

**COMPUTE-SUPPORTED COLLOBRATIVE LEARNING (CSCL)
VIA SOCIAL NETWORKING IN MATHEMATICS**

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**COMPUTER –SUPPORTED COLLABORATIVE LEARNING VIA SOCIAL
NETWORKING IN MATHEMATICS**

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To my beloved father and mother

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ABSTRACT

This research were designed to identify students' interest towards computer supported learning process for mathematics lesson, students interest on the use of Geogebra in mathematics lesson and students' perception on collaborative learning through social networking. This study deploys mixed method which is a combination of quantitative (Questionnaire) and qualitative (interviews) approach where students were taught transformation topic with the aid of Geogebra software and allowed to interact through social networking site (Facebook) to complete the activities given. 30 of Form two students were involved in the quantitative study who give their response to the questionnaire while five students were selected for qualitative study who participate in the interview session. Results of mean analysis showed that students perceived high level of interest towards computer supported learning process for mathematics lesson with $M=4.56$. Besides that, students also perceived high level of interest on the use of Geogebra in mathematics lesson with $M=4.40$. Lastly, students have a positive perception on collaborative learning through social networking with $M=4.55$. Results from the qualitative study also support the findings of quantitative study which the students stated that Geogebra software is very helpful in learning mathematics and very effective in cascading complex matters through easier method. In terms of collaborative learning, Facebook is an effective collaborative learning medium which enables easier communication and effective idea sharing session. The study shows that students have displayed positive attitude towards mathematics lesson with the use of Geogebra software and social networking site.

ABSTRAK

Kajian ini dijalankan bertujuan untuk menentukan minat pelajar terhadap proses pembelajaran berbantuan komputer dan penggunaan Geogebra dalam pengajaran Matematik serta untuk mengenalpasti persepsi pelajar terhadap pembelajaran kolaboratif melalui rangkaian sosial. Kajian ini menggunakan kaedah campuran yang merupakan gabungan pendekatan kuantitatif (soal selidik) dan kualitatif (temubual) di mana pelajar diajar topik transformasi dengan bantuan perisian Geogebra dan dibenarkan untuk berinteraksi melalui laman rangkaian sosial (Facebook) untuk menyiapkan aktiviti yang diberikan. 30 orang pelajar Tingkatan Dua terlibat dalam kajian kuantitatif yang memberikan maklum balas kepada soal selidik manakala lima orang dipilih untuk kajian kualitatif bagi tujuan temubual. Hasil analisis min menunjukkan bahawa pelajar memperlihatkan tahap minat yang tinggi terhadap pengajaran berbantuan komputer dengan nilai $M=4.56$. Selain itu, pelajar juga menunjukkan tahap minat yang tinggi terhadap penggunaan Geogebra dalam pengajaran matematik dengan nilai $M=4.40$. Akhir sekali, pelajar mempunyai persepsi yang positif terhadap pembelajaran kolaboratif melalui rangkaian sosial dengan nilai $M=4.55$. Dapatan daripada kajian kualitatif menyokong dapatan daripada kajian kuantitatif yang mana pelajar menyatakan bahawa perisian Geogebra banyak membantu mereka dalam pengajaran matematik dan sangat berkesan dalam menyelesaikan perkara kompleks melalui kaedah yang lebih mudah. Dari segi pembelajaran kolaboratif, Facebook dikatakan medium pembelajaran kolaboratif yang berkesan yang membolehkan Kedua-dua analisis kuantitatif dan kualitatif menunjukkan bahawa pelajar mempunyai persepsi yang positif terhadap Pembelajaran Kolaboratif Berbantuan Komputer, penggunaan perisian Geogebra serta laman rangkaian sosial sebagai medium pembelajaran kolaboratif, yang membolehkan komunikasi berlaku dengan lebih mudah disamping dapat berkongsi idea. Kesimpulannya, kajian ini menunjukkan bahawa pelajar menunjukkan sikap yang positif terhadap pengajaran matematik dengan penggunaan perisian Geogebra dan laman rangkaian sosial.

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LIST OF ABBREVIATION

| | |
|------|---|
| A | Agree |
| CMC | Computer Mediated Communication |
| CSCL | Computer Supported Collaborative Learning |
| CAI | Computer Assisted Instructed |
| CAT | Computer Aided Technology |
| DA | Diasgree |
| F | Frequency |
| ICT | Information Communication and Technology |
| IT | Information Technology |
| LD | Less Disagree |
| NCTM | National Council of Teachers of Mathematics |
| PPK | Pusat Perkembangan Kurikulum |
| SA | Strongly Agree |
| SD | Standard Deviation |
| SDA | Strongly Diasgree |
| SNS | Social Networking System |

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The world of information technology has made a significant change to this traditional education system. Intense competition and efforts towards the formation of a world-class education system have emerged. There has been an increase in the use of multimedia technology, especially computers and special software according to the teaching of science and mathematics as quoted from Rosnaini Mahmud et al (2009). According to HomaEdalati, (2009), the growth of technology is a fundamental fact to the development of technology in education. Technology is regarded as a powerful but exciting gateway to all aspects of education, learning and teaching.

Technology provides “world wide web” for teachers through web 1.0 in 1990s as a tool to enhance learning and provides solid foundation of technology in education (HomaEdalati, 2009). HomaEdalati, (2009) added that Wiki, blogs, Twitter and social networking sites are effective tools and means in the hands of teachers to convey the educational message with interesting participation and cooperation.

Roberts, (2012) stated that integrating technology in teaching provides greater learning opportunities for students and Al-A’ali, 2008 shared that the use of technology is able to enhance the students’ abilities and capabilities. Rosnaini Mahmud, (2009), added that technology is capable of producing visionary students with capabilities in

both advanced technology and subject matters. Meanwhile, Baker, (2001) reiterated that advanced technology such as Internet is going to play a pivotal role in enhancing education as it can provide diverse opportunities to the world of education.

Without doubt, ICT is an undisputed brilliant and multiple beneficial device for educators and learners in producing an interactive learning environment. This has been proven in previous studies which strongly recommend the use of ICT for positive change (Anderson, 2003 Godwin and Kaplan, 2008). According to O'Sullivan and Samarawickrema (2008):

“The use of ICT to foster new forms of learning by enabling new learning relationships is indeed a challenge for many teachers who are comfortable using conventional e-learning and teaching approaches within the learning management system platform. In adopting more recent web 2.0 technologies, decisions related to content and control are largely in the hands of the learners blurring the boundaries between experts or teachers and learners”

Media sharing service is another example which allows both students and teachers to share their resources and make a rich reference with free access and finally social network sites contribute too such as Facebook, Friendster and Myspace (HomaEdalati, 2009). Social networking sites which are well known among youngsters including students are regarded as a potential effective learning medium. These sites would definitely be able to provide an effective platform for teachers and students to communicate and collaborate around current school subjects and outdoor project works away from the classroom in real-time (Christoper, 2012).

Selwyn, (2009) added that these sites are able to create an online environment that further enriches the learning experience. So evidently these social networks such as the famous Facebook could go beyond just the classroom walls to even uniting various classrooms for the general purpose of knowledge sharing. From above, social

networking sites could have the features that support communication towards meaningful learning that can enhance the student's learning process.

According to Judith, (2010), the learning environment is a complicated matter today with the incorporation of ICT since networks in which all students and faculty have access to, notably powerful digital means such as social networkingsites, are inclined for social purposes rather than education, and it is a challenge for the academic world to facilitate the students' learning process using social networking sites.

Rusnani Mahmud,(2009) added that technological advances in mathematics education have paved the way for teachers to use technology to improve the quality of teaching and learning. As a result of the implementation of policies that emphasize the importance of using technology in education, all parties involved in education are faced with the important task of reforming methods of teaching and learning.

Our Malaysian government has realized that the use of ICT in the education system is becoming a norm worldwide. Therefore Malaysian Government through the Ministry of Education and Ministry of Higher Education has planned to integrate ICT in the Malaysian education system. According to Kamariah Abu Bakar, (2010), the integration of ICT in teaching and learning process has become catalyst for positive change in the education system.

Various mathematical software are available currently in the market, such as Mathematics, Matlab, Maple V, Geometers' Sketchpad, Autograf, Graphic Calculator and others. The notable features of these software are the powerful ability in symbolic and numerical calculations as well as fast calculations and assisting students in abstract mathematical concepts. However, the software comes with a high cost where the software needs to be purchased in order to enjoy all the exciting and powerful features. This has raised a big question whether the Malaysian government should decide to absorb huge costs to implement software in all schools.

Fortunately, there are companies which develop mathematical open source software and offer it for free to the public. This kind of free open software provides an alternative solution for the public who is not able to afford to fork out money to buy the software. Open source reflects that the software is available for free and this has become increasingly popular among computer users who seek an alternative to paid software. Through search engines we can have a variety of mathematical software which can be copied and used free of charge. Mathematical software such as Geogebra, Maxima, Scilab, Axiom, YACAS, are readily available for the use of teaching and learning. In addition, teachers who have skills in programming can also develop their own mathematical software for their students to use (Kamariah Abu Bakar, 2010).

This research is to determine students' interest towards Computer Supported Collaborative Learning (CSCL) process and the use of Geogebra in teaching mathematics as well to identify students' perception on collaborative learning through social networking.

1.2 Background Study

According to Rusnaini Mahmud, (2009), Mullis *et al.* study in 2008 has reported that, approximately 20% of Malaysian students failed to achieve the minimum benchmark in mathematics. Students fail to give accurate answers, especially in geometry. In addition, students do not understand mathematical concepts and lack necessary skills in problem-solving. Azlina and Suhaila, (2008) added that students have problems understanding basic mathematics and fundamental geometry concepts.

Therefore Rusnaini Mahmud, (2009) stated that it is important for teachers to find the best way to teach mathematics. One software program that is currently available free of charge is GeoGebra. GeoGebra was designed by Mark Hohenwarter. This software is dynamic and includes geometry, algebra and calculus. GeoGebra is designed

for use in mathematics education in secondary schools and higher educational institutions .

According to Rusnaini Mahmud, (2009), GeoGebra software comes with basic feature such object points, vectors, segments, polygons, straight lines, which are all part of a cone shape and function and the ability to offer various types of instruction.

In addition, GeoGebra is able to perform online, interactive teaching, which allows more opportunities for teachers to upload resources for online learning (Hohenwarter *et al.*, 2008). This software is an open source, or free, to be downloaded by all users and is not subject to any license fee. In addition, GeoGebra software is designed for use in schools and educational institutions (Hohenwarter, 2004). GeoGebra is a versatile software able to generate a picture or graphic visualization of mathematical ideas or concepts (Hohenwarter and Jones, 2007) and to display a picture or graphic on the simultaneous visualization of the window graphics, algebra and geometry (Arranz *et al.*, 2009).

Teachers also reported that GeoGebra software can generate dynamic visualizations in teaching students a particular calculus concept. Edwards and Jones (2006) found that this software is easy to use even for those who are not adept at information technology. In fact, teachers are excited by the potential use of GeoGebra to learn mathematics and are confident that this program provides effective learning experiences for students. GeoGebra software does not limit users to access either at home or at school and thus can greatly enhance learning opportunities for mathematics students.

Therefore, the main purpose of this research is to incorporate the Geogebra software as a learning medium in a mathematics lesson. This research will focus on the use of this software among Form Two secondary school students in Malaysia. The software will be used to design and develop learning module. The learning module is

used in parallel with the Geogebra software during the Mathematics lesson in the form of collaborative learning. Then, the social networking site, Facebook is deployed to provide an effective and interactive platform for collaborative learning process.

1.3 Research Objectives:

The objectives of this research are to identify:

- i. Students' interest towards computer supported learning process for mathematics lesson.
- ii. Students' interest on the use of Geogebra in mathematics lesson.
- iii. Students' perception on collaborative learning through social networking.

1.4 Research Questions

- i. What is the students' interest towards computer supported collaborate learning process for mathematics lesson?
- ii. What is the students' interest on the use of Geogebra in mathematics lesson?
- iii. What is students' perception on collaborative learning through social networking?

1.5 Rationale of the Study

As mentioned earlier, information technology has made significant changes to traditional education system. The use of information, communication and technology as part of teaching has been increasing especially in the subjects of mathematics and science (Rosnaini Mahmud et al.,2009). According to HomaEdalati (2009), technology

is regarded as a powerful but exciting gateway to all aspects of education, learning and teaching.

Despite rapid advancement of technology, one of the challenging tasks in Malaysia's education system is to integrate technology in education especially in mathematics and science. The use of technology in our teaching and learning process should be emphasized to fulfill our curriculum aim (Ministry of education, 2004).

The use of Computer Supported Collaborative Learning (CSCL) enables easier and simpler explanation in learning compared to traditional classroom where CSCL focuses on "knowledge building" instead of "knowledge reproduction". CSCL enhances student's understanding in learning process (Hoa, 2007).

Since our government has realized that the use of ICT in education system has become the norm, our government through higher education ministry has planned to integrate the use ICT in teaching and learning especially in the subjects of mathematics and science. According to Kamariah Abu Bakar, (2010), the use of ICT in teaching and learning has been catalyst for positive change in teaching methodologies especially in mathematics.

Therefore this research's intent is to further investigate the advantages of ICT integration in mathematics teachings through the use of open source software "Geogebra". The findings will provide concrete conclusions on the advantages of ICT in mathematics teaching as well as perception from the students.

1.6 Research Scope

The scope of this study is the research will use Geogebra software to design learning manual for Form Two students on the Transformation topic which covers areas such as translation, rotation, reflection and tessellation.

1.7 Significance of study

This research which discusses primarily on computer supported collaborative learning with the use of Geogebra and Social networking site (Facebook) is expected to provide significant value to the related parties at the end of the study. Following are the expected impact of this study to respective parties.

1.7.1 Importance to students

This study makes a big difference to the students as they are found to be spending a huge portion of their time on computer and social networking sites such as the Facebook. Thus this study will promote the use of ICT as a learning platform. This will enhance the interest of students in the learning process especially in the mathematics lesson.

1.7.2 Importance to Teachers

The significance of this study also greatly concerns the lecturers as they can find and explore new teaching aids through ICT. It is important that the use ICT in learning is very much needed by teachers to facilitate an effective learning process. This research

will enable lecturers to find out about students' perception about the use of ICT, Geogebra software and a social networking site in mathematic lessons.

1.8 Definition Terms

Some important terms and concepts need to be defined to avoid misunderstanding and confusion. It is hoped that readers of this study would be able to understand the terms more accurately.

1.8.1 Computer Supported Collaborative Learning (CSCL)

Computer-supported collaborative learning (CSCL) is an emerging branch of the learning sciences concerned with studying how people can learn together with the help of computers (Stahl, Timothy and Suthers, 2012). CSCL refer to the use of mathematics software and Facebook to aid collaborative learning in the said subject.

1.8.2 Social Networking

Boyd and Ellison (2007), defined social network sites as web –based services that allow individuals to construct a public or semi-public profile within a bounded system; articulate a list of other users with whom they share a connection, and view and traverse their list of connections and those made by others within the system. Meanwhile, social networking in this research refers to Facebook which is involved in the learning of mathematics.

1.8.3 Geogebra

An interactive and dynamics Mathematics software that joins geometry, algebra, and calculus application, intended for teachers and students (Tortosa, 2011). In this research, Geogebra is the Mathematics software used to teach the topic of transformation to the Form 2 secondary school students.

1.9 Conclusion

Without doubt, technological advances in mathematics education have paved the way for teachers to use technology to improve the quality of teaching and learning. As a result of the implementation of policies that emphasize the importance of using technology in education, all parties involved in education are faced with the important task of reforming methods of teaching and learning. Therefore this research is carried out at the right time to provide useful inputs to analyze the integration of ICT mathematics education through the involvement of teachers and students.

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