# MOBILEMATH (MOBILE LEARNING MATH) MEDIA DESIGN WITH SEAMLESS LEARNING MODEL ON ANALYTICAL GEOMETRY COURSE

***Akbarova Gulhayoxon Ashirali qizi***
*Postgraduate student at Kokand State University*
*E-mail: toxirjonjabborov05@gmail.com*

**Abstract:** The purpose of this research is to develop MobileMath (Mobile Learning Mathematics) Media with Seamless Learning Model in Analytical Geometry course in seen from its concept understanding ability. As for the specific targets to be achieved in this research is to produce MobileMath applications media to use it on analytical geometry course. The Procedure of the development of instructional media uses a model developed by Borg and Gall which includes 10 stages, namely (1) Research and information collecting, (2) Planning, (3) Develop a preliminary form of the product, (4) Preliminary field testing,

(5) Main product revision, (6) Main field testing, (7) Operational product revision, (8) Operational field testing, (9) Final product revision, (10) Dissemination and implementation. Borg and Gall (1983) states that the development of this research procedure consists basically of two main objectives, namely: (1) developing the product, and

(2) to test the effectiveness of the product to achieve goals. In this study the steps taken only to the extent to the Main Product Revision, results showed that the product which has been validated by two people as a subject expert and media expert validator with the average score of 88.33 and 91.66. the score means that MobileMath product is eligible for use in the learning process in the subject of analytical geometry, as it has been applied in mathematics education courses in University of PGRI Semarang, where the students are very enthusiastic in giving their response, with a percentage of more than 89.25% of the students enthusiasm in participating in learning geometry mobilemath media analytics with seamless learning model.

**Keyword:** MobileMath, Seamless Learning, Analytical Geometry.

## INTRODUCTION

In the era of globalization, there are many technologies that can be used as a medium of learning in the learning process of mathematics. The development of technology has made breakthroughs in developing learning process. The actors of many educational advantage of technological developments has used this technology as a learning medium. This, according to research conducted by Hammo (2015) on Investigating the Readiness of College Students for ICT and Mobile Learning: A Case

Study from King Saud University showed that more than 60% of the students of KSU use ICT and Mobile learning in everyday life on campus.

Mobile technology is one technology that allows each person to make learning easy and time-flexible. this is called mobile learning (M-learning). The combination of this telecommunications with applied technology may, stimulate the development of M-learning system as a learning medium. This, in accordance to research conducted by Martinez (2014) concerning the Development of a Mobile Service on a Wifi Network for the Evaluation of Mathematical Skills shows that with the development of mobile-assisted assessment system makes the assessment process becomes more easier and effective.

Currently the M-learning technology is still under development, however, M-learning technology as a medium of learning is one of prospective technologies that have many potential in the future. This is supported by several factors as follows:

**a)** The Demands of consumers who want a more practical thing.

**b)** Mobile phone prices are relatively cheap, more portable, easy to use, and the number mobile phone users are more than computer users.

**c)** The rapid development of wireless / cellular (2G; 3G; 3.5G; 4G) Technology.

On the other hand, the M-learning technology still had some limitations, that is: a limited amount of power, as the memory capacity isnt as big as computer, not to mention the processing speed and monitors that is smaller than computer. Hence, the M-learning application must be designed to be more effective, efficient, and optimized to overcome those limitations.

The M-learning applications can be developed using Java. Java is a portable open standard program made to provide support for the development of diverse applications one of which is the Java 2 Platform Micro Edition (J2ME). J2ME is java applications used only on mobile devices, one of which is Smartphone. This is according to research by Jere (2014), Implementation of Mobile Games for Mathematics Learning: A Case of Namibian Schools, which shows that starting from

junior high school students to university student in Namibia are very pleased with the Education Game applications using mobile phone in learning mathematics with the indicated table of questionnaire results as follows:

**Table 1.1.** Histogram Of Mobile Education Game Application Questionnaire Results




Handphone, especially smartphones are one of the gadgets most widely used by the public. The use of the mobile phones as today's telecommunications are still not utilized optimally for education. The use of mobile phones as a medium of learning is certainly attractive and practical, as it can be accessed anywhere and anytime. the argument as in accordance with what Deo Shao (2014) research result is. concerning the MobileMath: An Innovative Design of a Mobile-based System for Supporting Primary School Mathematics in Tanzania, which showed that more than 50% of teachers and students in primary school in Tanzania like MobileMath because it can be easily accessed and used anywhere, so sunandar (2016) showed on student mobile learning make interest to study hard because mobile learning very important this globalization area.

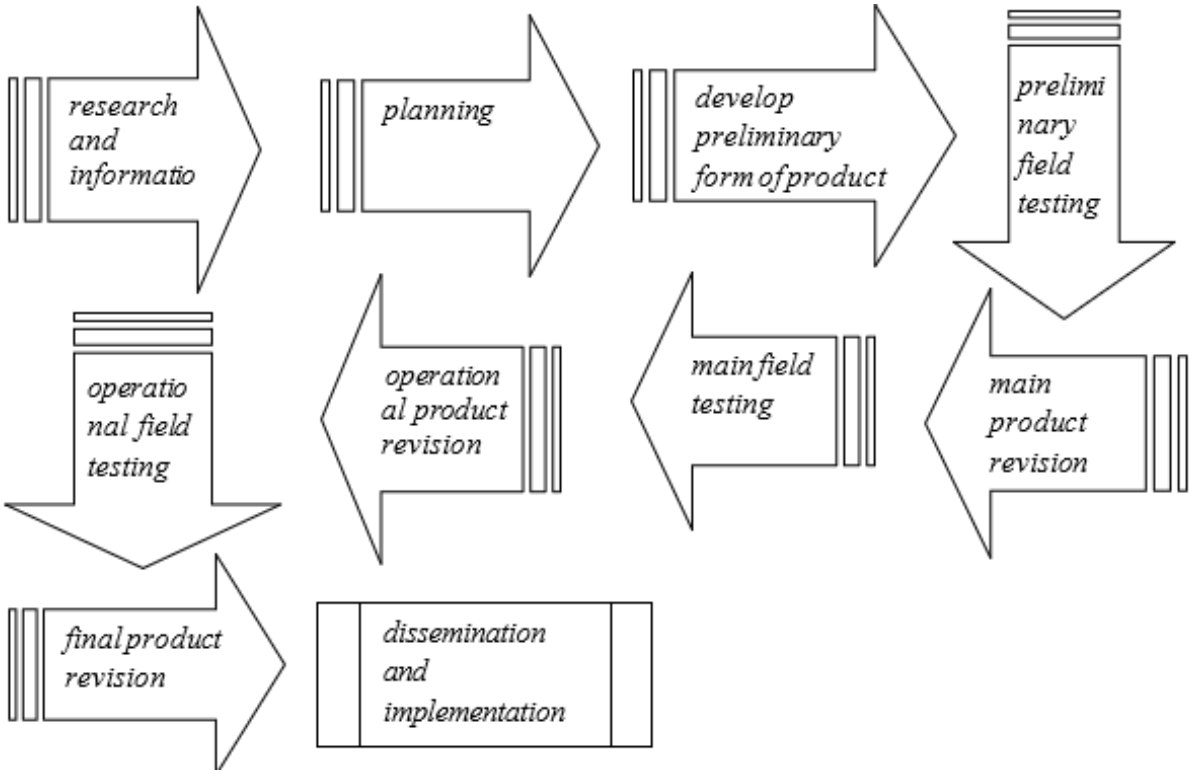
In order to use smartphone as a learning media requires a learning model that suits the character of the medium and its users, which is now done based on learning mobile in found in Singapore which uses mobile combined with a model of seamless learning which makes students learn easier as stated in a study conducted by Looi , CK, Seow, P., Zhang, B., So, HJ, Chen, WL., & Wong, LH (2010) on Leveraging mobile technology for sustainable seamless learning. The research showed that the use of mobile learning with a seamless model of learning in lectures at universities in Singapore are able to increase student motivation and learning outcomes.

Afterward, the model of seamless learning has been conducted a further comprehensive literature review by Wong (2010) which identify 10 dimensions of seamless learning, namely: (1) Includes formal and informal learning; (2) personal and social learning; (3) Flexible time; (4) Flexible location; (5) Ubiquitous knowledge Access (learning to integrate context- aware, learning augmented reality, and internet access everywhere); (6) Includes the physical and the digital world;

(7) The combined use of several types of instructional media devices (such as computers, interactive whiteboard with a mobile device); (8) easier transition in some learning tasks (such as data collection, analysis, presentation and communication). (9) the synthesis of knowledge (integrating previous knowledge and new, abstract and concrete knowledge, and multi-disciplinary learning); (10) the integration of multiple models of pedagogical and learning activities. From these explanations, it is very appropriate if the seamless learning models used for smartphone assisted learning are able to reach out for formal and informal learning by learning a more flexible time and location, Buchori (2016) explain about mobile learning with augmented reality make happy student elementary school any time and anywhere.

Based on interviews with several university lecturer in University of PGRI Semarang and in particular lecturer in the course geometry analytics on the course for mathematics education, it is found that (1) the majority of university professors in PGRI Semarang university did not use mobile phones as a medium of learning in the classroom, they often just use it for communication media or social networking. (2) The special learning analytical geometry courses that lasted this long in Mathematics Education University of PGRI Semarang is not optimizing advances in technology and have not used the Mobile Application Learning as a strategy and media teaching faculty in the classroom. (2) the majority of the value of final exams on analytical geometry course are always on an average score of below 60, (3) the conceptual understanding of student on the course of analytical geometry subject is still very low, especially in the material subject of circle, ellipse, parabola, hyperbole, the intersection of the fields, etc. (4) the learning model used is still limited to conventional models, drill and practice, yet using a model of renewable matches the media android majority owned student today, (5) students and lecturers have not been using a smartphone to help them better at understanding the concept of students about the material of analytical geometry,

Based on these descriptions, it can be formulated the problem is how to develop a MobileMath (mobile learning mathematics) media design with seamless learning models which are eligible to use in the analytical geometry course?




**Picture 1:** Borg and Gall Research and Development Model Cycle

## METHOD OF RESEARCH

The research aim is to develop MobileMath media design with seamless model of learning in the subject of analytical geometry, in accordance with these objectives, the type of study is a research & development (educational research and development). This is in accordance with the opinion of Samsudi (2009) and Johnson (2005) which states that 10 systematically steps as seen below that are required as the main purpose of this research is to develop mobilemath media design which is a valid media that can be used in colleges and the media is associated with a seamless model of learning. The product in question is not confined to concrete objects, such as text books, questions, but excluding products and procedures such as model or learning strategies (Takaya .: 2008). Through mobilemath media , it is expected that the students are able to understand what analytic geometry course well, as the course will not be boring but fun.

As for the subject of this research are college student mathematics education programme in PGRI University of Semarang in Semarang City, represented by class 3C by using the cluster random sampling based on the pretest of 7 existing class. (Arikunto : 2002).

## RESULT AND DISCUSSION

The research result of this development has been adjusted to The R & D research model measurement by Borg and Gall up to media design creation as seen below:

1. Conducting a preliminary studies and initial data collection for literature

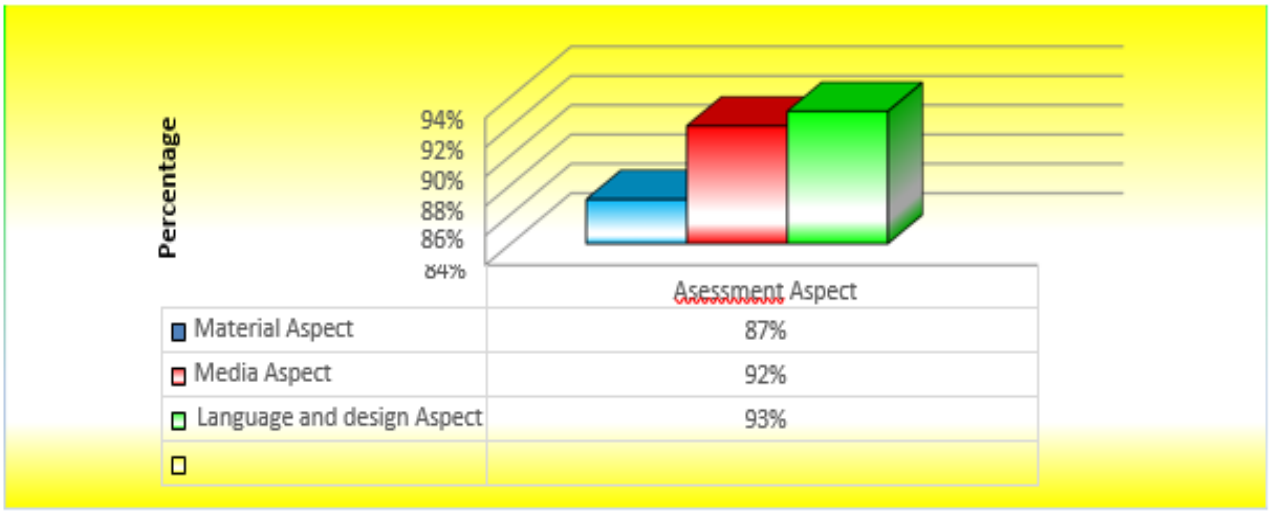
review, then classroom observation, identification of problems and summarizes the problems.

the preliminary studies which has been conducted by andreas (2007) earlier, that is the development of mobile media learning that help hospital's care to patient which indicates that the mobile learning can improve hospital services to be more practical, then reviewed using appropriate literature related to mobile learning based games by ayad ( 2010) which describes that the mobile media can improve the creativity and enthusiasm of student's learning and are further supported by Buchori (2013) which shows that the students are very enthusiastic in learning in the classroom with their mobile media learning, then the observation in the classroom of analytical geometry course at the University of PGRI Semarang data showed that during the lecture of analytical geometry are still not using mobile learning media yet so that the media needs to be made that are adjusted to the level of student's intelligence, this is because the majority of the college student already have a smartphone of their own.Conducting a plan. the stage is the stage where the identification and definition of skills, formulation of objectives, and expert testing or testing on a small scale, or expert judgment conducted.

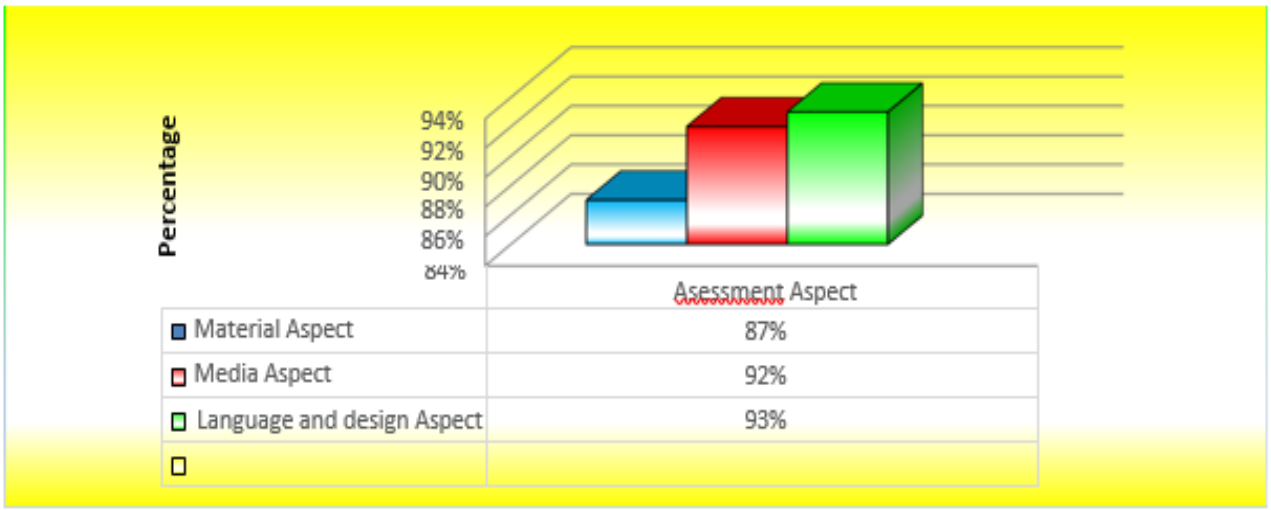
In planning to identify and formulate the goals in making this mobilemath media that is capable of making mobilemath media

that specializes in analytic geometry material there has been a common misconceptions in the class's subjects related to penetrating point, wedges and other fields. Then a Focus Group Discussion are done in order to create the appropriate product design of mobilemath in analytical geometry subjects which essentially able to motivate students to participate in learning enthusiastly which, by using initial design as follows. Once the design is finished, the MobileMath product is then validated by the subjcets expert. the result of the validation gained an average of 88.33 and 91.66. the result means that the product is eligible to be tested in the field. the result is as supported by Chan (2006), which shows that the meaning of interesting learning is to be able to collaborate the media with students. The picture below is the result of material and media expert validation on MobileMath product:

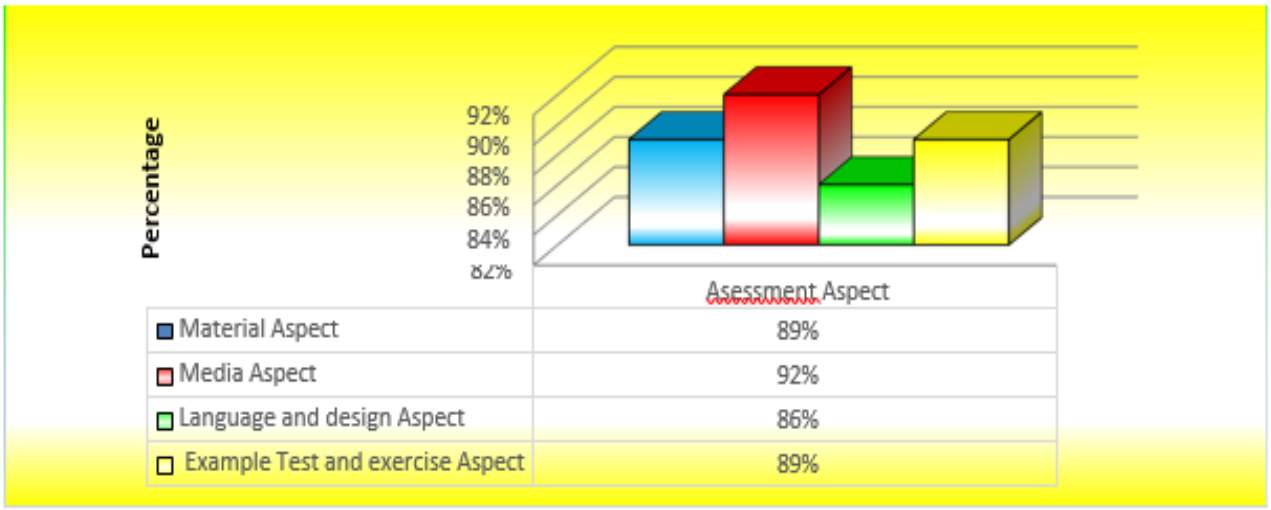
From Picture 3, it can be seen that the mobilemath product is good seen from all three aspects, especially aspects of the media's novelty, mobilemath media is very interesting to use because it is able to combine animation, music and materials simultaneously, while for the least input language aspect related to the examples of problems and exercises that should be made contextual, so that students could more easily understand the essence of the material analytical geometry. This is in accordance with the opinion of De Freitas, (2006). which shows that by learning using e-learning and mobile learning method makes learning more easier ather than having a face to face meeting.




**Picture 3:** Subject experts validation material results




**Picture 4:** Media Experts Validation on MobileMath Product




**Picture 5:** Student's College Response on MobileMath Product

The Development of the type / shape of the initial products which include: the preparation of teaching materials, preparation of manuals, and device evaluation.

In developing media products mobilemath which is designed using Corel Draw, Adobe Flash CS6 to make the interface look more attractively packaged. based on seamless and practical use in learning. the application is adjusted in android application. The media mobilemath contains SKL, indicators, description of materials, sample questions, quizzes and instrumental music, which is limited to analytical geometry subjects to answer how to make the lecturer and students interested to use them in the learning process. The results of the *tests or quizzes in each chapter can be determined instantly* along with its answer key so that students know whether the answer is correct or incorrect. In each application is equipped with a seamless application by selecting the preferred circle, to view the subject of the mobilemath application that has been designed interactively.

1. The test of the initial stage conducted on 30 subjects. The collection of information / data by using observation, interviews, and questionnaires, followed by data analysis.

In the selection of research subjects, it is then selected 30 students from class 3C representing the existing population (Mathematical Education Programme of PGRI University of Semarang) in which from the observation, the enthusiasm towards the use of mobilemath product for use in the learning process of analytical geometry can be seen. Based on the results of interviews with lecturer and students obtained an input that is to add instrumental music and animations that is able to attract or stimulate students to learn material adjusted to the national standart of Higher Education, and from the results of the initial questionnaire to the student data showed that 89.25% of the students are interested in using the mobilemath media as it is very attractive, but the problem is the android-based device of each student only facilitates a not maximized result because of its low specification. Below are the results of questionnaire responses of students to the mobilemath product.

## CONCLUSION

Based on the results of the research on the prototype design of mobilemath (mobile learning mathematics) media it can be summarized as follows:

1. The created mobilemath (mobile learning mathematics) media are suitable for learning for students
2. Both The Lecturer and students can use the Media mobilemath (mobile learning mathematics) as a supplement learning in the classroom well.
3. Based on testing conducted by media experts and subject matter experts showed that the media mobilemath (mobile learning mathematics) media is a decent media that can be used by students, with the value from subject matter experts 88.330% and 91.66% from media expert.

4. From the results of field observations with the Media mobilemath (mobile learning mathematics) shows that the students are very interested as seen in the percentage that reached 89.25%.

5.

## REFERENCES


1. Andreas Holzinger, Primoz Kosec, Gerold Schwantzer, Matjaz Debevc, Rainer Hofmann-Wellenhof, Julia Frühauf (2007) Design and development of a mobile computer application to reengineer workflows in the hospital and the methodology to evaluate its effectiveness., 977-968. In *Journal of biomedical informatics* 44 (6).
2. Ayad & Rigas, (2010) "Multi-modal game based learning: satisfaction and users achievement approach" published by Stevens Point, Wisconsin, USA
3. Buchori Achmad, Noviana Dini ,Sunan Baedowi. (2013), pengembangan mobile learning dengan model GNT di SMA NASIMA Semarang. *Jurnal pendidikan matematika Universitas Muhammadiyah Semarang* 5 (18), 51-58.
4. Buchori, A . 2016, Developing Character Building
5. Learning Model Using Mobile Augmented Reality On Elementary School Student In Central Java, Global Journal Pure and Applied Mathematics , 12 (4) , 3433-3444
6. Sunandar and Buchori, A . 2016, Development Of Media KOCERIN (Smart Box Interactive) to Learning Mathematics in Junior High School, Global Journal Pure and Applied Mathematics , 12 (6) , 5253-5266
7. Chan, T-W., Roschelle, J., Hsi, S., Kinshuk, Sharples, M., Brown, T., Patton, C., Cherniavsky, J. Pea, R., Norris, C., Soloway, S., Balacheff, N., Scardamalia, M., Dillenbourg, P., Looi, C.K., Milrad, M. & Hoppe, U. (2006). One-to-One technology-enhanced learning: An opportunity for global research collaboration. Research and Practice in Technology Enhanced Learning, 1(1), 3-29.
8. De Freitas, S., Roberts, G. (2006). *Does distance e-learning work? A comparison between distance and face-to-face learners using e-learning materials*. Association of Learning Technology Journal. Vol. 11, no. 2, pp. 69-87. Cardiff. University of Wales Press.
9. J. Wu, H. Cheng, M. Li, A. Carlson, S. Kim, Y. Huang, Z. Kang, K.-C. Hwang, and J.A. Rogers, (2012) "A Viscoelastic Model for the Rate Effect in Transfer Printing," ASME Journal of Applied Mechanics 1, 410.
10. Geoff D. Skinner. (2013), Integration of Motion Sensing into Mobile Learning Applications, *GSTF Journal on Computing*, 3 (1), 1- 6.
11. Helen Crompton. (2012), Implementation of a one-to-one iPod Touch Program in a Middle School, *Journal of Interactive Online Learning*, 11 (1), 1-18.
12. Kuh, G. D. (1996). Guiding principles for creating seamless learning environments

for undergraduates. College Student Development, 37(2), 135-148.

13. Looi, C. K., Seow, P., Zhang, B., So, H. J., Chen, W-L., & Wong, L. H. (2010). Leveraging mobile technology for sustainable seamless learning: a research agenda. British Journal of Educational Technology. 41(2), 154-169.
14. Mohamed Sarrab, Laila Elgamel, Hamza Aldabbas. (2012), Mobile Learning (M-Learning) and Educational Environments, *International Journal of Distributed and Parallel Systems*, 3 (4), 31-38.
15. NCTM. (1989). Curriculum and Evalutioan Standards for School Mathematics. Reston, VA: NCTM
16. Nicholas Zaranis, Michail Kalogiannakis, Stamatios Papadakis. (2013), Using Mobile Devices for Teaching Realistic Mathematics in Kindergarten Education, *Journal Creative Education* ,4 (7A1), 1-10.
17. Ruseffendi, E. T. (2006). Pengantar kepada Membantu Guru Mengembangkan Kompetensinya dalam Pengajaran Matematika untuk Meningkatkan CBSA. (Edisi Revisi).
18. Bandung: Tarsito
19. Santosh Kumar Behera. (2013), M-Learning: A New Learning Paradigm, *International Journal on New Trends in Education and Their Implications*,4(3), 24-34.