

SOCIAL NETWORKING IN PHYSICS HOMEWORK COMPLETION

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This study is dedicated to the great soul of my father. He was the only incentive of my learning. May he rest in peace.

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ABSTRACT

Learning physics is often considered by teachers and students as a difficult task. Homework is introduced as a way to tackle this difficulty. But most of the students lack motivation and refuse to do their homework. Thus, finding some motivational factors to encourage students in completing their homework seems necessary. Since supervisions by skilled teachers and web-based homework were frequently cited as some, this study focuses on investigating the benefits of using Facebook as a motivational tool and as a bridge between teachers and students to assist students in completing their homework. The study was conducted in an Iranian high school located in Kuala Lumpur, Malaysia with 41 female students in both science and mathematics streams in Year 11. A 'Pre-Experimental' design was used to conduct the research. A Facebook page including five sets of physics homework, on the topic of capacitor, was developed and distributed among the participants. The level of students' academic performances was measured before and after their physics homework completion using pre- and post-tests. The perception of the students, regarding the role of Facebook in supporting their physics homework, was enquired via a set of questionnaire. Later, ten of the students were selected for an interview. The obtained data was analyzed by calculating the central tendency and conducting t-test using Microsoft Excel and SPSS software. The findings from the questionnaire show that the students have a positive tendency towards using Facebook to support their physics homework completion. It was supported by the analyses of data from the interviews. The students' level of academic performance was also enhanced significantly after using the Facebook page ($t(38) = 6.574, p = 0.000$). The results of this project could be used to replace the traditional pen and paper homework system; and to improve the students' physics learning.

ABSTRAK

Pembelajaran fizik sering dianggap sukar oleh guru dan pelajar. Kerja rumah diperkenalkan sebagai satu cara untuk menangani kesukaran ini. Tetapi kebanyakan pelajar tidak motivasi untuk melakukan kerja rumah mereka. Oleh itu, adalah perlu bagi mengenalpasti faktor motivasi yang menggalakkan pelajar dalam menyiapkan kerja rumah mereka. Oleh sebab penyeliaan ke atas pelajar memerlukan guru yang mahir, kerja rumah berasaskan web mungkin dapat membantu menyelesaikan masalah ini. Sehubungan itu, kajian ini bertujuan untuk mengenalpasti manfaat menggunakan Facebook sebagai alat motivasi dan sebagai jambatan antara guru dan pelajar untuk membantu pelajar dalam menyiapkan kerja rumah mereka. Kajian ini dijalankan di sebuah sekolah tinggi Iran di Kuala Lumpur, ke atas 41 orang pelajar perempuan aliran sains dan matematik Tahun 11. Reka bentuk kajian 'Pra-Eksperimen' telah digunakan untuk menjalankan penyelidikan. Halaman Facebook termasuk lima set kerja rumah fizik dalam topik kapasitor telah dibangunkan. Tahap prestasi akademik pelajar diukur sebelum dan selepas penyiapan kerja rumah fizik mereka menggunakan ujian pra dan pasca. Persepsi pelajar mengenai peranan Facebook dalam menyokong kerja rumah fizik mereka diukur melalui satu set soal selidik. Kemudian, 10 orang pelajar telah dipilih untuk ditemubual. Data yang diperolehi telah dianalisis dengan mengira kecenderungan memusat dan ujian-t menggunakan perisian Microsoft Excel dan SPSS. Hasil analisis soal selidik menunjukkan bahawa pelajar mempunyai kecenderungan yang positif ke arah menggunakan Facebook untuk menyokong mereka menyiapkan kerja rumah fizik. Ini disokong oleh analisis data daripada temubual. Prestasi akademik pelajar juga telah meningkat secara signifikan selepas menggunakan halaman Facebook ($t(38) = 6.574, p = 0.000$). Hasil projek ini boleh digunakan untuk menggantikan kerja rumah tradisional untuk meningkatkan pembelajaran fizik pelajar.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Numerous studies show that homework is one of the most important factors in the process of learning. Homework is a comprehensive process that involves a complex interaction of factors in two contexts, home and school (Warton, 2001). Hong and Lee (2000) believed that homework is a ‘regularly used’ teaching strategy in schools. Many instructors assert homework as a contribution to the improvement of learning and academic accomplishment and to the growth of intellectual skills (Hong *et al.*, 2011).

There are different types of homework and various reasons to do homework. The role of homework is tremendously complex and is not simple to be explained (Warton, 2001). According to Warton (2001), some reasons for fulfilling the homework could be categorized as bellow:

- (i) To obtain progressive academic knowledge
- (ii) To extend the general skills
- (iii) For schooling purposes
- (iv) To execute expectation of parents
- (v) To advance the linkage between home and school
- (vi) To encourage communication inside the family

Homework completion has positive effects on the learning of science and mathematics in general, and physics' learning in particular. For example House (2009) believed that scientific achievement is associated to some factors; one is homework completion. Kodippili and Senaratne (2008) also confirmed the effectiveness of homework assignment in learning mathematics. The fulfillment of homework is also believed to be influential in learning physics. Chasteen and Pollock (2008) believed that solving physics problems as homework is a very powerful and valuable tool in the students' physics learning. Problem solving is an inseparable part of physics' homework and students tend to learn physics more effectively by problem solving, (Ozimek *et al.*, 2004). According to Freedman (1996), the best solution to teaching physics' ideas are applying these ideas in students' homework.

Because of the important role of homework in students' academic achievement and also in physics' learning, this project is focused on motivating students to complete their physics' homework and finding a way to help and supervise students when they are doing their physics' homework task.

1.2 Problem background

Learning physics is often considered by teachers and students as a difficult job (Park *et al.*, 2009). Doing homework will help reinforce students in their learning process and practicing skills (Kelley, 2006). Homework also has a specific affect in learning of physics' concepts and helps physics' problem solving. According to Radhakrishnan *et al.* (2009) homework is especially significant in scientific courses such as preparatory physics, where problem solving is a main focus and homework is the key place for practicing.

Although some students are aware of the role of homework in their academic life and have accepted that homework will give them a better understanding of the subject they are studying (Wilson and Rhodes, 2010), most of the students are not willing to do their homework. Teachers have repeatedly stated that a number of students would refuse to complete their homework for various reasons; they have long

experienced the frustration of students who do not or will not complete their homework (Wilson and Rhodes, 2010).

The numbers of students who are interested in doing homework is decreasing. There is a decrease in their incentive, especially regarding school-responsibilities among elder students (Hong *et al.*, 2011). For example junior high school students have been accounted to have less motivation to fulfilling their homework in comparison to elementary school students (Katz *et al.*, 2010). Finding the foundation of declined attention in carrying out homework is a significant step in developing homework performance (Hong *et al.*, 2011).

There are so many underlying reasons why students often turn down their homework duty. Some students bring forth their lack of free time; or their need for a social life and having other responsibilities, as reasons preventing them from doing their assignments (Hinchey, 1996). Hinchey (1996) also stated that some of the students believe homework does not have value because teachers do not really care about collecting, reading or marking them, let alone using the result of the homework for an evaluation of the students' progress.

Some students asserted that their homework is irrelevant to the lesson of the day (Darling-Hammond and Olivia, 2006). Students also feel that homework is not meaningful, because they often do not receive immediate feedback or any feedback at all from the teachers, concerning the result of homework (Wilson and Rhodes, 2010). A number of students feel that homework is boring; some others do their homework only to satisfy their parents and/or their teachers (Xu, 2010).

It seems that finding some motivational factors are necessary to encourage students in completing their homework. Radhakrishnan *et al.* (2009) claimed that students must be encouraged to complete their homework by incentives. Motivation would lead to greater homework accomplishment, which in return improves the performance. This reinforcement is often generated by instructors. According to Wilson and Rhodes (2010), teachers should make the homework relevant but interesting and appealing to the students' learning style.

Students need to be supervised when they are doing homework. Bempechat *et al.* (2011) believe that students need to be supported academically and motivationally. They emphasize on supervising all students, mainly lower achieving students in all of their learning process, particularly in homework tasks. According to Bryan *et al.* (2001), helping the students with their homework will make a strong link between what they learn in school and what they learn in their lives as out-of-class activities.

Although students' success will be higher when parents support the students academically and monitor their homework but parental support is eventually going to decrease, especially when students enter high school (Bempechat *et al.*, 2011). This is because of so many reasons such as lack of enough information or time (Cosden *et al.*, 2001). It seems that students should be assisted by skilled teachers when they are doing homework (Cosden *et al.*, 2001).

Therefore, the need for a tool arises; a tool that makes students interested in doing their homework and connects the teachers with students when they do out-of-school activities. Our ideal tool for resolving this problem has to have several specific characteristics. The most important of these characteristics is that students and teachers should be highly enthusiastic of this tool. The tool has to enable the teachers to supervise their students while doing their homework. It should be able to give the students immediate answer about their questions. It should be able to create a group-work atmosphere for sharing ideas, improving students' learning and motivating them into the completion of their homework task, tackling their homework avoidance problem.

Among the other essential requirements of this tool is its ability to let the students do their homework individually without any distractions and last but not least the tool has to make a suitable brain storming environment in which peers and teachers could easily share information.

The use of computers and the internet is rapidly growing in popular culture, mostly amongst older students (Arrington, 2005). The number of students who sign-up on Facebook is increasing at a rate of almost 150000 new accounts per day (Peluchette and Karl, 2010). According to Green and Bailey (2010) Facebook has

been used for making study groups in which the members help improve each other's mentally, increasing their knowledge and sharing information. It has potential to be used for instructional purposes. It is suitable for doing homework tasks in which the Students are able to discuss their homework. All Facebook members are able to connect to each other and share what they want (Schwartz, 2010). It has, therefore, the potential to connect the students to their teachers and vice versa (Schwartz, 2010). In addition, Students are interested to have connections with their teachers as an assistant with Facebook (Schwartz, 2010). Hence, Facebook may just be the tool to act as one solution, covering the aspects mentioned above.

1.3 Problem Statement

Although homework is an important part of learning and acts as an overpass between home and school (Murray *et al.*, 2006), most of the students are not willing to do their homework (Wilson and Rhodes, 2010). This is a reason why this study will focus on homework-task. Moreover, different approaches to motivate the students at doing their homework are reviewed, aiming to find a solution to make students as interested as possible in doing their homework and to address the students' avoidance problem in fulfilling their homework.

Since doing homework could enhance the students' academic learning and promote the students' skills in problem solving especially in technical courses, such as introductory physics' course (Radhakrishnan *et al.*, 2009), this study will focus on finding the best way to making physics homework as interesting as possible.

As one of the motivational ways to persuade the students in doing their homework is supporting them academically (Bempechat *et al.*, 2011) by skilled teachers (Cosden *et al.*, 2001), this study will focus on finding a solution that connects the teachers to their students when they are doing homework.

Computers have been proven to improve physics problem solving skills (Pol *et al.*, 2005), motivate students in doing their homework and to ease communications

through the internet (Salend *et al.*, 2004). Facebook as a part of internet has potential to be used for making study groups, organizing academic groups and being used for instructional purposes and homework completion activities (Green and Bailey, 2010). Students are also interested in using Facebook (Peluchette and Kar, 2010) and having connections with their teachers as an assistant via Facebook (Schwartz, 2010). It was therefore, concluded that using Facebook may help to motivate students and provide a medium in which the teachers could support the students. Thus, Facebook was chosen as our main tool of communication and motivation.

This research is to find out whether the use of Facebook can support Physics students and make them interested in doing their homework in order to improve their learning and problem solving in Physics.

1.4 Research objectives

This study attempts to achieve the following objectives:

- (i) To develop a Facebook page that can support physics homework among high school students.
- (ii) To measure the perception of students who use Facebook in supporting their physics homework.
- (iii) To find out if there are any differences in the level of academic performance of the students who take physics in high school before and after using Facebook in supporting their physics homework.

1.5 Research questions

In this research, questions with regard to the objectives of the study are:

- (i) What is the perception of students who use Facebook in supporting their physics homework?

- (ii) Is there any difference between the students' level of academic performance before and after using Facebook to support the completion of their physics homework?

1.6 Research hypothesis

Taken from second research question, one of the aims of this research is to accept or reject the null hypothesis:

H_0 : There is no significant difference on the level of students' academic performances before and after the use of Facebook to support their physics homework completion.

1.7 Research scope

This study will be carried out among the secondary school students who take the physics subject and are familiar with the concept of static electricity and the capacitor as a device for saving static electricity. The chosen subtitles in this study are familiarity with the capacitors, calculating the capacity of capacitors, changing the capacity of capacitor, what is a uniform electric field, how can make uniform electric field by capacitor and series and parallel capacitors. These topics are selected because firstly they are common for students of both science and mathematics stream in Iranian school (who are the sample of this study). Secondly according to the Iranian yearly curriculum, the students will be instructed this chapter exactly before conducting the project and their information about the capacitor's would be fresh, while the project will be conducted. All students who are familiar with the mentioned topics and Persian language can take benefit by accessible homework on Facebook pages in this study.

1.8 Importance of the study

Because of the important role of homework as a learning activity and as an overpass between home and school (Murray *et al.*, 2006), this study is conducted in order to highlight the importance of homework in physics academic improvement. It aims at discovering a solution to make homework more interesting for students. Whereas students need to support academically (Bempechat *et al.*, 2011) this study is also worth to find a solution to connect the students and their teachers to support the students when they are doing physics' homework.

Whereas doing homework could enhance the students' academic learning and will promote the students' skills in problem solving especially in technical courses, such as introductory physics' course (Radhakrishnan *et al.*, 2009), the main purpose of this study is to improve the students' physics learning.

1.9 Definition of terms

The following terms are defined in relation to this study:

Facebook: Is a social networking service and website launched in February 2004 (Stevenson and Waite, 2011).

Homework: Refers to tasks assigned to students by their teachers to be completed mostly outside-of class, and derives its name from the fact that most students do the majority of such work at home (Stevenson and Waite, 2011). It shows that students are free to choose the method for doing this out-of-class activity (Cooper, 1989). Homework is planned not only to broaden the academic abilities of the students, but also to help them through situations in their out of school life (Olympia *et al.*, 1994)

1.10 Summary of the chapter

As for a summary, the chapter presents a synopsis about the study and the related general information. The background of the problem was highlighted and has been discussed in this chapter to give a foreword of the research as well as to clarify the rationale of our intention to this research. The research problem and research questions mentioned above, will determine the framework of the research. The research objectives were also listed, followed by a scope of the research. The part named “Importance of the study”, explains the given value of the study. The definitions of the applied terms in the project, is the final part of the chapter.

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