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Quipper School contributes to higher test score, attendance rate and assignment submission in teaching Mathematics

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Abstract: Quipper School combines powerful technology with excellent content to transform the teaching and learning experience. Introduced in the Philippines in 2014, it has since been integrated for blended learning and teaching in K-12 classrooms. Initial findings of a quasi-experimental research study conducted in Grade 7 Mathematics classes in five (5) secondary public schools revealed that students with constant or intermittent Quipper School interventions are more likely to achieve higher test scores, attendance rates and assignment submissions compared to those who received none. Moreover, students, teachers and administrators are satisfied with the activities and functions of Quipper School and in agreement that utilizing it as a learning management system is good for learning and teaching. In addition, access and availability of technology inside and outside the classroom is still a perennial concern.

Key Words: Quipper School; test scores; attendance rate; assignment submission; blended learning and teaching; learning management system

1. INTRODUCTION

The use of technology has been in the forefront of Philippine education for decades. It is integrated as theory and practice in the analysis, design, development, implementation and evaluation of processes and resources for learning, teaching and training. The most commonly used form of which is blended learning defined as learning systems combining face-to-face instruction with computer-mediated instruction (Graham, 2006) with the end-result of improved student learning (Heinze, 2008) through the use of learning management system (LMS) across contents in all academic levels. LMS is

a software application for the administration, documentation, tracking, reporting and delivery of educational courses or training programs acting as a platform for fully online courses, as well as several hybrid forms, such as blended learning and flipped classrooms (Ellis, 2009).

The introduction of Quipper School (QS) in the Philippine educational system has push forward the use blended learning and teaching in the K-12 classrooms. QS is an online learning system that provides smart management tools with engaging educational content to support teachers and students all over the world - 150,000 teachers and 1.5 million students in 8 countries (Quipper, 2016). Launched in the Philippines in 2014 through the online platform



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<https://school.quipper.com>, it has provided a free eLearning platform geared towards assessment based on the K-12 Basic Education Curriculum to approximately 30,000 teachers and 600,000 students ranging from grades 4 to 10 and 1,965 schools with over 100,00 unique monthly active users (Quipper, 2016). As of November 2015, more than 20,000 Filipino students are studying Math, Science, English, *Araling Panlipunan*, Filipino, and Information and Communication Technology (ICT) at QS every day (Quipper, 2016).

At present, there has been no research done on QS in the Philippines (or in any of the other 7 countries) and it became imperative to assess and evaluate its effectiveness and efficiency for education. The evaluation of an LMS is essential to ensure its effective implementation and positive impact of eLearning (Almarashden, Sahari, Zin, & Alsmadi, 2011). Thus, this research aims to explore the effects of using Quipper School in the Philippines specifically exploring its association with test scores, attendance rate, assignment submissions, and satisfaction of students, teachers and administrators in utilizing it as a learning management system.

2. METHODOLOGY

The study employed quasi-experimental research design with the pilot and main studies conducted in selected secondary public schools in the National Capital Region (NCR) - one for the pilot and four schools representing each of the districts of NCR for the main study. In each school, three (3) heterogeneous mid-level Grade 7 Mathematics classes having the same teacher were selected as participants. These limitations were set upon considering the following: Grade 7 students are the least likely to have never been exposed to QS and most of the resources available in QS cater to students aged 12-17; Mathematics subject was chosen in line with the Philippine government's thrust of alleviating the Math skills of primary students in addition to the wealth of available resources in QS for Math; and having the same teacher would eliminate teacher factor that could influence the results of the study.

The three classes were randomly assigned to different research groups: Class 1: Control Group— no QS intervention employing the traditional teaching strategy; Class 2: Intermittent Group – 4 meetings with QS intervention and 4 meetings without QS intervention; and Class 3: Experimental Group – 8

meetings with QS intervention. The teacher working collaboratively with the researchers developed all pertinent resources such as lesson plans and other instructional materials that were given to the students regardless of their research group although in different platforms. Assignments, discussions and drill and practice quiz about the content were given. Assignments and quizzes in Class 1 were done using paper-and-pen while in Class 3 were administered and submitted through the use of QS. For Class 2, assignments and quizzes were given in a mix of paper-and-pen and online mode.

In addition, QS data analytics, manual records, observation guides, satisfaction survey and interviews were collected and analyzed.

3. RESULT AND DISCUSSION

The pilot study provided the baseline data that aided in the refinement for the main study. Taking into consideration notable recommendation such as conducting the research study at an earlier date to avoid higher drop-out rates and the burn-out effect, the main study adopted all processes and instruments of the pilot study and expanded to the four districts of NCR.

3.1 Pilot Study

The pilot study was conducted in Pasay City with 88 participants distributed as Class 1 (27, 31%), Class 2 (30, 34%) and Class 3 (31, 35%). There were 37 (42%) male and 51 (58%) female students with ages ranging from 11 to 17 years old.

Table 1. *Pilot Study Results*

Classes	Pretest / Posttest (gAve)	Quiz Passing Average	Attendance Rate	Assignment Submission
Class1	6%	25%	83%	15%
Class 2	6%	26%	84%	27%
Class 3	9%	43%	90%	29%

Table 1 showed that in Class 1 and Class 2 the average normalized gain in posttest/pretest is 6% and Class 3 has the highest at 9%. In terms of quiz scores, Class 3 has the highest passing average in quizzes at 43% followed by Class 2 at 26% and Class 1 at 25%. The class attendance record showed Class 3 was able to regulate absenteeism throughout the QS



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intervention with an average of 90%, followed by Class 2 at 84% and Class 1 with 83%. Furthermore, assignment submission of Class 3 is at 29% while Class 2 is at 27% and Class 1 at 15%. This a positive development since a large number of students in public schools often skip or altogether stop going to class near the end of the school year. During the focus group discussion (FGD), the students stated that they: (1) are looking forward to every Mathematics class because they are excited with the QS activities; (2) allocate extra time to explore QS at home; and (3) would go to computer rentals to submit assignments if they do not have computers at home.

The QS Satisfaction Survey revealed overall rating of satisfied to very-satisfied: students' perception regarding the primary purpose of QS are for drill-and-practice and for homework/assignment (44.83%) and 44.55% found that progress report/grade is more important than course email, online quizzes and exams, online assignments turn-in and discussion boards. The overall satisfaction rate of teachers is pegged at 84% who were very excited about utilizing the assessment contents, student analytics, and collaborative tools. The Principal was adamant about QS being integrated into all teaching and learning activities across all subjects in all schools in the Philippines. During the exit interviews of students, teachers and the administrator, it was made known that technology access, training and security are their primary concern but they are all convinced that QS is a good technological intervention in teaching and learning of Mathematics.

3.2 Main Study

Cross referencing by considering the dropout before and during the research and those students that are in module program, there were 475 participants: Class 1 with 171 participants (36%), Class 2 with 155 participants (33%), and Class 3 with 149 participants (31%). There were 189 (40%) male participants and 286 (60%) female participants ranging from 11 to 18 years old. In details, there were 129 (27%) from Southern District; 124 (26%) from Northern District; 95 (20%) from Eastern District; and 127 (27%) from Capital District.

The average normalized gain in pretest/posttest of Class 1 is 6%, Class 2 is 7% and Class has the highest at 9% (Figure 1). This ranking is true across all four (4) schools. In addition, FGD revealed that exposure to QS greatly enhanced the

understanding of the student about mathematical concepts thereby positively affecting learning outcomes as evident in higher test scores they obtained. These results are in agreement with the findings that there is a significant difference when LMS is used as opposed to traditional method of teaching mathematics (Castro, Finley, Villafaña, Sharma, & Collazo, 2013).

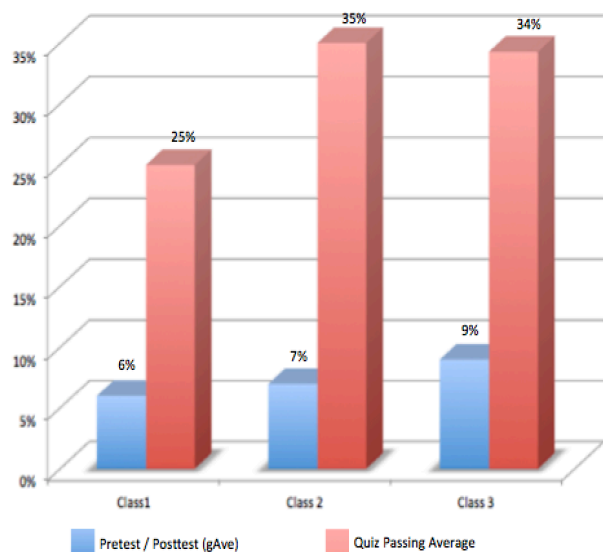


Figure 1. Main Study Pretest/Posttest (qAve) and Quiz Passing Average

Class 2 has the highest passing average in quizzes at 35%, followed by Class 3 at 34% and Class 1 with 25% (Figure 1). This ranking is true across all four (4) schools. During the FGD with randomly selected students from Classes 2 and 3, it was revealed that students prefer to take quizzes using QS instead of using the traditional paper-and-pen assessment. With the use of interactive computer tools, students foster deeper learning and engagement in problem solving (Gorse, Dickinson, Walker, Whitehead, & Shepherd, 2009). Students believed that it is easier for them to submit their answers through QS in addition to the immediate feedback of the results including the rationale behind the answers. Through immediate feedback, students are able self-assess their comprehension resulting in increase in motivation and desire for continuous learning to increase learning performance (Mosharraf, Taghiyareh, & Nasirifard, 2013).

Results showed that Class 3 was able to maintain the highest attendance rate with an



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average of 94%, followed by Class 2 with an average of 92%, and Class 1 with 86% (Figure 2). This ranking is true across all four (4) schools. During the FGD, students claimed that they were more motivated in their class compared to before receiving the intervention. They also believed that it should always be used not only in their Mathematics class but also in their other subjects. In addition, students were more excited in going to class and more participative during class discussion. As posited by Mosharraf, Taghiyared and Nasirifard (2013), the use of LMS increased the intrinsic motivation of the students to engage in learning activities thereby resulting in higher attendance rate.

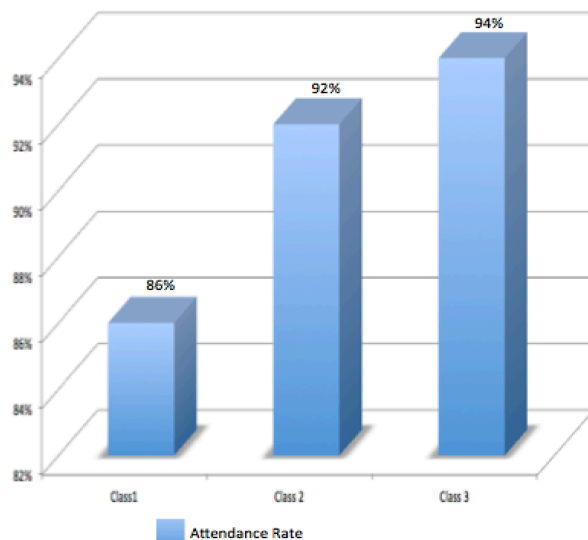


Figure 2. Main Study Attendance Rate

The average submission of assignments of Class 1 in all four (4) schools was pegged at 56%, Class 2 at 64%, and Class 3 at 63% (Figure 3). This ranking is true across all four (4) schools. During the FGD with students, it was revealed that this was attributed to immediate feedback and virtual token of rewards in QS. Students also stated that the discussion board of QS serves as a helpful reviewer before answering the assignments and as a reference whenever the students got incorrect answers. The presence of reviewers and immediate feedback in LMS allow the students to review instructional content as often as need without any pressure (Blackboard, 2010). The negative effect of requiring the students to submit assignments online when they

do not have access to computers or when they would need to rent one were also noted.

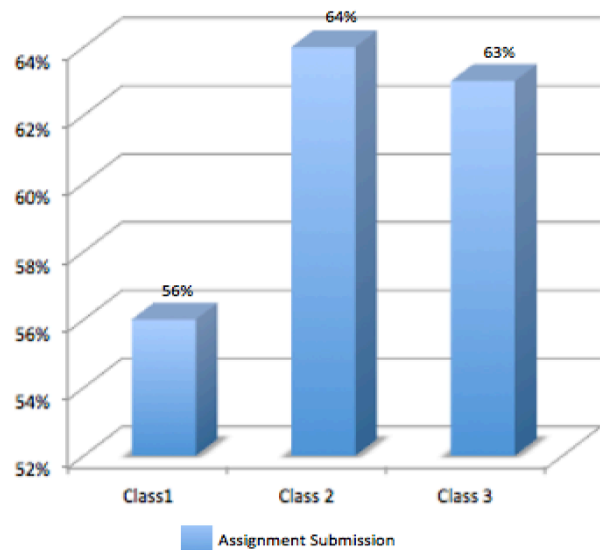


Figure 3. Main Study Assignment Submission

It could be inferred from Table 2 that Class 1 is 3% and 1% lower than Classes 3 and 2 respectively in terms of average normalized gain in pretest/posttest. The quiz passing average of Classes 2 and 3 are approximately 10% higher than Class 1. In terms of attendance rate, Classes 2 and 3 are approximately 8% higher than Class 1. The assignment submission of Class 2 and Class 3 is approximately 8% higher compared with Class 1.

Table 2. Main Study Results

Classes	Pretest / Posttest (gAve)	Quiz Passing Average	Attendance Rate	Assignment Submission
Class 1	6%	25%	86%	56%
Class 2	7%	35%	92%	64%
Class 3	9%	34%	94%	63%

The overall ratings of the students' satisfaction in Quipper School were as follows: Very Dissatisfied (1%), Dissatisfied (5%), Neither Satisfied nor Dissatisfied (17%), Satisfied (49%), and Very Satisfied (29%). It could be noted that the reason why the participants felt dissatisfied and very dissatisfied were limited access to and availability of technology. The most important features of Quipper



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School according to students are as follows: online quizzes/exams (34.01%), progress report (29.15%), online assignment turn-in (14.21%), discussion boards (13.16%), and course email (9.48%). These results were in agreement with a research that curated 1212 course websites revealing high level of satisfaction of students with the use of LMS (Scheg, 2015).

The overall satisfaction rating of teachers in four (4) different schools was pegged at 84%. Based from the results and FGD, teachers ranked the features of Quipper School as follows: ease in creating their online classes (91%); the teachers' dashboard and students' dashboard (both 90%) served as an effective tool and helpful in tracing and reminding the students about the tasks; ease of navigation (86%); ease of implementing discussion and quiz (85%); ease of enrolling students (83%); ease of creating and modifying discussion (81%); ease of creating and modifying quizzes and user interface (78%); ease configuring user settings (76%). These results are the same with California State University faculty members who are positively optimistic about the efficacy of LMS in tracking progress of their students (Gilbert, 2013).

4. CONCLUSION

The findings indicate that students with constant or intermittent exposure with Quipper School are more likely to demonstrate high test scores and keep the attendance rate at high level. They are also more likely to submit assignment that those who are not expose to Quipper School intervention. This implies the positive effect of Quipper School in the learning process and development of the students.

Students, the teachers and the administrators were all satisfied and convinced that Quipper School is positively contributory to the overall teaching and learning of Mathematics.

In addition, it is important to consider the availability of computer technology and internet connection when integrating and utilizing it as platform for teaching and learning.

These results suggest that students, teachers and administrators are open and willing to integrate blended learning and teaching through the use of learning management system like Quipper School despite the lack of access to and availability of technology.

Recommendation for further studies include but not limited to the use of Quipper School across all subject areas and grade levels; designing lesson plans with Quipper School integration; and the use and assessment of additional educational resource of Quipper School like videos and interactive online tutorials.

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