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Early Childhood Degree Students as Digital Software Designers Based on 21st- Century Learning Skills

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Abstract. This study is an early analysis of the ability of IPGKSM's early childhood education PPISMP educator to become a multimedia courseware designer. The student's ability was tested only through digital material production workshops over a limited period of time. Analysis of these findings is divided into three important stages; an early perspective of multimedia technology learning, basic technology learning (digital image manipulation), advanced multimedia technology learning (interactive interface design and visual programming). 6C Skills is a skill that is included in the skills needed in 21st-century learning skills. Two 6C skills tested in this study are creativity and critical thinking. The findings show that educators are capable of designing multimedia software if given space and opportunity.

Keyword: Multimedia Software, 21st-Century Learning Skills, Creativity, Critical Thinking.

1. Introduction

Technological development at the fingertips has a very significant impact on education. The innovative course software application is one of the approaches that can be used in classroom teaching and learning to be more effective and engaging. Information technology skills are one of the 21st-century learning skills. The integration of these two skills has had a high impact on students to compete globally [1]. In fact, using a computer with incorporating effective learning strategies has the potential to enhance the quality and quality of teaching and learning. Teaching using computer technology is a teaching method that is considered to be relevant to today's educational needs [2]

While multimedia technology has many advantages in teaching and learning, still only a few teachers use this technology in their teaching. According to [3][4], most teachers use computer technology to perform information retrieval, word processing and, slide presentations. [5] stated that teachers use computer technology for documentation and social networking in communicating. The use of appropriate digital materials is poor in teaching and learning. Lack of information technology skills is a key factor for teachers not interested in using digital tools as teaching aids. The use of these digital tools can help them save time, energy and money.



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Although ICT can be regarded as an important tool to enhance the teaching of writing skills [6], there are some disadvantages in terms of using this tool. Moreover, teachers have to take note of the matters in planning the activities involving the use of ICT and managing problems arising from the activities planned.

In the study [3], shows that there are students who do not know how to express the idea despite having a good idea. While in the working aspect of a group, there are individuals who lack a sense of responsibility and the spirit of cooperation. This shows that students are still uncertain and have high dependency on their peers and teachers. Therefore, introduction to interactive multimedia tools with learning strategies possible become a significant medium in the pursuit of objectives and mission academic excellence at the Matriculation and education system level school as a whole [7].

This study is an initial analysis of the ability of IPGKSM early childhood education PPISMP educators to become multimedia designers only through digital material production workshops over a limited period of time. This study focuses on the ability of students in early childhood education PPISMP IPGKSM to develop multimedia software based on two skills from 4K skills. Skills 4K are skills that are included in the skills needed in 21st-century learning skills. 4K Skills is communication, collaboration, creativity and, critical thinking. This study focuses on creativity and critical thinking.

2. Literature Review

i) 21st Century skills

21st Century skills are the learning skills that students need to compete in the new millennium. The 21st-century skills can be linked to the many skills needed in this age [8]. Based on Partnership for 21st Century Skills 2007, 21st-century skills are divided into three elements; i) learning and innovation skills, ii) information technology, communication and, media skills, iii) life skills and career. This study emphasizes on two elements of learning and innovation skills ie i) creativity and ii) critical thinking. These skills elements can be referred to in figure. 1.

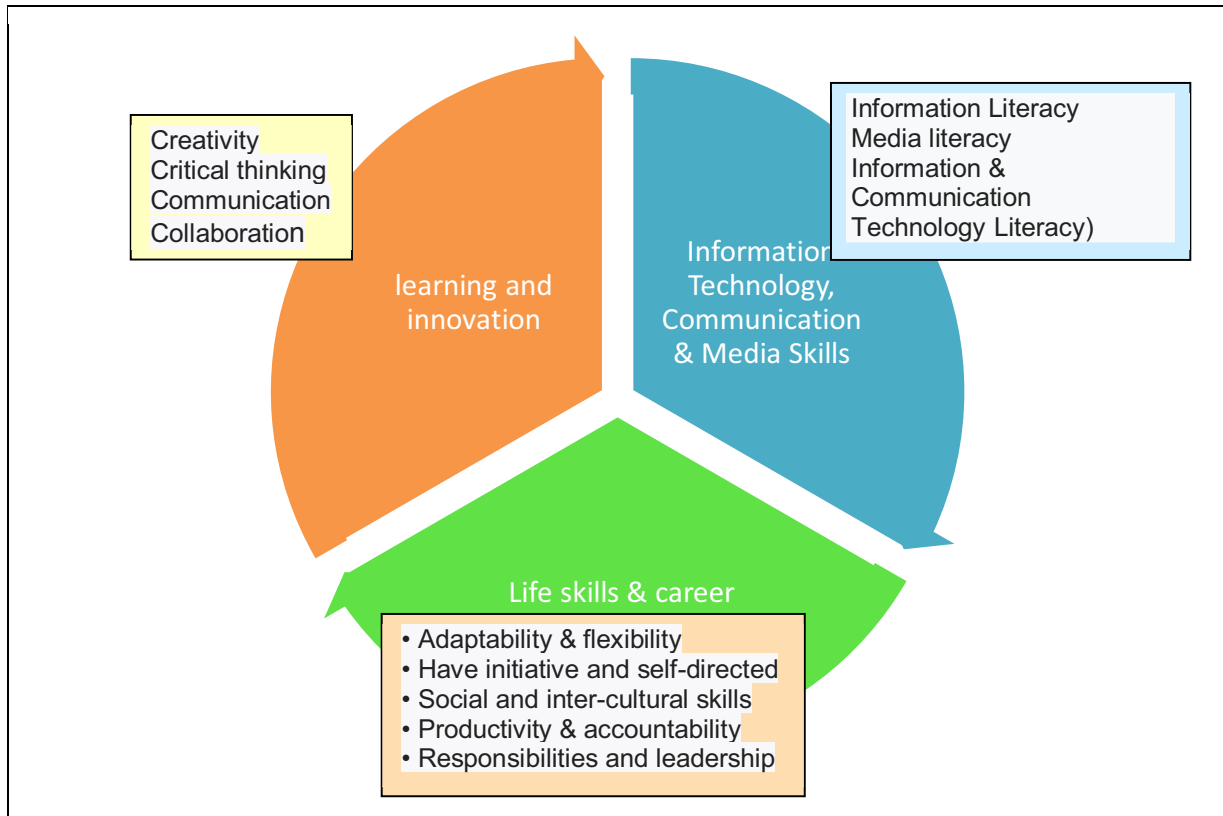


Figure 1. 21st Century Skills

ii) Creativity

Creativity is defined as a process of thinking that leads to the realization of new ideas as well as new discoveries in which it moves towards a more realistic one [9]. Creativity is related to terms such as 'thinking or creative ability', 'problem-solving', 'imagination' or 'innovation' [10], defines creativity as something that relates to a new product. It is supported by the National Advisory Committee on Creative and Cultural Education (NACCCE) United Kingdom which states that creativity can be defined as 'something to do with producing something original' (1999).

iii) Critical Thinking

This Critical Thinking Skill is the ability to assess the reasonableness of an idea, where this critical thinking involves the process of analyzing and evaluating ideas, data or information for a clear, sound and meaningful understanding. [11], also define critical thinking as a process of thinking about any matter, content or problem in which thinkers improve their thinking and set intellectual standards over their thinking. [12] the consideration of an idea by evaluating, contrasting and concluding that something is right or wrong by looking at the reasons given to assist in making a decision.

3. Purpose Of The Study

This study is an initial analysis of:

- i. Identify the competence of IPGKSM's early childhood education PPISMP educator students in multimedia technology through digital material production workshops.

- ii. Identify the ability of educators in early childhood education PPISMP IPGKSM develop multimedia skills based on 4K skills (creativity and critical thinking).

4. Methodology

The methods used in this study are qualitative research methods. The target of the study was that of 14 IPGKSM early childhood education PPISMP educators. Educator students have been given courseware for a short period of time. Technique of data collection is through interview instrument and analysis of work result.

5. Result and Discussion

Analysis of these findings is divided into three important stages, namely:

i) Early Learning Perspective of Multimedia Technology

Unstructured interviews have been conducted on educating students regarding multimedia technology learning before attending digital material production workshops. Educator students comment that the reason they choose to join the workshop is they think it will improve their professional competence and positive impact on their future work fields. One of the educator students stated:

"The development of digital technology is exploding, forcing them to know more in-depth multimedia technology to help classroom teaching. If I can learn the skills to create digital software, it is very helpful in improving the skills of my multimedia technology skills in the future. "Most educators claim that they are quite interested in learning new technology and are prepared to face the challenges.

"I am quite confident in dealing with computer software because we need to use a computer to do a lot of work every day. To find out the multimedia computer software, such as Adobe Illustrator, Photoshop or Flash, is very interesting. I look forward to learn it".

ii) Basic Technology Learning (Digital Image Manipulation),

At this stage, researchers focus on training educator students using basic multimedia software, such as computer graphics and image processing. Researchers use Photoshop CS3 computer software, to train educators to produce graphic materials such as animated text manipulation, image editing and so on.

Initially educator students were introduced to various types of graphic equipment and their skills were asked to create digital images based on specific themes and trends; At the end of this course, students learn how to design a digital scenario. Their final assessment is shown in Figure 2. At this stage, many students show high creativity and interest in producing digital images as desired. It is clear to show that they can reach the level of every task that the researcher asks. They show great pride in their accomplishments when presented to their peers. One of the student educators commented, he said:

"I think the course is quite challenging but fun because we are given the freedom to create our creativity at our will. Although it takes time, I am quite satisfied with the learning in this workshop. "

Another student commented:

"I am quite confident with my ability to deal with computer graphics and image editing. When I become a teacher or undergo a lab, I will feel comfortable and not worry about it. "

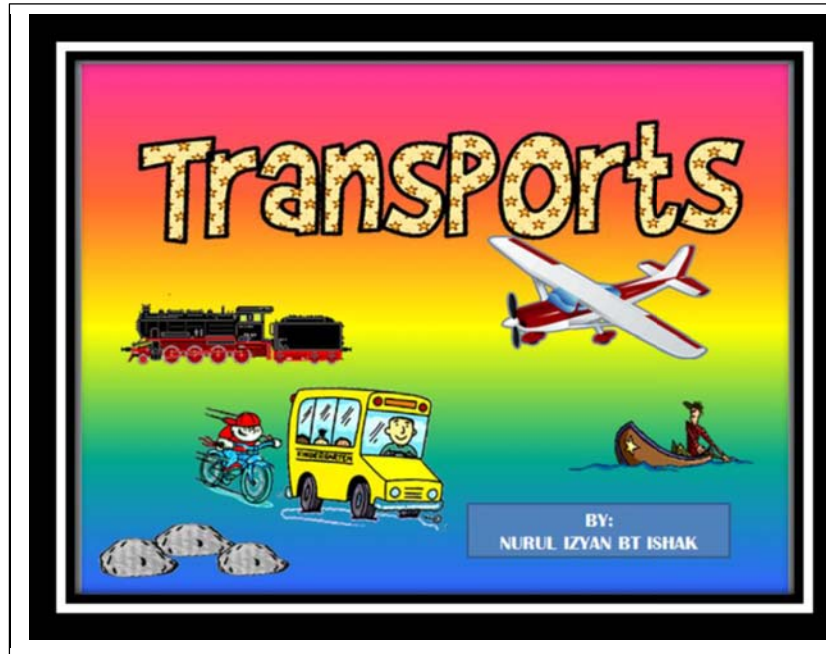


Figure 2. Graphic Editing Results Through Photoshop CS3 Software Applying

Figure 2 shows the creativity of educators who manipulate images using Photoshop CS3 software to produce meaningful images. They have applied the Photoshop CS3 graphics software to designing text-based images as well as editing images that match the selected theme. The ability of their creativity is in line with the 21st-century learning needs that demand that students be able to creatively.

iii) Advanced Multimedia Technology Learning (Interactive Interface Design and Visual Programming)

Once educator students have the basic skills of generating and editing digital images, educator students through the slot develop their animation skills, interactive interface design and visual programming via Microsoft PowerPoint software integrated with Visual Basic 6.0 software. At this stage, educators began to learn how to produce concise animations and interactive materials such as figure 3 and figure 4. At the end of the course, educators were asked to produce a simple digital material through the application of what was learned throughout the workshop session. They build many skills and gain a lot of knowledge about producing interactive digital materials. One of the educator students shared his perspective at this stage:

"This process helps us to gather integration experiences, which can help design digital tools that are more appropriate for classroom teaching."

"When we were asked to learn computer programming, I was very worried because we had no previous experience. After all this programming requires logical thinking but the lecturer convinces we can do it and it is not difficult if we understand the logical concept. "

Educator students comment that these workshops provide their confidence and ability to produce digital materials. They believe that it will help them in the future to become educators who can cope with the changing globalization of the 21st century.

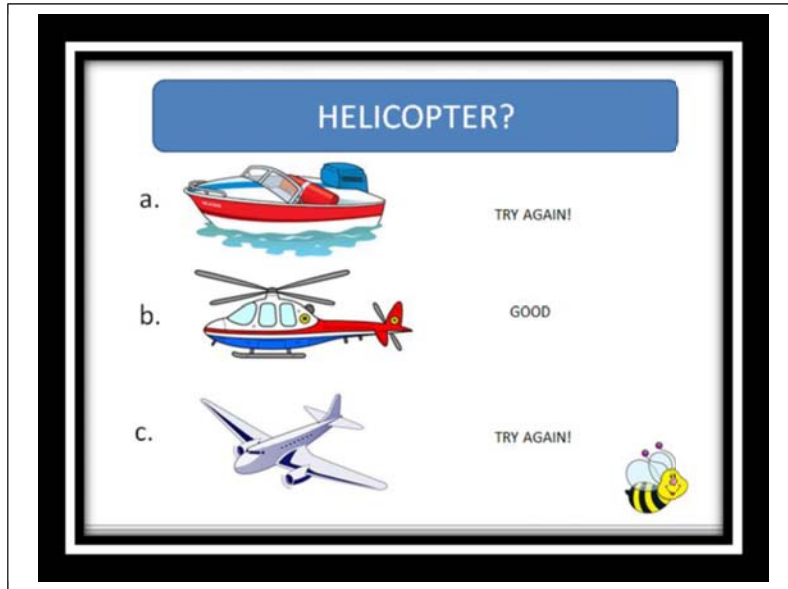


Figure 3. Graphic Interface for Interactive Material Production via Microsoft Power Point Software Applying

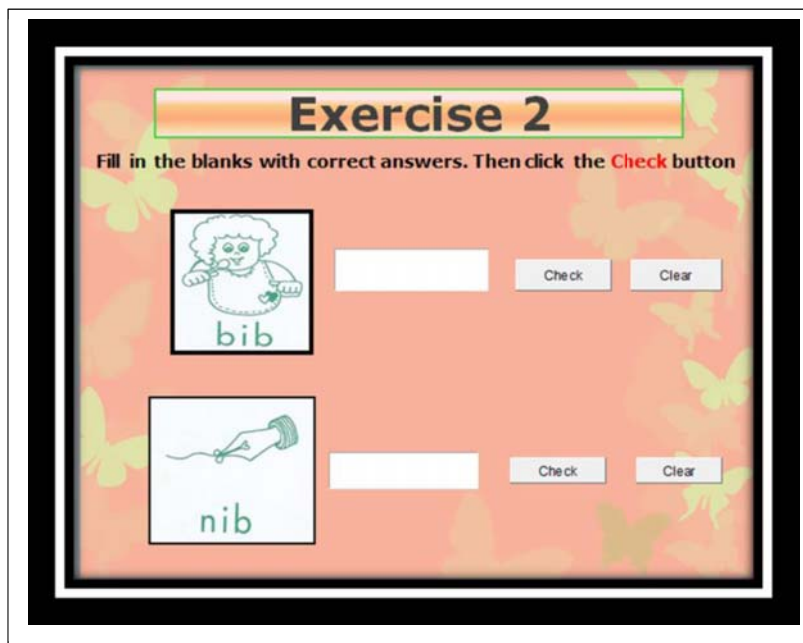


Figure 4. Interactive Training through Microsoft PowerPoint Software Use

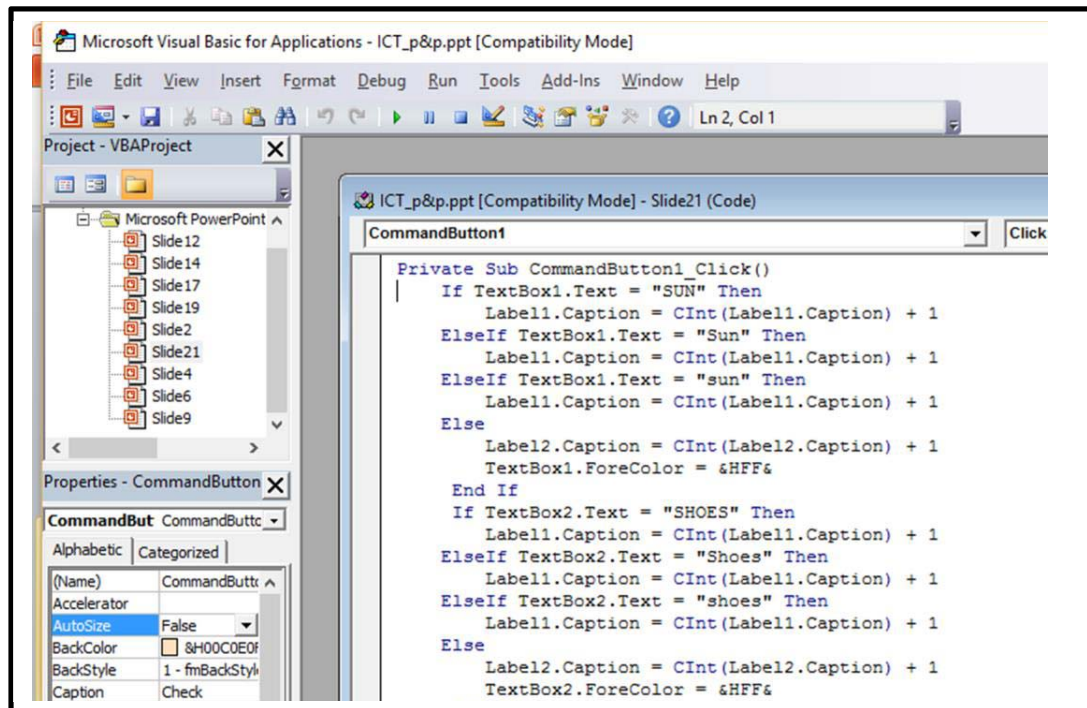


Figure 5. Example of Visual Basic programming in Microsoft Power Point software

Figure 4 and diagram 5 shows the result of interactive interface design. Through Microsoft Power Point presentation software integrated with visual basic software produces a more dynamic and interactive multimedia software. Educator students tested critical thinking through the use of Visual Basic programming (fig. 4). Apart from that, educator students are also able to produce animated moves without being guided by researchers. Researchers test educators to solve problems to produce a creative module. Educator students are able to solve it though that is the first time they learn basic animation techniques in Microsoft Power Point and Visual Basic Programming Language 6.0. Critical thinking of educating students in interactive module designs demonstrates the ability of educating students to produce a multimedia courseware that can meet the needs of learning the 21st century. This ability can be fully utilized when becoming a teacher later.

6. Conclusion

Digital multimedia integration in classroom instruction is not merely a concept that is understood. Instead, it is the implementation of integrated computer technology in teaching and classroom learning. While computer technology is inclinely growing, the designed course software usually does not fully meet the needs and also the needs of the teacher as the multimedia designers are not composed of teachers. Teachers are only able to choose related digital materials whether they are free or paid via online. This causes the digital material to be ineffective because it does not meet the requirements of the measure or the desire of teachers to apply in the classroom. Hence, the needs of teachers as multimedia designers are needed. They no longer only play a passive role as a "user" but an active role as a "creator". The researcher hopes that this study will be able to change the perception among the community towards the general teacher's ability and IPGKSM educator students in particular to be the designer of multimedia software that is characterized by the 21st century model.

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