

Teaching Algebraic Equation through iTooch Mathematics Application

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ABSTRACT

This study made use of the quasi-experimental design in examining the effectiveness of the iTooch Mathematics application in teaching algebraic equations. Conducted in Matungao National High School, Matungao, Lanao del Norte, Philippines, the study involved forty-eight (48) respondents. A researcher-made questionnaire which underwent pilot-testing to ensure validity and reliability was used as the main tool for data gathering. The data collection started with the administration of a pre-test, which was then followed by the intervention through the use and aid of the iTooch mathematics application in teaching algebraic equations, followed by the administration of a post-test. The results showed that the students failed both the pre-test and post-test, but the hypothesis testing yielded a significant difference between the two test scores. Some factors affected the participants during the intervention such as the lack of functional smartphones, slow signal, and poor comprehension skills in Math and English. After thorough analysis, it is suggested that teachers explore the world of technology and try using instructional applications in learning mathematics and learn to adopt various ways of acquiring knowledge in mathematics. Further recommendations for students to enhance their skills in solving mathematical problems and enrich their vocabulary so that they come up with the proper solutions needed were also put forward.

Keywords: iTooch mathematics application, teaching algebraic expression, quasi-experimental design.

I. INTRODUCTION

Mathematics is widely known as the hardest subject created so far. No matter how much the teacher discusses mathematical lessons, students still see them as burdensome and boring. Yet, everything is related to math, from counting daily allowance to looking at the time and how many steps one takes to go to school. However, there are only a few people in the world who seem to appreciate its beauty. There are countless reasons why people hate math and that is the big challenge teachers and educators face.

In the study of Gabriel (2012) as cited by Hadji Manan and Ismael (2014), students think that mathematics is a boring subject and is difficult to memorize and understand. This poses a great challenge for teachers and educators, especially at the primary and intermediate levels, wherein good study habits and a firm understanding of basic concepts should be developed. For a long time, the role of mathematics was limited to purely academic domains. Now, mathematics has already entered the domain of technology and industry.

According to the National Council of Teachers

of Mathematics (2014), technology is an essential tool for learning mathematics in the 21st century, and all schools must ensure that all students have access to technology. By using technology in the teaching-learning process, teachers can support both mathematical procedures and skills development. When technology is used strategically, it can provide access to mathematics for all students. The NCTM (2000), opines that technology is an essential component in teaching mathematics; it influences the way mathematics is taught and learned.

Salandanan, et al., (2006) cited that to be able to integrate technology into teaching, teachers should have mastery of the software they will use so that it will be more effective. Knowledge of technology must be broader so that the access of the students to new information becomes more alive. Technology is already widely used in more advanced countries, so much so that even preschoolers are already handling computers. In the Philippines, technology was limited when it came to communication, transportation, education, and medical technology. Today, the access of Filipinos to technology is exponentially increasing. The impact of technology is undeniable as it makes the lives of Filipinos more efficient and updated.

Since the teacher is the one who imparts knowledge and influences the quality of the learning situation, a teacher must employ a wide variety of teaching strategies to teach children and make them better learners. Teachers should be provided with the

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best tools and skills for them to fully exploit technology as a teaching tool and open their classroom to the world of discovery and learning (Sam Tacoba, Academic Lead, Microsoft Philippines, 2001 cited Alabat and Balistoy, 2011).

Hence, with the advancement of technology, researchers and mathematicians discovered necessary software that would be very useful in teaching and facilitating the learning of mathematics. One of the software that caught the interest of the researchers is the iTooch Mathematics Application.

The iTooch Mathematics Application is a fun way of practicing and learning Math for high school graders. It is, by far, the largest collection of educational worksheets based on the US National Common Core Standards on Google Play for middle school. The application contains 5 themes: Numbers and Operations, Functions, Geometry, Algebraic Structures, and Statistics with discussions and activities. iTooch Mathematics Application is by far the most comprehensive educative tool on Google Play for students in high school. iTooch apps provide comprehensive learning solutions that help parents, teachers, and students to identify and address learning needs in a fun and motivating way.

For that reason, the use of applications like iTooch is needed for the students to learn and experience solving math on their own. By using this tool, the teacher could save a lot of time because teachers do not need to write the discussion on blackboards or whiteboards, and visual aids. In this study, the researchers aimed to show that using technology in teaching Mathematics does help in making the discussion more interesting and engaging, thereby facilitating easier learning. It is envisioned that iTooch would improve their performance in math and boost their interest in solving mathematics problems.

This study aimed to determine the effectiveness of the iTooch Mathematics Application in teaching algebraic equations to the Grade 8 students of Matungao National High School.

Specifically, this study intended to answer the following questions:

1. What is the profile of the participants in terms of:
 - 1.1 age;
 - 1.2 gender;
 - 1.3 parent's educational attainment; and
 - 1.4 latest grade in Math?
2. What is the performance of the participants in the pre-test?
3. What is the performance of the participants in

the post-test?

4. Is there a significant difference between the participants' pre-test and post-test?

5. What are the challenges that the participants encountered in using iTooch Mathematics Application in learning algebraic equations?

II. METHODS AND MATERIALS

In this study, the researchers made use of a quasi-experimental design to determine the effectiveness of the iTooch mathematics application in teaching algebraic equations. A quasi-experimental approach design was used by exposing all subjects to the treatment or stimulus. The participants' performance in the pre-test was compared to their post-test performance. If post-treatment values differ significantly from pre-treatment values, a case can be made that the treatment may be the cause of the change. The researchers decided not to divide the participants and take them as one, instead of having experimental and control groups. This is specifically called the single group pre-test-post-test design.

The researchers made use of questionnaires in collecting the data. The first tool was the personal profile which solicited the participants' profiles in terms of age, gender, ethnicity, parents' educational attainment, and latest grade in Math. This is to ascertain if the personal profile of students has a potential influence on their learning progress in understanding algebraic equations. The second tool contains test items that were designed to determine the participants' performance in algebra. The test on algebraic equations was used in gathering the data on the test participant's performance in the pre-test and post-test. The test was constructed by the researchers following the sequence of the topic in the curriculum guide for Grade 8 Mathematics. It was pilot-tested on a comparable group of students in Iligan City National High School, Mahayahay, Iligan City to ensure its validity. It has a reliability coefficient (Cronbach's alpha) of 0.73 which is an indication that the instrument is appropriate to gather data.

Data Gathering Procedure

In this study, the participants were given a pre-test before the presentation of the iTooch mathematics application and a post-test after introducing it. The time interval between the pre-test and post-test was three (3) weeks, which was enough to measure the learning of the participants. To gather the necessary

data, the researchers asked permission from the principal of Matungao National High School, and the Grade 8 Math Teacher to conduct the research. As soon as the permit was obtained, the researchers started to conduct the study. On the first day, the researchers asked permission and assistance from the classroom Math teacher for the orientation and then the algebraic equation questionnaire was distributed. A pre-test was given to the participants afterward. On the second day, the researchers introduced the iTooch mathematics application and used it in discussing algebraic equations. During the intervention, there was a series of discussions on the use of the iTooch mathematics application supplemented with activities. On the last day was the administration of the post-test to the students. Proper instructions were given to the participants to obtain accurate data for the study. Afterward, the questionnaires were collected, tabulated, and analyzed.

III. RESULTS AND DISCUSSION

Profile of the Participants

Table 1-Distribution of the Participants' Age

Age	Frequency (f)	Percentage (%)
12 years old	4	8.3
13 years old	19	39.6
14 years old	13	27.1
15 years old	12	25.0
Total	48	100.0%

Table 1 shows the frequency distribution of the participants' age. As presented, most of the participants were 13 years old, which corresponds to 19 or 39.6% of the sample. There are 13 or 27.1% of them who were 14 years old, 12, or 25.0% were 15 years old, and 4 or 8.3% were 12 years old.

The result implies that most of the participants are at the right age for their grade level. Concerning this, Aragasi and Mangondaya (2016) stated that most of the students may understand the lessons better since their minds are mature enough. If the age of the student is not appropriate for his grade level, it may have relative effects on their academic performance. The student may be a slow learner if they enter school at a very young age and it will be hard for them to adjust to new things. The student may also be a fast learner or advanced if they are too old for their grade level and can adapt to new things easily.

Table 2- Distribution of the Participants' Gender

Gender	Frequency (f)	Percentage (%)
Male	22	45.8
Female	26	54.2
Total	48	100.0%

Table 2 shows the frequency distribution of the participants' gender. As seen in this table, most of the participants are female students. This corresponds to 26 or 54.2% of the sample while only 22 or 45.8% of them are male.

The data is clear that majority of the participants were female. This means that there were more females than males in Grade 8 of Matungao National High School. This finding is supported by Gonzales (1997), as cited by Ismael and Maruhom (2013) that the dominance of women in Philippine education is an established phenomenon. He reveals that 86% in both public and private schools are female. National Statistics Office 2011 data reveal that at least by region, the proportion of the population who completed at least elementary education is higher among females compared to their male counterparts. Aside from that, according to Buchmann and DiPrete (2013) mentioned that females appear to be more interested in school than males as they are more socialized which promotes academic engagement. On the other hand, it is assumed that males would perform better in school if they are actively involved in their studies.

Moreover, in the study of Tessema as cited by Aragasi and Mangondaya (2016), it was stated that female students tend to rate their academic satisfaction higher than their male counterparts. One probable explanation is that female students are more academically focused than male students.

In view of that, the researchers observed that females are more dominant than males since they are more interested in going to school than males. During the gathering of data, females are more interested in learning new things in Math than males and they always participate in every activity researcher's given to them.

Table 3-Distribution of Participants' Father Educational Attainment

Educational Attainment	Frequency (f)	Percentage (%)
Elementary Graduate	23	47.9
High School Graduate	14	29.2
College Graduate	11	22.9
Total	48	100.0%

Table 3 shows the frequency distribution of the educational attainment of the participants' fathers. As seen in this table, most of the participants' fathers were elementary graduates which correspond to 23 or 47.9% of the sample. There were 14 or 29.2% of them whose fathers are high school graduates and 11 or 22.9% whose fathers are college graduates.

It implies that the majority of the fathers finished only the elementary level. If the father finishes his studies successfully, there is a higher chance that their child will perform well in his academics. However, as the researchers observed, most of the fathers of the participants who did not finish their schooling are farmers or construction workers and might be less involved in their children's academic activities.

According to the study of Ampuan and Radia (2013), children may encounter difficulties when they are confronted with word problem-solving since their fathers were not able to finish elementary, thus making them unable to provide the proper guidance and tutoring to their children. If the father has a good academic background, then their children would possibly aim to follow in their father's footsteps.

Table 4-Distribution of Participants' Mothers' Educational Attainment

Educational Attainment	Frequency (f)	Percentage (%)
Elementary Graduate	9	18.8
High School Graduate	19	39.6
College Graduate	20	41.7
Total	48	100.0%

Table 4 shows the frequency distribution of the educational attainment of the participants' mothers. As seen in this table, most of the participants' mothers are college graduates corresponding to 20 or 41.7% of the sample. There are 19 or 39.6% of them whose mothers are high school graduates, and 9, or 18.8% of them whose mothers are elementary graduates.

According to the Functional Literacy, Education and Mass Media Survey conducted by the Philippine Statistics Authority in coordination with the Literary Coordination Council and Department of Education, 41.1% of the female population in the Philippines completed at least high school education compared to males with 36.4%.

This could only mean that the majority of the mothers are more educated compared to the fathers. Aside from that, a study by Ampuan and Radia (2013) claims that mothers could be of great help in the per-

formance of their children in terms of academics, considering that most of them were able to complete their college studies.

Casarino (2007), as cited by Ampuan and Radia (2013), emphasized the roles of parents, and stated that it provokes the cradle of personality development. It is the home that carries the enormous tasks of facilitating physical, intellectual, moral, and spiritual values.

Based on the result, most of the mothers of the participants finished their college education. There is a possibility that the student's performance will be higher when their mothers finish higher education because they can help and guide their children in their studies considering that most mothers stay at home more than the father. If that happens, the child will be motivated because there is someone who is guiding them in their academic endeavors.

Table 5 - Distribution of the Participants' Latest Grade in Mathematics

Transmuted Scores	f	%	Mean	SD	Qualitative Description
93-97	2	4.2			
87-92	10	20.8			
81-86	10	20.8	81.48	6.18	Fair/ Satisfactory
75-80	22	45.8			
74 & Below	4	8.3			
Total	48	100%			

Scaling:

98 and above - Excellent	81 – 86 - Fair/Satisfactory
93 – 97 - Very Good	75 – 80 - Passing
87 – 92 - Good	74 and below - Failed

Table 5 shows the frequency distribution of the participants' latest grades in Mathematics. As seen in the table, most of the participants obtained a transmuted score of 75 to 80 which corresponds to 22 or 45.8% of the sample. This means that 45.8% of them obtained a passing remark. There are 10 or 20.8% who obtained a transmuted score that falls within the interval 81 to 86 which is marked as fair/satisfactory. Another 10 or 20.8% obtained a transmuted score that falls within the interval 87 to 92 which is marked as good, and 8.3% obtained a transmuted score that is 74 and below which is marked as failed. Only 2 or 4.2% of the participants obtained a transmuted score of 93 to 97, which is rated as very good and none of the participants obtained an excellent mark.

Moreover, the participants obtained a mean score of 81.48 with a standard deviation of 6.18. This means that on average, the participants have a fair/satisfactory remark in their latest Mathematics grade.

In the study of Bugas (2010), she stated that the basis for classifying students into high or low was their Math grades. Students with Math grades of 79 and below were classified as low performing and students with Math grades of 90 and above were classified as high performing. Fielden (2004) on the other hand purports that good study habits help the student in critical reflections on skills outcomes such as selecting, analyzing, critiquing, and synthesizing.

In the interview, when participants were asked about their performance in Mathematics in Grade 7, two of the participants said:

Respondent 1: Ma'am di akn katawan, mababa so performance akn sa math. So 1st grading akn ago 2nd grading akn na mapya dn pero na no comment ako ko 3rd grading ago 4th grading akn. (Ma'am I don't know: I have low performance in Math. My 1st grading and 2nd grading performance were nice, but I have no comment in my 3rd grading and 4th grading grades.)

Respondent 2: Ma'am so standing akn na naba tanto mapiya kay naba rakn interesting so math ago boring skiyan. (Ma'am my standing is not so good since I find math not interesting and boring.)

Moreover, House (1993), as cited by Ayebo and Dingel (2021) stated that students with higher academic self-concept earned significantly higher mathematics grades. Students who had low performance in their previous mathematics subjects had a hard time understanding mathematical problems involving analysis and computations. If it happens, the student will eventually fail in math which causes him to re-enroll a given math subject.

If a child's previous performance is unsatisfactory, it can affect their current academic performance, especially with the new spiral curriculum where the teacher teaches basic to complex concepts. The teacher must do their best to impart mathematical knowledge and skills to their students properly.

Performance of the participants Before and After the Introduction of the iTooch Mathematics Application

Table 6-Descriptive Statistics Results of the Participants' Pre-test Performance

Transmuted Scores	F	%	Mean	SD	Qualitative Description
98-100	0	0.0			
93-97	0	0.0			
87-92	0	0.0	65.04	4.02	Failed
81-86	0	0.0			
75-80	1	2.1			
74 & Below	47	97.9			
Total	48	100%			

Scaling:

98 and above - Excellent	81 – 86 - Fair/Satisfactory
93 – 97 - Very Good	75 – 80 - Passing
87 – 92 - Good	74 and below - Failed

Table 6 shows the performance of the participants in algebraic equations before the introduction of the iTooch Mathematics Application. As presented, almost all of the participants obtained a transmuted score of 74 and below which corresponds to 47 or 97.9% of the participants. This means that 97.9% of the participants failed the pre-test. Only 1 or 2.1% of them obtained a transmuted score that falls within the interval 75 to 80 which is marked as passing. Moreover, the mean score obtained is 65.04 with a standard deviation of 4.02. Hence, on average, the participants obtained a failed remark in the given pre-test before the introduction of the iTooch Mathematics Application.

Based on the result, only one student passed the pre-test given by the researchers. According to one of the participants interviewed by the researcher, they failed because they did not know what operation to use and they had already forgotten the topics being asked in the test. As Bautista and Mulligan (2010) claim, as cited by Dibagalun and Mama (2016), students do not arrive at the correct answer due to misuse of mathematical operations. They do not know the appropriate operation to be used in a certain problem. This could be attributed to students' carelessness during the process, where operations are unconsciously misinterpreted or incorrectly executed.

In the interview, when participants were asked about the reason why most of them failed in the pre-test, two of the participants said:

Respondent 1: Ma'am kasi na kyalipatan amidn so mga topics a pakaisa sa test. Tapos na di ami katawan paano gamitn so multiplication, division piyapiya. (Ma'am because we already forgot the topics asked in the test. Then we do not

know how to do multiplication, division, ... properly.)

Respondent 2: Ma'am so test a inibgay nyo na marg'n, di ami katawan paano uto solve'n na pyamthangan ami badn. (Ma'am the test you have given was so difficult. We don't know how to solve it so we ended up answering it carelessly.)

Furthermore, Gourgey (2001), as cited by Naga and Poonadatu (2017), said that often students do not pay careful attention to sense-making and clarification. This often leads to impulsive and illogical attempts at solutions, when asked to solve math problems, they immediately performed operations without thinking carefully about the problem and whether the operation was appropriate. As a result, their answers did not make sense. Moreover, they also stated that participants tend not to easily recall the method that should be used to solve due to a lack of understanding of polynomial equations.

Table 7. Descriptive Statistics Results of the Participants' Post-test Performance

Transmuted Scores	f	%	Mean	SD	Qualitative Description
98-100	0	0.0			
93-97	0	0.0			
87-92	1	2.1	71.54	7.4	Failed
81-86	4	8.3			
75-80	10	20.8			
74 & Below	33	68.8			
Total	48	100%			

Scaling:

98 and above - Excellent 81 – 86 - Fair/Satisfactory
 93 – 97 - Very Good 75 – 80 - Passing
 87 – 92 - Good 74 and below - Failed

Table 7 shows the performance of the participants in algebraic equations after the introduction of the iTooch Mathematics Application. As seen in this table, 20.8% of the participants obtained a transmuted score that falls within the interval 75 to 80 which is marked as passing. There are also 8.3% and 2.1% who obtained transmuted scores within the intervals 81 to 86 and 87 to 92 which are marked as fair/satisfactory and good, respectively. However, 68.8% of the participants obtained transmuted scores which are 74 and below. This means that most of the participants still obtained a failed remark even after the iTooch Mathe-

tics Application was introduced. In addition, the mean score obtained is 71.54 with a standard deviation of 7.41. This means that, on average, the participants obtained a failed remark in the post-test given after the introduction of the iTooch Mathematics Application.

This implies that even after the introduction of the iTooch Mathematics Application, the majority of the students obtained failed remarks. However, if one compares the results of the pre-test and post-test, the number of students who passed increased from one to fifteen. This means that the said application seemed to be effective for some, but some factors could explain why, on average, participants still failed to have higher remarks even after the introduction of the intervention.

In the interview, when participants were asked about their perception about the iTooch application, two of the participants said:

Respondent 1: So iTooch app na mapiya kasi na kailay nga so solution ko specific a problem gira da katawan ka paano uto masolve ago sa gyuto a app na katrain iyan so utk ka sa kapangsolve sa math problems. (The iTooch application was good because, you can see the solution to a specific problem when you have no idea how, and by using that application, it actually trains your brain to solve math problems.)

Respondent 2: Owae Ma'am, mapiya skanyan mambo kasi na first time akn a gumamit sa application sa kapaganad sa math. Kausar ami aya bapya anda kami matatago pero paano Ma'am so mga classmates ami a da phone iran? Paano siran paganad? (Yes, ma'am, it was actually nice because it was my first time using such an application in learning math. We can use it wherever we are but how about my classmates who don't have a phone? How can they learn?)

In introducing technology, a teacher must first consider the classroom environment of the students. In this study, the application that the researchers used might not be effective in this school but might be effective in others. According to Zoch, Myers, and Belcher (2016), there are still times when integrating new technology can be ineffective. He said that teachers should consider the classroom environment and

whether it is conducive to bringing technology into the classroom. Teachers would think about what changes should be made to the way the classroom is set up to ensure that the use of technology is most effective for students. Backup plans and strategies must be prepared that can easily be incorporated should the technology be unavailable. With that, the best-case scenario is that technology in the classroom can drastically improve retention and engagement in the classroom.

Another reason is that sometimes they wanted to ask questions to their teacher, but they could not because they were afraid that their teacher might scold them for asking and this reason had a great impact on their study. As Gurganus (2007) posited, previous instructional experience can have a significant impact on achievement. If previous teachers did not explain concepts well, use effective teaching methods, or allow time for mastery and success, students' mathematics learning will be negatively affected. If the curriculum and materials used were not aligned with math standards, learning might be superficial or limited. Furthermore, if the student was not able to develop the deep conceptual understanding that comes from good teaching and a sound curriculum, their math achievement will suffer. Teaching mathematics must employ repetitive practice to develop efficiency in computational skills until students understand. As what the researchers interviewed, students said when they were asked the reason why do not like asking questions even though they do not understand the topic:

Respondent: Ma'am kasi na pkalk kami oba kararangiti so teacher ami amay ka misa kami. (Because we are afraid that our teacher will get angry if we ask questions.)

Respondent: Ma'am kasi na kyaingay kami ago masamok kami sa sold a classroom. Banda gyuto e rason ino so mga pd a teacher ami na strikto ago poon ro na myalk kami dn misa. (Because we are so loud and naughty inside the classroom. Maybe that's the reason why some of our teachers are so strict and because of that, we are afraid to ask question.)

The researchers also observed that during the intervention and introduction of the iTooch Mathematics Application, one of the reasons why the participants did not answer the post-test correctly was that they lacked comprehension, meaning that they could

not understand the question, and worse, some of them do not know how to read words in English. Teachers should engage students in the discussion especially those who are unable to understand the words and terminologies used in a word problem, do not grasp a phrase, and lack confidence or concentration when reading. When this happens throughout the problem-solving process, learners usually misunderstand and misinterpret what is asked of them. Success in answering math problem-solving highly depends on the ability of the learner to apply reading strategies. As the participants said when asked if iTooch application helped them:

Respondent 1: Of course Ma'am pero so pd a English words roo na tanto a madal'm para rakn kaya igira na pmbatiyaan akn bo apya di akn sabotn. (Of course ma'am, but some of the English words are too deep for me to understand, so sometimes I just read it even though I don't understand it.)

Respondent 2: Owae Ma'am pero kay marg'n para rakn a sabotn so pd a mga English words roo na ipkidiya aknon badn na pag-analyze'n akn badn so mga ib'bgay a examples na itry akn answer'an. (Yes ma'am, but it is hard for me to understand some of the English words there, I'm just analyzing the given examples and try to answer.)

Using technology in education is still effective as many studies claim but if a teacher wants to be successful in implementing this, proper planning is needed. Barnes (2007), cited by Falcon (2010), noted that technology is the solution, and with proper planning and successful implementation of the software, all students can succeed. Administrators must provide time for teachers to plan with their colleagues to find successful strategies. Also equally important is the fact that teachers should receive proper training for the software. When teachers receive training, the software is more advantageous for students. Teachers can access specific data provided by the software to enhance the delivery of lessons. The software may also include data that can assist teachers in the assessments and progress of their students.

Significant Difference Between the Participants' Performance Before and After the Introduction of the iTooch Mathematics Application

Table 8. One-tailed Paired Sample T-test for Pre-test and Post-test

Test	Mean Score	Qualitative Rating	t-value	p-value
Pre-test	65.04	Failed		
Post-test	71.54	Failed	-4.783	0.001

Since the t-value is -4.783 less than 0.000 tabulated value and with p-value of 0.001 which is also less than 0.05 at 0.05 level of significance, then there is a sufficient evidence to reject HO and accept the one-tailed alternative hypothesis, that is, the mean score in pre-test is less than the mean scores in the post-test. This significantly means that scores in the pre-test is less than those in post-test. Higher scores were observed in the post-test than in the pre-test. Thus, improved performance was observed after the intervention based on the given results.

Moreover, Algani (2019) encourages teachers to use diverse approaches that have proven to be effective, such as technological innovation and creativity when teaching mathematics. Most students have already put in their minds that mathematics is a difficult subject. As one of the participants said, if the teacher teaches well and is approachable, learning mathematics would be easy for them.

Given that, and since mathematics is widely credited as the hardest subject, teachers must use appropriate strategies to make students understand and appreciate mathematics. A teacher can use educational applications like iTooch Mathematics application and other supplemented instructional materials to make students understand the lessons. Our world is progressing; many inventions have been created to make our lives easier. A teacher just needs to adapt and integrate these technologies into their teaching.

Challenges that the Participants Encountered in the Use of iTooch Mathematics Application in Teaching Algebraic Equations

Researcher: What is your perception about iTooch application? How is it?

Respondent 1: Okay lang Ma'am so iTooch. Medyo pakasuwa ka ro sa kapangsolve ka adn a mga examples ro ago solutions. Aya bo problema ron talaga Ma'am na so mga English roo na di gaid sabotn so pd ron Margn mambo Ma'am so English. (iTooch is okay ma'am. You can learn how to solve because

there are some examples and solutions in the application. The only problem in that app is that some of the English words are too difficult to understand. English is difficult too, ma'am.)

Respondent 2: Amazing skanyan Ma'am. Kapakay bs a mbaloy a interesting so kapaganad sa math. Dati na di akn talaga type so math ka boring pero na pkainteresting skanyan ka ginan a application. Pero so mga English words na tanto ko madalm a di akn minsan sabotn. (It (iTooch application) is amazing ma'am. Learning math can actually be interesting. Before, math is not really my type because it is boring but it can be interesting because of that application. But some of the English words used there are too deep to understand for me.)

Respondent 3: Owae Ma'am, mapiya skanyan mambo kasi na first time akn a gumamit sa application sa kapaganad sa math. Kausar ami aya bapya anda kami matatago pero paano Ma'am so mga classmates ami a da phone iran? Paano siran paganad? (Yes, ma'am, it was actually nice because it was my first time using an application in learning math. We can use it wherever we are but how about my classmates who don't have phones? How can they learn?)

Most of the participants have negative perceptions of mathematics. However, as revealed by their responses, they found the iTooch Mathematics application interesting and accommodating. The said application helped them a lot to understand and appreciate the topics in mathematics discussed by the researchers, but since the said application uses the English language, it caused some difficulty in understanding some of the words used in the discussion part of the application. They found the words too deep for them to understand. If the previous teacher did not discuss the concept very well and did not allow the students to master it properly, the one assumption could be that students will not understand the topic discussed in their current grade level.

Researcher: I observed, that you don't like asking questions even though you don't understand the topic? Why?

Respondent 1: Ma'am kasi na pkalk kami oba kararangiti so teacher ami amay ka misa kami. (Ma'am because we are afraid that our teacher will get angry if we ask questions.)

Respondent 2: Ma'am kasi na kyaingay kami ago masamok kami sa sold a classroom. Banda gyuto e rason ino so mga pd a teacher ami na strikto ago poon ro na myalk kami dn misa. (Ma'am because we are so loud and naughty inside the classroom. Maybe that's the reason why some of our teachers were so strict and because of that, we are afraid to ask questions.)

Respondent 3: Banda Ma'am pkalk siran sa mga teachers ami ka misa ka na minsan na pkarangitan so teacher ami. (Maybe because they are afraid of our teachers because when you ask questions, they get angry sometimes.)

Students are the center of the teaching-learning process. Students will not learn if they are afraid of their teacher. Based on the interview, the participants are afraid to ask for clarifications from their teachers since some of them were not accommodating and approachable. Teaching can be effective if all the students participated in the discussion with the teacher. It is the teacher who is responsible in allowing the students to express what they want so they can learn effectively.

Researcher: Do you think iTooch application helped you?

Respondent 1: Lagid o pitaro akn Ma'am ka-gya na so iTooch na kailay nga so solution ko specific a problem gira da katawan ka paano uto masolve ago sa gyuto a application na katrain iyan so utk ka sa kapangsolve sa math problems na kyahelpful skanyan. (Like what I said earlier, using the iTooch app, you can see the solution to a specific problem when you have no idea how. Apart from that, it actually trains your brain to solve math problems. So it is very helpful.)

Respondent 2: Medyo Ma'am. Dikadi maka-pag-practice sa kapangsolve ka adn dn a solutions roo na kyapya ago adn a mga explanation o pd a mga questions roo na mas sabotn ka. (Slightly, ma'am. You can practice how to

solve because there is a solution in there so it is good and there is an explanation given on some of the questions there so you can understand it better.)

Respondent 3: Owae Ma'am pero kay marg'n para rakn a sabotn so pd a mga English words roo na ipkidiya aknon badn na pag-analyze'n akn badn so mga ib'bgay a examples na itry akn answer'an. (Yes, ma'am but since it is hard for me to understand some of the English words there, I'm just analyzing the given examples and try to answer.)

Using the iTooch Mathematics application can make the teaching-learning process easier. A lot of studies proved that using an application in learning is effective. As what the participants answered, it was their first time using an instructional application inside the classroom and they found it interesting. Based on the interview transcripts, if the topic discussed by the teacher is hard or if the teacher did not discuss the topic properly, they can browse the said application to understand the concept well. In addition, the app was viewed to help promote self-learning since they are encouraged to learn independently. The said application helps both the teacher and the student in many ways. A teacher can make their discussion more interesting and can discuss their lesson more clearly by using the application. Learners can learn anytime and anywhere since they can open the said app anytime they want to review topics.

IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

There is a small difference between the results of the pre-test and post-test. The students failed both the pre-test and post-test, but it does not necessarily imply that using an instructional application in the teaching-learning process is not effective. As the participants agreed, using an application inside the classroom is very useful because it will help them a lot in their studies. Some factors affected the students' performance during the application of the iTooch Mathematics application including that: not all of them have smartphones, they encountered difficulties understanding basic terminologies, coupled with intermittent internet connectivity within their area. These reasons suggest a great possibility for the majority to fail in both the pre-test and post-test given by the re-

searchers. Therefore, despite the potential of technology to help improve learning, external factors can still intervene and affect the process. In implementing and using technology inside the classroom, teachers must first examine the context in which technology will be applied. Thus, the said application might not be effective in Matungao National High School due to some factors but may be effective in some other schools or areas. Since there was a significant increase in students' performance after using iTooch, it may be said that the application has a positive impact in some respects. This desirable effect could be strengthened by addressing the intervening factors identified in the study.

Recommendations

Based on the findings of the study, there is a need to forward the following recommendations to concerned individuals and institutions:

Students being the center of the teaching-learning process, they must explore the world of technology and try instructional applications and learn to adopt various ways of acquiring knowledge in mathematics; Teachers being the facilitators of learning, should not only focus on traditional methods of teaching and involve their students in their daily discussions; Parents having a vital role in their children's education should be aware of their children's performance in every subject particularly Mathematics as well as the factors affecting their ability to solve math problems to help them minimize their difficulties and assist and give full support to their children's education in using various ways in learning mathematics for them to level up their performance; Mobile application designers are encouraged to create more applications useful in teaching students to facilitate their learning of different subject areas; and Curriculum developers are advised to adopt various program designs for the development of the teaching-learning process, especially the inclusion of useful and effective instructional software.

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