Effect of Computers on Creativity

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ABSTRACT
In this paper we describe the effect computers can have on the creativity of people. We do so by classifying the people into four different groups primarily based on their age groups and their interaction type with the computer. This includes children, adults, business people and gamers in the virtual gaming worlds. The study was done using surveys to directly involve the above groups of people in the surveys in order to arrive at the results of the effects of computers on creativity.

Author Keywords
Computer, creativity, children, adults, virtual game worlds.

INTRODUCTION
This paper is a result of our survey wishing to reveal the creativity levels of different groups of people. Though the creativity of a person can be associated with the natural insight of that person, external agents also play a major role in helping or hampering the creativity of people. Creativity is a mental process involving the discovery of new ideas or concepts, or new associations of the existing ideas or concepts, fueled by the process of either conscious or unconscious insight. There might be several agents in helping or hampering creativity of a person and its impact may vary from person to person.

Computers as a tool has been a major contributor in this issue as its usage has grown from academic and business purposed to everyday companion for some. Our study tried to focus on the aspect of what difference a computer is causing in a person's creativity which might be present or absent if not for the person's exposure to the computer. In a more generalized way, it can be described as the effort to classify the positive and negative effects of computers on creativity.

The following sections will be laid out to reveal the results of our work. Though we do not wish to provide a strong word on the effect of computers on creativity in this paper, it can be noticed from the survey results and the following sub sections that the answer to our question is really obvious. The rest of the paper is organized in the following way. The first section describes the effect of computers on creativity of children. Next is the description about computer and creativity of adults followed by the effects of computer on the creativity of business people. Lastly, a brief insight has been provided into the virtual gaming worlds of computers showing tremendous growth in today's world and its effect on the creativity of gamers. All the sections will include discussions of use cases and survey done on real subjects and a brief discussion of the results of this survey studies. This will be followed by the conclusion and a description of the idea of our future work in this research area.

CREATVITY AND CHILDREN
The first category of surveys and studies were done of children falling under the age of 12. Taking into a workshop a group of children under the age of 12, we offered them a few test based questions. Based on their reaction, we classified their creativity level accordingly. In order to classify the creativity level, we took into account the factors such as identification of existing objects, identification of new objects that they are not aware of and relating it to an already known object, creativity in using colors, observation and reproduction skills and so on. The key factor in our consideration however was to use the computer for the first group of children when and where possible to study its impact on the creativity measures of children whereas the same study was performed on the second group of children without the aid of computer. Using these we graded the creativity of children according to the performance level.

Use-Cases
Some of the main use cases we used for the survey study are discussed below:

- Given a rectangle, a triangle and a circle, draw as many real life objects using the three shapes as you can.

Observation: The first group of children drew objects that are seen in everyday such as a simple house, duck, man and so on. Similarly the second group of children produced results similar to the first group in this case. This confirmed that the creativity level of the children considered in the two groups were on par.

Conclusion: Judge the general creativity level of children in both groups.

- Brick Game - Build a toy house within one hour using resources provided. One child is shown a computer aided graphic simulator that builds the house step-by-step,

another child is told how to build it. Which does it more creatively?

Observation: This was the second step in our creativity analysis of children. The first group of children using the computer did not face any starting trouble because the simulator gave them a clear cut approach to build the house, so they could use their energy in developing creative elements for the toy house (stairs to the terrace, different types of roofs, adding a garden to the house, etc). On the other hand, the children who were not exposed to the computer simulated tool were unaware of the clear process of making the toy house and spent most of their time and energy developing an approach to build the house rather than focusing on the creative elements.

Conclusion: Computers help design creativity by simplifying tasks.

- Give one child a book about a topic. Give another child a similar topic, but on a computer (using visual and audio), as a story telling program. Who gets a better understanding?

Observations: First group of children using computer showed prolonged interest in learning the topic and understanding it better due to interactive visuals and audio. The other group of children using a static book was not interested in completely learning the topic due to lack of interest for a prolonged time period.

Conclusion: Computers help creativity by provoking interest in children?

- Ask two children to draw pictures. One uses MS Paint, the other uses a drawing canvas board. Whose painting is better?

Observation: The first group of children using MS Paint had the option of a color palette, predefined shapes, etc allowing him to start off his drawing whereas the other group spent more time on choosing colors and shapes for their basic structures.

Conclusion: Computers help creativity by defining a clear starting point for ideas.

CREATIVITY AND ADULTS

The second category of studies was done on the adults aging between 13 and 50. In this section of people, it was a study done without the direct involvement of people. It was mainly based in the resources available on the internet like the online blogs, forum boards, etc. We studied the impact of computer in the daily life of adults. Some of the use cases analyzed are listed below. These were analyzed in comparison to the same use cases prior to the use of computers for the same purposed and the effect computer has in improving the creativity of people in such tasks. We have seen so many different articles mentioning the resources available on the internet (directly or indirectly) as the source of their motivation for doing some creative work. This is truly an increasing scenario in today's world. The following use cases will reveal the true impact of computer on the creativity of tasks adults perform in their everyday lives.

Use-Cases

Some of the main use cases we analyzed in our study are discussed below:

- Online forum boards for discussing creative ideas.

Observation: The adults of the previous generations had far less opportunities to express or showcase their creative ideas to the extent it is possible in today's world. With just a click of the mouse button, a person is able to share his thoughts about any topic with people throughout the world. This indeed is a great motivator for enhancing creativity and creative ideas in people.

Conclusion: General increase in creativity level and motivation for creativity in adults due to advent of computers and the World Wide Web.

- Blogs and everyday activities (e.g., cooking)

Observation: Creativity has started penetrating into everyday activities of the people due to the vast growth of the internet. Let's take an example of a person cooking a recipe and posting it on her blog. Thousand of other users looking for a similar recipe stumble upon it and since already have the basic recipe attempt new variations with the same recipe using their creativity and post this recipe on the same blog. This in turn stimulated a creativity of another person and this cycle goes on in an infinite loop. The same case applies to every field and topic in our everyday life. Thus the internet and computers have not only made our lives simpler but also made it more creative and fun.

Conclusion: Computers and internet cause an infinite creativity loop in everyday life.

- Social networking sites and creativity in communication skills.

Observations: The social networking sites have caused a great infusion of data into the lives of adults and have in turn caused them to assume creative roles in their social lives in addition to their personal lives. This has led to a vast variety of inventions and increased the learning curve of individuals to a great extent. The communication skill of adults has improved to an extent which has necessitated the need for several communication platforms to showcase their creative ideas in addition to the traditional communication techniques.

Conclusion: Computers help creativity by provoking interest in children?

CREATVITY AND PROFESSIONALS:

The third category involves the study of computers and their on the creativity of professionals. Similar to the previous category, the creativity of professionals was also done as an analysis of the impact of existing resources along with a study of a few professionals. The overall approach of this section is to bring to light the computer innovations that have enhanced the creativity of business people.

Use-Cases

Some of the main use cases we used for the survey study are discussed below:

- Ask someone to develop a building plan using a program like AutoCAD, and another using a plain canvas. Which is better or creative?

Observation: The group of people using the CAD tool found it easier to design their plan due to readily available semi automated tool functionalities. Also, the swift usage of the system allowed them to quickly try out their design ideas and come up with creative ideas for the design. However, in the traditional usage case without the aid of the AutoCAD tool, there was a low creativity factor compared to the previous group.

Conclusion: AutoCAD tools aid creative design and business plans.

- Give two professionals (e.g., software developer/programmer) a difficult task, give one access to the Internet and don't give the other access to Internet. Which one can do it better?

Observation: The person with access to the internet not only completed the task earlier but also with a better accuracy and with creative ideas to improve the performance of the developed software. The other person without the access to the internet came up with a traditional problem solving approach which was not greatly optimized compared to the other person's results.

Conclusion: Computers and internet help creativity in professionals by providing them with vast resources.

- Simulators or information visualization tools to identify new sports strategies?

Observations: Taking into consideration the penetration of creativity in the field of sports as an example, we analyzed the following. Which sports coach is able to design the best sports strategy – the one with the information visualization tool which helps him visualize the data or the one without the tool. Obviously the person with the tool came up with the most creative strategy for winning.

Conclusion: Computers aid in making creative winning strategies by providing focus on details at a micro/macro level along with desired interaction?

- Performance analysis tools?

Observation: Computers provide a creative way of doing performance analysis compared to the traditional analysis styles, thus leading to a very successful business output from various angles. This also allows saving time to channel creativity on tasks for improvement rather than designing basic structures.

Conclusion: Computers help creativity by overcoming drawbacks of traditional performance analysis strategies.

CREATVITY AND VIRTUAL GAME WORLDS

The last category we studied involved the gamers' community of the virtual gaming worlds. We directly interviewed people for their comments about the games and their creativity levels to get a deeper understanding of the impact of the impact of computers on the creativity of the gamers. Based on their reaction, we classified their creativity level accordingly. In order to classify the creativity level, we took into account the factors such as creative usage of computer before and after their participation in the virtual gaming world. The questionnaire was provided on the gaming forum to get a realistic and first person view. The question set is shown below.

Use-Cases

- When did you start playing video games?
- How many games have you changed over the years/ what games do you play?
- What kind of games do you like most? (action/adventure/rpg/strategy/fps)
- How many hours do you play per day?
- Do you think gaming improves your creativity? How?
- What are the problems you face with your family or society because of playing games?
- How has your lifestyle changed with the introduction of these games?
- What would you rather have done if these games were not available?
- How do you gaming this will change the general creative trends in the society?
- Mention anything else that you feel is relevant to your gaming life.
- The survey results can be found in the Ant Forums gaming forum online.

CONCLUSION AND FUTURE WORK

In this paper, we have analyzed the impact of computers on the creativity of people belonging to different age groups. In particular, it has covered the effect computers have on the creativity of children, adults, business professionals and virtual game worlds. This paper has made it relevant from the user case studies and surveys that computer as mentioned earlier has a significant role to play in the

enhancement of creativity as an external source. Our future work will aim at developing a model for creativity analysis using computers in the fields discussed above, thus helping in the complete identification of resources that can be used in order to improve creative thinking and its benefits.

ACKNOWLEDGMENTS

We thank Prof. Ellen Do, Georgia Institute of Technology for her guidance and all other people directly or indirectly involved in our surveys in playing a significant role in helping us complete this paper in an appropriate manner. Some of the references cited in this paper are included for illustrative purposes only.

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