

The Development of Motion-Graphic Media in Learning: An Advanced Use of PowerPoint in Schools for Baby Boomer, X and Y Generation Teachers

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The massive development of various learning media has made it easier for educators to choose from different learning methods. However, utilising these new media is not without challenges and there is a risk of not achieving learning objectives if the learning process itself only focuses on the media. This study aims to produce PowerPoint motion graphics in learning economics in high school and to examine the product. PowerPoint is immensely popular and almost all teachers are able to use it as a teaching aid. Besides using PowerPoint, teachers are now encouraged to use a variety of software programs that are quite complex to create learning media. Obviously, this is not always easy for teachers to do, especially those of the Baby Boomer, X and Y generations. The results of this study show that the use of PowerPoint-based motion-graphic media is more effective for learning than the lecture method. The results of this study were obtained by comparing the results of the post-tests between a control class and a test class in which the use of motion graphics in PowerPoint was effective and significantly improved the outcomes of students' learning. This study also suggests that teachers who are not from Generation Z and are very accustomed to using PowerPoint and have the ability to create PowerPoint-based motion graphics with a more attractive appearance, without having to learn new software that is not necessarily easy to understand. One advantage of these motion-graphic media is that they are easy to understand, familiar to educators and have been proven effective in assisting teachers to achieve learning goals.

Key words: *Motion Graphic, Baby Boomer Generation, Media in Teaching.*

Introduction

Education is an important element in improving the quality of younger generations to prepare them to face many challenges in this rapidly developing era. It is believed that education is able to improve just about all aspects and help create a better nation. A good education system and its optimal implementation are in line with national education goals. Science and technology are both necessary to the learning process in realising these education goals. The development of science and technology is also used as the basis of improving the quality of education. The Ministry of Education and Culture of Indonesia continuously makes improvements to the education system to improve the quality of national education by changing the methods and media of learning. The educational objective set out in the constitution of Republic of Indonesia No. 20/2003, concerning the national education system, is to develop the potential of students to become people of faith and piety and to become citizens who are democratic and responsible.

Teachers, who are among the main components of education, need to always develop themselves in accordance with the existing needs of skills. In this 21st century, it is crucial that teachers have various competencies so they are able to prepare their students to compete globally. One important competency is the mastery of Information and Computer Technology (ICT) (Mcgrath & Fischetti, 2019; Turculeț, 2015). It is impossible to hold back this rapid technology development, and moreover, it is very important to adopt this development to the education world.

However, this development of technology must be accompanied by the ability of teachers to adapt to and to use a variety of new facilities. To apply this technology, teachers need to collaborate with various parties to produce appropriate products and be able to achieve learning objectives (Nousiainen, Kangas, Rikala, & Vesisenaho, 2018). The results of this study indicate that teachers are not automatically able to master these on their own. Technology offers many alternatives to obtain the most suitable learning method.

Improved skills of teachers are one important factor in advancing the education sector (Lauermann & Konig, 2016). In line with this idea, education and teacher-professionalism development are continuously intensified by adopting various contextual aspects such as the development of technology, social skills, and the need for education that arises, due to new challenges. One of the consistent challenges is the fact that changes in the education world seem to happen too slowly compared to the rapid changes in development outside the world of education. Technological development is supposed to render geographic boundaries irrelevant and help teachers become professionals (Prenger, Poortman, & Handelzalts, 2017).

Development in education is always linked to development in other aspects. An example of a very influential aspect is the swift development in the field of technology. The education sector is forced to continually adjust to these inevitable changes. Significant progress was made with the creation of the Microsoft operating system in addition to other systems such as Android and Macintosh (Apple) that contain a variety of programs. Teachers and those who are involved in education are given easy access to many free applications and computer programs, so they can take advantage of and use them to enhance the learning process.

Various learning media have been developed to improve students' learning outcomes. Web-based learning is a method that is quite widely used since the advent of the Internet and the availability of supporting gadgets. These media are seen as an opportunity for education practitioners to provide a different experience for their students (Gan, Menkhoff, & Smith, 2015). The use of digital media has also increased the motivation (Schneider, Nebel, Beege, & Rey, 2018) and behaviour change (Hidayat, Fauziati, Nugroho & Mokhtar, 2019) of youth (including high school students), even though they still need to keep improving their skills to participate in digital learning (Sousa & Rocha, 2019).

Considerable variations in applications for Android, Apple and Microsoft programs have led to the emergence of many ideas to create games that can be used for learning purposes. It is believed that the applications of game-based learning methods and project-based learning approaches will help students to master 21st-century competence (Musa, Mufti, Latiff, & Amin, 2012; Qian & Clark, 2016). A large number of free applications support the creations of digital games. Many programmers go even further by innovating games using Android platforms for certain purposes or study subjects.

Videos are also used as an alternative to support an interactive learning process. The first utilization of videos was to record learning materials which then developed into the creation of interactive videos with interesting content that attracted the attention of students during the learning process. It is interesting to note that using video recordings for teaching improves students' understanding (Loh, Tan, & Lim, 2016). This might be due to both direct and indirect involvements of students in the videos. Most people find interactive videos more attractive. Nevertheless, there is some evidence indicating that an excessive use of animation has a detrimental impact on learning (Lee & Shin, 2012). It is clear that the use of simple videos in the form of CD-ROMs is surprisingly effective in improving students' learning outcomes (Hamidi, Kharamideh, & Ghorbandordinejad, 2011), in contrast to the use of digital media that does not consistently improve students' metacognitive skills (Norman & Furnes, 2016).

The development of technology does not necessarily improve learning outcomes if educators are unable to master the rapidly developing technology (Day, 2002; Huber, 2010). The



variety of available applications can actually have a negative impact on education. For example, teachers might be overly focused on learning about the software and how to use it. In addition, it is very likely that technological development cannot be easily followed by Baby Boomer or X generations, or even by the Y generation. These generations were born between 1946 and 1965; 1966 and 1980; and between 1980 and 1997 respectively. This is certainly different from generation Z, which was born after 1997. This Z generation was born as the millennium period began, so they are native to the technological era.

For Baby Boomer and X generations, keeping up with the rapid development of technology is not easy. Therefore, optimising the use of PowerPoint, which has been commonly used in the learning process, becomes paramount since this program also continues to evolve in accordance with technological development. Furthermore, PowerPoint is often seen as simply a copy of an article presented using a different display, since its users are still reluctant to utilise the various PowerPoint features available.

However, so far teachers have, in fact, benefitted from PowerPoint when delivering learning materials to students (Hashemi, Azizinezhad, & Farokhi, 2012) and this program is still the primary choice for most students (Vernadakis, Antoniou, Giannousi, Zetou, & Kioumourtzoglou, 2011). In addition, the results of research done in classrooms show that the use of PowerPoint still has a positive impact in comparison to the use of other media (Haw, 2012). This indicates that even though PowerPoint is not new technology, its impact on improving students' learning outcomes is still significant.

One of the products of media used for learning is interactive multimedia, and this includes Microsoft PowerPoint which has not been optimally used. PowerPoint-based learning media contain learning materials equipped with a variety of attractive features that can help convey the learning contents. Such contents are presented in the form of images, illustrations, sounds, videos and even interactive animations (Kasmawati, 2016). Nonetheless, most teachers do not maximise the use of the features that can actually make their presentations more interesting. PowerPoint is a program that can be used to explain abstract contents. In this study, teachers who had already introduced simple features of PowerPoint into the learning process were asked to use the motion-graphic displays of PowerPoint. Motion graphics are time-based visual media that combine film and graphic design. The use of media for learning does not only help the teachers in the teaching process but it is rather aimed at making it easier for students to understand the materials better. This study aims to produce a PowerPoint motion-graphic for learning economics in high school and to test it.

Methodology

The research and development of Gall, Borg & Gall was adopted and used as the Research and Development model, with the following processes:

Figure 1. Stages in Research of Borg & Gall (Gooch, 2013)



In research and development, model testing is an important stage which is useful for assessing the feasibility of the model being developed. This feasibility includes the feasibility of both the process and the results. The assessment of PowerPoint-based motion-graphic media was conducted through verification or evaluation from experts of media and material related to the subject being taught. Revisions were made in accordance with recommendations from the two experts. The recommended research design for the trial was experimental, with data analysis techniques using the homogeneity test to examine the similarity of objects and the t-test to examine the difference in learning outcomes between the

use of motion-graphic media for learning and the conventional method of learning. Two groups, namely a control class and a experimental class were used in this media testing and it involved teachers as main actors in the learning process. There were 32 students in each class, and the study was carried out in Public High School 1 Gondang, Sragen, Central Java, Indonesia.

Results

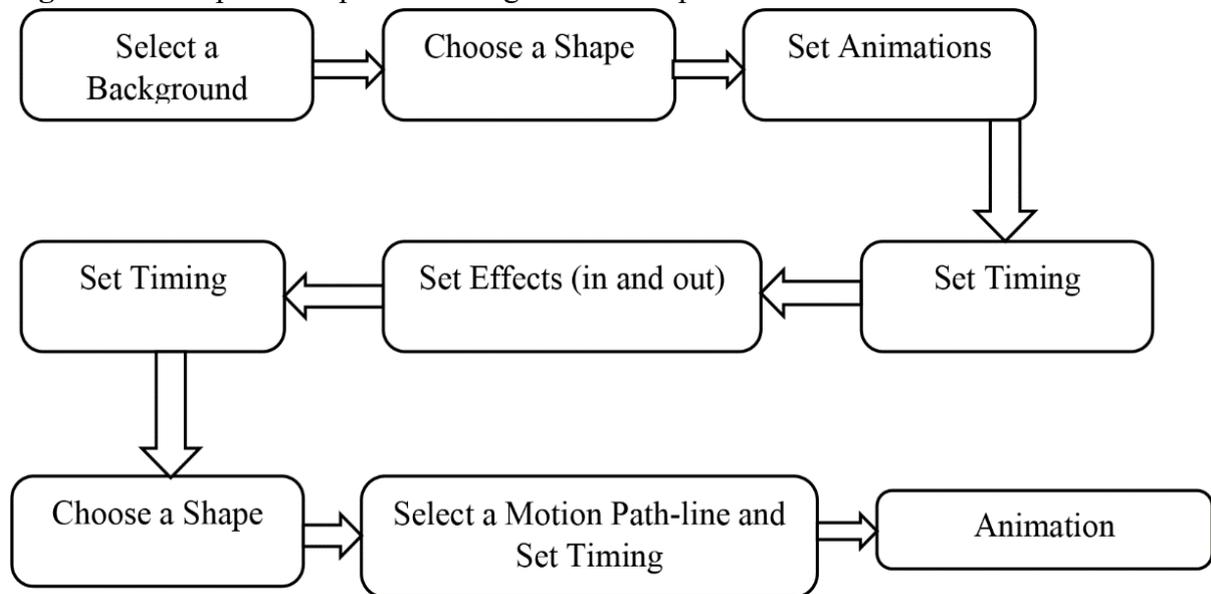
The product developed in this research was PowerPoint-based motion-graphic media. The learning media contained economic materials and in particular international economic cooperation. Based on the results of the research and development of motion-graphic media, media experts considered the displays in the media clear and interesting. Meanwhile, the assessments from material experts indicated that the use of media was in accordance with the learning materials and the needs of students to improve their understanding. The appearance and language used in the media were very interesting and easily understood by students. The two media and material experts provided an assessment stating that the media were worth a trial without revisions. Two of the displays on the slide that were presented like a video, without having to utilise a video maker, can be seen in Figure 2.

Figure 2. Motion-graphic Slide Displays



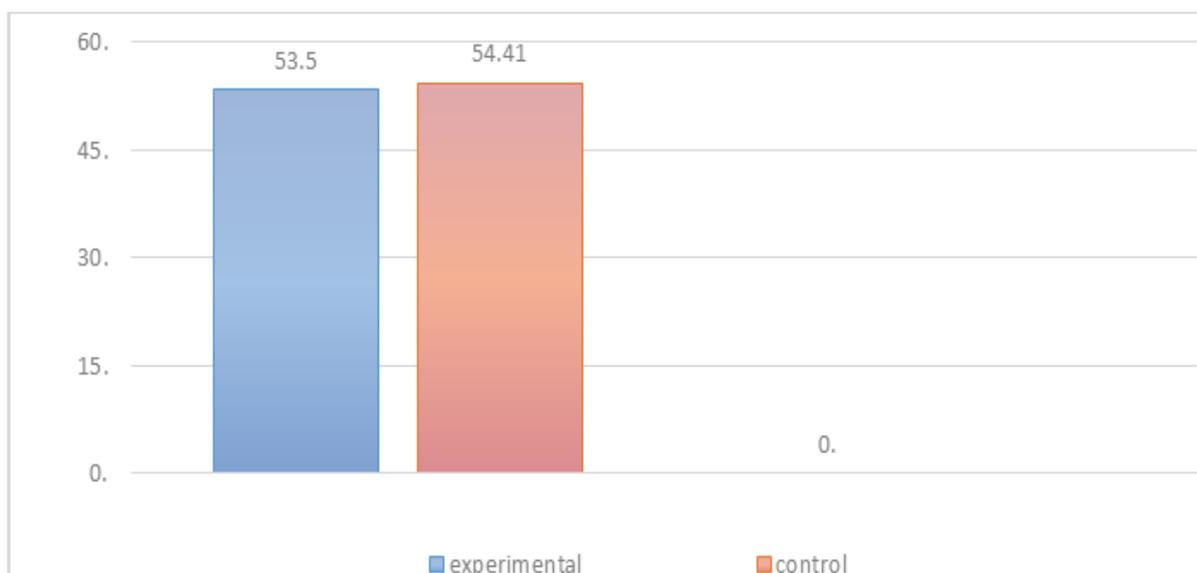
These PowerPoint media do look simple. However, when the slideshow option is turned on, students can see various movements in the slide and receive an explanation from sound inserted into the slide like a video being played. The steps in making motion-graphic learning media can be seen in Figure 3.

Figure 3. Example of Steps in Creating Motion Graphics



Once the media were approved and qualified for the test, further research was conducted. The research was carried out in an experimental class that used motion-graphic media for learning and a control class using the lecture method. There were 32 students in each class. Before the experiment began, a pre-test was held for both groups of classes to ensure that the initial knowledge of the students was not significantly different. The pre-test results show that the average values of the experimental and control classes are almost the same, with 53.53 and 54.41 respectively. There was only a difference of 0.88.

Figure 4. Average Values of Pre-tests



At the end of the study a post-test was carried out to determine the students' learning outcomes of the class using motion-graphic media in comparison to those of the class not using the media. The post-test results of the experimental and control classes were then processed statistically using the SPSS application. Learning-outcome data were analysed further in three types of tests, namely normality and homogeneity tests, and the t-test.

Figure 5. Comparison Values of Pre-tests and Post-tests of Experimental and Control Classes



Figure 5 is a bar chart depicting the average values of the pre-tests and post-tests of the experimental and control classes. According to the bar chart, the pre-test value of the experimental class was 53.53, whereas the post-test value was 81.03. It can be concluded that there was an improvement in students' learning outcomes before and after the learning activities. On the other hand, the pre-test value of the control class was 54.41, while the post-test value was 61.22. It can be seen that there was also an increase in students' learning outcomes before and after the learning process (Radhy, 2019).

The pre-test results of the experimental and control classes show a slight discrepancy in the average students' learning outcomes, with 53.53 and 54.41 respectively. The difference was only 0.88. The post-test results of both experimental and control classes indicate an increasing average in the learning outcomes. However, the experimental class, which is the class that used motion-graphic media, had an average value of 81.03, significantly higher than that of the control class, which scored 61.22. The post-test results show a difference of 19.81. These post-test results were analysed further using the normality, homogeneity and t-tests.

Table 1: Results of Normality Test

	Unstandardised Residual
N	32
Kolmogorov-Smirnov Z	0.540
Sig. (2-tailed)	0.932

Table 1 shows that the normality test of the Kolmogorov-Smirnov value is 0.540 with a significance value of 0.932. This means that H_0 is not rejected, and the data are normally distributed. Based on an analysis of Figures 4 and 5 and the analysis of one KS sample, the data subjected to the tests were normally distributed.

Table 2: Results of Homogeneity Test

Levene Statistic	df1	df2	Sig.
0.713	8	18	0.677

One of the criteria used in this homogeneity test is that if the significance level is higher than 0.05, the data can be said to be homogeneous. In table 2, the homogeneity test results show a significance value of 0.667, which is far greater than the significance value of 0.05. It can be concluded, then, that the sample data for learning outcomes of the experimental and control classes are homogeneous.

Table 3: Results of T-test

t_{table}	t_{count}	Sig.	Conclusion
1.998	5.057	0.000	H_0 rejected

The t-test aims to determine whether there are differences in the learning outcomes in the economics study subject between a class that uses motion-graphic media and a class that uses the conventional lecture method in which no media are used. The t-test shows that the result of t_{count} (5.057) is higher than that of t_{table} (1.998). It is also noticeable that the significance level is 0.000, which is lower than 0.05. The conclusion is that the H_0 is rejected. This means that there are differences in students' learning outcomes between the class that used motion-graphic media and the one that did not. The subjects of this study were 11th grade students in the social program (IPS), studying economics at SMA Negeri 1 Gondang. PowerPoint-based motion-graphic media are very effective tools in helping students learn.

The results of this study indicate that the use of motion-graphic media in PowerPoint is effective for learning in class. This can be seen from the difference in students' learning outcomes between the post-test result of the class using motion-graphic media (81.03) and that of the class not using the media (61.22), a difference of 19.81. According to the t-test

result, $t_{\text{count}} (5.057) > t_{\text{table}} (1.998)$, it shows a significance level of 0.000. If the significance level of the t-test is lower than 0.05, the H_0 is rejected. Hence, this research suggests that the students' learning outcomes of the class in which motion-graphic media of Power Point was used, is different than those of the class that used the conventional method of learning. Teachers and grade XI students studying economy in the social program (IPS) of SMA Negeri 1 Gondang were subjected to this research (Mendes & Silva, 2018; V Goloshchapova et al., 2019).

Discussion

Power Point is software from Microsoft which is very commonly used by teachers and lecturers to explain subject matter and lecture materials. In addition to education, PowerPoint has also contributed to significant changes in how people explain things to others. For example, someone who needs to describe how a business is run will find it much easier to use Microsoft Office PowerPoint than to use other methods.

The mastery of ICT, which has currently been an issue of discussion, is said to be important to improve teacher professionalism. However, it does not necessarily mean that teachers must become proficient at very complicated technology to create media or other learning methods in their classrooms. The definition of ICT mastery can be narrowed down to the mastery of one type of information and communication technology that is effective and can be maximised for classroom learning. It is important to note that the aim of the learning process is to help students achieve a certain competency, and not focus on the learning media used by teachers.

The classroom use of media, which are constantly changing and becoming more and more complex, can have a negative impact on the learning process itself. One study indicates that the availability of many types of media for learning has actually led to frustration among teachers, which is also due to the large number of students that they must handle (Huber, 2010). Moreover, senior teachers currently experience more pressure than younger ones, owing to the rapid development in technology nowadays (Day, 2002). Teachers are considered unprofessional if they do not use the latest technology in teaching. This has certainly put an additional burden on them.

The need for new media in the education sector has encouraged education practitioners to create learning media using the latest platforms. Qian & Clark (2016) state that many teachers have started using game-based media for learning. Some research shows that the use of computer-based games for learning has a significant impact on students' learning outcomes and motivation (Perini, Luglietti, Margoudi, Oliveira, & Taisch, 2018). Hence, the use of games in learning is highly recommended (Huizenga, Admiraal, Dam, & Voogt,

2019). In addition to improving learning outcomes and motivation, the use of game-based learning has successfully increased student engagement in the learning process (Park, Kim, Kim, & Yi, 2019).

However, these studies have mostly been conducted by people who work in the computer world, which makes it easier for them to make games for learning. Educators and people who are members of the Baby Boomer, X, and Y generations find it more difficult to create videos and digital games. Even for generation Z teachers, who are still relatively young, creating these learning media is often not an easy task. It seems to be more difficult for older generations to master technology than for younger ones (Chopik, Rikard, & Cotten, 2017). Even among the younger generation, the mastery of ICT is not optimal (Baydas & Goktas, 2016).

Education practitioners who do not master the use of a variety of computer software or different Android platforms will certainly face difficulties in making game-based learning media for certain materials. Therefore, optimising a commonly used software such as PowerPoint should certainly be done by those who cannot master other software to make games and videos.

The availability of motion-graphic features in Power Point can certainly be maximised by education practitioners in delivering learning materials. The results of this study suggest that the use of motion-graphics during the learning process can significantly improve students' learning outcomes compared to the conventional method. This study shares the same results as other studies conducted in the use of other media with more complex software. For instance, the use of videos which contain virtual reality improves students' learning outcomes (Rupp et al., 2019), as well as using illustration and explanation influence the information quality (Hidayat, Fauziati, Nugroho & Mokhtar, 2019). Simpler videos such as YouTube videos also significantly improve learning outcomes (Orús et al., 2016). The findings of one research study, however, show that the use of videos does not significantly influence student learning outcomes (Liu, 2016).

The results of this research were compared to the results of other studies that used different media. It is evident that the use of motion graphics in PowerPoint has various advantages compared to the use of other media, especially for teachers who do not master the technology to make media that require special skills. PowerPoint is very popular and also supports the use of motion graphics. These features can display a variety of movements and animations in accordance with the themes of the subjects being learned. Different from other types of media for learning, to create PowerPoint-based motion graphics, teachers do not need to learn to use new software. This motion graphic is also suitable for Baby Boomer, X, and Y generations, who no longer have the ability or opportunity to learn new software. It is important to note



that education is not a display of extraordinary, meaningless matters that cannot be understood by teachers or students. The most important factor in education is the achievement of the learning objectives.

Conclusion

The results of the analysis suggest that the use of motion graphics of Microsoft Office PowerPoint can significantly improve students' learning outcomes. These results are the same as those of the use of other media that are currently being developed, such as virtual reality and videos. Nevertheless, the use of these other media may not significantly affect learning outcomes. PowerPoint-based motion graphics are suitable for users who do not master other, more difficult, media. Teachers should simply optimise their ability to use Microsoft Office PowerPoint and learn a few skills related to the use of motion graphics so that the PowerPoint display is more attractive. In this way, teachers can display learning media that are interactive, present information in a way that is easy to understand, and can effectively improve students' learning outcomes.

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