Idea Generation for Creativity and Creative Thinking: Co-Relation with Divergent and Convergent Thinking in Learning

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Abstract: *When ideacomes to the learning process, the interaction between divergent and convergent thinking is referred to as the development of ideas on paper for creative thought and creative activity. Convergent reasoning inevitably results in a single correct solution and as a consequence, there is no longer any room for ambiguity as a result of this. It is impossible for there to be convergent thinking without this one specific component. Ideation, also known as the act of coming up with new ideas, is crucial to the process of developing and promoting new products, as well as to the process of formulating an effective advertising campaign.*
Keywords: *Divergent, convergentthinking, Creativity, Creative.*

I. Introduction:

When it comes to the process of discovering answers to issues and producing new ideas, two methodologies that are usually addressed are referred to as divergent thinking "and convergent thinking respectively. In the frenzy of enthusiasm that followed the launch of Sputnik, the convergent method of thinking was almost instantly misconstrued for normal intelligence". This occurred because convergent thinking was a relatively new way of thinking at the time. On the other hand, divergent thinking was viewed as being identical to creative thinking during the time, and both of these processes were commonly depicted as being in opposition to one another. The antithesis of divergent thinking, convergent thinking, was seen as either destructive or a necessary evil that was highly emphasised in areas of business and education. While it was believed that diverse thinking was useful, convergent thinking "was seen as either bad or a necessary evil. Having said that, one significant shift that has occurred over the course of the past few years is the growing acceptance of the idea that genuine creative production requires divergent thinking and convergent thinking, rather than just the former". This is a significant change that has brought about a significant shift in the creative landscape. This represents a significant new turn of events.
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Learning from this research,
1) Concept of divergent thinking
2) Concept of convergent thinking
3) Functions of divergent or convergent thinking in idea generation

Divergent Thinking: The technique of problem-solving that is known as "divergent thinking" is defined by the presentation of a number of various potential solutions in an effort to zero in on the one that is the most successful in resolving the issue that is currently being dealt with. The majority of the time, it is carried out in an unexpected and unstructured fashion and during this time, a variety of unique "creative ideas are developed and evaluated. A huge number of alternative solutions are evaluated in a very short length of time, and as a result, unanticipated connections may be discovered as a result of this process. Once the stage of divergent thinking has been finished" the next stage, known as convergent thinking, is utilised to order and organise the information and ideas that were formed during the stage of divergent thinking. Activities such as free writing and brainstorming are two examples of activities that demand participants to think in a variety of different ways.

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Numerous people feel that one of the most revealing qualities of divergence is the capacity to develop many or a larger number of difficult or complicated thoughts from a single notion or basic triggers or ideas. This is one of the most important characteristics of divergence. It entails performing things like making combinations that are unexpected, modifying information into forms that are not expected, building linkages among distant acquaintances, and other tasks that are quite similar in nature. When employing divergent thinking, a single question could result in multiple different replies, and despite the fact that these solutions can vary quite a little from person to person, they are all deemed to be of equal value. It is possible that they have never been seen before, which would explain why many find them to be creative, shocking, or weird. There are times when this

is true just for a certain setting or in the experience of the individual whose activities are responsible for the variability in the issue. One example of this is when a person's actions cause a variation in an issue. Having said that, it is conceivable that this is true in the most comprehensive sense.

Characteristics of divergent thinking
- **Complexity** – The capacity to conceptualize difficult, multifaceted, many layered or intricate products or ideas;
- **Curiosity** – A trait of personality characterised by the demonstration of inquisitive behaviours such as inquiring, questioning, and looking for additional knowledge or information about a subject, as well as the capacity to go further into concepts;
- **Elaboration** – The skill of adding to, building off of or embellishing a product or an idea;
- **Flexibility** – The capability of creating varied perceptions or categories wherefrom come a range of different ideas pertaining to the same thing or problem;
- **Fluency** – The skill of engendering many ideas so as to have an increase in the number of potential solutions or associated products;
- **Imagination** – The capability of dreaming up, inventing, or to think, to see, to conceptualize novel products or ideas, to be original;
- **Originality** – The skill of coming up with fresh, unusual, unique, extremely different or completely new products or ideas;
- **Risk–taking** – The readiness to be fearless, daring, and adventuresome; the willingness to take chances or try new things in order to differentiate oneself from others.

Divergent thinking is more likely to be displayed by those who have personality qualities such as inquisitiveness, nonconformity, perseverance and a willingness to take risks.

Participating in activities such as "bubble mapping, creating artwork, maintaining a diary, subject mapping, allocating some time to meditation and thinking, building lists of questions" and other similar pursuits can be effective ways to stimulate divergent thinking. An excellent example of divergent thinking at its most extreme is going to be shown in the following paragraphs. Twitter developed a web service that did not appear to have any obvious uses in the physical world when it was first launched. After then, the social media platform was the one to commence it in order to find out how people utilised the application in order for there to be modifications made to the application in line with the findings that were obtained from the study. It appears to have worked out well for Twitter to debut something, and then figure out what the market for it is after it's already been published, even if this strategy isn't usually a successful approach in fact, most of the time it isn'tand even though it isn't always a foolproof technique.

Objective
1. To conduct research on convergent and divergent thinking in the context of learning
2. To do research on creative endeavours and creative ways of thinking.

Convergent Thinking: Convergent thinking is a strategy for problem-solving that involves bringing together distinct ideas from a variety of participants or fields in order to identify a single solution that is the most effective overall response to a clearly defined issue. This can be done in order to find a single solution that is the most effective overall response to a problem. In other words, the focus of this mode of thinking is on identifying the solitary answer or solution that possesses the highest probability of being accurate. This might be the answer to a query, or it could be the best solution to a problem that you've been having. Joy Convergent thinking is a concept that was originally conceived of and coined by Paul Guilford. He deserves all of the credit for its creation. He conceived up this idea as a replacement for the word "divergent thinking" so that there would be more than one way to describe it. This mode of thinking lays an emphasis not just on speed, reason, and precision, but also on identifying what is already understood, recycling tactics, and accumulating information that has been previously stored. The circumstances that lend themselves most effectively to the utilisation of this strategy are those that feature circumstances that are defined by the presence of an easily accessible answer that merely needs to "be worked out or recalled by means of decision-making procedures". In other words, these are the kinds of circumstances that lend themselves most effectively to the application of this tactic. The conclusion of convergent thought is invariably one accurate solution; hence, there is no longer any opportunity for ambiguity as a result of this. Convergent thinking cannot exist without this particular component. This way "of thinking is also associated with knowledge, which is one of the most essential parts of creativity, because it entails" making use of previously learned knowledge by following established protocols. This is one of the reasons why this is one of the most significant components of creativity.
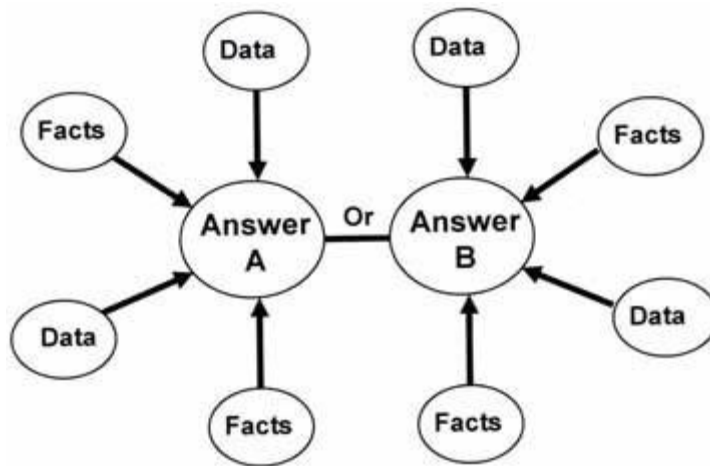
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Convergent thinking is evaluated using the traditional IQ test. These evaluations provide the opportunity to test and score a variety of abilities, including logical thinking flow, the ability to recognise patterns, the capacity to solve issues, and the ability to evaluate information. Convergent thinking may also be evaluated with the help of standardised tests that consist of multiple-choice questions. Consider the following as an illustration of such a question:

Who proposed the Theory of Relativity?
a. Rutherford   c. Kepling
b. Einstein   d. Max Planck

The majority of school tasks also call for convergent thinking.

Divergent And Convergent Thinking:
The following is a comparison of the two ways of thinking, with the comparing elements being one's mood, creative capacity, intellectual ability, brain activity, personality, and lack of sleep.

Mood – According to study, becoming psychologically prepared for a work that needs creative thinking could create mood variations that are particular to the sort of creative thinking necessary for the job. According to the findings of the research, divergent thinking has the opposite effect on mood as convergent thinking does. The earlier occurrence brought on a miserable temperament, whereas the latter one brought on the full opposite: a joyous disposition.

Creative Ability
Participants in research that aimed to evaluate creative capacity were given a variety of tasks to complete, some of which were divergent in character, while others were more convergent. When taken as a whole, each of the activities hinted at a connection; nevertheless, when the results of the tasks were compared across circumstances, they did not reveal any significant differences. This was true even for the tasks that were completely unrelated to one another. This is in spite of the fact that when looked at as a whole, each of the activities pointed to a connection between them.

When it came to the convergent tasks, there were really two completely different kinds that were used. The first part of the experiment consisted of remote associates' tasks, in which the participant was given three words and instructed to name the term to which all three of the presented words are associated. In other words, the participant was asked to identify the term with which all three of the presented words are associated. This particular aspect of the experiment was carried out in a remote location. The second category of questions was referred to as insight issues, and they were distinguished by the fact that they consisted of providing the participants with specific contextual details, and then asking them to respond to a question that required them to shed light on something. These questions were characterised by the fact that they were characterised by the fact that they consisted of providing the participants with specific contextual details.

In comparison to their counterparts, the divergent thinkers, the convergent thinkers were effective in providing accurate responses to a greater number of the challenges posed by the five remote associates. These obstacles included the following: A one-way analysis of variance was used to compare this group to the other one, and the results indicated that there is a significant difference between the two. In addition to this, when responding to questions that required such solutions, individuals who engaged in convergent thinking were successful in resolving a larger number of insight difficulties than the people who were in the control group. This is in comparison to the people who were in the control group. This was the case irrespective of the question being posed about the subject. Despite this, there was not a discernible difference between the persons and

participants who engaged in convergent thought and divergent thought, respectively. Both types of thinking were evaluated. Participants in research that aimed to evaluate creative capacity were given a variety of tasks to complete, some of which were divergent in character, while others were more convergent. When viewed as a whole, each of the tasks hinted at a possible connection; however, when the results of the tasks were compared across circumstances, they did not reveal any significant differences. This was the case for the tasks that were considered to be divergent. This is in spite of the fact that when looked at as a whole, each of the activities pointed to a connection between them.

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Brain activity – During both the process of divergent thinking and the process of convergent thinking, the levels of brain activity of the individuals were monitored to look for any changes that may have taken place. The researchers were able to achieve this goal by analysing the patterns of electroencephalography (EEG) produced by the participants when they were engaging in divergent and convergent thought. The EEG showed two separate patterns of abnormal brain activity, and these patterns were very different from one another. These patterns corresponded to the two different ways of thinking. Participants who were divergent thinkers and convergent thinkers produced a considerable amount of Alpha 1, 2 desynchronizations, in contrast to the people in the control group who were just relaxing. It was discovered that divergent thinking caused increases in coherence in the Theta 1 band, which was more right-sided and caudal. Divergent thinking, on the other hand, was shown to elicit amplitude decreases in the caudal parts of the cortex in the Theta 1 and 2 bands. This was in contrast to the previously mentioned finding. A robust link is being created between the two hemispheres of the brain, which may be deduced from the considerable increase in coherence and amplitude that has been seen.

Personality – Research was conducted on how personality traits correlate with convergent and divergent ways of thinking. According to the findings, extraversion and openness are the two personality traits that are most closely associated with the ability to engage in divergent thought. The qualities of intellectual curiosities, artistic interests, inventiveness, liberal views, and imaginative capacity are evaluated by openness. Convergent thinking was not shown to be connected with any particular personality characteristics in the research. Convergent thinking is assumed to be practicedby everyone, regardless of their individual personalities, as a result of this finding.

Sleep deprivation – According to the findings of a research that was carried out "by J.A. Horne in 1988, even a single night of inadequate sleep can do considerable damage to one's capacity to engage in divergent thought. On the other hand, it was shown that those who were engaged in tasks that needed convergent thinking were more flexible in respect to short-term sleep deprivation".

"Convergent thinking and divergent thinking are both strategies" for approaching the resolution of a problem; hence, they are analogous to one another in this regard. In addition to this, the end objective of both approaches is to discover the most practical solutions to the issues that have been raised. The common practiceof combining convergent and divergent streams of thinking in order to find a solution to a problem is something that may be witnessed occurring rather frequently.

The use of divergent thinking can produce the best results when it is applied to open-ended issues that foster invention. This is because such difficulties present more room for original thought. When there is only one solution that could possibly be correct and when it is possible to determine the answer through the examination of the information that is already stored, convergent thinking is the type of thinking that is most effective.Convergent thinking is the type of thinking that is most effective. Additionally, even though it might not appear to be the case, convergent thinking also provides a contribution to the generation of new ideas. This is the case despite the fact that it might not appear to be the case. Any solution that is discovered "as a consequence of divergent thinking, however, typically requires convergent thinking in order to transform it into a feasible to-do list. This is due to the fact that the focus of divergent thinking is on ideas rather than method. This is due to the fact that divergent thinking places a primary emphasis on ideas".

Now it was discussion of the theoretical foundations of convergent and divergent thinking, let's look at a real-world example of its application.

Ever since they first lay eyes on the stars, people have had a desire of being able to overcome the pull of earth's gravity in order to go into space. It is true that this has been a dream of theirs ever since they first laid eyes on the stars. This dream has been reoccurring for a very considerable amount of time. On the other hand, technology that might truly make the concept a reality did not become widely accessible until the middle of the 20th century.

There was a notable event that took place on the fourteenth of October in the year 1957. It was on this day in 1957 that the Russians successfully launched Sputnik into orbit. This event is generally recognized as the day when the space race officially began. The technological accomplishments of the United States' chief competitors, the Russians, caught the United States by surprise. After then, in response to the challenge, the country founded the "National Aeronautics and Space Administration (NASA) a year later".

"During the first half of the 1960s, John F. Kennedy, who was acting as President of the United States at the time, penned a number of letters to Wernher von Braun and other key persons working in the aerospace industry. These letters covered a variety of topics. He was curious in the means by which the United States could prevail over Russia in the competition for dominance in space. The well-known speech that the president gave, in which he pledged to get a man carried to the moon and also ensure that he would return safely by the end of the decade, was not delivered until after the president had received professional counsel relative to the subject matter. In the speech, the president promised to get a man carried to the moon and also ensure that he would return safely by the end of the decade. This speech was vital in encouraging approximately 400,000 NASA personnel and contractors to work together as a single unit and accomplish one of the most momentous events in human history in a span of less than 10 years. The event in question was the Apollo 11 mission to the moon".

John F. Kennedy performed an analysis on a variety of datasets and pieces of information in order to establish how the United States of America could prevail against the Russians in the competition for space domination. In this instance, we see "an example of convergent thinking in its most fundamental form. Building and manufacturing the rockets, lunar modules, spacesuits, and other necessary" pieces of gear needed the creation of a significant amount of cutting-edge technology in order for this unprecedented operation to be carried out and completed with flying colours. This required a substantial number of unique approaches to be taken in analysing the situation.

"Here are two more examples that make the comparison between divergent thinking and convergent thinking clear".

Divergent thinking: "Mr. A's home is at a distance of five miles from work. His Chevrolet gets 30 MPG. However, he wishes to expend less fuel in his travel for both monetary and conservation-associated reasons. Money is not an issue. What choices does he have to cut his fuel consumption?"

Convergent thinking:

The distance from Mr. A's home to his place of employment is around five kilometres. His Chevrolet gets 30 MPG. On the other hand, he would want to cut down on the quantity of gasoline he uses when he is on the road so that he may save money and contribute to the preservation of the environment. There is no issue whatsoever with the money situation. Which three vehicles would be the best substitutes for him driving his own car under the given circumstances?

In each of these two circumstances, the eventual outcome would be something of significance. It's conceivable that a different problem was what sparked the idea behind the convergent example in the first place. Consider the possibility that he was involved in a car accident that rendered his vehicle a total loss and that he had just the

weekend to find out how to address the problem. There is a possibility that conducting more research on the diverging case may take up more of your time. Nevertheless, it is still doable to develop a solution that has nothing at all to do with what the consumer asked in the first place. For instance, it may be possible to construct an automobile that drives itself through the air, and one may even be able to start a new business from the convenience of their own home.

Idea Generation Techniques among Creative and Creativity.

Ideation, which is another name for idea creation, is a vital part of the process of designing and promoting new goods, establishing an effective advertising text, and formulating a marketing plan. Ideation also refers to the act of generating ideas. To give one example, the production of new product ideas is a crucial component of the preliminary stage of the product development process. This part of the procedure is sometimes referred to as the "fuzzy front end," and it is generally accepted as one of the biggest leverage points for a corporation at this stage (Dahan and Hauser 2001).

Creativity is a very essential trait to have in life, and it can be observed in many of the tasks that we carry out on a daily basis. This is because creativity allows us to solve problems in novel ways. It is conceivable that it might take place in a broad range of settings, including but not limited to work, play, creative depictions music compositions, new media art, and technical innovation, amongst other possible arenas. It has been hypothesised that creativity gives a competitive advantage in the design processes, and the majority of literature maintain that creativity is a positive activity that occurs within an organisation. The creativity is an activity that takes place inside of an organisation. Despite the fact that it can be difficult to quantify, creativity is recognised as a crucial subject for inquiry across a wide range of professions. This is due to the fact that creativity is essential to innovation. The majority of the focus in the field of research on creativity and cognition has been placed on subjects "such as creative cognition, creative media and technology, and the impact of technology onpractice. In particular, research in the field of human-computer interaction has focused on the creation of technologies that are better" suited to assist the cognitive process of creativity. The research that has been done in this field has focused a considerable amount of its attention on the highly organized idea generating processes that occur during group design sessions; yet, this study has not put these sessions within the larger framework of design. These studies focused mostly on the various methods of brainstorming, which are frequently utilised in environments committed to product development in order to encourage higher levels of originality. Although brainstorming is a useful strategy for the generation of new ideas, there have been developed a great many other ways that may be used instead. A few of the methods that may be utilised in creative issue solving are free association, mind mapping, divergent thinking, and drawing. Even though a vast variety of methods for coming up with ideas have been identified, there have only been a very small number of studies conducted to this day that explore the degree to which idea generation techniques are utilised and the characteristics that are responsible for their application. In addition, it is not clear which specific design techniques designers regard to be the most important phases in the entire process of design. This further complicates the matter. This research was carried out with the objectives of gaining an understanding of the creative process from the point of view of the design community, developing "a model for the process of idea generation, gaining insights on the current strategies that are used to generate ideas, and establishing a research initiative for future research on creativity. These objectives were accomplished by conducting the research. The findings of this study increased our understanding of the design process, produced a new model for the generation of design-focused ideas, and identified a total of nineteen different research directions that need to be investigated in order to fully support the creative processes of the design community. In addition, the findings produced a new model for the generation of design-focused ideas".

Creativity Models

For a very long time, those conducting research on creativity have been seeking to extrapolate implications from their results by way of the development of models of creative thought. These models are an attempt to develop a common framework for the conduct of future empirical research and to help in the creation of creative support tools. This has been done so that these goals may be more easily accomplished. It is generally agreed that Wallas was the inventor of what would become one of the first and most influential models of creativity. He labelled the four different stages of the creative process as "Preparation," "Incubation," "Illumination," and "Verification." He divided the process of creation into these four distinct phases. The act of gathering knowledge and getting acquainted with a difficulty is what that mean when feeling, idea generation, thought process undergone the process of self-evaluation, concept formation, application of idea, innovation talk about preparing for it. During the Incubation stage, the subconscious mind takes over and begins to mull over the problem at hand without the need for conscious effort or concentration. When the solution has been located, there will be an instant burst of light to represent the aha! moment that has occurred. The verification process consists of carrying out an analysis on the recently developed idea. This model of the creative process, which is

comprised of four stages, has been the foundation for a significant number of other models of the creative process. Osborn simplified the creative process by breaking it down into its two most significant parts, which he identified as the development of ideas and the assessment of those ideas. He placed less importance on the incubation phase of the process. Amiable came to the conclusion that an extra step was necessary after determining that the first five processes should consist of "Problem and Task Presentation," "Preparation," "Response Generation," "Response Validation," and "Outcome."

Shneiderman took a unique approach by classifying the myriad types of creativity and the people who generate them under the headings of structuralism, inspiration, and circumstance. stating that technology that are created to encourage creative endeavours should provide help for the many different creative processes that originate from the many different sorts of creative personalities. In addition to this, he developed a paradigm that included the following steps: gathering, relating, generating, and donating the information. Within the framework of this concept, he placed a strong emphasis on making the results of creative endeavours available to the larger community. The work that was done by Warr and O'Neill, which was a synthesis of the primary creative models, resulted in the combination of Idea Generation, Problem Preparation and Idea Evaluation into a single model. This model of the Generic Creative Process put a focus on the commonalities that are shared by all other models and made an effort to develop a conclusion that is accepted by all models.
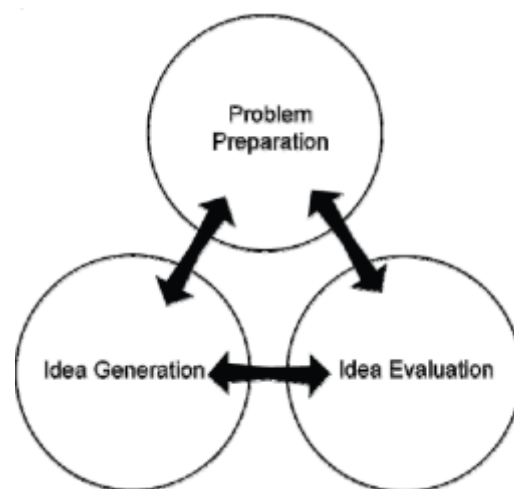

Figure 1: Generic Creative Process Model Adapted from Warr and O'Neill

Despite the fact that these ideas have gained widespread support and been utilised in the production of several creative help programmes, there is substantial debate about how straightforward they are. The vast majority of these models make it clear that they are not supposed to be applied in a step-by-step, linear fashion as directed. On the other hand, the representations are consistently presented in a static and linear form, moving sequentially through the many stages of the creative process. Instead of a "single, limited portrayal," a number of authors have suggested that creativity is more of a "dynamic blend of processes that co-occur in a recursive fashion throughout the work." Creativity is a "dynamic blend of processes that co-occur in a recursive way throughout the work." These same writers want a more representational model in addition to a more comprehensive understanding of the creative process. Although a rigorous cognitive process model is not attempted in this research, having awareness of existing models can be helpful.

Creativity and idea generation

"Idea generation, often known as the process of coming up with original and helpful concepts, is the activity that is most frequently associated with creative problem solving (CPS). Because the ideas created in this phase are used in subsequent stages of the creative process, the idea generation phase is an extremely important step that contributes significantly to the overall success of the CPS process. Research has been conducted in an effort to increase the number of unique ideas generated by creative professionals. This is due to the fact that there is a direct correlation between the quantity of unique ideas generated and the quality of the final concept. According to Osborn, the stage of the CPS process known as concept creation is the one in which individuals are most likely to experience the most difficulty". This is due, in part, to the fact that it is difficult for individuals to refrain from passing judgement as their thoughts are being formed. People care more about the quality of the idea and how well it can be implemented in their lives than they do about coming up with as many ideas as they possibly can. The inability of individuals to accept ideas that run counter to long-standing presumptions, regulations, and norms is another factor that hinders the creative process. In order for individuals

to be able to develop new contacts that were not there previously, they need to be able to break old connections and cognitive processes. In addition, the process of coming up with new ideas is significantly influenced by the presence of intrinsic drive. This indicates that creative workers need to be supplied with the tools they require as well as the incentives necessary for them to be motivated to generate innovative goods.

Idea generating using technology

The majority of research on creativity is conducted with the intention of informing the creation of tools that will boost the effectiveness of the creative process as well as the quality of the creative product. A number of academics have put up recommendations for criteria and potential outcomes regarding the creation of creative help technologies. According to the researchers, the findings have implications for the process of designing creative assistance systems. For example, tools for cooperation in the fine arts, drawing, creative problem-solving settings, and distributed scientific communities have been developed. In a similar manner, Shneiderman built on his three categories of creativity by offering ways in which technology may enhance the creative process of a person. He stated, for instance, that inspiration lists might benefit from technology that places an emphasis on free association since it assists users in comprehending previous work and introduces them to other visual styles. Standard software programmes contribute to the advancement of structuralism by facilitating the categorization and organisation of current ideas, as well as providing access to archives of completed work. Situation lists might benefit from advanced communication capabilities, which would enable members to freely share ideas and design papers with one another. In addition to the positive effects that this will have on design, a number of tools that have been produced have also been created with the intention of enhancing the creative process. The interactive idea capture tool known as SILK was designed to assist in the process of rapid prototyping. It enables designers to maintain ambiguity in their work while also making an effort to intelligently discern what is being drawn. This tool supports designers in rapidly designing user interfaces by providing them with a one-of-a-kind drawing interface. Tools like as Idea Tree and Idea Fisher are used to offer associative linkage; nevertheless, an examination of these tools revealed that they are insufficient for practical implementation. Even though many of these tools already exist, they are not being put to their full potential in the industry at this time. The research that is being done at the moment is focused on identifying inefficiencies in the methods that are being employed in design. The majority of research on creativity is conducted with the intention of informing the creation of tools that will boost the effectiveness of the creative process as well as the quality of the creative product. A number of academics have put up recommendations for criteria and potential outcomes regarding the creation of creative help technologies. According to the researchers, the findings have implications for the process of designing creative assistance systems. "For example, tools for cooperation in the fine arts, drawing, creative problem-solving settings, and distributed scientific communities have been developed. In a similar manner, Shneiderman built on his three categories of creativity by offering ways in which technology may enhance the creative process of a person". He stated, for instance, that inspiration lists might benefit from technology that places an emphasis on free association since it assists users in comprehending previous work and introduces them to other visual styles. Standard software programmes contribute to the advancement of structuralism by facilitating the categorization and organisation of current ideas, as well as providing access to archives of completed work. Situation lists might benefit from advanced communication capabilities, which would enable members to freely share ideas and design papers with one another. In addition to the positive effects that this will have on design, a number of tools that have been produced have also been created with the intention of enhancing the creative process. The interactive idea capture tool known as SILK was designed to assist in the process of rapid prototyping. It enables designers to maintain ambiguity in their work while also making an effort to intelligently discern what is being drawn. This tool supports designers in rapidly designing user interfaces by providing them with a one-of-a-kind drawing interface. Tools like as Idea Tree and Idea Fisher are used to offer associative linkage; nevertheless, an examination of these tools revealed that they are insufficient for practical implementation. Even though many of these tools already exist, they are not being put to their full potential in the industry at this time. The research that is being done at the moment is focused on identifying inefficiencies in the methods that are being employed in design.

II. Conclusion

This research aims to get a deeper comprehension of the creative process as it pertains to the work of professional designers so that creativity-enhancing technologies may be developed. The authors acknowledged the significance of creative thinking across the whole design process, and this was reflected in the creative design paradigm that they offered. When compared to convergent thinking, divergent thinking was seen to be beneficial, while convergent thinking was considered to be either negative or a necessary evil that was emphasised in fields such as education and business. On the other hand, the idea that true creative creation

necessitates both divergent and convergent cognition, as opposed to only the former, has been gaining ground in recent years and is gradually becoming more widely accepted.

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