ,Köppen, Jobst,& Meinel,. 2010).

According to Ben Jonson (2005), the aim was to catch the use of structure in ideation as it occurs in ordinary structure. In his perspective, ideation indicates early processes in which ideas, thoughts or portrayals are produced, created and conveyed as planned. The ideation stage results in an underlying idea. Jonson also (2005) characterized, the concept as an essential component of the believed that could be theoretical, visual, concrete or inherently unique. It is therefore a depiction that may rise in the frame of the mind or the material. The terms, plan concept and structure idea are now and then used conversely in design examination. Be that as it may, the concept of structure is described as a finished proposition in a few plan reviews, which joins a distinctive concept, but also in line with the relevant objectives that are differentiated in the problem of structure.

Interestingly, from the study of Garnham, Oakhill & Gilhooly, it was mentioned that, the central idea for creativity generation is the capacity to create thoughts. Some psychologists and philosophers returning to Aristotle and Plato, asserted that the formation of ideas could be explained by association. Moreover, many of these researchers have asserted that thinking includes moving from one concept to another through an unimaginable chain of connections and thoughts. Thus it was thought that the growth of thought was a method of accumulating connections. Therefore, it can be suggested that the ability of an individual to solve an issue is explained by their ability to create associations (Aurum & Gardiner, 2013).

1.5 Research Questions

Through this study, some important research questions were raised. The research questions invite other questions in discussing the problem statements. The three research questions that guided this study were:

1.5.1 Primary Research Question

RQ1: What is the overall grading in the student's academic achievement?

1.5.2 Secondary Research Questions

RQ2. What is the mean score and percentage for visual diary assignment based on the five dimensions of IDEO model?

RQ3. How effective is IDEO model for idea generation?

1.6 Significance of the Study

The significance of the findings of this research is to provide the students of Creative Arts Program, a better understanding and views in the fundamentals of design process. It will also develop a stronger outlook in generating ideas and disclosing the stages and step by step idea development for students in the Graphic Design, Multimedia and Fashion

Design Programs. This study was conducted for the structure of a tertiary level for the diploma of Graphic Design program, by associating it with the visual diary and adapting design thinking models as a practice of design thinking theory; This study also tests a new instrument built to increase the students' creativity, and ability to interpret and understand idea generation and solving a design problem in their projects and assignments. This research is essential since this investigation can be beneficial to students and instructors. The utilization of visual diary can be connected to any training courses for tasks and assignments. Furthermore, for researcher, this research will disclose a new way and tool to determine whether the students have acquired new ability and knowledge towards an increased demand of creativity and design approach.

1.7 Scope of the Study

This study is confined to students enrolled in the art programs, namely the Graphic Design, Program for the Department of Creative Art School in a private learning higher institution, Setapak, Kuala Lumpur. A total of 35 students participated in this study. Their visual diaries were collected, analyzed and assessed. A variety of dairy samples were photographed, labeled according to the content, visual elements, material used and documented in the diary. This study is only confined to a local private university in Kuala Lumpur.

1.8 Theoretical Framework

The theoretical framework is referring to (Abend, Gabriel, 2008) theories that are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions. The theoretical framework is the structure that can hold or support a theory

of a research study. The theoretical framework incorporated the formalist theory to analyze the visual diary created by students (Dazkir, 2013).
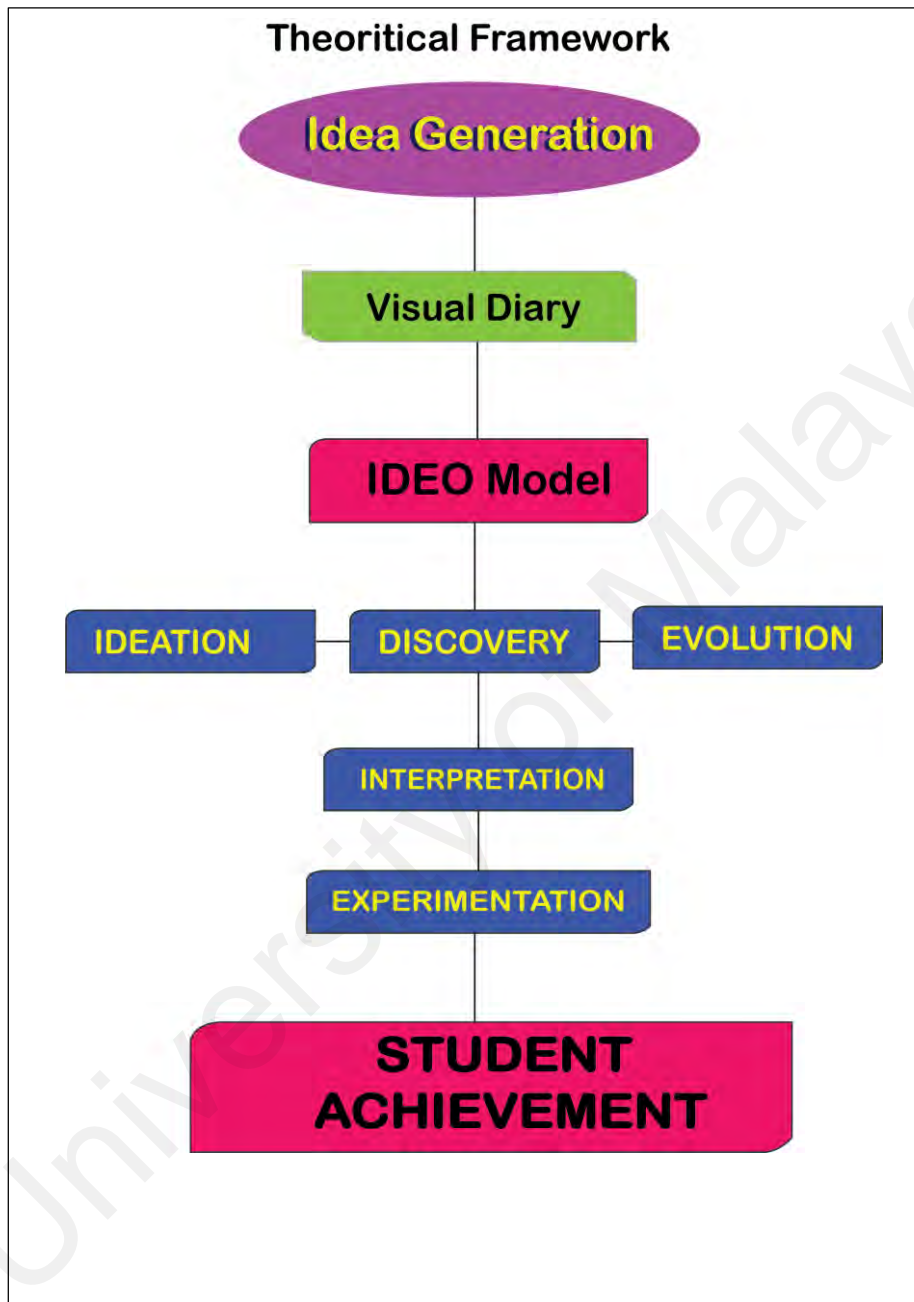
Fig.1.2 Theoretical Framework IDEO model adapted in this research.

1.8.1 Background of the Theory

Based on the ideational theory of meaning, implications of words are abstract ideas. This theory, the basic safeguard (although not trend-setter) of which is Locke, is presented in Book II of An Essay Concerning Human Understanding (Locke, 1996) (to which we refer by chapter, portion and section number beginning now and in the foreseeable future). Locke characterizes the concept as the brain considers itself at all, or is the fast object of recognition, concept, or understanding. The writer divides thoughts into two groups: fundamental and complicated. New concepts can be obtained from current ones through arrangement, correlation and deliberation. Most mediators agreed that two types of concepts must be acknowledged: those that depend on immediate discernment and those that are gradually conceptual. Thus, concepts generate a notion that is uncommon. Despite the fact that, according to Lowe's study, "idea" does not mean "picture," the Nominal Essence is applied to different ideas. As they have joined to ascribe to generate multiple layers of concept, according to this theory, it is discretionarily select some of them as perceived picture. This could assist people to understand and to express objects and identify ideas. Hence ideas establish an uncommon kind of idea. Despite the fact that "idea" does not signify "picture," To separate ideas from one another, according to Lowe's study, the Nominal Essence is applied. As per this theory, among ascribes joined to build a perplexing idea, we discretionarily pick some of them as perceived picture. This could assist us to identify objects and characterize ideas. (As cited in Chitsaz & Hodjati, 2012).

As today, Chitsaz & Hodjati (2012) had characterize, these properties give the vital and adequate conditions to decide if an article has a place with a class. In the study of Laurence & Margolis (1990), this conceptualization theory is known today as Classic Theory and there are some fresh forms of it called Neo-Classics. Locke's theory of

concepts has many views and is used as his epistemology's assumption. By "semantic," we mean, the link between words and thoughts: words in their vital and rapid significance, however, they constitute nothing in the subconscious that uses them. Here, we leave aside epistemological and ontological parts of Locke's theory and focus only on its semantic highlights. By "semantic" we mean, the connection among words and ideas: Words in their essential and quick meaning, represent nothing, however the ideas in the psyche of him that utilizes them. Subsequently, words are indications of emotional concepts in the ideational concept of meaning, not issues in the outside world (as cited in Chitsaz & Hodjati, 2012).

1.9   Limitation of Study

The limitation of this study is due to constrain of the sample size, as the number of students within the sample is quite small in proportion to the target population. Only 35 respondents were included in the sample size of this study. The study sample is limited to the first year Graphic Design program. The main limitation was that the allocated project would include written comments in the visual diary, to explain the topics drawn and researched in the visual diary. Some samples may have missed out on the written timeline to clarify in this visual diary and to document more information. This can lead a lack of information knowledge in this study.

Furthermore, collection of data is conducted during the academic semester, and it is almost impossible to do assessment on the samples while students are pursuing their studies during the semester. Thus, a restriction of timeframe and size of sample is limited due the subject or courses offered according to a particular period of academic semester. Hence, the assessment of the samples will take place in the following semesters. Another factor was due to lack of time and energy, having to analyze data gathered in a very short period of time. The samples gathered may not show creative input in sketches, drawings

and ideas for analysis, as students may produce poor quality work, at minimum efforts due to the rush or having to submit their visual diaries as part of assignment assessment. This may have made absence of data break down in this exploration. Besides that, gathering of information took place amid the scholastic semester. Results and marking had to be made within a tight deadline for assessors to grade and mark the samples of diaries from students.

1.10   Definitions of Terms used in the Study

For purpose of clarification on the nature of this study and the way it is conducted, the definitions of terms are provided as follows:

(i)   **Diary:** In education, a collection of literatures and in art, including visual studies, usually kept over a course of time and often used to promote student reflection and to teach specific types of higher order skills. (Frye, 2002).

(ii)   **Design Thinking:** Design thinking represents an additional problem-solving process that takes advantage of divergent and convergent thinking. It is the combination of analytical thinking and intuitive thinking. (Vogel, 2014).

(iii)   **Idea:** An instant thought on a particular design problem to solve it, idea is an independent thought. (Kadry, 2015).

(iv)   **Visual:** The visual part of the concept might be a specific image or color scheme. It might be an idea to use circles prominently. (Kadry, 2015).

(v)   **Visual Literacy:** the ability to recognize and understand ideas conveyed through visible actions or images (such as pictures). Early definitions of visual literacy outlined various cognitive strategies and skills that one needs to make sense of visual images. These skills were conceptualized as individually developed cognitive

abilities used for understanding visual images regardless of the contexts of production, reception, and dissemination. More contemporary definitions suggest visual literacy to be conceptualized as a contextualized, embedded social practice as much as an individual, cognitively based ability or set of visual competencies. Visual literacy is complex, multidimensional, and embedded within a range of visual, cognitive, aesthetic, and affective dimensions (Callow, 2003).

1.11   Organization of Study

The study consists of five chapters, namely introduction, review of literature, methodology, findings, and conclusion. The first chapter gives the reader the idea of the importance of this thesis in order to get a clearer understanding of what this review is all about.

The second chapter discusses secondary sources based on the secondary sources of this study according to key phrases. The key discussions are about the development of ideas requiring participation in the design process. On the other hand, using the visual diary as a tool for students to achieve a superior understanding (Vogels, 2014) of how to produce ideas and develop problem-solving skills. All of the materials in this report gives both the researcher and the readers a deeper understanding about visual diary.

Whereas, Chapter 3 outlines the research methods and procedures for data collection and treatment with the goal of exploring how the practice of using visual diary by students for assignments, design and innovative tasks, has defined the role of the process of developing ideas. The collected findings are to be discuss and presented in Chapter 4.

Last but not least, Chapter 5 will look at the relationship between the findings of the study and the theoretical context, literature, research questions, methods, and statistical

analysis. In addition, Chapter 5 also provides recommendations and suggestions for future study.

1.12   Summary

Many researches have carried out studies on the usage of visual diary as a tool for students' academic achievement, as well as the adaptation of visual diary by students to generate deeper meaning in their creativity. Many institutions have been reportedly using visual diary study as a reflective tool in painting for high school projects and assignments.

As stated in the study (Scott, 2010), course project experiment, tasks and media experiment, Art Educators used sketchbooks as a method for students to practice skills. However, there is still a lack of understanding in the development of ideas to enable students to participate in better design thinking. The findings suggested by the current studies and the conflicts among the theories differ greatly. Not much research has been carried out to examine the visual diary as a learning resource enabling learners to use it as an instrument to explore a suitable art and design assignment and school activities. Hence, this practice of using visual diary to generate ideas has not been widely implemented and practiced at the tertiary levels of local art institutions and universities.

Hopefully, through this research, the most up-to-date research on the generation of ideas information and method would be available and provided for the current graphic design study program of the Department of Creative Art School in the private learning higher institution, Kuala Lumpur, and also other local tertiary creative arts universities.

CHAPTER 2: LITERATURE REVIEW

2.1   Introduction

This chapter reviews past research on visual diaries which have been practiced and utilized in secondary schools. It is also practiced broadly by specialists, as summarized by Scott (2010) that the objective in visual dairying is to urge students to deliberately practice their subliminal personality and investigate their creative reasoning procedure that is identified with this phenomenon. As Singh, Chan and Sidhu (2006) mentioned, when a study topic is acknowledged, a literature review must be included. Both the studies and conceptual literature should be included in the evaluation. It generally requires research by other researchers who examine the same variables and associated problems in regard to the basic theoretical and experimental contributions. This study will review the practice of making, creating and keeping a visual diary, also known as visual journal that has been frequently used as a tool for secondary schools to enhance learning, not only in art and design, but also in other subjects. This tool is also used in English and Science subjects, to record observations and experiments. In Mathematics, the visual diary is used to explore theorems and formulas. Whereas, it is used in Social Studies to explore cultures and historical studies. Whilst in the subject of Arts, visual diary is used as a tool for students to do experimentation and exploration in art, crafts and design. These visual diary or visual journaling experience is very similar to sketchbooks. Nevertheless, sketchbooks are also used to explore ideas and practice techniques. Hence, both the sketchbook and visual diary are commonly used by students and designers in the course of their daily art and design activities.

2.2   Visual Diary

Visual diary is often link to the act of recording down ideas in anyway and not limited to any subjects and themes. It is often making connection to our creativity. As pointed out by Dorst & Cross (2001), creativity is often distinguished by the occurrence of an important event, i.e. the so-called creative leap. Sometimes this event happens as a sudden insight that the designer distinguishes instantly as important. However, sometimes the designer (or an observer of the design process) is not able to determine or point out the happening of a design process, or the moment when the key concept begins to emerge. Deep thoughts and creative outcome descriptions of creative events made by the designers are sometimes, not dependable. Therefore, designers and students can use a visual diary to record their thoughts, ideas and generate multiple ways to view their subject matters, to make connection to the creative design process. This research attempts to investigate the use of visual diary as a tool to help creative practitioners and students to generate and develop ideas. As Springgay, Irwin, Leggo & Gouzouasis (2008), have pointed out that the visual diary may also help students assess a moment, experience, feeling or idea, by combining designs with images to learn to evaluate an event, experiment, a sense or an idea. Through this stage, learners can explore, experiment with their thinking and emotions by accumulating different ideas and ramifying their minds (As cited by Scott, 2010). Scott noted that visual diary practice has been widely used as students' assignments and various subjects in schools and many creative and art programs, including art therapy subjects in psychology programs. However, it appears that students have not been taught, how to generate ideas and have a better understanding in the method of generating ideas in the design process. Therefore, there is a need to emphasize on the idea generation process, where students are encouraged to learn in different ways to create and generate thoughts. This tool can be regarded as a practical instrument to create more opportunities for students to explore methods to collect fresh thoughts.

2.3   The Early Visual Diary Practice

A diary has been used for practicing drawings and making art for a relatively long period of time. The earliest form of visual diary was known as a visual art diary, although throughout the long span of history many artists and designers have created and practiced and drawn art journals. The early form of visual diary can be traced to the sketches and drawings of famous great masters, such as Leonardo Da Vinci, Michael Angelo and others. Artists and designers, used visual diary mainly to record down their journey of making the art process or sometimes, it is to list down step by step of the engagement of making an art piece. In a visual diary they are able to experiment and express their thoughts and feelings through their imaginations.

In particular, Leornado Da Vinci, one of the greatest art master of the 14th Century Renaissance era, used visual diaries to generate ideas and to record his reflections, through his drawings and sketches. According to Scott (2010), it was found that Da Vinci's diary has around seven thousand pages, containing perceptions and considerations of scientists that he venerated, individual reflection on life structures, water, illustrations, herbal science, topography, works of art and more. Da Vinci's diaries, involves himself as, *inter-alia*, a researcher, naturalist, designer, craftsman, as can be discerned, from the record of his ideas based on his naturalistic thinking and concepts. The great master has certainly had vast topics and drawing themes in his visual diary. Often his sketches and drawings are accompanied by his semantic habit that is evident from his diaries.

As Trueit (1995) said, the word "diary" is taken out from the French word day, which stands for "the day," whereas the English word diary is a subsidiary of "late diurnal," which means "every day." In this way, a diary is a composed portrait of the day and combined the roots and consequences of these root words. In this modern day and age, the cutting-edge diaries, although similar to the more customary composed record of a

day, have advanced into a more extensive and progressively inventive endeavor. The practice of recording diaries has progressed towards becoming just a day by day process into a chronicle for life. Diaries go from composed depictions of exercises, documentations of enthusiastic battles, and discussed among self and the world, to transcriptions of movement encounters (As cited by Scott, 2010)

Scott (2010), also asserted, that there are always some occasions, events or thoughts to be expressed in one's life. Everyday there may be some interesting or incredible or as little as very ordinary daily stories. Visual diary, likened to a journaling process will have permitted the author to list, document, assess, explore and express ideas on his or her life. Hence, it is the process of listing, recording, evaluating, examining and expressing one's thoughts on one's live. Whether Da Vinci was thinking about his next exceptional thoughts for his painting and drawing, or any invention of a genius, such as Edison, records of their diaries have led to many historical facts, revealing how the excellent masters have worked in the past. Visual journal is effectively, the platform for documenting and reflection. Thousands of years ago people have devoted themselves to journaling throughout the globe and tales of their achievements and endeavors were found. Although questions for the historians could not be addressed right now, their visual journaling have however, provided many people with an in-depth view and insights that could be used as a potential guide for others.

Visual journaling or diary is relevant in various aspects of life, involving, our culture, our environment, society, our profile as well as our social development circle. In a nutshell, Todd-Adekanye (2017) in her studies summarized that, these visual journals offer great helped to students, designers, and artists to list down their ideas and to resolve issues. In addition, the diary process is very personal and if executed well, it may lead one towards a better understanding of ourselves better. Many great scientists and artists

had practice dairy making. For instance, Da Vinci's journals are full of visuals, images, drawings and notes and writings where he lists down his thoughts and comments or facts about the subjects he studied. Scott also (2010) stated that, the journal of Lewis and Clarks have survived to this day and still referenced in historical writings. Thomas Edison, the great inventor, who was very much similar to Da Vinci, had always listed down and recorded his thoughts and the formations of his inventions into drawings. One of his most interesting and inspiring idea was the light bulb, where he had produced many drawings depicting the idea of a type of device that shows the functions of recording. This device also showed an indication of playing back the message. Today this great idea has successfully channeled into the progression and creation of an answering machine.

Referring to Leonardo's sketchbook (Figure 2.1), The Vitruvian Man was created by Leonardo da Vinci around the year 1478. It is accompanied by notes based on the work of the famed architect, Vitruvius Pollio. The drawing, which is in pen and ink on paper, depicts a male figure in superimposed positions with his arms and legs apart and simultaneously inscribed in a circle and square. The drawing and text are sometimes called the Canon of Proportions or also known as, Proportions of Man. In addition, the Encyclopedia Britannica online states:

Leonardo considered his anatomic drawings and Vitruvian Man as a cosmographic of the minor Mondo (cosmography of the microcosm), the great picture-chart of the human anatomy which he produced. He thought the functioning of the human body analogous to the functioning of the cosmos. It was shown in fig (LeonardoDaVinci.net, 2011)

Notable scientists frequently contemplated and confirm in their diaries, records of the inventive procedure. Leonardo da Vinci recorded his reviews depicting the subject of his illustrations and day by day perceptions in a sketchbook. Hence, it is deeply inspiring to distinguish that, most of the great artists in the early 14th to 16th century have treated their

visual diary and sketching process as to perfect their ideas of drawings and simultaneously, many of these great artists had benefited from discovered new ways, new sights to improve on drawing skill, experiment on the drawing medium. They will have labelled and studied the subject, form and content of their paintings to achieve the most creative and unique master piece of art through these journaling process.
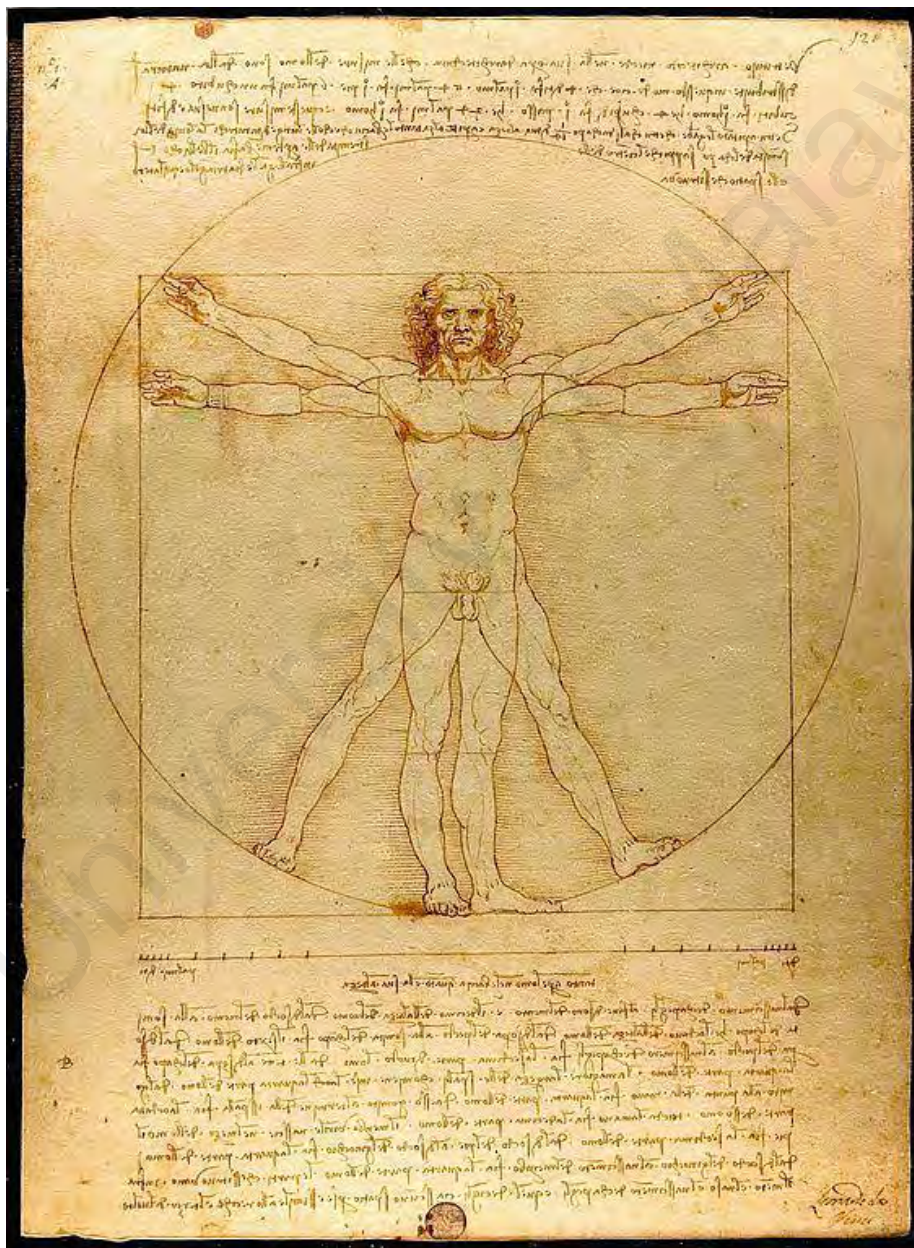
(LeonardoDaVinci.net, 2011)

2.4   Ideation theory

In the theory of ideation, Chitsaz & Hodjati (2012) claimed theory is represented in Unified Modeling Language (UML), which aids the understanding of the theory in all the ideas which are used in the ideational. UML was originally developed for programming frameworks as a visual representation. UML is helpful to visualize the theory of ideation, model conceptualized characteristics in subjective science and respond to ideational theory objections. Although UML could be suggested as a good demo device, it should be observed that for this purpose this was not designed. Thereafter, some philosophical reflection, as shown below, seems vital. As Booch, Rumbaugh & Jacobson (2005) asserted, "Class" is the key "Thing" that adapted in the UML which is characterized as, expresses on a lot of objects, which share many similar characteristics, activities, connections, and writing" (as cited by Chitsaz & Hodjati, 2012).
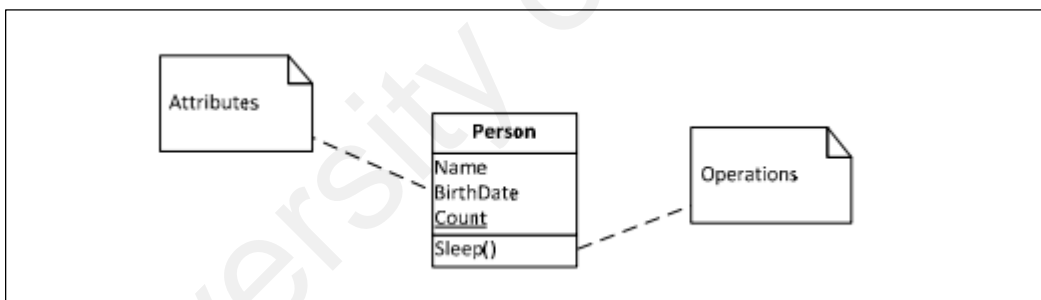
 Figure 2.2. A Simple Class (Maziar Chitsaz, 2011)

Chitsaz & Hodjati (2012) reasoned, on the relation between the "Class "and "Thing" using the UML. Both of these representations portray a lot of objects that share similar characteristics, activities, connections, and linguistic. There are two key focal facts to be noted: 1) Class is definitely not a lot of articles, yet portrayal of the set. This segregation encourages us to relieve some experiments of set theory. 2) This representation could incorporate both interpretation of articles which are individuals from the set and interpretation of the set itself. For instance, when we state Person has a Birthdate characteristic, we imply that each individual which this class means, has a Birthdate. In

any case, in the event that we state Person has a Count trait, we do not imply that each individual has a check. Clearly every individual is only one individual; Count ascribe has a place with class, i.e., extent of this piece of portrayal of Person is classifier and not occasion. Classifier properties are separated by underline. Figure 2.2 indicates Person class with three examples of qualities (extent of one of them is classifier) and a task.

The conclusion above is a mixture of hierarchical ideas and organization. Chitsaz & Hodjati (2012), had come to an assumption that, where a number of the characteristics are expanded to a more advanced set of characteristics, part of its significance would come from class relationships that would produce a fresh, compliant version of ideational theory. Hence, UML is an ideal visual modeling tool suitable in representing ideational theory of meaning, clearly. Class is the main component of this modeling, representing concepts which could be simple or complex. It takes into account various attributes and its constituents include, operations and relations as well as objects. In ideational theory of meaning, reference to the word itself is its meaning. Therefore, the importance of relation in conceptualization has made it possible for Generalization and Association to model semantics of ideational theory. Additionally, the enhanced idea of class and object is able to respond to objections to ideational theory, representing second-order concepts and a basic or essential attribute shared by all members of a class.

2.5   The Development of Diary Practice

Eastman's study (as cited in Todd, 2017) shows that record keeping, whether open or private, has been a significant human endeavor in the process of composing ideas. Having an internal record-a journal for individuals is one of the most, timely advances in history. With sophisticated technology, the imaginable results of diary maintenance have progressed. Despite the fact that early online diaries were similarly transmitted to blogging, since then different applications using different gadgets and devices have been

developed to improve the way you record your life in a diary. These include the price of usage that extends well beyond the composite 'process diaries' diary–management of distributed storage, diary-sharing and illustration of substances from other administrations online; in particular, web-based social networking (such as Facebook, Twitter), and self-sufficient apps (e.g. Moves, Fitbit). Therefore, they strengthen the comprehensible mix and curation by composed records of various media, especially photos. Logical metadata (e.g. timestamps, labels made by the customer, GPS region and environment) can be generated on each passage. This supports sophisticated hunting and journal content association. Finally, brilliant journals in two distinct aspects are self-sufficient. They push the initiation limit through the programmed import and age of journal content of cell phone and online networking posts, for example. These are then acceptable for the customer to comment on or change. As Wolfe (2011) states, that open debates, various views and solutions to issues, should be examined and different opportunities explored. Today, most media courses use a visual journal, but many people are assumed of using it not to the furthest extent possible. We can enhance results for our learners by thoroughly redesigning the objective and usage of the visual diary. As we venture into the digital and rapid growth of media and the social media, many apps have developed both in the mobile and tablet technology. This diary method should emphasize on how practical education and learning encourages the continuous research and reflection on spontaneous experiences. This can be used to teach every practical job, including animation, cinematography, photography, web design, comics and sound design. The evolution of a visual diary is highly versatile and can be adapted to the necessity of a particular task or practice under many circumstances. It is a series of events that clearly illustrate artistic and intellectual development. The initial form is irrelevant, and relies on learners' working conditions and methods. It could be a scrap sheet, a sheet binding, a journal, or a pad.

In contrast, Scott (2010) said that the visual newspaper is an instructional environment for the 21st century. On the other hand, the diary itself is a type of information compilation, lectures and observations based on the teaching policies described in the education environment of the 21st century. However, in the studies conducted by Bustle, journaling might be an efficient teaching instrument for the visual generation of the 21st century. We must regenerate established education methods and take fresh and innovative strategies such as interdisciplinary learning, critical analysis and investigation, creative growth, and real-world relations, into account as we migrate to a post-modern paradigm. (as cited in Scott, 2010)

2.6   The Visual Influence

In Marzano 's research, Pickering & Pollock (as cited in Scott, 2010) argues that, like journaling, the visual representation concept has proved to be useful to pupils. However, contrary to journaling, the benefits of visual representations were explored in direct relation to the student achievement. Psychologists developed a theory of how humans retain knowledge in the 1960s, when the practice of journaling was studied in the United States. The theory suggests the brain, language-based data and picture-based data are processed in two ways. This theory is also called dual coding. This form of language method for storing data is to store 14 data in the formatting phrase style. The brain gets orally or in writing and shops it in a comparable format. This reflects the storytelling newspaper. In comparison, the brain reacts to visual or physical stimuli in the visual way of information storage. In the context of the occurrence, the brain stores the data as a related picture or feeling. Findings indicate constantly that the bulk of data submitted at college is received by the pupil in language mode. Scott (2010) also emphasized, students, while strongly influenced by the visual, are more often engaged in verbal and written form. It has been shown that the active participation of students in the development of

non-linguistic representations activates and increases brain activity. Although the visual journal appeals to novices by integrating writing into the common linguistic roles, it also encourages them to use their visual way of thinking visually.

In the study of Bustle (2008), it was mentioned, that the most mainstream diary in the art classroom is the sketchbook. The drawing book is usually reserved for drawing and mastering purposes. The journal is a powerful tool, commonly used by students, wherein, assurance in their confidence is directly linked to the journal's perceived achievement.

There is a wide difference between student perceptions of journaling and the art education process. While many students find the process of maintaining a sketchbook tedious and seemingly useless, many art educators see this journal as a place for formulating ideas, experimenting with concepts and mediums, and practicing drawing skills (as cited in Scott, 2010). This journaling method should be taught and commonly practiced not only to students of design and art as early as at high school level, but also to the tertiary art education level. As for that, students will be exposed to learning how to formulate and be innovative in the process of art making and design.
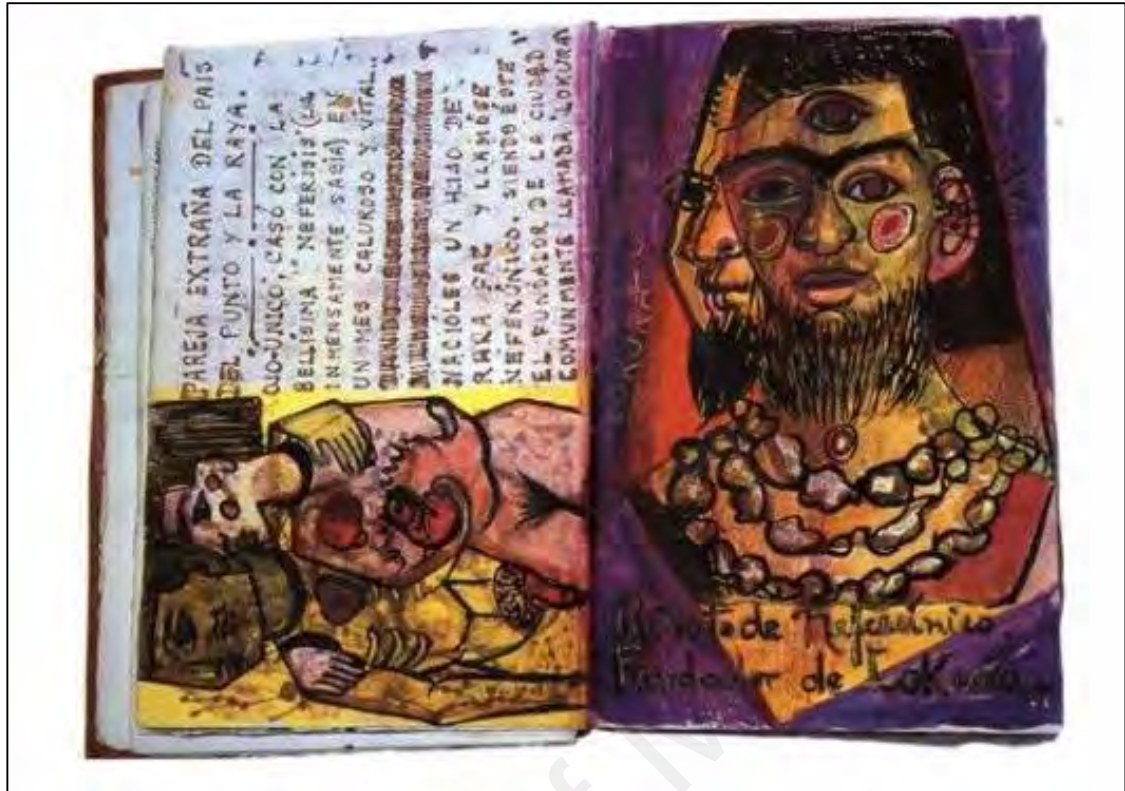
Figure 2.3. Frida Kahlo sketches from her visual diary. Retrieve from https://sketchesandjottings.wordpress.com/2011/11/29/fridas-diary-her-tortured-art-diary/

Frida Kahlo Calderón, a Mexican, is regarded as one of the 20th Century's most significant artists. This great artist too has practiced making her own visual diary in many ways to connect her drawings, paintings and expressed her thoughts and her ultimate soul and feelings in her visual diary. Although she was born in Coyoacán in 1907, she changed her birth day to 1910, paying tribute to the revolutionary Mexican Revolution. She had been the third daughter of Catholic, American, and Spanish ancestors Matilde Calderón y Gozález, and of the Austro-Hungarian German photographer Guillermo Kahlo, a Jew. Frida's early trauma encounters are a result of acute poliomyelitis complications, which affects her at the age of six. As a result, she had a hypotrophy for her right lower limb and a corrected foot that led her to be known as, 'Frida wooden leg'. It resulted in her wearing

lengthy, exotic ruts and slacks–dresses that later became her trademark. Between 1922 and 1925, after having been engaged in a serious accident between a trolley car and a bus, she endured several wounds and fractures, she studied medicine, which was disrupted at age 18. Fig.2.3, depicts Frida Kahlo's sketches from her visual diary.

The accident was a decisive factor in the beginning of her paintings. Because of her tragic life experiences and sorrows which she has to go through, involving many surgeries for her crucial illnesses. Frida had expressed her pain, sorrows, feelings of loneliness and love towards her husband. She has bravely doodled, painted and splashed ink and colors in her art diary. In her visual diary, she has portrayed many writings, with little explanation on the colors used and meaning of a particular subject in her drawing. A mirror placed on a canopy that was on Frida's bed allows her to deal with the boredom of depicting herself, which constitutes a large portion of her works of art.

As Bernabei determines (2009), the visual diary is widely used throughout the design process by professionals, educators and students. It acts as a body to facilitate collection, recording and reflection of ideas, data and design. For this reason, the visual diary is an established assessment practice in design education. The synopsis of a visual diary course describes it as a subject for students to generate and create ideas from a variety of unexpected sources. This course also introduces students to fundamental methods in recognizing worthy visuals. With the ability to look out for artistic representations, aspiring creative students are able to gather, classify, recall, reproduce and reuse these image references for generating originality. As a whole, this course acts as a way to store multiple ideas and students are able to develop good skills and creative habits in generating interesting and maybe, original ideas.

2.7   IDEO Design Thinking Model

Fig. 2.4. A Model based on IDEO Design Thinking. Retrieve from
https://www.designthinking.com/index

IDEO is a worldwide structure firm, situated in Palo Alto California, United States.
The firm was established in 1991 utilizing design thinking techniques to structure items,
administration, condition and advanced understanding (Bloomberg Businessweek, 2011).
This firm underlines Human Focused Design (Human Centered Design) to encourage
open associations and the private segment which enhances the said administration is
developing and aggressive. Tim Brown (1999) portrays design thinking as a procedure
relationship and comprehension of human needs from top to bottom. This procedure is
viewed as an exhaustive procedure in tackling structure issues, administrations and
conditions over critical thinking works in every aspect. Design thinking relies upon the
capacity of people to be instinctive to perceive designs, important ideas and to express
the person's self-articulation, apart from words and images. The procedure of design
believing is depicted as a space framework covering, and as opposed to requesting the
systematic advances. There are primarily three spaces:

i. Motivation - Inspiration is an issue or opportunity that drives business

searching for arrangements.

ii. Idea Generation - Idea age is the way towards producing, building and

testing ideas.

iii. Usage - Implementation is the way from venture to life of numerous individuals.

In this context, IDEO uses two conventional research devices and systems to enable customers to see how their new or existing tasks will be in the future. The IDEO technique includes, as protected innovation, a model of action plan, perception of information, advancement techniques, hierarchical structure, subjective and quantitative research.

2.8   The Design Process

From a review of Lupton & Phillips's book on *Graphic design thinking: How to define problems,* the authors discovered, that most design projects begin with an issue such as product improvement, logo creation, or illustration of a concept. At the beginning, designers and customers often believe too closely about issues, restricting the outcome's achievement by restricting their perspective of the scenario. For instance, a customer who claims to need a fresh brochure could do better with a website, promotional event, or marketing plan. The author explained that, if there is a developer who believes the customer requires a fresh logotype may discover a visual icon or a fresh name to function better for a worldwide crowd. There is a need to search for greener packaging that could produce fresh manufacturing and distribution technologies as well as individual products. The author's ideas are cheap and abundant at the beginning of the design process, pumped out in abundance and tossed around with abandonment. Later, when many concepts are reduced to those most likely to succeed, visualizing and testing each one will take time and money. Consequently, designers often start with a period of open-ended, playful research. It is a method that involves lists of writings as well as pictures of sketches. It includes mapping familiar territory and mapping unknown territory.

For this study, we are perceiving the techniques that developers use at the early stages of the creative process to identify (and question) the issue. Some techniques, such as

brainstorming, assist developers to produce key ideas, while others, such as interviews, focus groups, and brand maps, try to illuminate the issue by wondering what consumers want or what has been achieved before. Many of these methods could take place at any stage of the process, such as brainstorming. Brainstorming is the first step in the phase of many designers, and it is the mother of many other thought devices, so we put it at the top, to determine the methods to be used, whether informal or coordinated, or acceptable at all? Can one just sit down, and be a creative person? Most thinking methods include outsourcing of thoughts, so that they can be viewed and contrasted, sorted and paired, graded and shared. Thinking does not just occur within the brain. It happens as fleeting thoughts become things that are tangible: words, drawings, prototypes, and suggestions. Thinking occurs more and more among organizations in working towards common objectives (Lupton & Phillips, 2008).

2.9   Representations as a part of design thinking in ideation

Inventive action, pertinent for planning has been contemplated in intellectual brain research. In his double coding theory Allan Paivio (1971; 1986; 2007) contended that reasoning includes two particular subsystems: verbal and nonverbal. The verbal framework is specific for handling dialect and assumes a focal job in reasonable plan. According to his model the nonverbal framework, inevitably forms nonlinguistic articles and occasions, for the most part visual in nature. Since his spearheading research, specialists have known about the significance of visual comprehension when all is said and done and mental symbolism, specifically. Likewise, these frameworks speak to reality in various ways; the verbal subsystem helps theoretically and the visual framework aids terms of mental symbolism (Paivio 1971; 1986; 2007). Paivio's model (1971; 1986; 2007) of subjective preparation gave significant status on the job and significance of symbolism. Notwithstanding that, Akter Ahsen (1984; 1986) tested Paivio's theory and

stressed the job of real encounters in mental preparation. Ahsen contended that without the real reaction in the experience of the picture, the world would show up as an unimportant surface impression (Ahsen 1984). In the ensuing paragraphs, we will inspect three basic parts of design considerations: 1) mental imaging; 2) sketching and materializing; and 3) conceptualizing.

2.10   Design Thinking

Since, design process is constantly packed with visual artistic capacity and conceptual symbolism, it therefore assumes a critical role in a program. According to Paivio (1991), for example verse or fiction and brain science, a psychological picture has various meanings in artistic composition. He expressed that the idea of conceptual symbolism may refer to hyperboles, from one viewpoint, or in an alternate viewpoint, it may refer to pictures "in the brain" that emerge, for instance when considering commonplace spots. A psychological picture is additionally comprehended as a visual memory or picture, which could be intentionally drawn upon when required (Paivio, 1991).

In plain literature, the term 'mental picture' seems to be used frequently as an equivalent word for the terms 'inside' and 'mental' portrayal, starting from the mental research phrasing (see Eckert and Stacey, 2003). Interior portrayals are comprehended as the psychological pictures that architects initiate and process through their symbolism in connection to outer reality (Stacey and Eckert, 2010). Conceptualizing inward portrayals and outward portrayals into discrete classes is helpful for research purposes. Practically speaking, the partition between these portrayals is less clear due to their consistent communication in structure action (Stacey and Eckert, 2010).

In any case, the capacity to rationally visualize a picture is experienced as a critical part of structuring (Eckert and Stacey, 2003). The present investigation advocates an all-

encompassing perspective of mental symbolism as fundamental in exemplified comprehension. This characterizes mental symbolism as a component of other essential aptitudes, for example, physical exercises, and a capacity to comprehend implications in setting (see, Ahsen, 1984). Mental pictures are a basic piece of ideation which are rehearsed and educated by various assets in fashioners' exercises, for example, discussions, space information, accessible materials and relics, individual recollections and related feelings. Such differing assets move mental pictures that originators require for working, imparting and expounding their ideas. All things considered, there are relatively few researches concerning the job of these assets and their connection to creating mental pictures in structure. Claudia Eckert and Martin Stacey (1998; 2000; 2003) and Marian Petre et al. (2006) have led investigations concerning sources of motivation and the job of mental pictures in the field of knitwear structure.

The sources of motivation pass on data and can be utilized in early periods of plan for making multimodal affiliations (material, visual, olfactory, and kinesthetic sensations) unmistakable and explaining logical structure ideas in order to stir mental pictures, identified with the future plan (Mcdonagh and Storer, 2004; Eckert and Stacey, 2000). While gathering and choosing sources of motivation, architects make affiliations and even envision finished plans (Eckert and Stacey, 2000; 2003). As indicated by Eckert and Stacey (2000; 2003), sources of motivation fill in as a type of grapples for organizing architects' psychological pictures. Fashioners shape and review complex visuospatial lumps, which implies sorted out gatherings of components or design objects and their specific circumstances. These pieces fill in as models of classes of conceivable plans. They bear learning of past structure arrangements and give a vocabulary to new plans (Eckert and Stacey, 2000). Eckert and Stacey, (1998; 2003) additionally announced that fashioners' psychological pictures are effectively a manner in conveying new plans.

They express that architects can allude to past plans (their own, in magazines or shops) that are commonplace to their associates and clarify new ideas dependent on modifications of that psychological picture. Appropriately, associates can envision the updated piece of clothing following the verbal depiction (Eckert and Stacey, 1998; 2003). The movement of creating mental pictures or envisioning a plan object is a subjective capacity of mental symbolism that uses every single tangible mode (appearance, feel, smell, sound or flavor) (Thomas, 2014; 1999). Mental symbolism together with observation makes conceivable the plain essential mental ability of possessing fanciful and genuine space at the same time (O'Connor and Aardema, 2005).

As outlined above, regarding the case of architects in design process, creative energy empowers creators to draw upon encounters from various occasions and places and fit them to the present reality. Creative energy additionally underpins discernment when all is said and done. Elements of acknowledgment, for example, a leg of a seat that is just somewhat unmistakable, can be perceived and recognized as a component of a specific kind of furniture (O'Connor and Aardema, 2005). This capacity clearly turns into a progressively refined innovative reasoning. Designing can be seen as going back and forth between appreciation and creative energy, but observation does not just embrace knowledge openly and inactively. It also involves the encounter and development of multimodal settings and exercises which include critical thinking skills (Arnheim, 1969).

2.11 Design Information

Design information is a creative research process involving recording information to build a creative and innovative in depth understanding, namely, (i) Initial Exploration Direction Request Design, Defining Goals, Design, Developing; (ii) Design Research For Specifications; (iii) Develop Criteria Prototype Development Design; and (iv)Prototype Assessment.

This process consists of a combination of analysis and technical skills involving the creativity and knowledge of a person about a product and technical skills to achieve design goals. The literature involving the analytical stage in the design process can be referred to the model which has been described as Archer's design model (1984) and Jones (1984).

2.12 Design Process

Most of the design processes referred to above, have steps or provisions that determine a goal. One of the steps which has a design goal was introduced by Jones (1970) which emphasizes the structure of how the information was received and transformed. This step includes specifying the objectives for a design project shape. DeJonge (1984) describes the design process of a design goal starting with initial request as the first step in the design process to identify the next issue and direction of the process. Design and design framework introduced by Lamb and Kallal (1992) aims to help designers approach design issues for all levels of the target user. Identifying problems in design is the first process used in Lamb and Kallal models, emphasizing the goals for a design. Therefore, the models introduced by Jones (1970), DeJonge (1984) and Lamb and Kallal, have the same operand, that is, to identify the design problems at the initial stages and the goal setting for a design.

2.13 Classify content of Visual diary

A few visual diary examples chosen from the samples of this research have been categorized according to the visual diary material of the students. From Bernabei's (2010) study, the writer collected and recommended that students use the visual diary for the following reasons: collection of images / text / for inspiration, brainstorming of ideas – both individually and with others, personal reflection and problem analysis, validation of

ideas and concepts, detailing and developing ideas through sketching, documenting and refining of technical aspects for, understanding and refining personal style, collation of market trends and styles.

2.14   Visual Art Elements used in Visual Diary

In the Creative area, components of the visual diary are widely studied and shared among artists, designers and fashioners. It is usually taught by first-year program students in art schools and colleges who follow the creative arts course, such as graphic design, fashion design, interior design, digital design, and industrial design. The components of the visual diary can be varied from three main sections. Namely the content of diary, the subject matters which refers to a theme, topic or an idea and the visual art elements used in the diary to record and to draw out their idea or specific topic. Thus, the artist and designer are knowledgeable about the visual elements for the design, drawing and painting.

From the creator of Understanding Art, Rathus (2013), states that the line element is the main visual element mostly used by artists and designers. Lines can keep to shape, whilst light can uncover it. Shading can depict the world we see around us and uncover the mental universe inside us; example, we are blue with distress or red with fury. Surface is connected with all the feelings of contacting, with the cool sharpness of shape or the yielding vibes of substances. We exist in space; and space wraps us. Time enables us to form into what we are fit for being; time at last takes us to what we have been. We are all in movement through space, in a close planetary system that is crossing the edge of our world at a large number of miles every second, or turning on the outside of our own globe at a thousand miles for each hour. However, it is the littler movement - the movement of lifting an arm or riding through a field – that we are bound to detect and thus to speak to in workmanship.

In this way, it is important that the students understand the visual vocabulary – line, form, light, meaning, shading, air, space time, and motion – all of which are referred to as the visual components of the artwork. Rathus (2013) claimed that most designers and fashioners choose from a variety of media, like, but not limited to, form or image, drawing, painting, design, engineering, photography, materials, and pottery. They use the visual components of craftsmanship at that stage to express what needs to be in the medium chosen. They use these components in their self-articulation to design parts of a specific form, frame and material.

Visual Art Elements can be grouped into six fundamental visual elements component, namely, Line, Shape, Color, Value, Texture and Volume or space. The first visual element that is widely used is line. Art would be sunk without line, now and then known as "a moving point." Line is the most fundamental component of artistry skill; a ceaseless check made on a surface can change in appearance (length, width, surface, heading, bend). A line is a stamp or stroke made by a moving point. Lines are devices for correspondence. At the point when specialists use lines to characterize the edges of an item or to portray its surface, they are recounting a story.

1) Line quality portrays the presence of a line - its look. Diverse line characteristics like thick, thin, light, dull, strong, broken, hues and so on all will change according to how the line is translated in an illustration.

2) Shape: When a line crosses itself or meets with different lines to encase a space it makes a shape. Shape is two-dimensional it has statures and width yet no profundity.

3) Form is the three-dimensional item. Shape is just two-dimensional; frame is three-dimensional. In illustration or painting utilizing quality can suggest frame. Shading a hover in a specific way can transform it into a circle.

4) Space is characterized and controlled by shapes and structures. Positive space is the place where shapes and structures exist. Negative space is the vacant space around shapes and structures.

5) Space in a two-dimensional painting refers to the movement of objects on the surface of the picture. The plane of the picture is outside the paper or canvas of the illustration. A workmanship of two dimensions has statures and width but no depth. By using point of perspective, the illusion of depth can be achieved.

6) Value is the range of the image's delicacy and darkness. Esteem is created by a light source that shines on an article that makes shadows and characteristics. It further illuminates the subject's near or true shade. Value allows depth within a picture making an artwork looking in three-dimensional with characteristics and cast shadows, or in a scene where it becomes lighter in tone as it subsides to the substance providing the vision of depth.

2.15   Formalism Theory

Formalist philosophy emphasizes the importance of the intrinsic characteristics of a work of art as its main attribute. Lankford (1986) argues that formalism has become the most important language in classrooms for art education, where elements and principles of art/design are the basic components used to construct a structure.

First, students must learn the fundamental elements of visual art, such as line, form, color, So, they can come up with an aesthetic response. Besides generating ideas as a creative practitioner, having a good ability to understand the formal qualities of the visual elements, creating an artwork or an idea will be vital. Whether the visual elements are decided by the artist or the students, it should be noted that in the study of an art work,

not only Lankford but also Broudy (1967) argued that, formal properties may be used to establish vocabulary and processes.

Besides creating ideas as a creative practitioner, in order to produce an artwork or a concept it is necessary to understand the visual elements in formal qualities. If the visual elements are decided by the designer or by the students, it should be noted that both Lankford and Broudy (1967) argued that formal characteristics can be used to produce vocabulary in the exercise of art evaluation.

The formalistic theorists, Bell (1914/2014) and Fry (1920/2011) undoubtedly claimed that the main point of all aesthetic processes is a distinctive sensation or distinctive emotion related to aesthetic experience, aroused only by the compositional characteristics of an art piece. There should be one quality, which is the fundamental characteristic of art, and without it a subject cannot be called as an art piece. Also, Bell establishes that the vital quality of formalism is to be known as significant form. The formalism quality of works of art provokes the viewer's aesthetic peculiar emotions (as cited in Maithreyi Subramaniam, 2017)

In Bell 's theory (as cited in Maithreyi Subramaniam, 2017) it also distinguishes that the essential quality of formalism should be considered an important form. The quality of formalism awakens to the viewer the aesthetic, unique feelings of the audience. This meaningful form has been retained by the theorist as the mark of a good art that seems universal and eternal. In the same aesthetic ecstasy world, a good piece of art, whether ancient or contemporary, must take into account the significant form which leads to aesthetic feelings. Bell (1914/2014) did not explain anything specific about the nature of line, color and form connections but connected them through emotion, i.e. a specific type of emotion labelled as aesthetic emotion. The theorist also asserted that the formal

characteristics are not only used on emotional objects, but that emotion or data must be suggested or transmitted (as cited in Maithreyi Subramaniam, 2017)

2.16 Summary

There is still a lot to be learnt about the practice of using the visual diary as a teaching instrument that encourages students to exercise it and use it as a tool to explore an effective art and design assignment and school activities. In general, the literature review has shown that there is a positive connection between the use of visual diaries and the enhancement of critical thinking as well as the practice of in-depth learning, and that it can be perceived as an excellent tool for academic evaluation in helping students in the process of generating ideas. The practice of documenting a visual diary will have a positive impact towards the student's creative process and their academic achievements. However, this mode of teaching may be more effective in specific populations. To narrow the research gap on the absence of comprehension in creative ideas, a few theories have been listed and established to reinforce design thinking skills, ideation processes, and new knowledge gained, that has been adapted as an IDEO assessment through a study of new methods of finding ideas. The incorporation of formalism theories of Clive Bell and Roger Fry, was meant to clarify most of the essential terminologies of visual art elements, form and art principles. All these relevant theories were able to be used for the instructor to guide the students to develop their cognitive skills or enhance their thinking skills. To date, not much research has been carried out in this area. In fact, no research has been done to investigate the study of visual diary as a tool, (a) to discover ideation generation process for graphic design program, (b) to examine student academic achievements, and (c) to determine the effectiveness of IDEO model for ideation generation.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter describes the methodology employed in this study, with the objectives: (a) to discover ideation generation process in the visual diary for graphic design study program; (b) to measure students' achievement in idea generation process using a visual diary; and (c) to outline the importance of IDEO model in idea generation. Quantitative approach has been used to measure the effectiveness of IDEO model in assessing the visual diary assignment for the students who are pursuing the diploma in Graphic Design. This chapter on methodology also dwells in discussions of a standard form in research design, sample, instrumentation, procedural details and data analysis.

3.2 Research Design

A research strategy is a plan to follow closely to find data on a particular subject, whilst a research method is a detailed outline on how data will be retrieved and collected and what instrument will be employed. The quantitative method is suitable for this research design and procedure. This quantitative study has been used to test objective theories by examining the connection between variables, namely, the visual diary approach module and the Graphic Design program. This research design is using the IDEO model evaluation rubric and the five dimensions of evaluation criteria. The variables were then evaluated, typically on tools, so that numerated information could be analyzed using statistical processes (Creswell, 2014).

3.3   Description of Method

The study's approach is a Plan closely followed, while, on the other hand, the analysis method offers a detailed description of how information is to be collected or gathered, and what information was eventually used.

The researcher employed an experimental research in one shot study. Experimental research is the most conclusive of scientific methods (according to proponents of quantitative research) (Singh, Chan, & Sidhu, 2006). In experimental research, at least one independent variable is manipulated, other appropriate variables are controlled, and one or more dependent variable has its impact observed (Singh et al. 2006).

The study used the experimental research to identify, analyze and describe factors contributing to the idea generation in the visual diary as an effective tool for graphic design program. The method employed is one shot study that does not include the use of random assignment to control threats to internal validity. After considering various research approaches that exist, the researcher concludes that inductive approach is the best and most appropriate approach for this research, as it moves from specific observations to broader generalization and theories. Whereas, the quantitative research objective was used to test the relation between variables, namely, the rubric. based on the Ideation theory and visual diary.

3.4   Samples

The subject was selected using a non-probability sampling method in this study. The researcher does not simply study whoever is available, but used a judgment, based on prior information, to select a sample believed to provide the data that is needed. This

purposive sampling technique has been used because the researcher concentrates on a specific group of respondents who have the specific requirements to provide the necessary information (Fraenkel & Wallen, 2009). The criteria of the subjects for this study consists of students enrolled in the visual communication subject of the first -year graphic design program. These students were taught by the researcher in the first trimester of the year, i.e., May to September and April 2015. The 35 students comprised 19 males and 16 females who have completed their SPM or foundation course from the university.

3.5 Research Site

The study was conducted at a private university in Setapak, Kuala Lumpur. The university was established in 1969, where it originated as a single campus in Setapak, Kuala Lumpur and has now remained as the Main Campus. Subsequently, five branch campuses were established in Penang, Perak, Johor, Pahang and Sabah. The focus of this university is the provision of tertiary education opportunities for young Malaysians regardless of race, class and creed, who were seeking quality education, as well as meeting the rising demand for human capital from businesses and industries. With a student population of about 28,000 including international students from more than 20 countries enrolling in more than 200 programs over a wide range of disciplines from foundation and A Level to accountancy, finance, business, economics, engineering, built environment, applied sciences, ICT as well as mass communication, creative arts, social science and hospitality management.

This university offers a program in the arts under the Faculty of Creative Arts Department (FCAS). Since the inception of the faculty, seven years ago, it currently offers a program in Graphic Design and Multimedia, as well as several other program such as Digital Animation, Game Design, Broadcasting, Media and Creative Studies, Journalism and Media. The duration of study for each of the programs offered in the faculty, is three

years, terminating with an award of a Bachelor Degree upon completion. The student population in this faculty is 3000 (as of 13ʰ September 2015) including the total number of Graphic Design students as at of 16th October 2015. The number of students who enrolled in the first year of Graphic Design and Multimedia program is about 120 students; the intake per semester is an average of 100 students.

3.6   Instruments

The researcher used various instruments to assess the participants' achievements. The instrument, namely a rubric was used to measure, observe and document the quantitative data. The instrument employed to gather the numerical data is the IDEO Assessment Model (performance instruments). This instrument was developed using the IDEO Model, based on Vogel's *Design Thinking for Educators*. According to Vogel, the design thinking model was segmented into four areas that are human centered: empathic, collaborative, experimental and optimistic (Vogel, T. 2014). It is a hierarchy model, which is a manner in categorizing thinking according to five dimensions for educational learning that could be examined.

(i) **Discovery**— At this stage, the student needs to research the problem. Student is expected to gather as much information as possible so that they can define the problem.

(ii) **Interpretation**— At this stage, the student needs to look at all aspects of the research, find and understand the meaning and look from various angles and create from the facts that they find.

(iii) **Ideation**— At this stage, the student is expected to create as many ideas as possible. Generate ideas in large quantities. This process may involve brainstorming and mind mapping.

(iv) **Experimental**— At this stage, the student is expected to do experiment level and testing the ideas generated into the form, visual and product prototypes.

(v) **Evolution**— At this final stage, the student is expected to further develop or change to something new. He or she is required to compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.

3.6.1 Assessment and Score

An assessment scorecard is developed through the five dimensions of the IDEO model. This evaluation sheet is evaluated by three different lecturers of the creative department. These lecturers or instructors have also taught the graphic design program in other subjects such as photography, drawing and mixed media. Therefore, marking and assessment by these instructors is fundamental to the researcher to analyze and improve the visual diary as a tool for generating ideas for graphic design.

The researcher developed the scoring rubrics within the practical lessons. Assessment was crucial because they provide feedback during the process of making the Visual diary. During the 7 weeks of lesson, the researcher could pay attention to the process as well as the weekly activities of the subject. As such, students would learn how to assess their own exercises/tasks/assignments that were given to them.

The grading mark sheet with rubrics scores, referenced with criterion and categorized into five dimensions of the IDEO model is as listed below:

Categories	20 Excellent	15 Good	10 Average	5–1 poor	Points
01. Discover "I have encounter challeng"	Strong ideas, find many ways and willing to try new thinking and understand the challenge of an issue	Interesting ideas that need further pursuit and deeper exploration. Have good understanding of an issue	Interesting ideas but not taking risk. Being influenced by existing art piece.	Common ideas and not well developed. Need more hard work. Lack of creativity and shows no interest for improvement.	

Fig. 3.1 Discovery Dimension

Grading mark sheets were used in the whole duration of seven weeks of the lessons. In the grading mark sheet (figure 3.1) Discovery dimension, (figure 3.2) Interpretation Dimension, (figure 3.3) Ideation Dimension, (figure 3.4) Experimentation Dimension, and (figure 3.5) Evolution Dimension, the five categories employed in the scale were labeled: (i) excellent, (ii) good, (iii) average, and (iv) poor, for the assessment.

Categories	20 Excellent	15 Good	10 Average	5–1 poor	Points
02. INTERPRETATION "I learned something."	Clever transform of idea into meaningful views. Students find relevant samples and information to discover one clear direction.	Interesting and good transform of idea and relates storytelling in the idea direction.	Average and fair idea is produce. Lack of meaning and has no clear direction.	Lack of ideas and most of the ideas are not clear or has no meaning or had no relation.	

Fig. 3.2 Interpretation Dimension

The detailed narrative descriptions of each criterion for the excellent performance until very poor performance are stated in individual columns. A numerical value was assigned to each category with a value of 20 being assigned to "excellent" at the beginning of the scale and a value of 5-1 corresponding to a category of "very poor".

Categories	20 Excellent	15 Good	10 Average	5 – 1 poor	
03.IDEATION "I see an opportunity"	Students has shown ample of ideas in large quantity and also refine the ideas through (eg: Brainstorm , mind map and other idea generates technique)	Student has generated many ideas and enough quantity of idea. Students has possibilities to grow more ideas or more refine ideas.	Student has insufficient ideas and has not used any of the (eg: Brainstorm , mind map and other idea generates technique)	Student has not demonstrated enough efforts in generates ideas, students tend to give up easily and only propose limited ideas.	

Fig. 3.3 Ideation Dimension

Categories	20 Excellent	15 Good	10 Average	5 – 1 poor	
04. Experiment ation "I have an idea..."	Student shows great ability to build a model or proto product .Besides, building the final model. Also gathered feedbacks .	Student shows fair model or proto product .Besides, building the final model. Also gathered feedbacks .	Student shows limited model or proto product .Little feedbacks was gathered.	Weak in coming out a model or proto product .No feedback was gathered.	

Fig. 3.4 Experimentation Dimension

Categories	20 Excellent	15 Good	10 Average	5 – 1 poor	
05.Evolution "I tried something."	High efforts in documenting the planning and showcase of idea and concept development.	Average efforts in documenting the planning and showcase of idea and concept development.	Low efforts in documenting the planning and showcase of idea and concept development	Only minimum and limited effort in documenting the planning and showcase of idea and concept development.	

Fig. 3.5 Evolution Dimension

The criterion was developed on the basis of the weekly goals of the particular lesson based on the Bloom's taxonomy learning process.

3.6.2   Reliability and Validity of the Instruments

A reliability test was conducted on the assessment rubric to test the validity, consistency and reliability of the data analysis procedure, to be used as the assessment rubric by the researcher to cater specifically to this study and its activity. The reliability test was used on the evaluators' assessment as all three of them gave marks using the same assessment rubric; therefore, they should attain the same results. The reliability test used was Cronbach's Alpha to test the assessment rubric. The acceptable value of the test to be considered as reliable in this study is 0.50 and above. The higher the value is, the higher the consistency and reliability of the assessment. Hence, the reliability test was done on ten of the students' studio practice scores.

As illustrated in Table 3.1, The reliability test for the students' studio practice was with an alpha of 0.813.

Table 3.1: Cronbach's Alpha Reliability Statistics

Cronbach's Alpha	N of Items
0.813	5

3.6.3   Validity

Three of the assessors hold a Master of Art & Design degree. They each hold a Master of Graphic Design, Multimedia Design and Print Media, respectively. They graduated from local universities such as, LimKokWing University College of Art and Design, University of Malaya and Multimedia University. In an effort to improve the validity of this study and to minimize the potential for evaluators' error and bias, this study used three different assessors to mark and evaluate the students' visual diary assignments. All three assessors participated in this study were given one set of rubrics together with the visual diary project brief and a weekly lessons' plan to help guide their assessments of

the studio art production with marking scheme based on the IDEO model assessment sheet. The assessors involved in the assessments were given a brief explanation on how to assess the students' marking on the visual diary assignment based on the marking scheme using the criteria in the developed rubrics and the five dimensions of the IDEO model. Upon completion of assessment of the students' visual diary assignment by the three assessors, the scores were average for each section. A final calculation was created for an average score for each student. Cronbach's alpha coefficient, was conducted. The acceptable value of the test to be considered that is reliable in this study is 0.5 alpha and above. The higher the value is, the higher the consistency and reliability of the instruments.

3.7 Research Procedures

The researcher performed all the experimental sessions, which included both the studio art production and the assessment sheet for the IDEO model. A master student in visual arts education, the researcher welcomed each subject and explained the intent of the study. The assignment of the visual diary was conducted in the April trimester of 2018 from week 1 through week 7. In the meantime, the researcher conducted the model's five dimensions. Throughout the short semester analysis, the five sets of exercise and drawing themes were administered to the students during week one, week three, week five, and week six. For each practical study the allocated time was two hours.

3.8 Method of Data Analysis

It is essential at this point to present the statement on the variable in this study. The quantitative data from the studied variable is assessed according to the scale of the variable. The researcher decided to study the independent variable so that it can be assumed that it has an effect on one or more other variables (Fraenkel & Wallen, 2009).
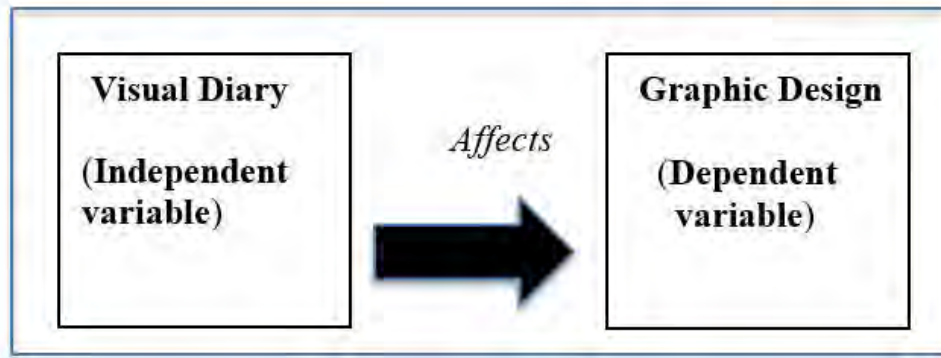
Fig. 3.6: The relationship between independent variable and dependent variable

Figure 3.6 shows the relationship between the independent variable and dependent variable. The independent variable refers to the project of Visual Diary and the dependent variable is referring to the Graphic Design course. The descriptive statistics made use of means, standard deviations and percentage to determine the students' achievements. Furthermore, SPSS and Microsoft Excel have been used as a computer analytics statistics program to support the process of data analysis.

3.9 Summary

In conclusion, at the end of the study, the researcher assembled all the results and responses carefully, and considered them before interpretation and conclusions were reached. The nine parts consist of, an introduction, research design, description of method, samples, research site, instruments, research procedures, method of data analysis and summary. This study is to investigate, how effectively the respondents were able to use this tool to generate the ideation process through the Visual Diary assignment. Descriptive statistics were employed to analyze the data generated from respondents. The results of this study will be discussed and analyzed in Chapter IV.

CHAPTER 4: RESULTS

4.1   Introduction

This chapter consists of findings, results and discussions of the data analysis related to the three research questions, as enumerated in chapter one of this thesis. The data is analyzed using descriptive statistics in line with the following objectives: (a) to discover ideation generation process in the visual diary for graphic design study program; (b) to measure student's achievement in idea generation process using a visual diary; and (c) to outline the importance of IDEO model in idea generation.

4.2   Presenting the Findings of Data

Table 4.1: Grade and Percentage obtained by students 'in visual diary assignment'

Grade	Percentage (%)
A	11.4%
A-	5.7%
B+	22.9%
B	25.7%
B-	17.4%
C+	8.6%
C	8.6%
F	0%

As illustrated in Table 4.1, descriptive statistics presented the distribution of students' scores in the assessment of their grades and percentages obtained in their visual diary assignment. The distribution is observed on the basis of percentage of students' getting grades from grade A (Excellent) to grade F (Fail) (Refer to Appendix C). From a total of 35 students, only 11.4% scored grade A, 17.4% scored B-, and most students achieved grades B with the greatest percentage of 22.9%, 5.7% scored A- and 8.6% were students with grade C+ and C. None of the students were assessed in the category of grade F.

Table 4.2: Mean score achieved by students in visual diary assessment

N	Minimum	Maximum	Mean	Std. Deviation
35	44.00	87.00	66.5	9.8

As illustrated in Table 4.2, descriptive statistics are presented for the mean score achieved by students in the visual diary assessment. A sample of 35 students (N=35) participated in this experiment. Based on the total score of 100, the mean score of students' level is 66.5. Meanwhile, the mean score achieved by students is 66.5 (SD=9.8). The minimum value is 44.00 and the maximum value is 87.00.
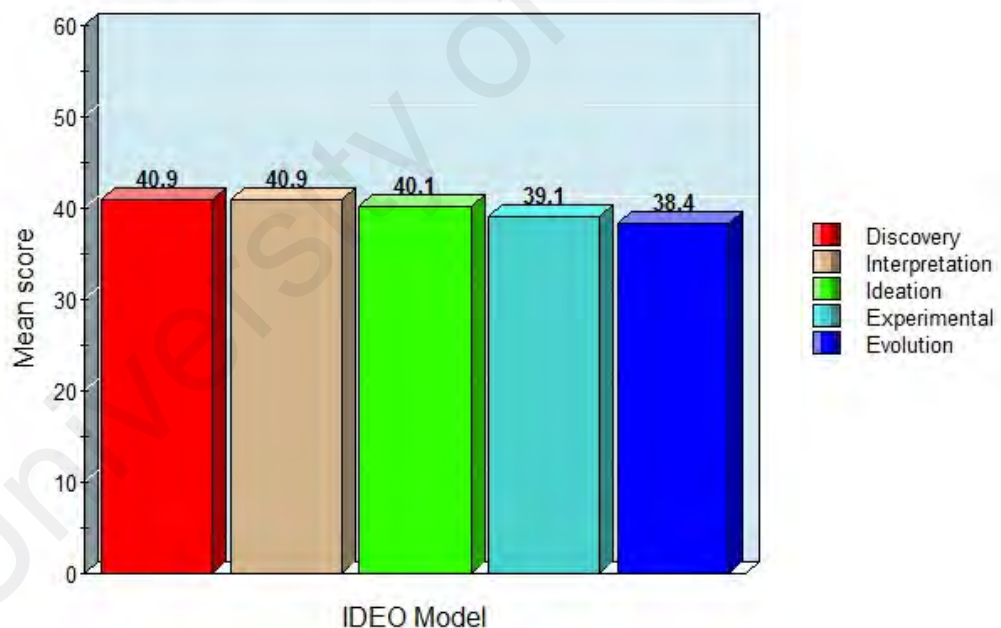
Fig. 4.1: Bar graph of the students IDEO model dimensions

As illustrated in figure 4.1, descriptive statistics are presented against the mean score of the 5 dimensions of the IDEO model. A sample of 35 students (N=35) participated in

this study. Based on the total marks, there are 5 dimensions in this model, which starts with the Discovery and the Interpretation dimensions. Students scored 40.9% for both of these dimensions. Followed by 40.1% in the ideation dimension. While for the experimental dimension, students' score is 39.1% and finally, the evolution dimension has the lowest score at 38.4 %.

Table 4.3: Mean scores for discovery dimension by 3 Assessors

	N	Minimum	Maximum	Mean	Std. Deviation
Assessor 1	35	7.00	18.00	14.51	2.36
Assessor 2	35	7.00	18.00	14.22	2.40
Assessor 3	35	9.00	17.00	12.23	2.05
Valid N (listwise)	35				

As illustrated in Table 4.3, descriptive statistics are presented for the mean scores obtained by the students, for the discovery dimension. The mean scores resulted from assessment by 3 assessors. A sample of 35 students (N=35) participated in this study. The mean score of Assessor 1, is 14.51 (SD=2.36), with a minimum value of 7.00 and a maximum value of 18.00. Meanwhile, the mean score of Assessor 2, is 14.22 (SD=2.40), with a minimum value of 7.00 and a maximum value of 14.22, followed by a mean score of 12.23 (SD=2.05) by Assessor 3, with a minimum value of 9.00 and a maximum value of 17.00.

Table 4.4 : Mean scores for Interpretation dimension by 3 assessors

	N	Minimum	Maximum	Mean	Std. Deviation
Assessor 1	35	7.00	18.00	14.46	2.55
Assessor 2	35	7.00	18.00	14.31	2.43
Assessor 3	35	9.00	17.00	12.17	1.95
Valid N (listwise)	35				

As illustrated in Table 4.4, descriptive statistics are presented for the mean scores obtained by the students, for the Interpretation dimension. A sample of 35 students (N=35) participated in this study. The mean score of Assessor 1, is 14.46 (SD=2.55), with a minimum value of 7.00 and a maximum value of 18.00. Meanwhile, the mean score of Assessor 2, is 14.31 (SD=2.43), with a minimum value of 7.00 and a maximum value of 18.00, followed by a mean score of 12.17 (SD=1.95) by Assessor 3, with a minimum value of 9.00 and a maximum value of 17.00.

Table 4.5: Mean scores for ideation dimension by 3 Assessors

	N	Minimum	Maximum	Mean	Std. Deviation
Assessor 1	35	8.00	18.00	14.03	2.36
Assessor 2	35	7.00	18.00	14.91	2.48
Assessor 3	35	9.00	17.00	12.20	2.05
Valid N (listwise)	35				

As illustrated in Table 4.5, descriptive statistics are presented for the mean scores obtained by the students, for Ideation dimension. A sample of 35 students (N=35) participated in this study. The mean score of Assessor 1, is 14.03 (SD=2.36), with a minimum value of 8.00 and a maximum value of 18.00. Meanwhile, the mean score of Assessor 2 is 14.91 (SD=2.48), with a minimum value of 7.00 and a maximum value of 18. Followed by a mean score of 12.20 (SD=2.05) by Assessor 3, with a minimum value of 9.00 and a maximum value of 17.00.

Table 4.6: Mean scores for experimental dimension by 3 Assessors

	N	Minimum	Maximum	Mean	Std. Deviation
Assessor 1	35	8.00	18.00	14.03	2.36
Assessor 2	35	7.00	18.00	14.91	2.48
Assessor 3	35	9.00	17.00	12.20	2.05
Valid N (listwise)	35				

As illustrated in Table 4.6, descriptive statistics are presented for the mean scores obtained by the students, for Experimental dimension. The mean scores resulted from assessment by 3 assessors. A sample of 35 students (N=35) participated in this study. The mean score of Assessor 1, is 14.03 (SD=2.36), with a minimum value of 2.00 and a maximum value of 18.00. Meanwhile, the mean score of Assessor 2, is 14.91 (SD=2.48), with a minimum value of 7.00 and a maximum value of 18.00 followed by a mean score of 12.20 (SD=2.05) by Assessor 3, with a minimum value of 9.00 and a maximum value of 17.00.

Table 4.7 : Mean scores for evolution dimension by 3 assessors

	N	Minimum	Maximum	Mean	Std. Deviation
Assessor 1	35	7.00	18.00	14.46	2.55
Assessor 2	35	7.00	18.00	14.31	2.43
Assessor 3	35	9.00	17.00	12.17	1.95
Valid N (listwise)	35				

As illustrated in Table 4.7, descriptive statistics are presented for the mean scores obtained by the students for Evolution dimension. The mean scores resulted from assessment by 3 assessors. A sample of 35 students (N=35) participated in this study. The mean score of Assessor 1, is 14.46 (SD=2.55), with a minimum value of 7.00 and a maximum value of 18.00. Meanwhile, the mean score of Assessor 2, is 14.31 (SD=2.43),

with a minimum value of 7.00 and a maximum value of 18.00, followed by a mean score of 12.17(SD=1.95) by Assessor 3, with a minimum value of 9.00 and a maximum value of 17.00.

Table 4.8: Overall grading student's academic achievement by 3 assessors

	N	Minimum	Maximum	Mean	Std. Deviation
Assessor 1	35	36.00	90.00	69.90	10.80
Assessor 2	35	33.00	90.00	68.94	11.90
Assessor 3	35	50.00	83.00	60.70	8.90

As illustrated in Table 4.8, descriptive statistics are presented for the mean scores obtained by the students, for overall grading in student's academic achievement in the visual diary assignment. The mean scores resulted from assessment by 3 assessors. A sample of 35 students (N=35) participated in this study. The mean score of Assessor 1, is 69.90 (SD=10.80), with a minimum value of 36 and a maximum value of 90.00. Meanwhile, the mean score of Assessor 2 is 68.94 (SD=11.90), with a minimum value of 33.00 and a maximum value of 90.00, followed by a mean score of 60.70(SD=8.90) by Assessor 3, with a minimum value of 50.00 and a maximum value of 83.00.

4.3 Findings and Discussions of Data

Based on the results obtained in this study, it appears that usage of visual diary as a tool for idea generation does have an impact on students pursuing the foundation year of the graphic design program. The visual diary enables them to gain a better understanding of the development and experimental process in generating ideas.

Since the study was conducted in line with the three research questions as enumerated in chapter one of this thesis, the results are summarized and discussed in relation to those questions.

4.4 Research Question One

RQ1: What are the overall grading in student's academic achievement?

Table 4.9: Grade and Percentage obtained by students 'in visual diary assignment

Grade	Percentage (%)
A	11.4%
A-	5.7%
B+	22.9%
B	25.7%
B-	17.4%
C+	8.6%
C	8.6%
F	0%

Based on the result, the overall grading in the student's academic achievement revealed that due to their prior knowledge, skills and experience gained through the visual diary assignment, good grading indicated the students' ability to understand that a work of art was achieved. As illustrated in Table 4.1, descriptive statistics presented the distribution of students' scores in the assessment of their grades and percentages obtained in their visual diary assignment. The distribution is observed on the basis of percentage of students' scoring grades, ranging from grade A (Excellent) to grade F (Fail) (Refer to Appendix C). From a total of 35 students, only 11.4% scored grade A, 17.4% scored B-, and most students achieved grades B with the greatest percentage of 22.9%, for grade A-. Only 5.7% of the students manage to score in this grade, followed by, 8.6% students scoring grade C+ and C. None of the 35 students were assessed in the category of grade F.

4.5   Research Question Two

RQ2. What is the mean score and percentage for visual diary assignment based on the five dimensions of IDEO model?

Table 4.10: Mean score achieved by students in visual diary assessment

| N	Minimum	Maximum	Mean	Std. Deviation
35	44.00	87.00	66.5	9.8

Based on the results, the visual diary assignments were assessed through the five dimensions of IDEO model. This model was used to investigate the students' assessment in the making of visual diary project and their involvement in early stages of ideation process, so that they may generate multiple ideas and explore usage of the various mediums in their drawings and design. From the results, gathered it was revealed that due to the students' prior involvement in the ideation process, drawing skills, art techniques and experiences gained through this visual diary assignment, they have achieved good grading. This was indicated in their ability to understand the process of idea generation and their ability to communicate various ideas namely in the drawing themes, designing icons and usage of mind mapping in their visual diary.

As illustrated in Table 4.10 descriptive statistics presented the distribution of students' scores in their assessment on the mean score and percentage for visual diary assignment based on the five dimensions of IDEO model. Based on the score of 100, the mean score of student's level of knowledge is 66.5. This indicates that by general standards of the university score, the students' acquisition of knowledge in idea generation is good. Average scoring falls within grade B-, even though, it is not a superior score, students are

generally knowledgeable about generating and developing ideas. Nonetheless, the big range between the highest score of 87 and the lowest scores of 44 seems to indicate that students' ability is quite varied. Meanwhile, the mean score achieved by students is 66.5 and the standard of deviation is (SD=9.8).
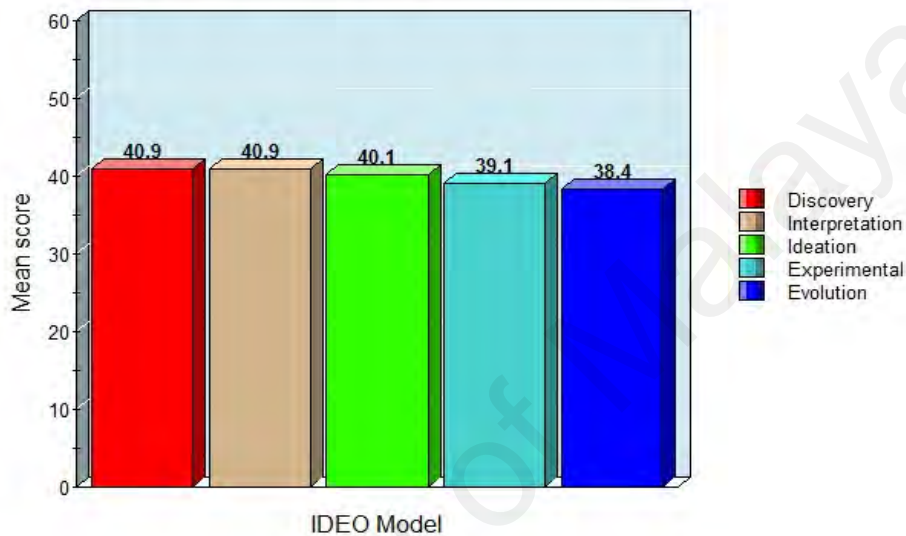
Figure 4.2: Bar graph of the students IDEO model dimensions

4.6   Research Question Three

RQ3. How effective is IDEO model for idea generation?

Most of the 35 students, have shown the ability to generate ideas and concept based on the IDEO model. Based on the results, the students appear to have the ability in idea generation. The visual diary assignment impacted the quality of students' development, particularly, in their selection of skills in visual observation, design knowledge gained, and improved problem-solving skills. As depicted in figure 4.2, the students have demonstrated a fairly equal ability across the five dimensions. However, upon closer scrutiny, the students achieved the highest abilities in the Discovery and Interpretation dimensions, with a mean score of 40.9 for both dimensions. As expected, they scored the

lowest in the Evolution dimension with a mean score of 38.4. Meanwhile, they achieved a mean scores of 40.1 and 39.1 in the Ideation and Experimental dimensions, respectively. Needless to mention, this is the highest dimensions to measure critical ability shown in figure 4.1. From the findings above, it is concluded that students excelled in the area of Discovery and Interpretation dimensions. However, students appear to be showing slightly weaker abilities in Experimental and Evolution dimensions.

4.7   Summary

This chapter focuses on the outcomes, conclusions and controversies resulting from the collected and analyzed data. This is subdivided into three sections, which provides the researcher with a comprehensive specific statistical procedure. Part one is an introductory, part two is presentation of data, part three is findings and discussion of data and part four is a summary of data

The researcher introduced the chapter content in part one and in part two the researcher discussed data presentation using mean score, standard deviation, and percentages. The researcher presented the results in part three by making comparisons and discussing data through critical analysis and the chapter description addressed the structure of Chapter Four of this thesis.

CHAPTER 5: DISCUSSION

5.1   Introduction

This chapter gives an overview of the findings from the study. It comprises of three main parts: (a) conclusions derived from the study, (b) implications established from the findings of this study, and (c) recommendations for future studies, which are relevant to various parties, such as art and design educators, institutional heads in creative arts, multimedia, fashion and textile designing, and other design related industries.

5.2   Summary of the Results

Based on the results obtained in this study, it appears that usage of visual diary as a tool for idea generation does have an impact on students pursuing the foundation year of the graphic design program. The visual diary enables them to gain a better understanding of the development and experimental process in generating ideas in their classroom assignments and projects. On the other hand, an IDEO Assessment model was developed for the purpose of measuring students' achievement in their assignments and projects for academic achievement. The results revealed that, through adapting this IDEO assessment model, the visual diary has a significant impact on the student's cognitive learning strategies and are efficient tools to help the learners with issues of generating ideas. Lastly, it is evident that the presence of this comprehensive IDEO assessment model, has a positive impact on the students' academic achievement. This model also plays a significant role in providing support to students to assist them in generating and developing multiple ideas.

5.3   Discussion of Findings of the Study

5.3.1   Research Question One: What are the overall grading in student's academic achievement?

In this study, there is a significant difference of mean scores, standard deviation and percentages in terms of the student's achievement based on the IDEO assessment model, together with five dimensions that were analyzed using descriptive statistics.

This research question leads to the conclusion that the 35 students who were examined showed the developmental progress anticipated in their performance exams. This outcome endorsed the developmental level, although there were individual variations. Students obviously have shown that their knowledge and cognitive characteristics for greater cognitive skills are increased adequately. A notable result of studio job and artistic output was the result of this academic achievement.

From the research evidence gathered, it was revealed that due to their prior knowledge, skills and experience gained through the visual diary assignment, the students' good grading indicated their ability to understand a work of art was achieved. The existence of this fundamental assignment, in this tertiary level of creative arts program significantly impact the students' achievement and academic grading in their course works and assignments. Eisner (1998a, 1998b) argues that students who have learned through art and design experience may gain more benefits and good learning characteristics in other educational areas. Majority of the students scored well and have the most scoring in grade B, followed by grade B+, and B-. This academic achievement indicates that students generally have fair and average knowledge and understanding to perform their abilities in their assignments. There is a small percentage of student who scored grade C+ and C in this assignment.

This reflects that this group of students may lack knowledge and understanding in the process of completing the assignment. These students would need to try and find new methods to improve their grades. They may improve through better creativity. Creativity has many elements. Aurum & Gardiner (2013), advocate that creativity is essential to the ability to generate ideas. Some psychologists and philosophers (returning to Aristotle and Plato) claimed that association could explain the development of concepts. In addition, many of these scientists have claimed that thinking involves moving from idea to concept through an unimaginable chain of association and thought. Tomas (1999) also pointed out creativity as an original idea. Steinberger (1999) claims that all have some creativity, but the creativity is discouraged by culture and executives. In terms of intelligence, understanding, thinking styles, personality, motivation and environmental context, Steinberger points out that there are six vital aspects of creativity (as cited in Aurum, & Gardiner, 2013).

Gardner (1973/1990) and Eisner (1981, 1982), on the other hand, expressed that cognitive elements will improve the creative expression and reaction of learners. By trying to generate fresh thoughts and experimenting, this will assist them to develop their critical thinking skills and foster creative problem-solving skills. By doing so, they are attempting to solve issues with new methods and become innovative. Most of them were able to produce thoughts with creative problem-solving capabilities ranging from informal to more complicated. They were also versatile in generating diverse categories and opinions for the same problem with a variety of ideas. They worked out their ideas well by adding, exaggerating, or building on their idea. Most of the students' ideas were original, fresh, distinctive, unusual, new and distinct when producing their studio art production. The development of visual diary as a tool for students will engage many of the learners' divergent thinking skills. The group of students who participated in this study, have also been able to conceptualize some difficult, complex and multidimensional

thoughts. The willingness of this group of learners to be brave, risk-taking and excited to learn fresh thoughts could be seen (as cited in Maithreyi Subramaniam, 2017). It is a 7 weeks' project for students to do this visual diary assignment. This is the preliminary stage, where students will engage in the visual diary process.

They began to explore various topic to draw, doodle, sketch, scamp and color in the diary activities. Many questions and examples were raised at the preliminary stage to discuss various topics and subject matters for inclusion in the diary, as most of the students, at the early stage of this project, were not certain what to put down in the diary, or how to create a visual diary. It is a non-directional, experimental and a pilot stage for students to discover early design process, to set up a design brief for them to generate topics, drawing medium and drawing style in the diary. The progress of visual diary as an instrument involves divergent thinking skills of the students. This group of students have also been able to develop multiple thoughts in the design process.

As acknowledged by Coleman (2015), in the academic context, the design process is also a structure tailored to accommodate the contextual and educational demands and realities of the academic setting while attempting to capture and simulate professional design practices. Hence, a model should be used to explain the link between the thinking abilities that work in the development of all types of design process knowledge and the role that these abilities plays in the academic achievement of the students.

5.3.2 Research Question Two: What is the mean score and percentage for visual diary assignment based on the five dimensions of IDEO model?

Based on the results in this study, this research question leads to the conclusion that students have significantly shown a better understanding towards the design process. Through the five dimensions of the IDEO model, the quality of students' development in the following areas have improved: idea communication, visual perception and artistic response, research in drawing skills, knowledge of form and subjects, design engagement process, and their critical and aesthetic inquiry skills.

This progress is essentially vital especially for students who are in the fundamental program or in the foundation level in the creative arts program, namely graphic design, multimedia design, fashion design, product design, interior design and architectural design. Design ideation can be seen as a debate of developing and communicating ideas, where 'idea' is understood as a fundamental element of thought that can be either visual, concrete or abstract. As such, in both education and other practices, it is an important component of the design process (Fowels, Broadbent, 1979:15) (as cited in Jonson, 2015).

Towards the end of the project, comments and writings in visual diary were observed as students' progression in the visual diary. Many of them started to express their thoughts, for example, thoughts as to how to improve their drawings, logo design and their art technique in general. They questioned and challenged themselves on ways and means to enhance the methods used to improve their creative designs. They also stated down the duration of the process of making their artwork. Whilst there are students who commented and criticize their own artwork and design output. Hence, the visual diary has also encouraged critical thinking and convergent thinking process. It was explained by Gardner (1973/1990) and Eisner (1981, 1982) that cognitive components will enhance learners' creative expressions and response. By attempting to generate fresh ideas and

experiment, they will create their thinking abilities and foster creative problem-solving abilities, by trying to fix problems with new techniques and become innovative (as cited in Maithreyi Subramaniam, 2017).

After the completion of the visual diary project, the students have shown higher self-confidence in presenting their concepts and ideas. They were able to showcase their artwork in a more expressive, critical and precise manner. Most of them were able to create ideas using creative problem-solving skills, either informally or in a more complex manner. They were also versatile in generating different categories of views for the same issue with a multitude of thoughts. They have worked out their thoughts well by adding, exaggerating, or building on their concepts. Most of the students' ideas for creating their studio art output were able to create ideas that were informal to more complex with creative problem-solving skills. (as cited in Maithreyi Subramaniam, 2017).

5.3.3 Research Question Three: How effective is IDEO model for idea generation?

This research question leads to the conclusion that, students were able to gain improvement of practical art production, as indicated by their ability to understand a work of art due to their prior knowledge, skill and experience gained through the design process. The presence of this comprehensive IDEO assessment model significantly impacted the students' achievement in their idea generation and experimentation. Similarly, the model has an impact on the evolution thinking in the student's final stage of making the art and design piece and studio production through their visual experience. The students attempted new methods to solve issues and became innovative, using fresh concepts and experiments to improve their critical thinking skills and to encourage

creative problem-solving skills. They also show increase engagement in creative, critical and divergent thinking abilities.

Companies have been using human-centred design as a creative approach to problem-solving. According to (Brown, 2002) IDEO, " the process is designed to get you to learn directly from people, open yourself up to a breadth of creative possibilities, and then zero in on what's most desirable, feasible, and viable for the people you're designing for". Human-centred design has been used by businesses as a creative strategy to problem solving.

The investigations of this study revealed and discussed on how students have gained good insights and experience in the problem-solving process. This process involves five dimensions, namely; Discovery, Interpretation, Ideation, Experimental and Evolution dimensions. According to Vogel, Design thinking for educators, offers a mind-set that involves four distinct human-centred dimensions, i.e., emphatic, collaborative, experimental, and positive thoughts. (Vogel, 2014)

For the first stage, Discovery dimension, it is a stage to research the problem, gather as much information as one can find, and define the problem. Students has shown fair knowledge and understanding at this stage. They are able to analyse and gather facts from various resources. Thus, through this stage students appeared to have acquired a deep understanding and able to define a set of problems.

A two weeks exercise of "self-portrait character" was given and briefed to students to execute in the visual diary. Students must create a self-portrait character, where they need to list down ten characteristics about themselves or even find suitable objects to represent themselves or describe the personalities, favourite hobbies, food, games and others. From the sample gathered in this study, at first, students were not able to generate ten items

about themselves. The tutor and lecturer had to guide them by asking them to relate or introduce themselves starting with their 'personal background. For example, questions like, "what is your name? where is your hometown? How old are you …." It all began with very simple questions, since this was an early exercise and this group of students were mainly the first year, first semester students, having just completed their high school studies in the Sijil Pelajaran Malaysia (SPM).

As they have just enrolled in the course of diploma in Graphic Design Program, most of the students have very little knowledge about art and design field. They even have difficulties in drawing and dealing with colours and the choice of medium at the beginning. For this, the tutor or lecturer will have to do a small ice breaking session, so that, students start to introduce themselves and be comfortable with their classmates. After this session, students started to be more expressive by describing themselves like, "I am friendly, I am Tall and muscular, I wear a pair black spectacles, I have big fore head, I have small eyes, I love to listen to music, I have curly hair… and as the they continued with their listings, they found that there are many things they can list and share about themselves. Most of the students end their listing with, their wishes and wants, like, "I wish to be a happy person, I want to be a superstar, I wish to become a billionaire, I want to become a designer," including some interesting listing, like, "I wish to become the next Prime Minister, I wish to become a superhero, I wish to become next JACK MA, I wish to have supernatural power." The students have warmed up and become more open about themselves and willing to share their personal views and interests in their listings. From result of this findings, students are more open to share their thoughts in doing the listings and have shown a good understanding and initiative in trying to seek more information in the Discovery stage.

Next, the students had to gather and investigate the most suitable ideas, drawings and topic. They were put into small groups to share their views about themselves and their peers. There were multiple answers amongst the students, and they were all engaged in the team building and sharing of knowledge.

This part of sharing knowledge is vital as the act of sharing and identifying problems are core values of the Discovery stage, wherein a deep understanding of the context can be gained. Students are also encouraged to be inspired and learn from each other, also from their lecturers or other experts. This will have helped students gain personal knowledge about the contests from others. According to Vogel(2014) in the discovery stage, it is a stage where, full engagement and focused on the subject was to prior to find solutions and answers to the design problems (Vogel, 2014, pp.49-51)

The second stage in the design process is the Interpretation dimension. Within this stage, knowledge is imparted and information gathered to be examined, where issues are dealt with from multiple angles so as to be able to interpret the design problem. According to Vogel (2014), founders of design thinking, advocate that users of this process should share observations and create meaning from the information they have obtained from multiple sources and views. From this pool of information, it is again suggested by the expert that, the information and theme, that will start to appear, should be classified, organized, and synthesized.

The students would then need to organize the listing of their ideas and to see which listings may be suitable to best suite their self-portrait character. From these listings, they had to filter and choose the best ideas. This exercise of self-portrait has limit students to only list ten items to describe themselves. This is because, students will have to learn to interpret and search for more meaning in the contexts at the Interpretation stage. Students were asked to select only four to five items which is closer to their core meaning of their

self-portrait character. This process was certainly not easy for the students as it was their very first attempt of trying to interpret design projects. However, as they undergo a few sessions of discussion with their peers and tutors, they were able to select and interpret the suitable character for their self-portrait exercise. It is important for students to be exposed to the stage of Interpretation, as Barone & Eisner, (1997) stated that Business and art educators have highlighted the importance of producing future designers with different abilities, with many different features, characteristics and transformations engaged with knowledge.

According to the findings gathered from this study, students are able to interpret and combine one or more listings in the exercise for self-portrait. In the nutshell, students have scored well in the Interpretation stage, indicating that they have a good understanding of the experimental process at this stage. As (Vogel, 2014) claims, although design thinking relies heavily on human perception and the ability to apply empathy, it is crucial to relate any research outcomes to individuals and their stories.

The third stage refers to the Ideation dimension. According to Vogel (2014), the objective of this stage is to try to generate and develop as many ideas as possible. As mentioned earlier divergent thinking should be practiced and the vast expansion of ideas is the main objective. For the ideations stage, the students initially had difficulty to list down many ideas. It was not easy for students to perform this task and they could only generate around 10 to 15 ideas. A mind mapping exercise was introduced to guide them to develop as many ideas as possible. The students still find it difficult to do this exercise individually. The solution was to group them in a small groups of 3 to 4 students and each group was given a topic to list down and generates as many ideas as possible using the mind mapping exercise.

The students constantly raised questions as to whether it is the right answer to use in the mind map? The advantage of the ideation stage is that, there is no good nor bad idea, whether related or not related, special or worst ideas. In this ideation process, the students will just have to be focused and jot down whatever that comes out from your thoughts. The students felt more confident after one session of practice in group discussion. They then tried to perform the ideation stage, and found that they were able to develop more ideas. According to the findings, the students were able to generate many ideas and have gained a good understanding of the process as evident from the mean score in the Ideation stage. Vogel (2014), reasons that, after producing a great number of ideas, users of this process should refine and compare those ideas against their objectives. In short, check to see which idea would best resolve your problem.

The fourth stage in the design process is the Experimentation dimension. At this stage the students had to try to test their idea and experiment with their designs for suitability to be used? Or determine if any more changes have to be made to improve the design or drawing. The students had to first produce a draft drawing and then, go on to refine their artwork that shows the whole of the concept of the idea. It is effectively a stage to examine and build a sample or to refine an idea.

After the ideation stage is completed, it is time to start the Experimentation phase. It is the fourth step in design process. According to IDEO, it is important to build upon the idea that has been develop during the ideation phase. This translates into building prototypes, making the idea tangible and learning and gain even more information by applying the solution at an early stage. Prototypes provide an excellent opportunity to gain feedback. It is important to define what kind of feedback you are looking for and how you can learn from it and make improvements. (Vogel, 2014, pp.49-51)

The result gathered from this finding showed that students scored weaker mean core. This may be due to their lack of skill base practice in drawing or lack of understanding in the artistic aesthetic sensibility to perform their artwork. Therefore, in Mittler's study (as cited in Maithreyi Subramaniam, 2017), studio art production activities are essential, offering a more complete art education for students to improve their practical skills. Mittler (1986) reasons that students should be given the support and encouragement to participate in critical, historical and studio operations that are of relatively equal significance for greater comprehension and appreciation in artworks. In addition to accomplishing these activities, the students would be kept interested and excited and continue in their art studies.

The fifth stage is the Evolution dimension. At this stage, the final outcome or the final product of the successful, good or fair artwork of the student is produced.

Clearly, Vogel (2014) writes:

Evolution is the last phase in the design process. In this phase, the winning ideas are being applied and further developed. According to *Design Thinking for Educators* it is important to ensure an idea's success over time. This might include looking ahead and considering how idea's success have to adjust in changing environments, thinking about how ideas should be communicated to audiences and stakeholder. During this phase it is also important to document any process and progress. (p.51)

The final outcome for this group of students is to produce their visual diary. Students will be assessed based on the final outcome of their artwork. According to the result gathered from this finding the students achieved a weaker mean score in the Evolution dimension. This could be due to the lack of time to produce better artworks towards the end of the semester, when the students will have to produce and submit many

assignments. These first-year students, will have 3 to 4 core subjects in Graphic Design. The students may not pay full attention and commitment to the final outcome due to tight deadlines for assignments of other subjects from the Creative Arts Program. Secondly, as mentioned in the Experiment stage, the students lacked studio and drawing practice, leading to their weaker mean score at the Evolution stage. However, there is very little difference between the mean scores of the Experiment and Evolution stages. This IDEO assessment model is still considered an effective model for students of the graphic design program and it is recommended that this model be used for future assessment of the visual diary assignments.

This model is also suitable for projects or assignments in other design subjects and areas. IDEO model is distinguished as one of the most successful design thinking model which has been widely practiced by the creative industries as well as in art and design education. As claimed by Vogel (2014), all of these procedures will assist the problem solver to become more conscious of the type of thinking they might want to apply to resolve the issue. Having the ability to learn deliberately when to use divergent and convergent thinking can assist people to attain the ideal state of mind when creating the best suggestion for problem-solving. This creative process will allow us to improve our ability to develop and generate new and original ideas.

5.4   Conclusion

The application of visual diary as a tool for idea generation does have an impact on students pursuing the foundation year of the graphic design program. The visual diary enables them to gain a better understanding of the development and experimental process in generating ideas. Based on the results obtained in this study, it appears that usage of. Previous studies in idea generation revealed that the visual diary enables the new students to gain a better understanding of in creative thinking approach, help to promote students'

reflection and help to develop deep thinking and high order skills in the western countries. However, in our local higher learning creative art programs, insufficient studies were carried out to investigate on the impact of using visual diary as a device for students to test, investigate and express ideas through the idea generation process. Since the study was conducted in line with three research questions as enumerated in chapter one of this thesis, the results are summarized and discussed in relation to those questions.

The main aim of this research was to develop the IDEO assessment model using visual diary as tool for the purpose of assisting students in generating ideas for their assignments. Cognitive learning strategies are efficient tools to help the learners with issues of learning. Based on the one- shot study, 35 samples were collected from the 35 students pursuing the program of creative arts in Graphic Design, for analysis. The findings suggest that the visual diary allows them to gain a deeper understanding of the idea generation process with positive impact in their production and experimental process when generating ideas in their classroom assignments and project. The results also showed that the visual diary has a significant impact on the cognitive learning strategies of the student through the adaptation of this IDEO assessment model as an efficient tool to help the learners with ideas generating issues. Finally, the presence of this comprehensive IDEO evaluation model has a positive impact on the academic performance of the students.

To clarify this study, it is clearly suggesting that visual diary is a tool that support students in the idea generation process and increasing creativity in the analysis in design process. At the same time, students are empowered by the use of text and images, as synergistic tools. This tool will also benefit students, especially the foundation year students in the Creative art program, as this group of students are generally having difficulties in expressing and producing ideas, due to the lack of knowledge in the creative process. Hence, this study has suggested an alternative method for student and instructor

to connect in the assignment, workshop and other design training. In conclusion, the outcome of this study contributed to the knowledge relationship towards generating design ideas incorporated in the theory of design processes. Moreover, through the introduction of IDEO assessment model, students are able to achieve; a greater level of creative and critical thinking, extend their imagination, build up effective communication skills and offers students critical choices and assessments. Hence, this model has played an important role in supporting students to understand and positively increase their engagement in generating and developing multiple ideas.

5.5   Implications of the study

The findings of this research have established and strengthened the claim that visual diary is an excellent tool for idea generation for graphic design program. The visual diary enables students to gain a better understanding of the development and experimental process in generating ideas. It is evident from this study that the visual diary can be effectively used as a structural, multidisciplinary and multidimensional instructional instrument (Scott, 2010).

In addition, previous studies demonstrated that the involvement of the utilization of visual diary can be connected to any training course for school tasks and assignments. This research likewise demonstrates the significance of utilizing visual diary in the imaginative planned process as expressed by Huber, Leigh and Tremblay (2010), whereby it can be used in the classrooms by students and designers in creative practice. According to the results of this research, students in the foundation year of the creative arts program are often not able to express ideas or generate multiple thoughts in the design thinking process, due to lack of knowledge and practices in design activities. Hence, it is imperative that the tertiary level creative arts universities, in particular the instructors of the foundation year, should be aware of this situation and help students to learn to

generate and develop multiple ideas using the visual diary as an effective pedagogy in both art and design program. As Aurum et al. (2003), mentioned ideation process has always been associated as the main activity of creative idea generation amongst the creative art industry ranging from the field of architecture, fashion, advertising, graphic design, to product design. It is one of the main objects of the art and design education. With the introduction of IDEO assessment model, students have been offered the opportunity to engage in a greater level of creative and critical thinking and improve their ability to extend their imagination, build up effective communication skills and make critical choices and assessments.

Furthermore, the study has proven that the IDEO assessment model has effectively improved the student's learning process, with a great impact on their academic achievement. The achievement of students has been especially important in the field of art education and education, as a whole, to improve their skill levels and prepare for adulthood. Students would be mentally involved in information processing through classroom learning activities. They have been able to discover a material understanding by recognizing links between the concepts they were taught and able to connect new concepts with previous knowledge. Thus, the implementation of the visual diary coupled with the IDEO assessment model, offers students the opportunity to engage in a greater level of creative and critical thinking by enhancing their imagination. It is a helpful resource for the lecturer to guide the students to develop their cognitive skills or enhance their thinking skills. It was found to be a significant strategic component in the graphic design and creative arts program.

5.6   Recommendation for Future Research

A number recommendation for future research were considered and discussed. Firstly, small samples were used in this analysis. It is recommended that future studies should be more vigorous and extensive involving larger samples to further strengthen and enhance confidence in the study results. In addition, other variables may be explored for further studies, as an extension of the process of idea generation, using the visual diary as a resource in the Graphic Design program to help increase higher order thinking skill. It is to be noted that there are many variables affecting the ideation process and it is difficult to identify one solitary factor. Many related research can be carried out to determine if the variation in the reflective process or art appreciation variables may affect and make a difference in the outcome of the study.

Secondly, it is suggested that visual diary be used as a tool to encourage the practice of art making for our local secondary school's art programs, in order to promote their interest in experimenting and expressing their creativity and innovative thoughts in the art making process. The next suggestion is that, the IDEO assessment model can also be incorporated into the main areas of the local tertiary design and art education programs. Hence, it is relevant for the tertiary level of creative arts programs such as in the field of visual arts, fashion design, ceramics, industrial design, fine metal design, textile design, decorative arts, architecture, interior design, game design, digital media, and product design, photography, animation, and other art and design courses, where graduate students can be provided with practical learning experience.

Lastly, a further recommendation for future research is the use of other design process models within art and design education to nurture visual perception among students through the creative design process.

REFERENCES

Ahsen, A. (1984). ISM-the triple code model for imagery and psychophysiology. Diary of Mental Imagery, 8(4), 15 –42.

Ahsen, A. (1986). The new structuralism: Images in dramatic interlock. Diary of Mental Imagery, 10(3), 1–92.

Akin, Ö. (1990). Necessary conditions for design expertise and creativity. Design Studies, 11(2), 107–113.

Akin, Ö. (2002). Case-based instruction strategies in architecture. Design Studies, 23(4), 407–431.

Amabile, T. M. (1988). A model of creativity and innovation in organizations. Res. Organ. Behav. 10, 123–167.

Amabile, T. M. (1996). Creativity in Context. Boulder, CO: Westview Press. Arlin, P. K. (1986). "Problem finding and young adult cognition," in Adult Cognitive Development: Methods and Models, eds R. A. Mines and K. S. Kitchener (New York, NY: Praeger), 22–32.

Armbruster, B. B. (1989). "Metacognition in Creativity," in Handbook of Creativity, E. P. Torrance, J. A. Glover, R. R. Ronning and C. R. Reynolds (New York, NY: Plenum), 177–182. doi: 10.1007/978-1-4757-5356-1_10

Anderson, C. (2012). Makers. The New Industrial Revolution. New York: Random House. Anttila, P. (1993). Käsityön ja muotoilun teoreettiset perusteet.

Arnheim, R. (1969). Visual Thinking. Los Angeles: University of California Press.

Arntson, A. E. (2007). *Graphic design basics*. Thomson/Wadsworth.

Ashby, M. F., & Johnson, K. (2013). *Maerials and design: The art and science of material selection in product design* (2nd ed.). Oxford: Butterworth Heinemann.

Aurum, A., & Gardiner, A. (2013). 3 Creative Idea Generation. Retrieved from https://pdfs.semanticscholar.org/1fc4/649055b30a4ac969c495cfb823b85fc60476.pdf?_ga =2.106780419.1458117640.1563294965-2118514277.1562628613

Ayers, M. (1998). *The foundation of knowledge and the logic of substance: The structure of Lockes's general philosophy.* London: Oxford University Press.

Baer, J. (1998). The case for domain specificity of creativity. Creat. Res. J. 11, 173–177. doi: 10.1207/s15326934crj1102_7

Baer, J. (2010). "Is creativity domain specific?" in The Cambridge Handbook of Creativity, eds J. C. Kaufman and R. J. Sternberg (Cambridge: Cambridge University Press), 321–341. doi: 10.1017/CBO9780511763205.021

Barone, T., & Eisner, E. (1997). Arts-based educational research. Complementary methods for research in education, 2, 75-116

Basadur, M., & Thompson, R. (1986). Usefulness of the ideation principle of extended effort in real world professional and managerial creative problem solving/. The Journal of Creative Behavior, 20(1), 23–34. http://dx.doi.org/ 10.1002/j.2162-6057.1986.tb00414.x.

Basadur, M., & Gelade, G. A. (2005). Modelling applied creativity as a cognitive process: theoretical foundations. Kor. J. Think. Prob. Solving 15, 13–41.

Bates, D., Maechler, M., Bolker, B., & Walker, S. (2013). lme4: Linear mixed-effects models using Eigen and S4. R package version 1.0-5.

Baughman, W. A., & Mumford, M. D. (1995). Process-analytic models of creative capacities: Operations influencing the combination-and-reorganization process. Creativity Research Journal, 8(1), 37–62.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. The Qualitative Report, 13(4), 544–559.

Baynes, K. (2009). Models of change: The impact of 'designer thinking' on people's lives and the environment. Seminar 1...modelling and intelligence. Loughborough University.

Berger, R. M., Guilford, J. P., & Christensen, P. R. (1957). A factor-analytic study of planning abilities. Psychol. Monogr. 71, 1–29. doi: 10.1037/h00 93704

Berman, S., & Korsten, P. (2010). *Capitalizing on Complexity: Insights from the Global Chief Executive Officer Study*. Somers, NY: IBM.

Bernabei, R.(2010) The Digital Visual Diary: the blog as an alternative for paper and pen in the Industrial Design studio. 28 June-1 July, 2010. University of New South Wales, Sydney , Australia

Berg, J. M. (2014). The primal mark: How the beginning shapes the end in the development of creative ideas. Organizational Behavior and Human Decision Processes, 125(1), 1–17. Retrieved from http://dx.doi.org/10.1016/j.obhdp.2014.06.001.

Blasko, V. J., & Mokwa, M. P. (1986). Creativity in advertising: A Janusian perspective. Journal of Advertising, 15(4), 43–72.

Blei, D. M., Ng, A. Y., Jordan, M. I., & Lafferty, J. (2003). Latent Dirichlet allocation. *Journal of Machine Learning Research,* 993–1022.

Blunt, J. (1966). The Composite Art of Acting. New York, NY: Macmillan. Boden, M. A. (2004). The Creative Mind: Myths and Mechanisms. Abingdon: Routledge. doi: 10.4324/9780203508527

Botella, M., and Lubart, T. (2015). "Creative processes: art, design and science," in Multidisciplinary Contributions to the Science of Creative Thinking, eds G. E. Corazza and S. Agnoli (Singapore: Springer), 53–65.

Botella, M., Zenasni, F., & Lubart, T. I. (2011). A dynamic and ecological approach to the artistic creative process in arts students: an empirical contribution. Empir. Stud. Arts 29, 17–38. doi: 10.2190/EM.29.1b

Bolton, M. B. (1976). Substances, substrata and names of substances in Locke 's essay. The Philosophical Review, 85, 488-513.

Boden, M. A. (2004). The creative mind: Myths and mechanisms. New York. Brown, R. T. (1989). Creativity: What are we to measure? In J. A. Glover, R. R. Ronning, & C. R. Reynolds (Eds.), Handbook of Creativity (pp. 3–32). New York, NY.

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. Annual Review of Psychology, 54, 579–616.

Booch, G., Rumbaugh, J., & Jacobson, I. (2005). *The unified modeling language user guide*. Reading, MA: Addison-Wesley.

Borden, S.S. (2008). Rubrics as an assessment and evaluation tool for art education. (Master's thesis). Available from Proquest Dissertations and Theses database. (UMI No. 1463142).

Björklund, T.A. (2013). Initial mental representations of design problems: Differences between experts and novices. Design Studies, 34(2), 135–160.

Brewer, J., & Hunter, A. (2006). *Foundations of multimethod research: Synthesizing styles* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Brown, T. (2002). design thinking define. Retrieved from designthinking.ideo.com/: https://designthinking.ideo.com/

Brown, T. (2008). Design thinking. *Harvard business review*, *86*(6), 84.

Brown, T., & Katz, B. (2009). *Change by design: How design thinking transforms organizations and inspires innovation.* New York: Harper Business.

Bruford, W. (2015). Making it Work: Creative Music Performance and the Western Kit Drummer, Unpublished dissertation, University of Surrey.

Bucciarelli, L. L. (1988). An ethnographic perspective on engineering design. Design Studies, 9(3), 159–168.

Bucciarelli, L. L. (1994). *Designing engineers.* Cambridge MA: MIT press.

Bucciarelli, L. L. (2002). Between idea and object in engineering design. Design Studies, 23(3), 219–231.

Burnard, P. (2012). Musical Creativities in Practice. Oxford: Oxford University Press. doi: 10.1093/acprof:oso/9780199583942.001.0001

Cardoso, C., & Badke-Schaub, P. (2011). The influence of different pictorial representations during idea generation. The Diary of Creative Behavior, 45(2), 130–146.

Carson, D. K. (1999). "Counseling," in Encyclopedia of Creativity, Vol. 1, eds M. A. Runco and S. R. Pritzker (New York, NY: Academic Press), 395–402.

Casakin, H., & Goldschmidt, G. (1999). Expertise and the use of visual analogy: Implications for design education. Design Studies, 20(2), 153–175.

Cassim, F. (2013). Hands on, hearts on, minds on: Design thinking within an education context. International Diary of Art and Design Education, 32(2), 190–202.

Chan, J. (2014). The impact of sources of inspiration on the genesis of creative ideas (Doctoral Dissertation). University of Pittsburgh.

Chan, J., Dow, S. P., & Schunn, C. D. (2015). Do the best design ideas (really) come from conceptually distant sources of inspiration? Design Studies, 36, 31–58.

Chan, J., & Schunn, C. (2015). The impact of analogies on creative concept generation: Lessons from an in vivo study in engineering design. Cognitive Science, 39(1), 126–155.

Charlesworth, C. (2007). Student use of virtual and physical modelling in design development–an experiment in 3D design education. The Design Diary, 10(1), 35–45.

Chitsaz, M., & Hodjati, S. M. A. (2012). Conceptualization in ideational theory of meaning: Cognitive theories and semantic modeling. Procedia-Social and Behavioral Sciences, 32, 450-455.

Christensen, T.C., Barrett, L. F., Bliss-Moreau, E., Lebo, K., & Kaschub, C. (2003). A practical guide to experience-sampling procedures. Diary of Happiness Studies, 4(1), 53–78.

Coleman, L. (2015). How drawing is used to conceptualize and communicate design ideas in Graphic Design: exploring scamping through a literacy practice lens. Parlor Press.

Collins, A. M., & Loftus, E. F. (1975). A spreading-activation theory of semantic processing. Psychological Review, 82, 407-428.

Collins, A., & Quilian, M. (1969). Retrieval time from semantic memory. Diary of Verbal Learning and Verbal Behavior, 8, 240-248.

Collado-Ruiz, D., & Ostad-Ahmad-Ghorabi, H. (2010). Influence of environmental

information on creativity. Design Studies, 31(5), 479–498.

Collanus, M., Kairavuori, S., & Rusanen, S. (2012). The identities of an arts educator: Comparing discourses in three teacher education programmes in Finland. International Diary of Education through Art, 8(1), 7–21.

Collado-Ruiz, D., & Ostad-Ahmad-Ghorabi, H. (2010). Influence of environmental information on creativity. Design Studies, 31(5), 479 – 498. doi:10.1016/j.destud.2010.06.005.

Conner, T.S., Barrett, L.F., Tugade, M.M., & Tennen, H. (2007). Idiographic personality: The theory and practice of experience sampling. In R.W. Robins, R.C. Fraley, & F.W. Krueger (Eds.), Handbook of research methods in Personality Psychology (pp. 79–96). New York: Guilford Press.

Craig, E. (2003). Meaning and privacy. In B. Hale, & C. Wright (Eds.). A companion to the philosophy of language (pp. 127-145). Oxford: Blacwell Publishing.

Creat. Res. J. 24, 29–40. doi: 10.1080/10400419.2012.649234 Dewey, J. (1934). *Art as Experience*. New York, NY: Penguin Books.

Creswell, J. W. (2014). Research design: Qualitative, quantitative and mixed method approaches (4th ed.). London: SAGE.

Cropley, A. J. (1999). "Definitions of creativity," in Encyclopedia of Creativity, Vol. 1, eds M. A. Runco and S. R. Pritzker (New York, NY: Academic Press), 511–524.

Cropley, D. H., & Cropley, A. J. (2012). A psychological taxonomy of organizational innovation: resolving the paradoxes.

Cross, N. (1997). Descriptive models of creative design: Application to an example. Design Studies, 18(4), 427–440.

Cross, N. (2001). Creativity in the design process: co-evolution of problem– solution. Design Studies, 22(5), 425–437.

Cross, N. (2006). Designerly ways of knowing. London: Springer. Cross, N. (2011). Design thinking: Understanding how designers think and work. Oxford: Berg.

Cross, N. (2004). Expertise in design: An overview. Design Studies, 25(5), 427– 441.

Csikszentmihalyi, M., & Larson, R. (1987). Validity and reliability of the experience-sampling method. The Diary of Nervous and Mental Disease, 175(9), 526–536.

Csikszentmihalyi, M., & Sawyer, K. (1995). The great-minds Approach. In J. Stenberg, & J. E. Davidson (Eds.), The Nature of Insight (pp. 329–363). Cambridge, MA: MIT.

Cunningham, S. J., Bainbridge, D., Masoodian, M. (2004). How people describe their image   information needs: a grounded theory analysis of visual arts queries. In JCDL '04: Proceedings of the 4th ACM/IEEE-CS joint conference on Digital

libraries, pp. 47–48. New York, NY, USA: ACM. doi:http://doi.acm.org/10.1145/996350.996362.

Curtis, H. (2002). *Making the Invisible Visible: Process, Inspiration and Practice for the New Media Designer.* 1249 Eighth Street, Berkeley, California 94710: New Riders Publishing.

Darke, J. (1979). The primary generator and the design process. Design Studies, 1(1), 36–44

Dame, K. A. (2011). Mood board for a tuscan style interior. http://www.flickr.com/photos/kerryanndame/6907272105/in/photostream/. Retrieved 1/2/2013.

Dazkir, S.S., Mower, J. M., Reddy-Best, K., & Pedersen, E. L. (2013). An exploration of design students' inspiration process. College Student Diary, 47(2), 394–404. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=884 13470&site=ehost-live&scope=site

Dormer, P. (1991). *The art of the maker.* London: Thames & Hudson.

Dorst, K. (2006). *Understanding design.* Amsterdam: Bis Publishers.

Dorst, K. (2008). Design research: a revolution -waiting-to-happen. Design Studies, 29(1), 4–11.

Dorst, K. (2011). The core of 'design thinking'and its application. Design Studies, 32(6), 521–532.

Dougan, B. (2009). Craft-based design as a means to architecture. In L. K. Kaukinen (Ed.), Proceedings of the crafticulation & education conference (pp. 31–35). Techne Series: Research in sloyd and crafts science A: 14. Helsinki: Nordfo.

Doyle, C. L. (1998). The writer tells: the creative process in the writing of literacy fiction. Creat. Res. J. 11, 29–37. doi: 10.1207/s15326934crj1101_4

Drew, L., Bailey, S., & Shreeve, A. (2002). Fashion variations: Students approaches to learning in fashion design. Paper presented at CLTAD conference, Enhancing Curricula: Exploring effective curricula practices in art, design and communication in higher education. (pp.179–198). London: RIBA.

Dondis, D. (1973). A Primer of Visual Literacy. Cambridge, Massachusetts: The MIT Press.

Dorta, T., Pérez, E., & Lesage, A. (2008). The ideation gap: hybrid tools, design flow and practice. Design Studies, 29(2), 121 – 141. doi:10.1016/j.destud.2007.12.004.

Dubberly, H. (1995). Managing complex design projects. Retrieved from http://www.dubberly.com/articles/managing-complex-design-projects.html on 16 July 2013.

Doboli, A., Umbarkar, A., Subramanian, V., & Doboli, S. (2014). Two experimental studies on creative concept combinations in modular design of electronic embedded systems. Design Studies, 35(1), 80–109. http://dx.doi.org/10.1016/j.destud.2013.10.002.

Dorst, K., & Cross, N. (2001). Creativity in the design process: co-evolution of problem–solution. Design studies, 22(5), 425-437.

Dow, S. P., Heddleston, K., & Klemmer, S. R. (2009). The efficacy of prototyping under time constraints. In Proceedings of the 7th ACM conference on creativity and cognition.

Dreistadt, R. (1969). The use of analogies and incubation in obtaining insights in creative problem solving. J. Psychol. 71, 159–175. doi: 10.1080/00223980.1969.10543082

Eastman, C. (2001). New directions in design cognition: Studies of representation and recall. In C. Eastman, W. M. McCracken, & W. Newstetter (Eds.), Design, knowing and learning: Cognition in design education (pp. 147–198). Oxford: Elsevier.

Eckert, C., & Stacey, M. (1998). Fortune favours only the prepared mind: Why sources of inspiration are essential for continuing creativity. Creativity and Innovation Management, 7(1), 9–16.

Eckert, C., & Stacey, M. (2000). Sources of inspiration: A language of design. Design Studies, 21(5), 523–538.

Eckert, C., & Stacey, M. (2003). Adaptation of sources of inspiration in knitwear design. Creativity Research Diary, 15(4), 355–384.

Eckert, C., Stacey, M., & Clarkson, P. (2000). Algorithms and inspirations: Creative reuse of design experience. Paper presented at the Greenwich 2000 International Symposium: Digital Creativity (pp. 1–10). London: University of Greenwich.

Eisentraut, R., & Günther, J. (1997). Individual styles of problem solving and their relation to representations in the design process. Design Studies, 18(4), 369–383.

Eisner, E.W. (1996). Research on arts and crafts as cultural phenomena. In P. Seitamaa-Hakkarainen, & M. Uotila. Product, Fenomen, Upplevelse. Proceedings of a Nordic Symposium (pp. 64–72). Techne Series: Research in Sloyd and Crafts Science B no.3.

Eisner, E.W. (1998). *The enlightened eye. Qualitative inquiry and the enhancement of educational practice.* New Jersey: Prentice-Hall.

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. Diary of Advanced Nursing, 62(1), 107–115.

Eneroth, B. (1984). Hur mäter man" vackert"? Grundbok i kvalitativ metod. Stockholm: Akademilitteratur.

Ericsson, K. A. (2006). The influence of experience and deliberate practice on the development of superior expert performance. In K. A. Ericson, N. Charness, P. J. Feltovich, P. J., & Hoffman, R. R. (Eds.), The cambridge handbook of expertise and expert performance (pp. 683–704). New York: Cambridge University Press.

Ewenstein, B., & Whyte, J. (2009). Knowledge practices in design: The role of visual representations as epistemic objects. Organization Studies, 30 (1), 7–30.

Ewenstein, B., & Whyte, J. (2007). Visual representations as 'artefacts of knowing'. Building Research & Information 35(1), 81–89.

Eysenck, M. W., & Keane, M. T. (2000). *Cognitive psychology: A student's handbook* (4th ed.). Philadelphia: Taylor & Francis.

Fletcher, A. (2001). *The Art of Looking Sideways.* London : Phaidon Press.

Feldman Barrett, L., & Barrett, D.J. (2001). An introduction to computerized experience sampling in psychology. Social Science Computer Review 19(2), 175–185.

Fenwick, T., Nerland, M., & Jensen, K. (2012). Introduction. Sociomaterial approaches to conceptualizing professional learning. Diary of Education and Work 25(1), 1–13.

Ferguson, E.S. (1992). Engineering and the mind's eye. Cambridge MA: MIT Press. Finnish National Board of Education (2014). Basis for the national curriculum. Retrieved from Fletcher, K. (2008). Sustainable fashion and textiles: Design journeys. London: Earthscan.

Flick, U. (2006). An Introduction to qualitative Research (3rd ed.) Thousand Oaks: Sage. Flick, U. (2008). Designing qualitative Research. New York: Sage.

Fraenkel, J.R, & Wallen, N.E. (2009). *How to design and evaluate research in education* (7th ed.). New York: McGraw-Hill.

Frege, G. (1970). On sense and reference. In P. Geach & M. Black (Eds.). Translations from philosophical writtings of Gottlob Frege (pp. 56-78). Oxford: Basil Blackwell.

Finke, R. A., Ward, T. B., & Smith, S. M. (1996). Creative cognition: Theory, research, and applications. Cambridge, MA: MIT Press. Gelman, A., & Weakliem, D. (2009). Of beauty, sex and power. American Scientist, 97, 310–316.

Fürst, G., Ghisletta, P., & Lubart, T. (2012). The creative process in visual art: a longitudinal multivariate study. Creat. Res. J. 24, 283–295. doi: 10.1080/10400419.2012.729999

Getzels, J. W., & Csikszentmihalyi, M. (1976). "Concern for discovery in the creative process," in The Creativity Question, eds A. Rothenberg and C. R. Hausman (Durham, NC: Duke University Press), 161–165.

Ghiselin, B. (1952). The Creative Process. Berkeley, CA: University of California Press. Glaveanu, V. P. (2010). Paradigms in the study of creativity: intro ˇ ducing the perspective of cultural psychology. New Ideas Psychol. 28, 79–93. doi: 10.1016/j.newideapsych.2009.07.007

Glaveanu, V. P., Lubart, T., Bonnardel, N., Botella, M., De Biasi, P.-M., De Sainte Catherine, M., et al. (2013). Creativity as action: findings from five creative domains. Front. Educ. Psychol. 4:176. doi: 10.3389/fpsyg.2013. 00176

Gruber, H. E. (1989). "The evolving systems approach to creative work," in Creative People at Work: Twelve Cognitive Case Studies, eds D. B. Wallace and H. E.

Gruber (New York, NY: Oxford University Press), 3–24. Gruber, H. E., and Davis, S. N. (1988). "Inching our way up Mount Olympus: the evolving systems approach to creative thinking," in The Nature of Creativity, ed R. J. Sternberg (New York, NY: Cambridge University Press), 243–270.

Guilford, J. P. (1950). Creativity. Am. Psychol. 5, 444–454. doi: 10.1037/h0063487 Guilford, J. P. (1956). Structure of intellect. Psychol. Bull. 53, 267–293. doi: 10.1037/h0040755

Gershuny, J. (2011). *Time-use surveys and the measurement of national wellbeing.* Centre for Time-use Research.Department of Sociology. University of Oxford.

Goel, V. (1995). Sketches of idea. Cambridge MA: MIT Press. Goldberg, M.W., Salari, S., & Swoboda, P. (1996). World Wide Web—Course tool: An environment for building WWW-based courses. Computer Networks and ISDN Systems, 28(7), 1219–1231.

Goldschmidt, G. (1991). The dialectics of sketching. Creativity Research Diary, 4(2), 123-143.

Goldschmidt, G. (1997). Capturing indeterminism: representation in the design problem space. Design Studies, 18(4), 441–455.

Goldschmidt, G. (2003). The backtalk of self-generated sketches. Design Issues, 19(1), 72–88.

Goldschmidt, G., & Sever, A.L. (2011). Inspiring design ideas with texts. Design Studies, 32(2), 139–155.

Goldschmidt, G., & Smolkov, M. (2006). Variances in the impact of visual stimuli on design problem solving performance. Design Studies, 27(5), 549– 569.

Goldschmidt, G., & Tatsa, D. (2005). How good are good ideas? Correlates of design creativity. Design Studies, 26(6), 593–611.

Hakkarainen, K., Palonen, T., Paavola, S., & Lehtinen, E. (2004). Communities of networked expertise: Educational and professional perspectives. Amsterdam: Elsevier.

Hargreaves, A., & Shirley, D. (2009). *The fourth way. The inspiring future for educational change*. Thousands Oakes, CA: Corwin.

Herring, S. R., Jones, B. R., & Bailey, B. P. (2009, January). Idea generation techniques among creative professionals. *In 2009 42nd Hawaii International Conference on System Sciences* (pp. 1-10). IEEE

Heller, S., Ili´c, M. (2007). The Anatomy of Design: Uncovering the influences and inspirations in modern graphic design. Rockport Publishers.

Hembree, R. (2006). The Complete Graphic Designer: A Guide to Understanding Graphics and Visual Communication. Rockport Publishers.

Hernandez, N. V., Shah, J. J., & Smith, S. M. (2010). Understanding design ideation mechanisms through multilevel aligned empirical studies. Design Studies, 31(4), 382 – 410. doi:10.1016/j.destud.2010.04.001.

Herring, S. R., Chang, C.-C., Krantzler, J., & Bailey, B. P. (2009a). Getting inspired! understanding how and why examples are used in creative design practice. In Proceedings of the 27th international conference on Human factors in computing systems, CHI '09, pp. 87–96. New York, NY, USA: ACM. doi:http://doi.acm.org/10.1145/1518701.1518717.

Herring, S. R., Jones, B., & Bailey, B. (2009b). Idea generation techniques among creative professionals. In Proceedings of the 42nd Hawaii International Conference on System Sciences, HICSS '09, pp. 1–10. Washington, DC, USA: IEEE Computer Society. doi: 10.1109/HICSS.2009.241.

Herring, S. R., Jones, B. R., & Bailey, B. P. (2009, January). Idea generation techniques among creative professionals. *In 2009 42nd Hawaii International Conference on System Sciences* (pp. 1-10). IEEE.

Hongik, C. S., Hongik, S. J., & Hongik, K. N. (2016). Configuring Time for Creativity: How to Optimize the Ideation Process in Design Thinking Workshops. *The International Journal of Design Management and Professional Practice*, *10*(4), 25-33.

Holland, D., Lachicotte, W., Skinner, D., & Cain, C. (1998*). Identity and agency in cultural worlds*. Cambridge, MA: Harvard University Press.

Howard, T. J., Culley, S. J., & Dekoninck, E. (2008). Describing the creative design process by the integration of engineering design and cognitive psychology literature. Des. Stud. 29, 160–180. doi: 10.1016/j.destud.2008.01.001

Hsieh, H.F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. Qualitative Health Research, 15(9), 1277–1288.

Hultén, M., Artman, H., & House, D. (2018). A model to analyse students' cooperative

idea generation in conceptual design. International journal of technology and design education, 28(2), 451-470.

Hutchins, E. (1995). *Cognition in the wild.* Cambridge MA: MIT press. Inkinen, M., Lonka, K.,

Jacucci, G., & Wagner, I. (2007). Performative roles of materiality for collective creativity. Proceedings of the 6th ACM SIGCHI Conference on Creativity & Cognition, Washington DC, USA, 73–82.

Jonson, B. (2005). Design ideation: The conceptual sketch in the digital age. Design Studies, 26(6), 613–624.

Jonson, Ben. (2005). Design ideation: The conceptual sketch in the digital age. Design Studies. 26. 613-624. 10.1016/j.destud.2005.03.001.

Kadry, A. (2015). The Creative Concept and its role in Advertising Design. International Design Journal, Volume 5, Issue 3, 1085-1090

Kangas, K., Seitamaa-Hakkarainen, P., & Hakkarainen, K. (2013a). Design thinking in elementary students' collaborative lamp designing process. Design and Technology Education: An International Diary, 18(1), 30–43.

Kangas, K., Seitamaa-Hakkarainen, P., & Hakkarainen, K. (2013b). Figuring the world of designing: Expert participation in elementary classroom. International Diary of Technology and Design Education, 23(2), 425–442.

Katz, J. (1972). *Semantic theory*. New York: Harper and Row.

Keinonen, T. (2006). Introduction to concept design. In T. Keinonen, & R. Takala, Product Concept Design (pp. 1–13). London: Springer

Keller, A., Hoeben, A., & der Helm, A. (2006a). Cabinet: merging designers? digital and physical collections of visual materials. Personal and Ubiquitous Computing, 10, 183–186. 10.1007/s00779-005-0018-7.

Keller, A. I., Pasman, G. J., & Stappers, P. J. (2006b). Collections designers keep: Collecting visual material for inspiration and reference. CoDesign, 2(1), 17 – 33.

Keller, I., Stappers, P. J., & Vroegindeweij, S. (2004). Supporting informal collections of digital images: organizing, browsing and sharing. In Dutch Directions in HCI. ACM.

Keller, I., Visser, F. S., van der Lugt, R., & Stappers, P. J. (2009). Collecting with cabinet: or how designers organise visual material, researched through an experiential prototype. Design Studies, 30(1), 69 – 86. doi:10.1016/j.destud.2008.06.001.

Kerne, A., Koh, E., Smith, S. M., Choi, H., Graeber, R., & Webb, A. (2007). Promoting emergence in information discovery by representing collections with composition. In Creativity and Cognition (C&C). ACM.

Kosslyn, S. (1990). Mental imagery. In D. Osherson, & S. Kosslyn (Eds.). Visual cognition and action: An invitaion to cognitive science (pp. 73- 97). Cambridge, MA: MIT Press.

Kilgour, M. (2006). Improving the creative process: analysis of the effects of divergent thinking techniques and domain specific knowledge on creativity. Int. J. Business Soc. 7, 79–107.

Kozbelt, A., Beghetto, R. A., & Runco, M. A. (2010). "Theories of creativity," in The Cambridge Handbook of Creativity, Vol. 2, eds J. C. Kaufman and R. J. Sternberg (New York, NY: Cambridge University Press), 20–47.

Laurence, S., & Margolis, E. (1999). Concepts and cognitive science. In S. Laurence, & E. Margolis (Eds.). Concepts: Core readings (pp. 3-81). Reading, MA: MIT Press.

Lawson, B. (2005). How Designers Think: The Design Process Demystified. Architectural Press, 4th edition.

LeonardoDaVinci.net. (2011, april 24). Leonardo da Vinci, his Life and Artworks. Retrieved from leonardodavinci.net: https://www.leonardodavinci.net/

Lubart, T. I. (2001). Models of the creative process: past, present and future. Creat. Res. J. 13, 295–308.

Lubart, T. I., Mouchiroud, C., Tordjman, S., & Zenasni, F. (2015). Psychologie de la Créativité (Deuxième Edition) [Psychology of Creativity]. Paris: Armand Colin. Mace, M.-A., and Ward, T. (2002). Modeling the creative process: a grounded theory analysis of creativity in the domain of art making. Creat. Res. J. 14, 179–192. doi: 10.1207/S15326934CRJ1402_5

Lupton, E., & Phillips, J. C. (2008). *Graphic design thinking: How to define problems, get ideas & create form*. NY: Princeton Architectural Press, 93p.

Maclennan, S. (1902). The image and the idea. Psychological Review, 9(1), 69. Makri, S., Warwick, C. (2010). Information for inspiration: Understanding architects' information seeking and use behaviors to inform design. Diary of the American Society for Information Science and Technology, 61(9), 1745–1770. doi:10.1002/asi.21338.

Maithereyi, Subramaniam (2017). The development of a tertiary level visual communication module incorporating an art appreciation approach. (Unpublished Doctoral dissertation). University of Malaya.

Maithereyi, S. (2017). The Development of a Tertiary Level Visual Communication module incorporating an art appreciation approach. (Unpublished Doctoral dissertation). University of Malaya, Kuala Lumpur.

Mäkelä, A. M., & Nimkulrat, N. (2011). Reflection and documentation in practice-led design research. Nordes, (4). Nordic Design Research Conference 2011 Helsinki. Retrieved from www.nordes.org

Maral Babapour, M , Rehammar, B., Rahe,U.(2010) A Comparison of Diary Method Variations for Enlightening Form Generation in the Design Process

Marcus, G. H. (2002). What is design today? Harry N. Abrams. Meggs, P. B. (1992). Type and Image: The Language of Graphic Design. Wiley.

Mendels, P., Frens, J., Overbeeke, K. (2011). Freed: a system for creating multiple views of a digital collection during the design process. In Proceedings of the 2011 annual conference on Human factors in computing systems, CHI '11, pp. 1481–1490. New York, NY, USA: ACM. doi:http://doi.acm.org/10.1145/1978942.1979160.

Mougenot, C., Watanabe, K., Bouchard, C., & Aoussat, A. (2009). Visual materials and designers' cognitive activity: Towards in-depth investigations of design cognition. In International association of societies of design research. Korean Society of Design Science, (463- 828) 314-8 Korea Design Center, 344-1 Yatap 1 dong, Boondang-gu, Sungnam, Kyunggido. ISBN 978-89-963194-0-5.

Mumford, M. D., Reiter-Palmon, R., & Redmond, M. R. (1994). "Problem construction and cognition: applying problem representations in ill-defined domains," in Problem Finding, Problem Solving, and Creativity, ed M. A. Runco (Norwood, NJ: Ablex), 3–39.

Ocvirk, O. G., Stinson, R. E., Wigg, P. R., Bone, R. O., & Cayton, D. L. (1968). *Art fundamentals: Theory and practice*. WC Brown Company.

Osborn, A. F. (1953/1963). Applied Imagination, 3rd Edn. New York, NY: Scribners. Patrick, C. (1935). Creative thought in poets. Arch. Psychol. 178, 1–74.

Pinker, S. (1997). How the Mind Works. W.W. Norton & Company, Inc, New York.

Patrick, C. (1937). Creative thought in artists. J. Psychol. 4, 35–73. doi: 10.1080/00223980.1937.9917525 Peilloux, A., and Botella, M. (2016). Ecological and dynamical study of the creative process and affects of scientific students working in groups. Creat. Res. J. 28, 165–170. doi: 10.1080/10400419.2016.1162549

Schön, D. (1995). A.(1983). The reflective practitioner: How professionals think in action.The Reflective Practitioner: How Professionals Think in Action. https://doi.org/10.1080/07377366.1986.10401080

Scott, S. (2010). Visual journaling towards greater meaning making in the secondary art classroom. (Master dissertation). Available from Proquest Dissertations and Theses database. (UMI No. 1484118)

Singh, P., Chan, Y. F., & Sidhu, G. K. (2006). A comprehensive guide to writing a research proposal. Venton.

Smith, E., Shoben, E., & Rips, L. (1974). Structure and process in semantic memory. Psycological Review, 81, 214-241.

Sullivan, G. (Ed.). (2010). *Art practice as research: Inquiry in visual arts*. Sage.

Todd-Adekanye, C. (2017). Visual Journaling for (Self) Education through Art Education. Online Submission.

Van der Lugt, R. (2005). How sketching can affect the idea generation process in design group meetings. Design studies, 26(2), 101-122

Vogel, T. (2014). Breakthrough Thinking: A guide to creative thinking and idea generation. Simon and Schuster.

Vogel, T. (2014). Breakthough thinking. A guide to creative thinking and idea generation.ohio: Howbooks.

Washington D.C. Dunbar, K. N., & Blanchette, I. (2001). The in vivo/in vitro approach to cognition: The case of analogy. Trends in Cognitive Sciences, 5(8), 334–339.

Wolfe, M. (2011). The complete picture: Teaching for understanding using the visual diary. Screen Education, (64), 80.