Scientific Research Publishing

Open Journal of Social Sciences, 2022, 10, 60-80
https://www.scirp.org/journal/jss
ISSN Online: 2327-5960
ISSN Print: 2327-5952

Fixation in Visual Communication: Ideational Issues

Bismark Sabeng Amoateng, Anita Akwa Toffah, Richard Selase Gbadegbe*, Joseph Amewu, Ansah-Asiedu Junior

Department of Industrial Art, Ho Technical University, Ho, Ghana
Email: *rgbadegbe@htu.edu.gh, bamoateng@htu.edu.gh, atoffah@htu.edu.gh, jamewu@htu.edu.gh, jansah-asiedu@htu.edu.gh

How to cite this paper: Amoateng, B. S., Toffah, A. A., Gbadegbe, R. S., Amewu, J., & Junior, A.-A. (2022). Fixation in Visual Communication: Ideational Issues. *Open Journal of Social Sciences, 10,* 60-80.
https://doi.org/10.4236/jss.2022.1012005

Received: September 20, 2022
Accepted: October 31, 2022
Published: November 3, 2022

Abstract

World development has fostered the effectiveness of utilizing visuals in print and electronic media communication. The visuals for communication are crafted through the ideation process to the final execution of the project. In completing a design project, ideation must be successfully carried out. But sometimes, there are instances where the process is hindered since designers may want to settle for comfort zones and thus become fixated on ideas. This study therefore aims at exploring the challenges associated with design fixation in ideation in the local setting and how to mitigate them. Using interviews and observation in a qualitative inquiry, the researchers examined the phenomenon under study with the aid of the Ideation Activity Model as a theoretical lens. The study revealed an insightful relationship between designers, tools (manual and digital), design process, ideation techniques, client, design team, and the outcome of a designer's activity during ideation. Four major themes that affect design fixation were discovered: the Designer's background, Digital Ideation, Client and Designer tensions, and Fixation type.

Keywords

Design Fixation, Communication, Ideation, Activity Model, Fixated

1. Introduction

Communication is vital to the success of the human race. There are various forms of communication, but generally, the communication process involves exchanging data and information. Eckert et al. (2005) add that knowledge is created in the communication process, aside from exchanging data and information. One of the possible modes of communication is visual communication.

Visual communication uses visual elements to communicate specific messages. The success of visual communication involves "the process of conceiving, planning, projecting, coordinating, selecting, and organizing textual and visual elements" (Frascara, 2004).

Communication is dynamic; therefore, visual communicators have to employ vibrant and effective strategies for the process. It involves a well-planned thinking process to find the right visuals to communicate a message best, considered under design thinking. According to Brown & Wyatt (2010), design thinking is an optimistic, constructive, and experiential process that incorporates consumer insights and rapid prototyping aimed at getting beyond the assumptions that block effective solutions. Unfortunately, designers sometimes stay in a comfort zone where they remain static in using only a particular design style to solve a specific problem. This phenomenon has been tagged as design fixation. The negative impact of design fixation is crucial since it limits design space exploration (Moreno et al., 2015). Hence, a message is likely to miss the maximum impact since consumers continue to see virtually the same design repeatedly.

Furthermore, many practical solutions available in the design space are missed, which can hinder the progress of the design industry. Creativity is then killed (Amabile, 2006). Suppose creativity is killed and designers become static. In that case, every Tom, Dick, and Harry becomes a designer leading to the influx of unprofessional and ineffective artworks that fail to communicate the intended message. Therefore, the research is to explore design fixation in Ideation in our present age and its contributing factors.

2. Literature Survey

Many researchers contribute their share of knowledge and findings to the design community in the design industry. There are numerous resources available to gather relevant information for the current study. Current researchers considering design fixation, two of which are notable are Moreno et al. (2015) and Howard et al. (2013). Another author has also contributed to Ideation and Information and Communication Technology (ICT) (Appiah, 2014). Design fixation is "the inability to work around existing solutions or the focus on developing mere variants of existing solutions" (Moreno et al., 2015). Thus, designers become "fixed" or "static". Fixation is studied in many areas of human endeavour and mainly in different fields of design (Alipour et al., 2018). Design fixation is a stagnation stage and a blockage to innovation, creativity, and design development. Moreno et al. (2015) present the phenomenon in this light:

The relevance of studying fixation effects in Ideation, creativity, concept generation, and processes across knowledge domains to develop innovative solutions, lies in the often negative impact it has in the early stage of ideation by limiting design space exploration and, therefore, narrowing the range of divergent possibilities of solutions. The above extract reveals the relevance of studying fix-

ation and highlights the negative impacts on Ideation due to its limitation, stagnation, and restrictions. Furthermore, fixation is at its worst when "a persistent and implicit use of knowledge is inappropriate and counterproductive". Due to design fixation, a particular design industry may continue to repeat or cycle around a standard error because the designers have become used to or fixed with bad practice. Design fixation, a complex phenomenon, can be caused by many factors. As workload increases, designers always find ways of working faster to meet time constraints and may end up in daily routines, leading to design fixation (Hwang et al., 2021). The qualities of a good idea include originality, appropriateness, and the surprisingness of an idea. Moreno et al. (2015) also identified other possible causes of design fixation: "a designer's unfamiliarity or limited knowledge of analogous fields of study, limitations due to cognitive blocks, and comfort with the familiar existent feasible sets of solutions." Researchers on design fixation always seek out the causal agents and how to mitigate fixation even when designers become experts in any design field (Howard et al., 2013).

2.1. History of Design Fixation

Design fixation finds its roots in "fixation" as used in cognitive science studies, not to be confused with other types of fixation; for example, fixation in photography. To make clear the research area, the researchers present a brief history of how fixation entered the domains of design studies. According to Mohanani et al. (2014), fixation was originally proposed by Freud in reference to unusual sexual traits but currently refers to the tendency to "disproportionately focus on one aspect of an event, object, or situation, especially self-imposed or imaginary obstacles" (Moreno et al., 2015; Ralph, 2011).

Cognitive fixation refers to a potentially resolvable block or impediment to reaching the goal of one's mental activity, something that blocks completion of different types of cognitive operations, including many processes and structures involved in memory, problem solving, and creative ideation.

The above definition is a more technical and scientific look at fixation. The interest of this definition to this study lies in the fact that fixation is a "potentially resolvable block"; thus it can be solved. This confirms the fact that if researchers explore design fixation, there is a potential viable outcome; it can be solved. Furthermore, Jansson & Smith (1991) explain design fixation as "a blind adherence to a set of ideas or concepts limiting the output of conceptual design" (Jansson & Smith, 1991). They introduced cognitive psychology to design practice. In their study, participants were asked to design a bicycle rack for a car, a measuring cup for the blind, and a spill-proof coffee cup. It was finally realized that the treatment participants "generated more non-infinitely variable designs than the control group, more designs without overflow devices, and more overall designs similar to the example" (Jansson & Smith, 1991). They realised that by showing wrong samples to the participants, they were fixated on the wrong samples shown. This is seen in another term for Design Fixation which is "Function-

al Fixedness" (Howard et al., 2013). The designers were fixed on the functions presented. It can also be seen as a cognitive fixedness.

Howard et al. (2013) define Cognitive fixation as a mental block in the production of novel ideas when solving problems, where someone is unable to think beyond what they have been exposed to in the past in relation to the problem at hand. Moreno et al. (2015) add that design fixation is "the inability to work around existing solutions or the focus on developing mere variants of existing solutions". The definitions above show that design fixation relates to ideation which is also a cognitive activity where designers develop ideas through various techniques using their brain as an active processing unit. It is also clear that the approach to retrieving information from the brain can be hindered by some factors either external or internal.

2.2. Design Fixation

Design fixation is "the inability to work around existing solutions or the focus on developing mere variants of existing solutions" (Moreno et al., 2015). Thus, designers become "fixed" or "static". Fixation is studied in many areas of human endeavour and mainly in different fields of design. It has been understudied from the 90s in design industries. Design fixation is a stagnation stage and a blockage to innovation, creativity and design development. Moreno et al. (2015) present the phenomenon in this light:

The relevance of studying fixation effects in ideation, creativity, concept generation, and processes across knowledge domains to develop innovative solutions, lies in the often negative impact it has in the early stage of ideation by limiting design space exploration, and, therefore, narrowing the range or divergent possibilities of solutions.

The above extract does not only reveal the relevance of studying fixation but also highlights the negative impacts it has on ideation due to its limitation, stagnation and restrictions on ideation. Furthermore, fixation is at its worst when there is "a persistent and implicit use of knowledge that is inappropriate and counterproductive" (Smith et al., 2011). This is a major concern. Due to design fixation, a particular design industry may continue to repeat or cycle around a common error because the designers have become used to or fixed with a bad practice.

Considering the enormity of the design space and all the available ideation techniques, designers should be able to flood the market with novel designs but this is not the case. Unfortunately, designers sometimes stay in a comfort zone where they remain static in using only a particular style of design in solving various problems because of fixation even though there are better ways of solving such problems. Sometimes "designers and problem solvers tend to get fixated; that is, they get stuck on ideas that seem not to be promising, usually in hindsight, but nevertheless, continue to attempt to fit them to the problem rather than exploring other possible solutions that may be more promising" (Tversky & Chou, 2011).

The visual message is thus devoid of the needed impact since consumers continue to see virtually the same design over and over again. The "novelty" and "surprise" components of a creative work which is sufficiently important are lost. Becattini et al. (2011) opine that "it is necessary to innovate to be competitive, it is necessary to enhance problem solving skills to develop valuable innovations". Furthermore, a lot of effective solutions available in the design space are missed. This negatively influences the progress of the design industry. Creativity is then killed (Amabile, 2006). If such a major component of designers' profession, creativity, can be "killed", then researchers cannot overlook it of which fixation is one of the culprits. Furthermore, innovation has a major contribution to the success of an enterprise, product and product quality (Westwood & Sekine, 1988; Claver et al., 1998; Ottosson, 2004).

Innovation is contingent on creativity (Goldschmidt, 2011). Fixation inhibits creativity (Gero, 2010) and thus innovation. To be innovative, a designer must be ready to liberate himself from routines of perception (Tschimmel, 2011) which are hindering innovation and embrace new and better ways of designing. As such the causal agents of fixation must be researched thoroughly.

2.3. Causes of Design Fixation

The template is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin in this template measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire journals, and not as an independent document. Please do not revise any of the current designations. As work load increases, designers always find ways of working faster to meet time constraints and may end up in daily routines which can lead to design fixation. These routines can be techniques proposed by researchers which if strictly followed can yield effective results but unfortunately these routines if not well utilised can end up in design fixation. This is due to the fact that "systematic approaches of problem solving are characterized by linear and 'step-by-step' procedures that drive the design process, but usually cover a narrower solution space" (Becattini et al., 2011). A narrower solution space exploration relatively increases the occurrence of design fixation. Contrary, Lindemann (2011) assert that systematic procedures can have a way of promoting creativity but only if there is the needed flexibility.

The next likely cause of design fixation is the inadequate desire of designers to strive for originality and hence innovation. To develop an original idea is a dutiful task which involves effective ideation to ensure that the idea is appropriate and useful. The qualities of a good idea include originality, appropriateness and surprisingness of an idea Collado-Ruiz & Osta-Ahmad-Ghorabi (2011). Suprisingness is quite rewarding in communication since users easily remember such unique ideas.

When designers do not mind developing something original, it leads to copying other designers' work which affects innovation negatively. The benefits of innovation cannot be overlooked and as such designers must strive for it. Innovation has become a base for competiveness even among countries. Lloveras et al. (2010) confirm to this in this extract:

In the current world a developed country bases its competitiveness on the innovations of products or services. The spark of a good idea is the "Holy Grail" that companies search for to reach a significant innovation allowing them to dominate the market and obtain profits, and the results is normally an increase of the social wealth and comfort. This main objective is sometimes more modest, and small innovations allow the survival of the company, and even to earn profits.

Moreno et al. (2015) also identified some other possible causes of design fixation such as "a designer's unfamiliarity or limited knowledge of analogous fields of study, limitations due to cognitive blocks, and comfort with the familiar existent and feasible sets of solutions". Researchers on design fixation are always seeking out the causal agents and how to mitigate fixation even when designers become experts in any field of design (Howard et al., 2013).

2.4. Types of Design Fixation

Howard et al. (2013) present three categorizations of fixation proposed by Youmans and Arciszewski (2012) in their research as presented below in this extract:

1) Unconscious Adherence: When a designer proposes an idea believed to be new but in actual fact the designer had been exposed to the idea at some point in the past.

2) Conscious Blocking: When a designer is aware that he/she is unable to break free from a certain concept or thinking pattern.

3) Intentional Resistance: When a designer is unwilling to let go of a previous design through a preference for the previous design and a lack of motivation for change. How do you review this or how do these play into your study?

2.5. Visual Communication

Communication is vital to the success of the human race. There are various forms of communication but generally the communication process involves the exchange of data and information. Eckert et al. (2005) add that, aside exchange of data and information, knowledge is created in the communication process. Furthermore, they classify communication as relational, thus the communication process can "never be attributed solely to the communicators (sender and receiver), nor to the message, but occurs as the specific relation between these units". The receiver must have the cognitive ability to decode the message for successful communication. There are various forms of communication from verbal to visual. One of the modes of communication is visual communication. Before proceeding to expatiate further, it is important to discuss the difference

between Communication Design and Graphic Design. The terms are similar but the context connotes the angle from which a researcher is considering the design activity. According to Frascara (2004), the term graphic designing "places too much emphasis on the graphic, physical element". He further argues that by using the term "graphic designing", the essential aspects of the graphic design profession which is effective communication is obscured.

The researchers share in the view of Frascara (2004). The communication component is vital to this research, hence the use of the term, visual communication. By using visual communication, the reader is always drawn to the main activity of the type of design in question. It distinguishes the visual communicator from the engineering designer as well as architects who are also graphic artists but plan for creation of structures which are not primarily for the purposes of communication. Frascara (2004) finally enlightens on the components in the definition and use of the term visual communication design as more appropriate because it covers the totality of the profession. Thus the method (design), objective (communication) and medium (vision) of visual communication are made clear (Frascara, 2004).

Visual communication utilises visual elements to communicate specific messages. The success of visual communication therefore involves "the process of conceiving, planning, projecting, coordinating, selecting, and organizing textual and visual elements" (Frascara, 2004). This highlights the design process involved in creating visuals for communication. Design can be considered in many activities. It can include inventing, projecting, programing, and coordinating in many areas of human and technical factors. Frascara (2004) asserts that design is "to translate the invisible into the visible, and to communicate." He further defined design especially with respect to visual communication as "the process of conceiving, planning, projecting, coordinating, selecting, and organizing a series of elements—normally textual and visual—for the creation of visual communications". His definition presents a holistic view of the planning to the execution of visual communication projects.

He thus defines Visual Communication Design as "the action of conceiving, programming, projecting, and realizing visual communications that are usually produced through industrial means and are aimed at broadcasting specific messages to specific sectors of the public". Visual communication is broad but it is the major activity of the visual communication designer. The visual communication designer is the human resource managing the process. He works on interpreting, organizing and presenting the message of the client in a visual form.

Visual communicators are visual thinkers making extensive use of visual images in the process of designing (Goldschmidt & Smolkov, 2006). Designers "consume" visuals and output visuals (Goldschmidt & Smolkov, 2006). The level of "consumption of visual images" affects a designers' production of visual representations as thinking aids in communicating a given message. Visual communicators use stimuli all the time (the "aha" idea retrieval concept) whether consciously or unconsciously (Goldschmidt & Smolkov, 2006). It is a complex

process of problem solving to solve complex problems of design (Guilford, 1967). Frascara (2004) further presents the complexities of the communication design process in this extract:

Every communication in design involves a source, a designer, a medium, a code, a form, a content, a context, and a public (that builds a meaning, develops an attitude, and adopts a visible or internal behaviour). Every communication involves perceptual, emotional, and cognitive processes (denotative and connotative). Form and style always communicate. Every communication is affected by the different contexts that surround it.

The complexity of visual communication design contributes to the tensions of the phenomenon under study. Design fixation may be fueled when visual communicators assume this complexity cannot be easily managed such that if they find a route, they may not be ready to find out better routes. Considering the findings of Moreno et al. (2015), designers may stay in a comfort zone due to the complexities of visual communication design.

Even though, it is a complex process, the success of visual communication lays in the senders achieving the intended goal by inciting the needed reaction from the receiver, mostly the public who may lack the intelligence of a designer. The ability to understand or decode a given visual message and respond to it requires careful execution of visuals mainly text and images. According to Frascara (2004) the public may accept or reject; forget or remember, obey or dismiss the intended purpose of the visual message. The researchers consider this to be true due to the clatter of visual messages which the public interact with in almost every point of time during the day. The public hold the power to interpret it as they choose bounded by their cognitive, emotional, socio-cultural views and the like. This evokes the need for the visual communicator to carry out in-depth research and present the best possible design solution since the reaction of the public is uncertain Frascara (2004). If designers remain fixated and fail to develop new variants, the power of visual communication will be underutilised likely due to the clatter of virtually similar designs in an ever growing and changing society. Visual communication involves the source (designer), the medium (physical or digital), code, form, and context (Frascara, 2004). The visual communication designer requires effective design thinking, planning and execution to yield effective communication design from ideation to implementation. The researcher will thus like to elucidate on issues concerning design thinking as it relates to the current study.

2.6. Design Thinking

Nobody can be a good reasoner unless by constant practice he has realised the importance of getting hold of the big ideas and hanging onto them like grim death (Lawson, 2005). Design thinking cannot be ruled out of visual communication. Designers have sought to improve message transmission via the visual medium over the years from senders to receivers. McLuhan (1964) asserts that "the medium is the message"; that is to say "that content follows form, so the

form in which one receives the message affects one's interpretation of it" (Erlhoff & Marshall, 2008). McLuhan (1964) places emphasis on the visual medium and how best visual communicators can exploit its maximum potentials in communication. Communication is dynamic therefore visual communicators have to employ dynamic and effective strategies for the process. It involves a well-planned thinking process to find the right visuals to best communicate a message while preventing design fixation.

According to Brown & Wyatt (2010), design thinking is an optimistic, constructive, and experiential process which "incorporates consumer insights in depth and rapid prototyping aimed at getting beyond the assumptions that block effective solutions". Design thinking is "a system of overlapping spaces" and can be iterative until the final idea is developed. Yilmaz (2010) assert that the overlapping "design spaces" consist of many possible design solutions, with many possible strategies that a designer can choose to solve a given problem innovatively.

Design thinking is beyond mere thinking. Lawson (2005) compares design thinking to the type of imaginative thinking described as fantasy anchored in reality where designers "think" through certain scenarios which are possible but not actual. It usually emerges from the inspiration to design usually from a client. Lawson (2005) also looks at "reasoning" which he classifies as reflective thought and problem solving where a person self-consciously attempts to control the direction of thought towards an intended goal and overcome obstacles.

Goldschmidt (2011) opines that design thinking contributes to innovation. He asserts that design thinking is not just to support the generation of a large number of original ideas but it is also a method for "devising innovative solutions for products, spaces, services (including 'experiences') or systems". This gives a clue to how to solve design fixation; understanding design thinking process for effective ideation. A designer's ability to recognise relationships facilitates idea and concept generation. Lawson (2005) quotes Bruner: "the designer must 'go beyond the information given' and see possibilities which others may fail to discover for themselves but still recognise as useful, appropriate and beautiful when they are presented". Sources of information available in a design decision-making situation as proposed by Markus are: The designer's own experience, Others' experience, existing research and new research (Markus, 1969).

Designers draw inspiration from the sources of information mentioned above. In recent years, the types of experience by designers from these sources are different and continue to change over the decades of world development. A limited data source of inspiration can lead to design fixation. It can also be that some designers may not have the ability to utilise what they receive from these sources. For instance, there are numerous image banks available on the internet but without the right keywords, a designer may end up having a good tool but underutilised which can be a contribution to fixation. The success of design thinking is influenced by the creativity of the designer.

2.7. Idea and Ideation

Through design thinking, ideas are generated which can be creative or not. In general, an idea can be expressed in a drawing, a word, a phrase, a sentence, a figure, a speech, or an action, even a gesture (Carroll, 1993); (Jimenez-Narvaez et al., 2010). The ability to generate ideas and express it in a media is a vital human characteristic (Carroll, 1993). Jimenez-Narvaez et al. (2010) distinguish a creative idea from other expressions in its attribute of manifesting itself as a solution to a given problem. This makes creative ideas unique. To add to the above, a creative idea must not just be a solution, but it must be innovative such that old creative ideas are developed in our ever changing growing world to be able to meet the insatiable needs of man.

Ideation is the process used to explore and represent the many possible design solutions. During ideation, a designer develops various ideas depending on the level of creativity to arrive at the best solution. Kudrowitz (2010) identifies many researchers like (Reinig et al., 2007), (Osborn, 1963), (Mednick, 1962) and (Kim et al., 2011) who assert that "quantity breeds quality in ideation". That is, when a designer is able to conceive more ideas during ideation, he gets a more innovative and useful design solution. Hence, less design fixation.

During ideation, designers connect to various inspirational sources which serve as base for idea development through design thinking. These sources include: comparable designs, other types of design, images of art, beings, objects, and phenomena from nature and everyday life (Dorta et al., 2011).

2.8. Ideation Techniques

There are many techniques developed over the years for ideation. This include Brainstorming, Analogy, Word Tree, Mind-mapping, 6-3-5/C-Sketch, Brute Thinking, Design Heuristics etc. "Many methods have been proposed for idea generation in design, aimed at increasing creativity" (Goldschmidt, 2011). These methods aid in exploring the design space of a given problem. Dorta et al. (2011) proposes two approaches in evaluating the effectiveness of ideation. First is process-based approach where the process of ideation is measured. Data is collected from protocol analysis or analysis of the process of ideation. The other approach is outcome-based which relates to measuring the results of the ideation; thus the ideas generated.

The current study focused on understanding the process of ideation used by designers especially in a generation where the digital media is fast chasing the traditional media in exploration of the design space of a problem.

2.9. Design Space

Design space can also be referred to as "a space of possibilities" (Maher, 2011) or a solution space (Simon, 1969; Tversky et al., 2010). This space is a conceptual space which is dependent on the way designers think (Maher, 2011). According to Boden (2003), creative artworks can be produced by combination, exploration

or transformation of ideas. With the development of technology, Gero (2000) adds analogy to it. All the methods of ideation seek to increase the efficiency, quality, and novelty of innovation (Weaver et al., 2009). In design, concept generation is an area that has undergone continuous development from vague ideas of brainstorming to fleshed-out formal methods such as morphological matrices (Otto & Wood, 2001).

With all the available techniques or tools for ideation, the design space for solving every design problem is wide hence the possibility of developing creative and novel solutions is not farfetched. It must be noted that if designers employ these techniques in the right context, they can be very innovative. Innovation is "the capacity to generate ideas or products that are both novel and useful" (Chan et al., 2011). The ability of a designer to be innovative depends on the fruitfulness of the ideation stage. With the variety of ideation techniques, a designer should be innovative. Even though this should have been the direct situation, it has not being so which is common in predicting social issues. This is because of the human factor involved. Designers being social beings are unpredictable and human behaviour has created a phenomenon known as fixation. Effective design thinking may be the solution. Goldschmidt (2011) quotes:

Design Thinking, which is meant to do more than support the generation of a large number of original ideas. Design Thinking denotes a method for general use in the process of devising innovative solutions for products, spaces, services (including "experiences" solutions for products, spaces, services (including "experiences") or systems. More than anything, it is a business strategy.

In our current information age, it seems that every one can become creative by following steps and guidelines and present a solution but not all solutions satisfy a need Goldschmidt (2011). Designers should find ways to mitigate curtailed practices that lead to catchy results which do not have any value attached to them Goldschmidt (2011). The need for innovative solution is herein expressed. Considering the complexities of design fixation, visual communication, and the multidimensionality of creativity, design thinking and ideation, it is required that a guiding theory is used to serve as a lens for the current study. Uniquely, the researcher happens to note a theory which is effective at understanding complex phenomena and studying tensions between variables in ideation activity. This is the Ideation Activity Model. The next aspect of the Literature review enlightens on the assumptions of the effectiveness of the Ideation Activity Model as a guiding lens for this study.

2.10. Theoretical Framework

A study should be guided by a guiding lens to fully understudy the problem at hand. The current study was guided by a conceptual framework developed from the Activity theory (AT).

Activity Theory

The joy of literature review is gaining the knowledge of what is likely to work

and what will not work; learning from the successes and failures of preceding researchers in any field of study. Their successes become grounds on which one can stand to look high and reach greater heights especially with respect to theories and conceptual frameworks which aid in analysing activities. According to Tarbox (2006) the use of a theory presents "the general or abstract principles of a body of fact, science, or art—a belief, policy, or procedure proposed or followed as the basis of action in a research work" (Tarbox, 2006). In this study, the base activity, ideation, is paramount. This activity requires a theory that analyzes human activities and behaviour. A theory that studies activities is the Activity theory. Activity theory can drive this study since it can study the human activities and behaviour.

Lev Vygotsky, an early-twentieth-century Russian psychologist, first developed activity theory. It was further expanded by Engestrom (2000) who gives themes to help define the nature of an activity which was based on the activity triangle created by Vygotsky (1978). Activity theory is used to analyse human behaviour and activities from social perspectives. Since the current study is a study on designers' behaviour and ideation activity of designers, it aligns with the Activity theory. Tarbox (2006) asserts that "activity theory provides a platform for designers to look at all the components of a specific situation [activity like ideation], and it impacts the way we approach design by looking carefully" at the factors that influence a design activity.

Appiah & Cronjé (2013) used activity theory to explore ideation activities among students in the use of Information Communication and Technology (ICT) and the challenges of ideation in graphic design. They identified "disturbances in the ideation process of graphic design with ICT, especially within large class in a developing country" Appiah & Cronjé (2013). Using interviews and observations, students were studied on how they interact with tools in the ideation process with the current developments in ICT. In concluding, Appiah and Cronjé (2013) believed that there is the need for "an activity-oriented framework that relates to graphic design" for studying ideation in graphic design.

3. Materials and Methods

Considering the objectives of the current study and the research questions posed, it was clear that exploratory qualitative research should be conducted. The researchers sought to explore design fixation in visual communication considering Ideation issues. The researchers studied some designers and explored their views and daily activities in designing, especially Ideation being of keen interest (Crilly, 2019). The researchers collected data from designers who have experienced the phenomenon under study and described what they have experienced and how they experienced the ideation process. The researchers wanted to study the participants without any presuppositions or judgments (epoch) to ascertain the "natural attitude" of designers concerning the phenomenon being studied (Creswell, 2007). As a qualitative research, the current study was conducted such that ontologically, the reality is subjective, as presented by the study

participants (Creswell, 2007). In addition, the investigation becomes more reliable and valid when such biases are limited (Creswell, 2007).

3.1. Participants

Ten (10) participants were chosen for the study in ten (10) different studios, nine (9) males and a female. Four (4) males and a female were interviewed for the study while the observation involved five (5) other male designers who were randomly purposefully selected. The designers were from small-medium scale enterprises which dominate in the study area.

3.2. Study Area

The sample was concentrated at Asafo, Kumasi in Ashanti Region of Ghana. This area was chosen because it is the hub of visual communication designers in Kumasi. The area hosts the bulk of design companies and studios as well as printers. Most of the design companies and studios are small-medium scale enterprises. They serve many clients from individuals to corporate bodies as well as institutions from all sectors of the economy of Ghana. Due to the increased patronisation of print media, individual clients also employ the services of visual communication designers at Asafo.

Two methods were used to ensure validity and reliability of the research (Dorst & Cross, 2001). Validity here considers the meaningfulness of the components of the research (Dorst & Cross, 2001). Thus, being sure that the right data is measured which will provide right information for the phenomenon understudy. Furthermore, reliability in this study considers "the extent to which measurements are repeatable" (Dorst & Cross, 2001). Thus, when another researcher uses the same measurements in different situations, the result will be same or similar. Validity and reliability could not be overlooked even though that meant more work to be done. The researchers were ready to go all out to ensure the right data was gathered hence the use of two methods of data collection.

3.3. Data Collection

Data collection can be seen as "a series of interrelated activities aimed at gathering good information to answer emerging research questions" (Tarbox, 2006). The success of data collection is at the heart of well thought planning before launching out to gather data. Creswell (2007), proposed a cycle for data collection where a researcher runs through series of steps from locating the site/individual to the final step of storing the data gathered. The researchers therefore planned adequately before launching to gather the data for the study. The data was stored for later analysis. In the long run, sufficient data was collected for thorough analysis. Qualitative exploratory study of a phenomenon uses "relatively unstructured methods of data collection" (Dorst & Cross, 2001). The researchers employed interviews as well as observations for validation and reliability of data gathered.

3.4. Interview

An interview is a conversation between people in which one person has the role of a researcher (Dorst & Cross, 2001). As already noted, interview is one of the major tools for data collection in exploratory research (Dorst & Cross, 2001). It gives the researcher the opportunity to ascertain participants' experiences within their own worldview. Participants share their life experience during interviews with the researcher being the guide so as to reduce the chunk of unessential information. Research is thus "able to ascertain what is in people's minds" (Appiah, 2014). Furthermore, interviews were able to provide more insightful and enlightening data (Dorst & Cross, 2001). It may be face-to-face or by telephone or any other appropriate medium.

The researchers adopted face-to-face interviews, "where the interviewer works directly with the respondent to ask questions and record their responses", (Bhattacherjee, 2012) which may be carried out at home or in the office. The researchers engaged the participants in their design studios. Furthermore, the interviews were semi-structured. "Semi-structured interviews are non-standardized" in structure and order of data collection. As a qualitative study, the opportunity to probe for more detail by using semi-structured interviews was powerful in gathering all the needed data. The researchers recorded the interview sessions with a portable recording device.

The researchers sought for consent from all the interviewees to record their interviews. They were assured of confidentiality and the fact that ethical issues were considered to protect their image and organisation. They were ready and free to share their experiences when the researchers assured them of such confidentiality. The interviews were recorded with a digital Samsung voice recorder which was kept close for a clear recording.

3.5. Observation

"Observation is not simply a question of looking at something and then noting down 'the facts'" (Dorst & Cross, 2001). Observation should be systematic involving careful planning for research work and can provide rich qualitative data if well carried out. Observation helps a researcher to gather direct information as events happen directly. Participants can hide some information which can be collected through observations.

The researchers tried to avoid observer bias where a researcher sees what he wants to see instead of observing what is really happening. Due to this, there was a guide for the observation where the researchers observed some key data. However, observations were not limited to just that. It was semi-structured. The observation was semi-structured because it was planned and what was observed was recorded for later analysis.

One of the major challenges in observation is getting access to observation sites (Dorst & Cross, 2001). The researchers initially planned for an overt observation but later decided to adopt a pragmatic approach where both overt and

covert methods were used. Overt observation is where those being observed are aware that they are being observed while covert observation is where participants are not aware that they are being observed (Dorst & Cross, 2001). The researchers adopted covert approach also to prevent observer effect on the participants.

Due to this, the style of note taking varied from site to site. Hence the researchers used different styles of taking field notes. During the covert observations, the researchers had to observe the event keeping mental records which were quickly jotted down after the observation. With the overt ones, the researchers had the opportunity to sit or stand and make notes. In effect, the researchers were both undercover observers as well as announced observers depending on the situation at the site. There were observations of verbal behaviours such as mannerism and mood. Non-verbal behaviours such as body language were also observed including facial expressions, body postures, movement and speed at which the designers worked. Studio setting was also observed.

Furthermore, the researchers presented themselves as seeking to find out more about ideation and acknowledging the participants as the masters in their field of work. In the long run, the researchers did not only observe ideation processes but virtually the whole design process. After the field work, the researchers documented the full notes using Microsoft Excel. Microsoft Excel was used because it offers a broad sheet with which individual observations could be recorded against each other according to columns. Using Microsoft Excel also facilitated reading through the notes and making comparisons less laborious.

Even though, covert observation was undertaken in some instances, it was essential that ethical issues were considered. Hence, the names and locations of those observed were not included in the analysis.

"Deductive coding implies that the codes were pre-determined by prior knowledge of the subject, and then allocated to particular parts of the transcribed text through the extensive literature reviewed. Inductive coding, on the other hand, implies that the codes were developed as the information was presented".

The deductive codes were priori codes provided by the ideation activity model (**Figure 1**) as well as literature review while the inductive codes were obtained through narrative analysis of the interviews gathered (**Figure 2**).

4. Major Findings

A major finding of the study is that, the vast majority of the designers didn't know about design fixation and its mitigation. Preparing designers in the best way to alleviate fixation would therefore yield positive outcomes. The researchers presume that preparation would work with development, yet designers should be persuaded about the significance and guarantee of its reasonableness. Additionally, training can be digitalized into video or simple-to-follow books, which designers can reference at their solace. Besides, the researchers saw that the undertakings were finished carelessly and, as such, the requirement for addi-

tional time. The research showed that the portion of time would be relative, relying upon the kind of work. Time is valuable and should be very much used.

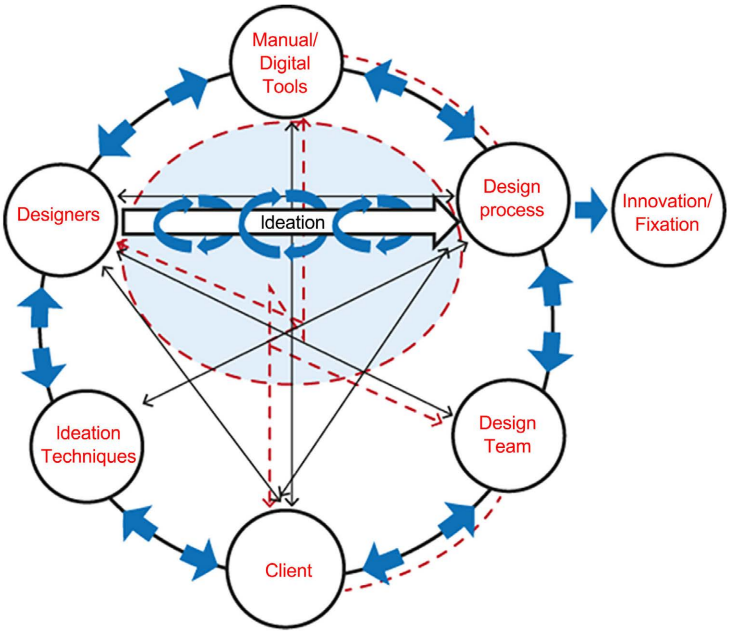

Figure 1. Ideation activity model.

SUBJECT

Participants
Five (5) participants were interviewed; four males with a female.

Work experience
- Two (2) has four (4) years work experience
- Two (2) has six (6) years work experience
- One (1) is a novice within her first year

Training
- Two (2) underwent Apprenticeship training
- Two (2) underwent Tertiary education
- One (1) has both Tertiary and Apprenticeship training

Mode of Self-training
- Peer learning (highest)
- Billboard
- Video tutorials
- Internet
- Already designed works
- Family inspiration

Inspiration
- Billboards (2)
- Signboards (1)
- Posters - hardcopy & softcopy online (2)
- Internet (3)
- Video animations (1)
- Magazines, Books, Paintings (1)
- Other works of art (2)

TOOLS

Tools
- CorelDraw
- Photoshop
- InDesign
- Illustrator
- Scanner
- Computers
- Storage devices
- Other design software (not mentioned)

Ease of use of internet
- Low speed of internet from service providers
- Depends on internet speed
- Depends on designer's level of knowledge
- Depends on the theme of the work

Uses internet for
- Downloading pictures
- Downloading samples]
- To gather inspiration from other designers

Figure 2. Analysis of Interview classified under Ideation Activity Model (Subject and Tools).

The study also noticed that design space exploration of designers is relatively limited since sketching was minimal since sketching minimizes cognitive load during brainstorming. Most of the designers brainstormed without sketching. All the advantages of sketching were lost, which relatively limited innovation and maximized fixation. Sketching should be introduced, or with the aid of the graphics tablet, sketching can be done digitally.

It was additionally seen from the review that design space investigation of designers is generally restricted since sketching was minimal, limiting the intellectual burden during conceptualizing. The vast majority of the designers conceptualized without sketching. The upsides of sketching were lost, which moderately restricted development and expanded obsession. Sketching should be presented or guided by the design's tablet.

The type of Ideation practised is generally computerized Ideation. The robust instrument utilized in the process is the internet. Rather than conceptualizing, there is looking at picture banks on the internet and storage devices. The picture banks online give analogies or related picture looks, which turns into advanced conceptualizing. The accomplishment of the internet search relies upon the contribution of the correct watchwords, just as the Designer's skill in perusing the internet and downloading pictures.

Clients have become accomplices during Ideation (co-designers). Design experts execute their projects on the fly while clients are noticing the cycle, offering remarks when vital. It occasionally mounts tension on the designers who need to address clients' issues in the briefest possible time—design experts penance traditional Ideation to show dominance even though this somewhat amplifies obsession. Compelling clients the board abilities are required. The claim that "quantity breeds quality in ideation" does not benefit design professionals since working conditions do not allow the generation of several ideas. Instead, the focus is on developing a concept critiqued by the client synchronously while the project is in execution. Templates are primarily used to execute tasks that have a short time for completion also contribute maximally to fixation.

Furthermore, the tendency of fixation is highly dependent on the type of client the Designer is executing the project. The study also revealed different types of fixation among designers expanding what was already proposed by past research. Finally, there is a negative relationship between the level of creativity of a designer and his level of fixation, which can be illustrated using the fixation point graph proposed by the researcher in the current study.

5. Conclusion

From the interviews and observations, the researchers realized that the following factors contribute positively to design fixation. Designer's quest is to maintain a unique identity by keeping to a particular style of executing projects. Designers are unaware of issues concerning design fixation. A low value is placed on the design production activity. Design activity offered for free reduces motivation to

strive for novelty. This mounts pressure on designers; hence the designers rely on already known Ideas. Late submission of projects with a deadline; thus, the nature of the project contributes to fixation. In summary, the above findings and discussions have been very insightful and informational. Some of the findings complement findings from the literature, whereas some add to knowledge. There is a negative relationship between the level of creativity and its fixation group. Creativity and design fixation issues can be further researched to promote creativity and innovation.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Alipour, L., Faizi, M., Moradi, A. M., & Akrami, G. (2018). A Review of Design Fixation: Research Directions and Key Factors. *International Journal of Design Creativity and Innovation, 6,* 22-35. https://doi.org/10.1080/21650349.2017.1320232

Amabile, T. M. (2006). How to Kill Creativity. *Harvard Business Review.* https://doi.org/10.4135/9781446213704.n2 https://hbr.org/1998/09/how-to-kill-creativity

Appiah, E. (2014). *An Exploration of ICT for Graphic Design Education at a Public University: Issues of Ideation and Pedagogy.* Cape Peninsula University of Technology.

Appiah, E., & Cronjé, J. C. (2013). Exploring Information Communication Theory in Graphic Design Education with Activity Theory. *International Journal of Computer Applications, 84,* 15-22. https://doi.org/10.5120/14627-2979

Becattini, N., Borgianni, Y., Cascini, G., & Rotini, F. (2011). Coaching the Cognitive Processes of Inventive Problem Solving with a Computer. In T. Taura, & Y. Nagai (Eds.), *Design Creativity 2010* (pp. 289-296). Springer. https://doi.org/10.1007/978-0-85729-224-7_37

Bhattacherjee, A. (2012). *Social Science Research: Principles, Methods, and Practices* (2nd ed.). Open Access Textbooks. http://scholarcommons.usf.edu/oa_textbooks/3

Boden, M. A. (2003). *The Creative Mind: Myths and Mechanisms* (2nd ed.). Routledge. https://doi.org/10.4324/9780203508527

Brown, T., & Wyatt, J. (2010). Design Thinking for Social Innovation. *Development Outreach, 12,* 29-43. https://doi.org/10.1596/1020-797X_12_1_29

Carroll, J. B. (1993). *Human Cognitive Abilities: A Survey of Factor-Analytic Studies.* Cambridge University Press. https://doi.org/10.1017/CBO9780511571312

Chan, J., Fu, K., Schunn, C., Cagan, J., Wood, K., & Kotovsky, K. (2011). On the Benefits and Pitfalls of Analogies for Innovative Design: Ideation Performance Based on Analogical Distance, Commonness, and Modality of Examples. *Journal of Mechanical Design, 133,* Article ID: 081004. https://doi.org/10.1115/1.4004396

Claver, E., Llopis, J., Garcia, D., & Molina, H. (1998). Organizational Culture for Innovation and New Technological Behavior. *The Journal of High Technology Management Research, 9,* 55-68. https://doi.org/10.1016/1047-8310(88)90005-3

Collado-Ruiz, D., & Ostad-Ahmad-Ghorabi, H. (2011). *Influence of Environmental Information on Expert-Perceived Creativity and Ideas, Design Creativity.* Springer-Verlag

Limited. https://doi.org/10.1007/978-0-85729-224-7_11

Creswell, J. W. (2007). *Qualitative Inquiry and Research Design* (2nd ed.). SAGE Publications.

Crilly, N. (2019). Methodological Diversity and Theoretical Integration: Research in Design Fixation as an Example of Fixation in Research Design? *Design Studies, 65,* 78-106. https://doi.org/10.1016/j.destud.2019.10.006

Dorst, K., & Cross, N. (2001). Creativity in the Design Process: Co-Evolution of Problem-Solution. *Design Studies, 22,* 425-437. https://doi.org/10.1016/S0142-694X(01)00009-6

Dorta, T., Lesage, A., Pérez, E., & Bastien, J. C. (2011). Signs of Collaborative Ideation and the Hybrid Ideation Space. In T. Taura, & Y. Nagai (Eds.), *Design Creativity 2010* (pp. 199-206). Springer. https://doi.org/10.1007/978-0-85729-224-7_26

Eckert, C., Maier, A., & Mcmahon, C. (2005). Communication in Design. In J. Clarkson, & C. Eckert (Eds.), *Design Process Improvement: A Review of Current Practice* (pp. 232-261). Springer. https://doi.org/10.1007/978-1-84628-061-0_10

Engestrom, Y. (2000). Activity Theory as a Framework for Analyzing and Redesigning Work. *Ergonomics, 43,* 960-974. https://doi.org/10.1080/001401300409143

Erlhoff, M., & Marshall, T. (2008). *Design Dictionary: Perspectives on Design Terminology.* Birkhauser Velag AG. https://doi.org/10.1007/978-3-7643-8140-0

Frascara, J. (2004). *Communication Design: Principles, Methods, and Practice*. Allworth Communications, Inc.

Gero, J. S. (2000). Computational Models of Innovative and Creative Design Processes. *Technological Forecasting and Social Change, 64,* 183-196. https://doi.org/10.1016/S0040-1625(99)00105-5

Gero, J. S. (2010). Innovation Policy and Design Thinking. In *Design Thinking Research Symposium* (pp. 175-186). Cambridge University Press.

Goldschmidt, G. (2011). Better, Not Catchier: Design Creativity Research in the Service of Value. In T. Taura, & Y. Nagai (Eds.), *Design Creativity 2010* (pp. 29-33). Springer. https://doi.org/10.1007/978-0-85729-224-7_5

Goldschmidt, G., & Smolkov, M. (2006). Variances in the Impact of Visual Stimuli on Design Problem Solving Performance. *Design Studies, 27,* 549-569. https://doi.org/10.1016/j.destud.2006.01.002

Guilford, J. P. (1967). Creativity: Yesterday, Today and Tomorrow. *The Journal of Creative Behavior, 1,* 3-14. https://doi.org/10.1002/j.2162-6057.1967.tb00002.x

Howard, T. J., Maier, A. M., Onarheim, B., & Friis-Olivarius, M. (2013). Overcoming Design Fixation through Education and Creativity Methods. In *International Conference on Engineering Design (ICED 13)* (pp. 1-10). Sung Kyun Kwan University.

Hwang, D., Choi, B., Bae, S., & Park, W. (2021). Mitigating Design Fixation: A Visualization for Enhancing Situation Awareness. *Journal of Mechanical Design, 143,* Article ID: 061402. https://doi.org/10.1115/1.4048814

Jansson, D., & Smith, S. (1991). Design Fixation. *Design Studies, 12,* 3-11. https://doi.org/10.1016/0142-694X(91)90003-F

Jimenez-Narvaez, L. M., Segrera, A., Nagasawa, S., Nagasawa, S. Y., Morimoto, K., Tseng, W. S., & Ball, L. J. (2010). Visual Representation in Design. *Design Creativity, 239.*

Kim, Y. S., Shin, J. H., & Shin, Y. K. (2011). Conceptual Design and Cognitive Elements of Creativity: Toward Personalized Learning Supports for Design Creativity. In T. Taura, & Y. Nagai (Eds.), *Design Creativity 2010* (pp. 105-111). Springer. https://doi.org/10.1007/978-0-85729-224-7_15

Kudrowitz, B. M. (2010). *Creativity, Idea Generation, Improvisational Humor, and Product Design.* Doctoral Dissertation, Massachusetts Institute of Technology.

Lawson, B. (2005). *How Designers Think: The Design Process Demystified* (4th ed.). Architectural Press, Elsevier. https://doi.org/10.4324/9780080454979

Lindemann, U. (2011). Systematic Procedures Supporting Creativity—A Contradiction? In T. Taura, & Y. Nagai (Eds.), *Design Creativity 2010* (pp. 23-28). Springer. https://doi.org/10.1007/978-0-85729-224-7_4

Lloveras, J., Saiz, M. A., García-Delgado, C., Chaur, J., Claudí, L., Barlocci, A., & Carnicero, L. (2010). *Creative Engineering Design Aspects Given in a Creativity Training Course, Design Creativity.* Springer-Verlag.

Maher, M. L. (2011). Design Creativity Research: From the Individual to the Crowd. In T. Taura, & Y. Nagai (Eds.), *Design Creativity 2010* (pp. 41-47). Springer. https://doi.org/10.1007/978-0-85729-224-7_7

Markus, T. A. (1969). *Design and Research* (pp. 35-38). Conrad.

McLuhan, M. (1964). *Understanding Media: The Extensions of Man (Mentor Series).* McGraw-Hill.

Mednick, S. A. (1962). The Associative Basis of the Creative Process. *Psychological Review, 69,* 220-232. https://doi.org/10.1037/h0048850

Mohanani, R., Ralph, P., & Shreeve, B. (2014). Requirements Fixation. In *Proceedings of the 36th International Conference on Software Engineering* (pp. 895-906). The Association for Computing Machinery. https://doi.org/10.1145/2568225.2568235

Moreno, D. P., Yang, M. C., Hernández, A. A., Linsey, J. S., & Wood, K. L. (2015). A Step beyond to Overcome Design Fixation: A Design-by-Analogy Approach. In J. S. Gero, & S. Hanna (Eds.), *Design Computing and Cognition* (pp. 607-624). Springer International Publishing. https://doi.org/10.1007/978-3-319-14956-1_34

Osborn, A. F. (1963). *Applied Imagination: Principles and Procedures of Creative Problem-Solving* (3rd ed., p. 417). Scribner.

Otto, K., & Wood, K. (2001). *Product Design: Techniques in Reverse Engineering and New Product Development.* Prentice Hall.

Ottosson, S. (2004). Dynamic Product Development—DPD. *Technovation, 24,* 207-217. https://doi.org/10.1016/S0166-4972(02)00077-9

Ralph, P. (2011). Toward a Theory of Debiasing Software Development. In S. Wrycza (Ed.), *Research in Systems Analysis and Design: Models and Methods* (pp. 92-105). Springer. https://doi.org/10.1007/978-3-642-25676-9_8

Reinig, B. A., Briggs, R. O., & Nunamaker, J. F. (2007). On the Measurement of Ideation Quality. *Journal of Management Information Systems, 23,* 143-161. https://doi.org/10.2753/MIS0742-1222230407

Simon, H. A. (1969). *The Sciences of the Artificial.* MIT Press.

Smith, S. M., Linsey, J. S., & Kerne, A. (2011). Using Evolved Analogies to Overcome Creative Design Fixation. In T. Taura, & Y. Nagai (Eds.), *Design Creativity 2010* (pp. 35-39). Springer. https://doi.org/10.1007/978-0-85729-224-7_6

Tarbox, J. D. (2006). Activity Theory: A Model for Design Research. In S. Tennent (Ed.), *Design Studies: Theory and Research in Graphics Design* (pp. 73-81). Princeton Architectural Press.

Tschimmel, K. (2011). Design as a Perception-in-Action Process. In T. Taura, & Y. Nagai (Eds.), *Design Creativity 2010* (pp. 223-230). Springer. https://doi.org/10.1007/978-0-85729-224-7_29

Tversky, B., & Chou, J. Y. (2011). Creativity: Depth and Breadth. In T. Taura, & Y. Nagai (Eds.), *Design Creativity 2010* (pp. 209-214). Springer. https://doi.org/10.1007/978-0-85729-224-7_27

Tversky, B., Chou, J. Y., Nagai, Y., Taura, T., Sano, K., & Tschimmel, K. (2010). *Design Process and Cognition. Design Creativity*. Springer.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press.

Weaver, J. M., Wang, D., Wood, K. L., & Crawford, R. H. (2009). Increasing Innovation in Multi-Function Systems: Evaluation and Experimentation of Two Ideation Methods for Design. In *Proceedings of the ASME 2009 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference* (pp. 965-983). The American Society of Mechanical Engineers. https://doi.org/10.1115/DETC2009-86403

Westwood, A. R. C., & Sekine, Y. (1988). Fostering Creativity and Innovation in an Industrial R&D La. *Research Technology Management, 31,* 16. https://doi.org/10.1080/08956308.1988.11670532

Yilmaz, S., Seifert, C. M., & Gonzalez, R. (2010). Cognitive Heuristics in Design: Instructional Strategies to Increase Creativity in Idea Generation. *Artificial Intelligence for Engineering Design Analysis and Manufacturing, 24,* 335-355. https://doi.org/10.1017/S0890060410000235

Youmans, R. J., & Arciszewski, T. (2012). *Design Fixation: A Cloak of Many Colors* (pp. 1-18). Springer.