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Instructional Media "Game Math Comic Story" Based Android on Number

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A R T I C L E I N F O

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A B S T R A C T

Instructional media have an important role in learning mathematics. Mathematical concepts will be easier to learn if in learning, appropriate media are used. The development of information technology that is very rapid at this time can be used to support learning media. This research was conducted with the purpose to produce mathematics instructional media based game and comic stories for android. This study aimed at assisting students in studying number material and increasing reading interest for 7th grade students. Media developed were stories that were made into an adventure game made with "appsgeyser.com". The research method was research and development. The development of this medium used 4D (Four-D) development techniques consisting of Define, Design, Develop, and Disseminate stages. To obtain quality media, validation and experiment were done. The result of this study indicated that mathematics instructional media comic game story based android could improve the positive nature and spirit of students in learning. The validity value of media was 3.2 and the practical value of media was 3.14

1. Introduction

Game is an activity of someone that has a purpose to please and it is done for the activity of the game itself. Game is the children's primary work and the most important is as a way to prepare them for the future (Miller & Kuhanech, 2008). Game is to provide a new perspective on the challenge (Sanford. 2015). According to Indonesian Dictionary game is something used to play, stuff or something to be played. Game is a kind of complex learning environment that cannot be understood by simply taking a learning perspective (Plass, Homer & Kinzer, 2015).

Game-based learning is a learning step in learning process using the game as an alternative to achieve learning objectives. Game-based learning is also defined as learning that emphasizes the achievement of a goal in determining the type of game (Shaffer, Halverson & Squire, 2005). Game-based learning is providing a clear direction for the purpose of learning and improving one's ability that can be used in everyday life (Chang, Wen-Chih, Wang, Te-Hua, Lin, Freya, Yang & Hsuen-Che, 2009). . Game-based learning is defined as an activity that has a game at its core, either as a primary activity or as a stimulus to other related activities (Kirriemuir & McFarlane, 2004). Game-based learning is an innovative method that provides benefits to improve the training process and makes it easier to achieve motivation in learning (Pérez, Duque, García, 2018).

Game-based learning provides many benefits in education. Game-based learning improves logical-mathematical thinking ability (Pérez, Duque, García, 2018). Game-based learning has a positive impact in language (Kamnardsiri, Hongsit, Khuwuthyakorn & Wongta, 2017). Game approach is effective for improving students' attitudes toward mathematics and producing better learning outcomes (Mavridis, Katmada & Tsiatsos, 2017). Game-based learning is an effective learning strategy to strengthen students' understanding (Tham &Tham, 2014). Game-based learning can enhance the achievement of learning through challenges and content within it (Su & Cheng, 2013). . Therefore, it is necessary to give further innovation in game-based learning. One way is with the game about a comic story.

A comic story is also a learning strategy that can improve student's ability. A comic story provides fun in learning through entertaining content and non-standard language (Ozdemir, 2017). A comic story is able to give a better meaning in teaching some knowledge at once (Jacob, 2007). Learning using comics also provides positive perceptions for students in learning activities (Affeldt, Meinhart, & Eilks, 2016). A

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comic story can also reinforce teaching of leadership through the fictional story that lies within it (Krusemark, 2016). A comic story also provides a safe approach to teach an unusual concept, as well as the potential to improve a teacher's professionalism (Sockman, Sutton, & Herrmann, 2016).

Some researchers have done research on android-based mathematics learning, as has been done by Adiwijaya, Iman & Christyono (2015). In their research, Adiwijaya et. al. (2015) claimed to have succeeded in making an Android-based educational game that could be installed on a smartphone. Rizal, Suyanto & Yudantoro (2016) in their research have also succeeded in making an Android-based arithmetic learning game that is interesting to be played on children. According to the results of a survey aimed at 20 people consisting of elementary school students, a score of 81.3% was obtained from the respondent's satisfaction level, which means that the respondent was very satisfied.

Considering many uses of game-based learning and comic story in learning, the researcher has a desire to combine both types of learning strategies through an android-based instructional media. Therefore, the researcher took the title Development of instructional Media *Game Math Comic Story* on number material.

2. Methods

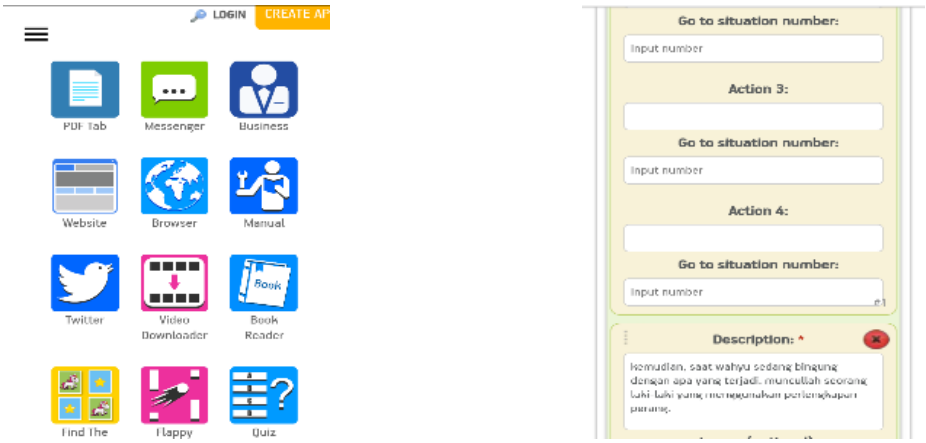
The type of this research was development research or Research & Development (R & D). The method of development research is the process of development and product validation. The product produced in this research was instructional media in the form of mobile math comic story game application. The procedure used in the study was using the 4D development step (Four D) which consisted of Define, Design, Develop, and Disseminate stages. At define stage, the activity performed was doing some analysis activities. Furthermore, at design stage, the activity undertaken was planning the display of each page, button position, language selection, image selection and story line creation.

The third stage was develop, in which at this stage game-based instructional media and comic story began to be made in accordance with the plan in the previous stage. After the media were made, the media were then tested by media development experts and post graduate students who took the instructional media subject to get the results that would be used for the revision process until obtained good media. The last stage namely disseminate in this study was not implemented because of the research time that was not in the semester in accordance with the school curriculum.

3. Result And Discussion

At define stage, the activity undertaken was conducting several analytical activities (analysis of student characteristics, technological analysis, and curriculum analysis). Seventh grade students were taken for the characteristics of students. The technology development used was using appsgeyser.com (see chart 1) and the material taken was the number material with the basic competence of integers and how to compare the integers. The material in the media was conveyed through comic stories which contained fictional stories and material and some exercise questions that aimed to form an understanding of integers. The material that had been developed would be arranged in such a way that it became a game based android.

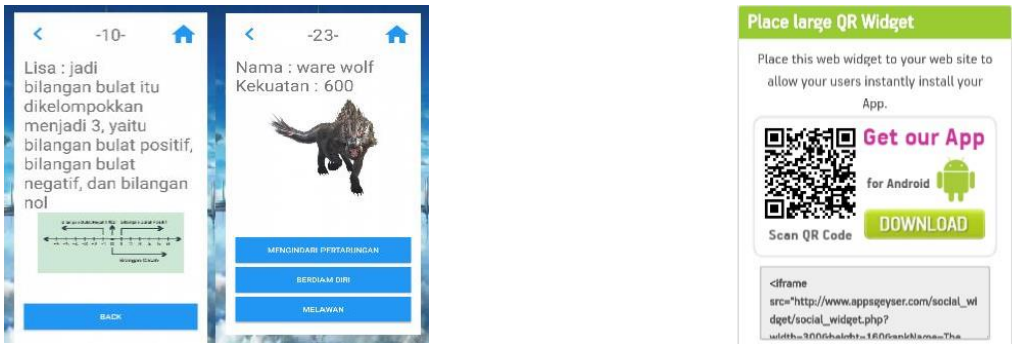
Furthermore, at design stage, the activity undertaken was planning the display of each page, button position, language selection, image selection and story line creation.



(a) (b)

Figure 1 (a) Appsgeyser.com display, (b) Planning language selection and buttons

The third stage was develop, in which at this stage game-based instructional media and comic story began to be made in accordance with the plan in the previous stage. After the media had made, the media were then tested on the media development experts and post graduate students who took instructional media subject to get the results that would be used for the revision process until the media were eligible to be tested. The last stage namely disseminate in this study was not implemented.



(a) (b)

Figure 2 (a) Media display, (b) Development stage

After the media design stage was completed, a test was conducted on students who followed instructional media subject to obtain valid and practical instructional media.

Table 1 Validation of Media

Criteria assessed	Average rating scores
Content of instructional media	3.4
Images and animations	3.2
Media utility	3.3
Display and language	3,0
Average	3.2

Table 2 Student questionnaire related to the presentation of the material

Criteria assessed	Average rating scores
Media are easy to use	3.6
The presentation of the media helps understand the mathematical	3.1

concepts	
Instructional media makes me happy in learning	2.7
Instructional media makes me like mathematics	3,0
Instructional media makes me want to understand math	3.3
Average	3. 1

Table 3 Instructional Media Practicability

Criteria assessed	Average rating scores
Content of instructional media	3.1
Language and display	3.1
Average	3.1

The research that had been implemented gave results that the media developed had met the valid and practical criteria that had been determined namely 3. The validity media developed was 3.2 as seen in Table 1 while the practicability of the media can be seen in Table 2 and Table 3, namely obtained 3.14. Thus, it can be said that the developed media were good, but still had to go through several stages of revision again before finally going to spreading stage.

The results of this study were also in line with the results of previous studies related to the use of game-based learning and learning using comic stories providing an increase in learning. Kamnardsiri, Hongsit, Khuwuthyakorn & Wongta (2017) game-based learning has a positive impact in language: Game approach is effective for improving students' attitudes toward mathematics and producing better learning outcomes (Mavridis, Katmada & Tsiatsos, 2017). Game-based learning is an effective learning strategy to strengthen students' understanding (Tham &Tham, 2014). Game-based learning can enhance the achievement of learning through challenges and content within it (Su & Cheng, 2013, ;Ozdemir, 2017) a comic story provides fun in learning through entertaining content and non-standard language. Jacob (2007) argues that a comic story is able to give a better meaning in teaching some knowledge at once. Learning using comics also provides positive perceptions for students in learning activities (Affeldt, Meinhart, & Eilks, 2016).

This study also obtained the same results with previous research, namely students felt happy and provided a positive nature in learning math through the existing content in developed media, and made students want to learn math more because a comic story created was a serial story that attracted students to wait for the next story. However, there were aspects that must be considered in selection, suppose in the character selection of the story.

4. Conclussion

From the research that has been done, the results obtained are that the game-based instructional media and comic stories developed are able to provide the positive properties in mathematics and increase pleasure in learning mathematics. It is seen from the questionnaire results and validation that show good results. However, in subsequent developments, researchers must be more careful in media development steps for example, more carefully in choosing the characters used in which in the process should pay more attention to the characteristics of students as a whole.

Reference

Adiwijaya, M., Iman, K. S., Christyono, Y. (2015). Perancangan Game Edukasi Platform Belajar Matematika Berbasi Android Menggunakan Construct 2. *TRANSIENT*, VOL.4, NO. 1, Maret 2015. pp: 128-133

Affeldt, F. Meinhart, D. & Eilks, I.(2016). The Use of Comics in Experimental. *International Journal of Education in Mathematics, Science and Technology*. vol. 6, no. 1, pp. 93-104.

Chang, Wen-Chih, Wang, Te-Hua, Lin, H. Freya, Yang & Hsuen-Che. (2009). Game Based Learning with Ubiquitous Technologies. *IEEE Internet Computing*. vol. 13, no. 4, pp. 26-33.

Jacob, D. (2007). More than Words: Comics as a Means of Teaching Multiple Literacies. *The English Journal*, vol. 96, no. 3, pp. 19-25.

Kamnardsiri, T., Hongsit, L. , Khuwuthyakorn, P. & Wongta, N.(2017). The Effectiveness of the Game-Based Learning System for the. *The Electronic Journal of e-Learning*. vol. 15, no. 4, pp. 283-296,

Kirriemuir, J. & McFarlane, A.(2004). Literature review in games and learning, Futurelab retrieved from http://www.futurelab.org.uk/document/lit_reviews/Games_Review.pdf,

Krusemark, R. (2016). Teaching with Batman and Sherlock: Exploring student perceptions. *Creighton Journal of Interdisciplinary Leadershi*p, vol. 2, no. 1, pp. 71-92.

Mavridis, A., Katmada A. & Tsiatsos, T. (2017). Impact of online flexible games on students' attitude," *Education Tech Research Dev*. v65 n6 p1451-1470.

Miller, E. & Kuhanech, H.(2008). Children's perception of play experiences and the development of playpreferences: a qualitative study. *American Journal of Occupational Therapy*, vol. 62, no. 4, pp. 407-415,

Ozdemir, E. (2017). Comics in modern physics: Learning blackbody radiation through quasi-history of physics. *Studies in Educational Research and Development*, vol. 1, no. 1, pp. 41-59.

Pérez, E., Duque, A. & García, L. (2018). Game-Based Learning: Increasing the Logical-Mathematical. *Journal of New Approaches In Educational Research*. vol. 7, no. 1, pp. 31-39,

Plass, J. Homer, D.& Kinzer, C. (2015). Foundations of Game-Based Learning. *Educational Psychologist*. vol. 50, no. 4, pp. 258-283,

Rizal, F.A., Suyanto, B., Yudantoro, T.R. (2016) Aplikasi Game Edukasi Matematika Dengan Konsep Aritmatika Anak Berbasis Android, *Jurnal Teknik Elektro Terapan,* ISSN: 2252-4908 Vol. 5 No. 1 April 2016. pp : 45 – 50

Sanford, K. (2015). Serious games: video games?. *E-Learning and Digital Media*, vol. 12, no. 1, pp. 90-106,

Shaffer, D. Halverson, R. & Squire, K. (2005). *Video games and the future of learning*, Wisconsin Center for Education Research, Wisconsin-Madison.

Sockman, B. Sutton, R.& Herrmann, M. (2016). Comic Relief: Graduate Students Address Multiple Meanings. *TechTrends Springer*. 60(5).

Su, C. & Cheng, C. (2013). 3d Game-Based Learning System For Improving Learning Achievement In Software Engineering Curriculum. *TOJET: The Turkish Online Journal of Educational Technology*, vol. 12, no. 2, pp. 1-12.

Tham, R. &Tham, L.(2014). The Effectiveness of Game-based Learning. *International Journal on E-Learning*, vol. 13, no. 4, pp. 483-496,.