The Effectiveness of Using a Mobile Messenger as an Educational Supporting Tool among Nursing Students

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Abstract

The evolution of information technology has exerted great influence on nursing education via new pedagogy of knowledge delivery without time and place restriction. Mobile technology revolutionises nursing education and clinical practice via empowering skills of critical thinking and clinical decision-making through learning. The aim of this study is to evaluate the effectiveness of using mobile messenger (Whatsapp) as an educational supporting tool among nursing students. The study design used is a Cluster Randomized Control Trail. Two nursing colleges were selected. Sample size was 93 participants, 48 from the Kuala Terengganu Nursing College Kuala Terengganu as the intervention group while the control group were recruited among 45 participants from UniSZA Nursing College. There is a significant difference in the level of knowledge between pre and posttest among intervention group (mean difference was -8.70 with a standard deviation 8.42, p-value< 0.001) and 93.8 percent of the respondents perceived the usefulness of using WhatsApp mobile messenger to enhance learning. This demonstrates that learning through mobile messenger (WhatsApp) enhances learning and is well received as a new method of learning by almost all students.

Keywords: Mobile learning, WhatsApp messenger, Social Interaction

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Introduction

The advancement of information and communication technology (ICT) in the past decade has been universally recognized. There has been tremendous influence of ICT on all aspects towards the society as a result of the advancement in science and technology. In education, the mobile device is intensively used for querying, retrieving information and gaining knowledge (Bouhnik, 2014). This new technology has a great potential in nursing education as it allows the nursing student to access resources efficiently even when wireless network is not available (Leon, 2007). The most popular tested application of mobile messenger is the WhatsApp messenger application (Bouhnik, 2014). This application is able to enhance learning and access pertinent data especially in the clinical setting and provide immediate patient feedback (Wu et al., 2012).

The report on “Crossing the quality chasm: A new health system for the 21st century” (Baker, 2001) addresses the failure of healthcare industry and education system of future practitioners. The report advocated significant roles of information technology for the design of a health system which champions safety, effectiveness, patient-centeredness, timeliness, and efficiency. Thus, restructuring of clinical education is recommended. In particular, there is a crucial aspect of preparing nursing students with active and self-directed learning challenges educators to be creative in teaching strategies. This is because active engagement through self-directed learning empowers motivation, enriches collaboration, and enhances the thinking process with consequent overall improvement in learning experience (Chickering & Gamson, 1987)

However, there is a need to transform the conventional practice of nursing education in Malaysia which largely focuses on didactic teaching (instructional type of learning). Face to face learning is still preferred, and students guided by lecturers or tutors in class or clinical area. The traditional teaching paradigm was prevalent in education for many years. The focus is on role of instructor as the “sage on the stage” who disseminates knowledge through lectures and slide presentation that emphasizes on the acquisition of facts (Oblinger, 2006). Brown (2006) supported the aforementioned statements that knowledge is attained through text-based that is focused on logical sequencing of knowledge, emphasising on memorization, repetition and recall, believing that “one-size-fit-all” and the teacher is deemed as a master and commander. The traditional model of face to face learning is a largely solitary task, and there is a need to look as new model of educating student by building on growing the knowledge about the best practises of online courses (Twigg, 2003).

Advantages of Mobile Learning

Mobile learning is a method of learning accomplished with small and portable device. It is defined as “an array of ways that people learn or stay connected with their learning environment while going mobile” (Rosman, 2008). Based on the study by Geddes (2004), mobile learning is defined as an acquisition of any knowledge and skill through the use of mobile technology, anytime and anywhere. Other perspective that defined the mobile learning is by Bansal and Joshi (2014) that mobile learning is a provision and training by using portable or mobile devices such as smart phone, personal device assistant and iPod mobile phone. Previous study showed that mobile learning as an educational supporting tool has positive impact to lecturers, students, and higher education institution. Even though studies on the use of mobile phone in nursing education are recent and limited, findings of the studies indicate the presence of positive impact on the learning process.

Mobile learning provided active learning experiences among student. Through mobile learning, students are able to interact among themselves and discuss pertaining the lessons taught; and this is known as active learning. Chickering and Gamson (1987) define active learning as encouragement by an instructor in the classroom that provide discussion and produces an interactive team. Institutions that support interactive learning in education process report higher student’s grade and student’s self-report education is gained (Kuh et al., 2003). This notion is supported by Rooyen et al. (2014). Mobile learning provides additional tool that supports learning and improves knowledge. According to Sharples (2002), portable devices are valuable tools in supporting informal and life learning experiences where people can enhance their knowledge and skills continuously in addressing immediate problems. In addition, these devises promote social cultural approach to learning by enabling construction of knowledge, conversation among learners, peers and teachers.

Mobile technology presents the opportunity to augment the clinical experience and aids in developing the knowledge, required skill and socialization. Farrel (2009) mentions that this software motivates active learning with numerous tools from email to clinical guidelines practices. Stroud, Erkel and Smith (2009) reported on the patterns of use and demographics of users within nurse practitioner (NP) programs. Twenty items of the questionnaire were sent to students and faculties in 150 organizations across the USA. The 227 returned questionnaires represented 27% of the sample. At a high percentage, 67% of those returning the questionnaire, used PDAs, generally to “support clinical decision making”. Nursing education must take in the advantage of using mobile messenger application such as WhatsApp. These application (WhatsApp) does not need any hands- on training since most of the students are familiar with mobile phone application. This is supported by Rooyen et al. (2014) that educational institutions must use tools that student are familiar with. In the study by Elliana, Luís and Mark (2014), that in the educational context, mobile learning (WhatsApp) enables to facilitate interactive group work and collaboration of stimulation communication with peers. Bansal and Joshi (2014) state that the using WhatsApp mobile learning is a form of collaborative learning whereby the students are eager to post video.
audio, and text on the problem, as well as to solve the problem and learn from others. They also found that social interaction with their peer and the teacher increased collaboration with the students.

Bere (2013) conducted a study on the use of WhatsApp among a South African university students. The study resulted positive feedback from students who claimed that WhatsApp is an easier way of communication with their teacher and the rest of their class, that results productive and fruitful discourse on relevant issues in an informal environment. As WhatsApp application is relatively a new phenomenon, little research exists. There are limited studies conducted on the use of mobile messenger (WhatsApp) in nursing education. Based on observation, WhatsApp gives good sign in new teaching method as students are more active in discussion, sharing ideas and videos; and the teacher or tutor can also use this platform in problem-based learning. The result of this study may provide a useful alternative in teaching, especially in nursing education program. The nursing students given the opportunity to participate and have fun in learning, and increases knowledge through discussion, sharing of ideas and facilitate critical thinking skill among students; hence improve aptitude and quality of patient care.

Methodology

Research design

The study design employed in this study was Cluster Randomized Control Trail. Cluster Randomized control trials are an experiment in which a cluster of individuals rather than an independent individual are randomly allocated to the intervention group (Donna, 2000).

Participants

This study employed two groups of nursing student from two colleges as respondents. Nursing college Kuala Terengganu was selected as the intervention group (n-48) and Nursing Department Unisza as the control group (n-45). The researcher used the simple random sampling in selecting the respondents from the total number of the students. The researcher selected simple random sampling because this sampling is the most elementary sampling method, and each sample unit has an equal chance of being selected. Furthermore, this type of sampling provided high representative of the population being studied. In this study, the researcher used the table of random numbers. Forty-eight respondents were selected for the intervention group, and universal sampling was used to select the respondents for control group, amounting to 45 respondents.

These two nursing colleges were selected as both the colleges have similar course curriculum and syllabus. The respondents are third-year students and have learnt Trauma and Emergency subject and were posted to Trauma and Emergency Department, Hospital Sultanah Nur Zahirah (HSNZ) in Kuala Terengganu for practicum. The effectiveness on using mobile messenger WhatsApp as an education supporting tool through pre and post-test on Trauma and Emergency course was investigated to determine the score of knowledge between both the groups. A survey was done on the benefit of using WhatsApp as an educational and support tool in the intervention group. Through this survey the perception of the respondents on the usefulness of mobile messenger (WhatsApp) as an educational supporting tool.

An inclusion criterion is the attribution that is essential for the selection of the participations. The inclusion criteria for the respondents is that the respondents are third year nursing student and possess mobile phone with WhatsApp application. There was no specific withdrawal criteria or exclusion criterion in this study and the respondent can opt to be dismissed from the study in any circumstances that they are uncomfortable.

Data collection

This study involved two phases of data collection. Data collection was conducted on 8th January 2015 and 26th April 2015 for pretest and posttest, respectively. For intervention group, the researcher explained about the research processes which include the purpose of the study, the procedure of data collection and responsibilities and rights of the participants, consent form and questionnaires on Subject Trauma and Emergency for pretest to determine the level of knowledge of the respondents. A WhatsApp group was created, and the intervention group had discussion on any issues related to the subject and clinical posting. In the WhatsApp group, the respondents had conversations, discussions, problem-based learning, uploaded pictures and served as a mean for sharing concerns with friends, sharing opinions, conversing and questioning each other about handling and managing clients in the Emergency Department.

The intervention group was instructed not to share their information related to the course to others except the group assigned for this purpose. In the control group, the researcher discussed with the lecturer teaching the subject Trauma and Emergency which they learn through face to face learning. In the second phase of the data collection, the researcher conducted posttest for both the groups. As per the pretest, the same set of questionnaires was used in posttest to evaluate the knowledge score of the respondents after completing the course of Trauma and Emergency, and practicum at the emergency ward.

Data analysis

A statistical analysis is a method of analysing the methodological data information which that leads to decision making. In this study, descriptive and inferential statistics were used in analysing the collected data. Categorical variables were described using frequency and percentages. Descriptive analysis was used to identify outlier, typing errors as well as to check for data normality (Karthan Chinna, Krisnakumari Kharuthan & Choo, 2012). As for descriptive statistics, frequency distribution was used to calculate age, gender, educational qualification of the participants, and marks of the respondents on the subject of Trauma and Emergency for pre and the posttest. For inferential statistics, the researcher used paired t-test to determine the differences in marks of the respondents on pre and posttest on trauma

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and emergency subject for the intervention group. The independent t-test also was used to measure characteristic between two groups. Comparison of the median subscale score between pre and posttest was done by using nonparametric test. Two independent sample t-test was used to analyse the difference of marks between intervention and control group. Confident interval (CI) 95% and alpha (p) value (0.05) were reported to indicate the effect of using mobile messenger (WhatsApp) among nursing student.

Ethical consideration

Ethical approval to conduct this study was obtained from the Medical Research Ethic Committee, Ministry of Health, Nursing College Kuala Terengganu, and University Sultan Zainal Abidin (UniSZA). All participants were given an explanation on the purpose of the study and consent form was given to the participants prior distributing the questionnaires to them. Information on the nature of the study was provided to all participants and consent implied by an individual’s voluntary completion of the questionnaire. All data remained anonymous.

Results

Forty-eight (51.6%) respondents are in the intervention group and 45 (48.4%) respondents are in the control group. All participants in the intervention group were female (100%), while in control group, 41 (91.1%) out of 45 respondents were female and remaining four (8.9%) were male. Demographic characteristics of respondents in both two groups revealed that the majority of the respondents were Malay followed by Chinese and Indian. Out of 48 respondents in the intervention group, 35 (72.9%) of them were Malay, followed by seven Chinese (14.6%) and six Indian (12.5%) respondents, respectively. For the control group, 44 (97.8%) of them were Malay and remaining one respondent was Chinese (2.2%).

Majority of the respondents, 44 students (91.7%) used the mobile messenger (WhatsApp) as a social networking platform for communication, while the remaining two (4.2%) respondents used instant messenger and email. In this study, the time spend (hour) in using mobile social networking was also determined. Based on the results obtained, most of the respondents, 21 students (43.85%) spent two to five hours a day while 17 of them (35.4%) spent six to ten hours per day on mobile social networking. The remaining nine students (18.8%) spent hourly on social mobile networking and one student (2.1%) spent more than 10 hours per day.

In terms of searching information with mobile social networking, majority of the respondents, 20 students (41.7%) always used the mobile social networking to seek information, 13 (27.1%) of them used the mobile social networking according to needs, following eight students (20.4%) used it sometimes and the remaining six (12.5%) respondents used often and one student (2.1%) has never used the mobile social networking to seek the information. Based on the question on primary search for mobile social networking, 27 (56.3%) out of 48 respondents used the mobile social networking to seek for the education information, followed by 12 respondents (25%) searched for other information, seven respondents (14.6%) searched for entertainment and the remaining two respondents (4.25) used mobile social networking for shopping.

Level on student knowledge pre and post intervention both groups

The level of student knowledge from pre and post-test was investigated by determining the mean score level of knowledge on Trauma and Emergency course for both intervention and control group (Table 1). For intervention group, the mean score was 48.7 with standard deviation 8.03 with the minimum score is 33 marks and the maximum marks is 63. As for the control group the mean score of knowledge was 51.4 with standard deviation 10.8, the minimum score was 30 marks and the maximum score of the knowledge was 70 marks. After intervention, the mean post-test for intervention group was much higher which is 57.5 (SD: 8.89) with the minimum score at 47% and the maximum mark at 83% compared with the control group with the mean at 54.3 (SD: 7.12), the minimum score was 33% and the maximum score was 70%.

Comparison of pre and post-test score of knowledge between two groups

Table 2 shows the mean difference of-8.70 with standard deviation of 8.42. The p-value was 0.001, which is less than 0.05. Thus, it can be concluded that there is a significant difference in level of knowledge between pre and post-test scores among intervention group.

Comparison of mean difference score between intervention and control group on level of knowledge

Table 3 shows that the p-value for the Levene Test for equality of variances is 0.005, since the p value is less than 0.05, equality of variance is not equal. The mean difference is 5.81 and the standard difference t is 2.7 The two tailed p-value of the test is 0.008, which is less than 0.05. The independent t-test was carried out and the result showed the p-value of the test is less than 0.05. Thus, there are significant differences in mean score of knowledge in two groups.

The benefit of using WhatsApp as social interaction in learning

The perception of usefulness on using mobile messenger as an educational tool among nursing students was based on the three components, which were the benefit of using...
Mobile messenger (WhatsApp), easy to use and social influence. Based on the results, it showed that 44 (91.7%) of respondents agreed that the device used for communication and sharing information with friends and 38 (79.2%) respondents agreed that mobile messenger helps them in learning more systematically. Thirty-two respondents (66.7%) agreed that they can manage their study time more effectively by using WhatsApp and 28 respondents (58%) agreed that WhatsApp can improve their understanding in studies. The respondents, 36 of them (75%) stated that WhatsApp is a very efficient educational tool and 40 respondents (83%) were encouraged in interacting with others. Thirty of them (62.5%) believe that WhatsApp helps them to become more familiar with the module of Trauma & Emergency. This study also clinically corresponds with Bansal and Joshi (2014) who stated that most of the students found this application to be interesting and educational useful, provide collaboration in learning, where the students can upload videos, text on the problem, and solve the problems. Mobile learning can provide opportunities in constructing their own knowledge with application of mobile devices (Shih et al, 2007).

A quasi experimental study was done by Jacobson (2006) from at Faculty of Nursing, Oslo University College, Norway with the aim to compare the effectiveness of the online learning on the first year as nursing student, and experience face to face and online discussion. The results show that there is little difference between two groups in opinion of discussion, fruitfulness, and the ease in which they express their feeling, thoughts, and ideas. However, there are marked differences between the two groups regarding the experience of how the discussion affected the amount of contact between group members outside the discussions. Previous study done by Bristrom (2005) found that this application provides a potential collaborative interaction and learning opportunities for person and group.

On the segment of effort expectancy, thirty-seven respondents (77.1%) agree that they enjoy attending the course through WhatsApp and 42 respondents (89.6%) agreed that this application makes communication easier with their instructor and friends. Majority of them, 39 respondents (81.3%) agreed on the statement that this application creates conducive environment and enjoyable in learning and 31 respondents (64.5%) agreed that there is ease of communication with instructor through WhatsApp. Thirty-seven respondents (77.1%) agreed that information can be obtained easily through sharing from other group members and instructor. This is congruent by the study by Devi and Khan (2014) who mention that the students expressed the ease of using mobile (smart phone) in study than the traditional method. This is supported by Ibrahim et al. (2014), who stated that the majority of the medical students in his study found mobility, ease of use, quick access to current information and resources as the main advantages in the use of smartphone in learning.

On the social influence segment, majority of them, 43 respondents (89.5%) agreed that this application works as a supporting tool as it helps their academic performance and results showed that 45 respondents (93.8%) prefer WhatsApp as a supporting tool. Based on the results obtained, WhatsApp proved that it is a good educational portal as agreed by 32 of the respondents (66.7%). This is congruent with the study by Bansal and Joshi (2014) in social interactive which showed that 81% of the respondents agreed that WhatsApp in mobile learning has increased social interactivity in the group while 11% were neutral, and 8% disagreed to the concept. Interview disclosed that those respondents who never had conversations among the group members are now able to converse without any hesitation. The findings also showed that WhatsApp learning helped in breaking hesitation between teacher and students, and students are now more comfortable in asking questions to their teacher.

Discussion

Mobile learning can facilitate self-learning process in which students will reflect to the diversity in learning styles, helps in designing learning activities, particularly in distance education, outside the classroom and class hours. This study was conducted to analyse the effectiveness of using mobile messenger, specifically WhatsApp in learning. It is important to know the level of knowledge before the intervention. The present study determined the level of knowledge on pre-test for Trauma & Emergency. The mean score for intervention group was 48.7 (SD: 8.03) with the maximum score was 63 and the minimum score was 33, while for control group, the mean score was 51.4 (SD: 10.08), maximum score was 70 and the minimum score was 30. The result showed that there is no difference on the knowledge score between these two groups of nursing students, and it could be because the pretest was done before they learned Trauma & Emergency course.

There is a difference knowledge score between pre and post when compared the two groups. The intervention group’s score was higher compared with the control group. The result showed that the usage of mobile messenger (WhatsApp) as an educational supporting tool, the knowledge of the student on Trauma & Emergency subject were increased. This is congruent with the study by Rooyen and Matli (2014) who stated that mobile learning as an additional tool supports learning among student. This statement was supported with Sharples (2002) who studied about the portable devices as a valuable tool to support informal and life learning where people needs to enhance their knowledge and skills continuously in addressing immediately problems.
The comparison in the level of knowledge between the intervention group and control group were demonstrated and the result showed that there are significant differences in mean score of knowledge. In intervention group, the mean score increased from 48.7 during pre-test to 57.5 in post-test. Meanwhile, in control group, the mean score slightly increased from 51.4 during pre-test to 54.3 during post-test. Therefore, the researcher concluded that the mobile messenger, WhatsApp acts as an educational supporting tool to increase student’s knowledge on Trauma & Emergency course and helps student in learning. These results also correspond to Wu et al. (2012) on their experimental study to nursing student on physical assessment by using mobile learning. They reported the t-test mean score of the skill for pre and post-test experimental group was 70.14 to 78.14, and control group was 53.5 to 53.13, respectively. It shows that learning achievement was significantly better in the experimental group with mobile supported system compared with the control group. Therefore, this study proved that the mobile application is a potential innovative approach in nursing education.

A quasi experimental study by Bidaki et al. (2013) was implemented to determine the effect of mobile learning on paramedic student’s report that the mobile learning has positive effect on education achievement. In the study, the mean score of the education achievement in intervention group increased from 12.4 to 15.1 compared to control group with the mean score increased from 12 to 13.8, respectively. These effects are related to the capability of the mobile application in allowing learning without restriction of time and place, allowing communication between learning and timely feedback.

The effectiveness of mobile learning was also studied by Norouzi et al. (2012) on their experimental study which reported the mean score on pre and post-test of the experiment group is significantly higher than control group. The study done by Chua, Tsoa and Chen (2011) to evaluate the effectiveness of using mobile messenger on pharmacology course with the objective to enhance student knowledge found significant increase in medication knowledge score after intervention among experimental group.

The quasi-experimental study was done by Esfehani et al. (2014) on nursing students in Iran to determine the effect of multimedia education software on learning basic of cardiopulmonary resuscitation among nursing student. The result provided comparison of the knowledge on this subject between experimental and control group. The mean score showed the use of multimedia software increased student knowledge in terms of basic life support more than traditional method. Independent t-test showed that there is a significant difference (p<0.001) in score between the intervention and control group. The usage of this device seemed to be positive with the respondents, with the evidence by agreement upon 16 question and was agreed by more than 50% of the respondents. Furthermore, this was also supported with the perception score positively by 45 (93.9%) of the respondents.

Future direction

The study on WhatsApp application helps the nursing students to improve their knowledge, and the same time it also can be useful to share or receive information gained with subordinates, helps the students to improve their knowledge and discuss their educational topics with their lecturer and groups members. Thus, mobile technology for nurses has changed the face of nursing education and clinical practice. By utilizing mobile resources for nursing education in classroom, lab and clinical venues, students can develop and enhance skills in critical thinking, and clinical decision-making acts socially with their tutor to facilitate learning and solving learning difficulty.

The Y-generation students rely on mobile gesture in engaging social communication, leisure and retrieving information at anytime and anywhere through mobile phone. Considering the needs of this generation, teaching and learning must be transformed to give support to the new generation of students. The study on how mobile devices can be used to encourage students to adopt deep approach, improve perception of their study context, and improve their overall learning experience and outcome.

Relevance to clinical practices

The mobile messenger application has been useful as an educational supporting tool besides the formal class. The students can interact with each other and share knowledge and information through this application. This will not only make a lesson become more effective and interesting, but it can keep the nursing education updated from the instructional type of learning. Through this mobile application, it can enhance student’s learning with fast and efficient access of pertinent data while in the clinical setting and provide immediate patient feedback.

Conclusion

WhatsApp can be used as an educational supporting tool to provide opportunities for improved result performance. The dialogue between students, whether spontaneous or direct from teacher creates the atmosphere of cooperation, solidarity, and solving problem together and face challenges constructively. The nursing students are recommended to use this application because of its benefits toward a better education. Nursing colleges, responsible authorities or the Ministry of Education should reconsider the usage of this application for students, which may be helpful to increase the level of education in Malaysia. It is an empowering tool for the new generation of learners who can help themselves to
navigate the growing complexities of our knowledge society.

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Table and Figure

Table 1. Level on knowledge for pre-test between intervention and control group.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest mark</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention group</td>
<td>48.7(8.03)</td>
<td>33</td>
<td>63</td>
</tr>
<tr>
<td>Control group</td>
<td>51.4(10.08)</td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>Posttest mark</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention group</td>
<td>57.5(8.89)</td>
<td>47</td>
<td>83</td>
</tr>
<tr>
<td>Control group</td>
<td>54.3(7.12)</td>
<td>33</td>
<td>70</td>
</tr>
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</table>

Table 2. The level of knowledge before and after intervention for both groups (Paired Samples Test)

<table>
<thead>
<tr>
<th>group</th>
<th>Paired Differences</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Std. Deviation</td>
<td>Std. Error Mean</td>
<td>95% Confidence Interval of the Difference</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>intervention</td>
<td>Pair 1 pre_mark -</td>
<td>-8.70833</td>
<td>8.41215</td>
<td>1.21419</td>
<td>-11.15097</td>
<td>-7.172</td>
</tr>
<tr>
<td>group</td>
<td>post_mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>control group</td>
<td>Pair 1 pre_mark -</td>
<td>-2.8889</td>
<td>11.89198</td>
<td>1.77275</td>
<td>-6.46164</td>
<td>-1.630</td>
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<tr>
<td></td>
<td>post_mark</td>
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<td></td>
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### Table 3. Comparison between mean difference pre and post score between intervention and control groups

(Independent Samples Test)

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>---</td>
<td>------</td>
</tr>
<tr>
<td>Prepost diff</td>
<td>Equal variances assumed</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>2.708</td>
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