Teaching Food and Beverage Services Through Gamification

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ORIGINAL ARTICLE

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ABSTRACT

Technology and Livelihood Education (TLE) in the Philippines is continuously progressing due to the demand of global community in technical skills. In this progression in education, inadequate teaching and learning materials, and teaching strategy that are suitable in the new curriculum becomes a problem inside the classroom. The use of technology is constantly upgrading the classroom environment. It is being used by teachers to enhance the creativity, innovation, and engagement of their teaching methods. Moreover, it has the capability to increase student's attainment and escalate their future opportunities, whatever career they choose. Among this innovative teaching strategy is gamification. Gamification is a teaching strategy that increases students' participation, wherein teacher uses technology game-based to discuss lessons or to do task. This study is intended to determine the effects of gamification as teaching strategy through the performance of selected Grade 9 students in Bagong Silangan High School and to know the challenges encounter using this strategy. Furthermore, this study employed Quasi-experimental design of research. According to White and Sabarwal (2014), quasi-experimental design is known to be the association of groups that is as similar as possible to the experimental group when it comes to the characteristics of pre-intervention. The comparison group captures what would have been the outcomes if the intervention had not been implemented. Hence, the intervention can be said to have cause any difference in outcomes between the treatment and comparison groups. Based on the data gathered, the following major findings are: The academic performance of both control and experimental group on their first quarter grade in Food and Beverage Services is equal before the start of the experiment. The performance of control group in pretest is slightly advance compared to the experimental group. During posttest, students taught using gamification, gained advantage over those taught using the traditional approach. And based on the retention test scores of the students, experimental group advances more over control group. The performance of control group in pretest is slightly advance compared to the experimental group. During posttest, students taught using gamification, gained advantage over those taught using the traditional approach. And based on the retention test scores of the students, experimental group advances more over control group. And lastly, problems encountered by the students in gamification comes in accessing different websites while the lesson is on-going, no, or slow internet connection, no gadgets available, compatibility of the application to the device, time consuming and it makes the class unruly.

Keywords: *Digital Natives, Food and Beverage Services, Gamification, Kahoot, Mentimeter*

INTRODUCTION

Technology nowadays is rapidly developing and keeps on modernizing adapting to the trends of human beings. It makes the task of an individual easy and stress-free in just a click of a finger. In technology, distance is no longer a hindrance in keeping in touch with others or looking for answers to certain questions. Through technology and its continuous development different fields and organization have already expanded such as banking, commerce, communication, government transactions and education.

In the field of education, technology has a huge impact in the teaching and learning process, especially students are now digital natives. Students' interests are now hooked and focused on the use of technology such as smart phones and computers, engaging themselves on social media and different online and offline applications. Utilizing technology in teaching and learning process makes the classroom atmosphere more interactive and enjoying. It also lessens and eases the agony of the teachers in preparing lessons and thinking the teaching strategies to be used inside the classroom. By means of technology, different teaching strategies were immersed to help teachers deliver their lessons effectively, and one of them is the gamification.

Gamification is a teaching strategy that encourages active classroom participation, wherein teacher adds games by the use of technology such mobile phones to discuss lessons or to do certain task. According to Cohen (2016) gamification is a method by which lesson is presented in the form of a game. This comprises students competing to gain points or prizes within the game. Gamification can add essential structures in delivering the lesson and can provide remarkable routine in the teaching and learning process.

Students nowadays are digital natives, active and very curious in many and different things. They are uneasy if they not do or try things on their own. According to Edgar Dale's Cone of Experience, the more the learner involved in the learning process, the more and the better the learning will be. In addition, McCrann (2015), stated that once you immerse your students and let them participate actively in the learning process they will learn better. Students are active learners, traditional method of teaching limits their abilities to develop more.

In Philippine curriculum, Technology and Livelihood Education (T.L.E) is one of the subjects that deals with process of discovery and developing skills that helps the students to become technically equipped. It is one of the most important subjects in school due to its applicability and practicality to students' lives. Through T.L.E, students learn skills and knowledge needed to succeed in school and afar.
In Bagong Silangan High School, grade 9 students who took Food and Beverage Services (FBS) as their specialization in T.L.E. last Academic Year 2018 – 2019, students got a low mean of 36.32 in their fourth periodic examination. Students are very engaging and technologically inclined, they are always looking for new things to learn or experience new ways of learning. Applying traditional approach repetitively in the learning process find it unexciting by the students which leads to their low academic performance.

From this perspective, the researcher decided to come up with this study entitled, "Teaching Food and Beverage Services Through Gamification" which aims to determine the effects of gamification as teaching strategy through the performance of the students and to know the challenges encounter using this strategy.

Research Questions

1. What is the academic performance of the respondents based on their first quarter grade in Food and Beverage Services?
2. How do the students were taught using gamification (experimental group) and those taught using traditional approach (control group) perform based on their pre-test, post-test and retention test scores?
3. Is there a significant difference in the post-test and rentention testof the two groups of respondents?
4. What challenges are encountered by the students who were taught through gamification?

5. How may the findings be utilized in crafting a Learning Action Cell Plan on gamification?

REVIEW OF RELATED LITERATURE

Technology and Livelihood Education as part of the curriculum
According to Rudio (2017), Technology and Livelihood Education subject can give students a source of money to earn a decent living. It is very essential in our daily life. Without it, life can be very unsatisfying. Technology is a key aspect of life, as is the need for a living. These acts of imagination and labour accompany every single deed. In order to maintain their quality of life and health, people should be able to use technology to their advantage.

As stated by Umlas (2015) Technology and Livelihood Education provides our students with the necessary experiences, valuable knowledge, skills and values. This subject is intended to give students a better output and develop more the quality of education in the Philippines. She also added that Technology and Livelihood Education will have an essential part in each student because it will serve as their ladder to go up and get a better life.
Technology and Livelihood Education incorporates discipline and life skills that will help our students to stand on their own. She also added that students do not only learn the subject matter that has relevance to their present lives but it will be of constant use as they continue to grow (Acordon, 2016).

As stated by to Bautista (2018), TLE provides students with useful skills, practical knowledge, and capability in home economics, establishing business, and different aspects of technology. This is where students will learn how to acquire the necessities and the means to improve upon them in order to have a better life. They will be taught things like home education, sewing, cooking, etc. Additionally, they will learn here how to use innovation and modern technology to find solutions to issues they could encounter in daily life. Incorporating Technology and Livelihood Education as subject in Philippine curriculum gives hope to our students and economy. It addresses the needs of global community in terms of technology, skills and job opportunities. It create students with knowledge, skills and good attitude towards global competent citizens. It also offers business opportunities for those people who have limited capital to start up their own business.

Teaching Technology and Livelihood Education
According to Rudio (2017) every time teachers provide material on technology and livelihood or entrepreneurship, they have an impact on whether or not the students have understood the TLE concepts. Technology and livelihood education is a crucial subject. TLE interest typically comes from the teacher. He continued by saying that it is crucial to emphasize the role that teachers and students play in the educational process.

Teachers must focus more on preparation with concrete knowledge on how to maximize the utilization of technology to support the teaching and learning process. Using technology in education is not an option or a basic skills that a teacher must know and use inside the classroom. Teachers need to know how to maximize the proper utilization of technology in education for them to realize and appreciate every learning standards (U.S Department of Education, Office of Educational Technology, 2017). According to Deepika (2015) Teachers in the 21st century are empowered to make the most of any new technology that becomes available in the classroom by mixing traditional and online learning forms to offer a full learning experience. Incorporating technology with online education is known as blended learning, and the idea of anytime, anywhere education is made possible by the availability of computer hardware or a mobile device with an internet connection (Mancao, Hermosisima, Baclagan and Aggarao, 2014).

Using the best of tradition and technology is a continuing struggle for 21st-century education, according to Aguiluz as cited by Carreon (2018), who emphasized how important it is to nourish young minds, stimulate the development of dreams, and inspire promising lifestyles. When it comes to achieving inclusive education, the convergence of technology creates another obstacle. Teaching Technology and Livelihood Education is very challenging yet enjoying. It produces answers to the problems of the global community especially in terms of technical skills. Students who undergo, embrace and apply the

knowledge, skills and good attitude in this subject might have secure lives, because TLE leads to job and business opportunity and serves as ladder to a successful life.

Role of Technology in Education

Technology can be a useful and great instrument for strengthening the teaching and learning process. It sustains the connections of the teacher to his students and creates big changes in the teaching strategy of the teacher to his students. Furthermore, teachers, parents, non-government organization, policymakers, community members and other stakeholders should commit themselves to work together hand in hand to use technology to improve our education system (U.S Department of Education, Office of Educational Technology, 2017).

Furthermore, based on Intel Education Case Study (2014) technology has become a tool to facilitate teacher professional development, enhancing content of knowledge and teaching strategies to ensure effective learning, both for the teachers and students.
According to Himmelsbach (2019), technology in education is the biggest transformation in the teaching and learning process we will ever experience. On the other hand, some argue that using technology inside the classroom can be a distraction in the learning process or even promote wrong doings such as cheating.

The Internet plays a major role in the lives of the youth. Learning institutions can motivate students with the use of ICT tools to make learning more relatable, enjoyable, and sustainable. Social media tools allow online students to share information and build a sense of community (Friedman, 2014).
Using of technology in education plays a major role in the teaching and learning process. With the development of technology, education among the people has begun to increase and there is continuous study and improvement of the going on technologies to make education easier, joyful and available. Today, with the help of technology, education of children is no longer boring because educational technologies have made it much more interesting and easy to use and access.

Gamification as a Teaching Strategy

According to Mahanta (2019) gamification in education motivates students to learn by introducing gaming elements and video game design in the learning environment. It fosters a child's cognitive learning abilities during the early years for overall brain development. Collaborative effort and teamwork are key to gamification. While they are always learning, students occasionally engage in conflict with one another and other times they cooperate. It is a long-term, consistent series of events that require quite a bit of prep work by the teacher but has the potential to reinforce content and engage all learners in new ways (Mitchell 2019).

According to Finch (2019) students are exposed to a new, enjoyable learning style through gamification and interactive technology, which they may want to continue at home. Based on the NMC Horizon Report: 2014 Higher Education Edition they draw the conclusion that well designed games can generate considerable increases in productivity and creativity among learners. Our schools should incorporate 21st century skills and competences into every aspect of the educational process if we want to maintain our global competitiveness and produce engaged citizens. These include the development of critical thinking, complex problem solving, collaboration, and adding multimedia communication into the teaching of traditional academic subjects (U.S Department of Education, Office of Educational Technology, 2017).

Using gamified strategy in education alone is already effective in motivating students to participate in the class. Applied to educational application, you will get more effective learning system that will teach students to solve problems, take risks, and accept feedback. Applications have given children more fun and interactive way to learn things. They also give a healthy competition among their classmates. Educational applications give students more reasons to love learning, and help to address the learner engagement challenge that has long been a problem for all educators.

The Field of Technology and Livelihood Education

Technology and Livelihood Education subject is very essential in Philippine education system. It provides skills and knowledge that fits to the needs of the industries. TLE is very important in ours students life because it will serves as a ladder to achieve a better life. TLE subject will also help our country to solve economic needs of the people by improving our educational system and by giving

necessary skills needed to give high quality services in the industry (Gregorio, 2016). Offering TLE in schools is a response to the need of the community. It provides practical knowledge, skills of vocational and technological efficiency, and problem solving in daily life.

According to Ariaso and Tancinco (2016) teaching Technology and Livelihood Education subject is enjoyable yet it requires the mastery of the skills. It provides vocational and technical expertise among the students and develops their critical thinking. Technical courses are opportunities to uplift the economic competencies and improve the standard of living.

According to Albarico, Tagura, Visitacion, Zabala, Magnetico, and Ramayan (2014) Technology and Livelihood Education is a program which equips learners with knowledge and information, skills and process, right work values and life skills. It incorporates discipline and life skills that will help our students to stand on their own. As stated by Ariaso & Tancinco (2016) Technology and Livelihood Education subject is the practical and suitable answer to the needs of our society and improves the quality of the life of an individual.

Furthermore, Technology and Livelihood Education subject has a vital role in equipping our youth with knowledge, skills, and proper attitudes towards work and ensure the development and wise utilization of our country's resources. It produces a productive member of the modern workforce. Choosing a career path and learning the technology related to the needs of the industry can be an outstanding way to improve the chances of succeeding in life (Jacolbia, 2016).

Technology and Livelihood Education subject is essential in our curriculum. It secures the lives of the students from poverty due to skills offered by it that is useful in global trends. TLE offers different technical opportunities and it can be a great asset of the country in strengthening its economy. With this subject students has an edge to fight and break the chain of poverty and be part of solution in the community.

Technology and Livelihood Education as Teaching Profession

The teaching profession continued to be a complex field as the population demands and changing needs of the evolving world. The teaching profession roles has not been only that of transferring knowledge, skills, values and attitudes but also shaping the individuals to fit the world that is changing socially, politically, economically and technologically (Angelista, 2018).

According to Raba (2017) learning outcomes that are produced by effective teaching are long-lasting, adaptable, practical, meaningful, generalizable, and application-focused. Additionally, good education fosters individual learning, thinking, teamwork, and regulatory abilities.

Teachers should be skilled and aware in wrong and inappropriate assessment tools and practice with the wider educational perspective knowing the boundaries assessment (Salatan, 2018). Teachers are the responsible person in education. Teacher must be globally competent and knowledgeable in order to teach the knowledge and skills they could give to their students. Teachers are viewed as the source of light in the classroom. We are tasked with a vast array of duties, from the simplest to the most difficult and complex.

Teaching is one of the hardest career yet it is the one of the noblest profession. Teachers are considered as the second parent of the students. They serve as light among their students for them to see the bright future and ladder to reach the peak of their life. Being a teacher is not as easy as others think, it requires knowledge, skills and heart to secure the better future of the students.

Effect of Modern Technology in Education

Technology makes difference around the world and affects our education system. Teachers are using it to make their teaching more creative, more innovative and more engaging and enjoyable. Above all, teacher has the power to increase students' attainment and increase their future opportunities, whatever path they choose to go down. In the field of Education, technology serves as pathways to deliver the skills and knowledge to the students. According to Bedrule-Grigoruta & Rusua (2014), technology has huge effect in education system, making possible both a better communication and the implementation of the newest information systems that is useful for learning and can ease the process of harmonization of necessary knowledge.

According to Ghavifekr & Rosdy (2015), technology in education has a big effect in teaching and learning process, it helps the teachers to save time, money and effort in preparing and utilizing the teaching

strategy inside the classroom. And also, with the help of technology the classroom environment is more alive and productive. It can provide interaction with rich, visual, multimodal, and immersive stimuli, which, particularly when situated within authentic learning experience and anchored by the skill of the teachers.

In comparison to traditional classrooms, technology-based teaching and learning is more successful. This is because utilizing ICT tools and equipment will create an active learning setting that is more engaging and productive for both teachers and students (Ghavifekr & Rosdy, 2015).
The internet as a source of knowledge plays a key role in the growth of a person's intellect and life experiences through the creation of beneficial works in classrooms, offices, and even homes. The most useful strategic tool available to a person today for empowering himself to take charge of and deal with the quickly evolving technology is this (Dumrique & Castillo, 2017).

Technology influences education in a beneficial way, but it also has potential drawbacks. Teachers and students should make use of this in a positive way and remove the obstacles that prevent many students and schools from attaining excellence (Raja & Nagasubramani, 2018). Technology has a big advantage in education, it makes the learning materials accessible to every students. With this, learning is continuous and enhances the efficiency in the education sector (Budhwar, 2017).
Using technology in teaching and learning process is always going to be the teacher-student relationship. Technology is not meant to replace the teacher, but rather, the idea is to create a flexible learning environment that creates innovation. It shifts the classroom experience from the teacher-centered approach to a more collaborative learning environment. The success of such actions will ultimately depend upon on how does the teacher uses technology keep students engaged.

Benefits of Gamification in Learning
Gamification is the process by which an instructional unit is presented in the format of a game or incorporates elements of gameplay. It increases participation, motivation, and student overall achievement (Cohen, 2016). It is also the process of enhancing motivational affordances in order to invoke gameful experiences and further behavioral outcomes. Its main function of gamification is to provide and enhance situation through the use of gaming mechanics (Hamari, Koivisto & Sarsa, 2014). According to Ribeiro, Silva & Mussi (2018) gamified strategies encourage active students' participation and interaction inside the classroom. Integrating games and technologies in the lesson motivates and enhances the learning experience of the student inside the classroom. It also promotes collaborative environment among learners and gets their attention. Also it sharpens the students' memory and stimulates inspiration among learners (Fan & Xiao, 2015).

According to Surendeleg, Murwa, Yun, and Kim (2014) the key advantage of gamification is the low cost of development and the possibility of making learning content more interesting using game elements. The use of gamification technology can greatly help to address the issue with traditional educational methods where students find lecture classes to be uninteresting. Digital games are influential in the lives of the students. With this massive interest in digital games, aspect or recreational games have spread across education (Walz & Detering, 2015).
Using gamified strategy in teaching shown that it can be a valuable addition on creating effective learning atmosphere inside the classroom. Students tend to like it, and in certain situations and scenarios, it can motivate and increase student's performance. The key on this matter is the way on how the teacher incorporates games in the lesson.

RESEARCH METHODOLOGY

Research Design
The study employed Quasi-experimental design of research. According to Head and Harsin in The SAGE Encyclopedia of Communication Research Methods (2017) Quasi-experimental designs (QEDs) are a type of design commonly used in communication research. This type of design allows researchers to have a moderate degree of control in establishing causality and is usually used in the field.

In this study, two sections from grade 9 level in Bagong Silangan High were assigned as the subjects of the study: control group (which will be taught using traditional method) and experimental group (which

will taught using gamified strategy). Gamified strategy which will be used in experimental group is limited only in using two online applications namely Mentimeter and Kahoot. A pretest was planned to take place before the experiment began and a posttest was planned to take place after all of the topics in the experiment is discussed, week after the posttest, retention test was planned to give to the subjects to measure their retention on the topics that is being discussed to them using the experimentation period.

Research Respondents

In getting the respondents of the study, pair matching was used. Two sections from Grade 9 in Bagong Silangan High School in academic year 2019 – 2020, Carbon (Experimental group) and Cobalt (Control group), were utilized in the study. Through pair-matching that was based on the first quarter grades of the students in Food and Beverage Services, 15 students from Carbon and 15 students were identified to be part of the study.

Research Instrument

In the conduct of this study, the following are instruments was used:

1. Documentary Analysis

Documentary analysis made use of the grading sheet of the two groups of respondents. From said document, their first quarter grades were extracted and used as basis in the pair-matching.

2. Teacher-made Pretest, Posttest and Retention test

Teacher-made pretest, posttest and retention test was used in assessing the performance of the students before and after the use of gamified strategy in teaching Food and Beverage Services and each tests was composed of 25 items. The tests was used as research instruments which are based on the topics covered in Food and Beverage Services (FBS) during second quarter in Grade 9 level. The topics include table set-up and table service. These were discussed in the period when the experiment is conducted.

Also, before the administration of the teacher-made tests, a pilot testing was conducted using twenty (20) grade 10 students answering the teacher-made pretest and retention test. They were chosen for the reason that they already took up the topics when they are in Grade 9. Each teacher-made tests are composed of five (5) easy, twenty (15) average and five (5) difficult questions using Cronbach Alpha.

Based on the reliability test administered by the researcher on the teacher-made test to 20 students who were not part of the study, the computed coefficient of Cronbach's alpha is 0.720. This translates to high reliability with a cut-off coefficient or 0.70.

3. Questionnaire

A survey questionnaire is a data gathering method that is used to gather, analyze and interpret the view of a group of people from the target population in terms of the challenges encountered by the experimental group in gamified strategy used in the class. The survey questionnaire was composed of six (6) challenges that students might encounter. This challenges was conveyed with the help of FBS teachers and ICT teachers and it was used to gather the students' responses in the experimental group as regards to the challenges that they encountered in gamification.

In addition, the survey questionnaire was subjected to face, content and construct validation of two ICT teachers and two T.L.E teachers who had taught Food and Beverage Services. They feedback and inputs were considered in the preparation of the final draft of the questionnaire.

Data Analysis

Various statistical methods were used to analyze data, these include:

1. Frequency and Percentage

The frequency of an event is the number of times the event occurred in an experiment. The sum of the frequency is equal to the number of data, which is denoted by N. Frequency and percentage was used in this study to determine the number of students that reach each level of performance: advance, proficient, approaching proficient, developing, and beginning before and after the use of gamified strategy in teaching TLE.

Formula:

$$\% = \frac{f}{N} \text{ x } 100$$

Where: **%** = Percentage
    f = Frequency
    N = Number of classes

2. Arithmetic Mean

Arithmetic mean is found by the getting the total of the data divided by the total number of values in the set.

Formula:

$$Arithmetic\ Mean = \frac{\sum x_i}{n}$$

Where: **x$_i$** = ith variable
    n = Number of Variables in the data set

3. Standard Deviation

Standard deviation is used to measure how spread-out numbers are.

Formula:

$$S = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}}$$

Where: **S** = Standard Deviation
    n = Number of classes
    x$_i$ = ith variable
    $\bar{x}$ = Mean

4. T-test for independent sample

This statistical tool is used to compare the means of two independent groups in order to know whether there is numerical evidence that the population means are significantly different.

Formula:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

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RESEARCH FINDINGS AND DISCUSSION

1. Academic Performance of the Students

Table 1
First Quarter Grade of the Students in Food and Beverage Services (FBS)

Groups	1st Quarter Grade in FBS	SD
Control	81.00	1.56
Experimental	81.00	1.56

Table 1 shows the arithmetic mean and standard deviation of the students' performance based on their first quarter grade in Food and Beverage Services (FBS).

As seen in the table, both groups, those who were taught using gamification (experimental group) and those who were taught using the traditional method (control group) have the same arithmetic mean of 81.00 with a standard deviation of 1.56. It is expected that the results would be the same since the students who were selected as subjects of the study were identified through pair-matching thus the same mean averages and standard deviations.

The data only proved that before the conduct of the experiment, the two groups of subjects were on equal footing thus any variation that would be observed after the period of experiment can solely be attributed to the method being introduced to the experimental group which is gamification.

2. Performance of the Students in their Pretest, Posttest and Retention test
Table 2
Students' Performance based on their Pretest

Groups	Mean Score	SD
Control	9.67	1.91
Experimental	9.20	1.52

Table 2 shows the arithmetic mean and standard deviation of the students' performance based on the result of their pretest.

As gleaned from the table, the students who were taught using the traditional approach in teaching Food and Beverage Services (FBS) or the control group got a mean score of 9.67 with a standard deviation of 1.91 while the students who were taught using gamification in FBS or the experimental group got a mean score of 9.20 with a standard deviation of 1.52. Based on given figures, it can be deduced that the control group has a slight advantage over the experimental group as evidenced by the mean difference in their pretest scores of 0.47. This means that students in the control group have better prior knowledge about the topic before the conduct of the experiment. The reason why the control group took the slight advantage over experimental group is due to the fact that they had taken the same elective or subject in Junior High School.

The result of the pretest shows that the control group has more prior knowledge about the lesson over experimental group, but the result may change due to different factors like teaching strategy to be used in the learning process.

Table 3
Students' Performance based on their Posttest

Groups	Mean Score	SD
Control	18.67	2.16
Experimental	19.80	2.34

Table 3 presents the arithmetic mean and standard deviation of the students' performance based on the result of their posttest.

As seen in the table, the students in the experimental group who were taught using gamification had better performance than those taught using the conventional approach. The experimental group got a mean score of 19.80 with a standard deviation of 2.34 while the control group got a mean score of 18.67 and a standard deviation of 2.16. A mean difference of 1.13 between the two groups of students can be derived favoring the experimental group. The result of the posttest scores shows that experimental group got a slight advantage over control group due to the reason that experimental group who used gamified strategy engaged themselves more to the lessons using their smart phones compared to the control group who undergone traditional approach.

According to Dogra (2019) using gamified strategy in teaching and learning process gives the teachers a creative way to motivate their students to participate and increase achievement in the classroom. Gamification gives students more reasons to love learning and help to address the learner engagement challenge that has long been a problem for all educators.

Table 4
Students' Performance based on their Retention test

Groups	Mean Score	SD
Control	19.67	2.06
Experimental	21.80	1.08

Table 4 presents the arithmetic mean and standard deviation of the students' performance based on the result of their retention test.

As revealed in the table, the examination conducted weeks after the posttest was administered to measure the degree to which the students retain information. Those students who were taught using gamification got a mean score of 21.80 with a standard deviation of 1.08 while taught using the traditional approach got a mean score of 19.67 and a standard deviation of 2.06. An observable margin or mean difference of 2.13 can be seen favoring the experimental group not to mention that the scores of students in the experimental group is not too dispersed as evidenced by a very low standard deviation. The result of the retention test scores shows that experimental group got a noticeable difference over control group due to the reason that experimental group is exposed to technology-based approach.

According to McCrann (2016), once the teacher engaged his students and let them participate actively in the learning process they would learn better. Students are active learners, traditional method of teaching limits their abilities to develop more.

3. Test of Difference Between the Posttest and Retention Test Scores of the Control and Experimental Groups

Table 5
Difference Between the Posttest Scores of Controls and Experimental Groups

Groups	N	Df	t-value	t-crit	p-value	Interpretation	Decision
Control Experimental	15 15	28	-1.38	±2.05	0.179	Not Significant	Accept H_0

Table 5 shows the test of difference between the posttest scores of the control and experimental groups. As presented in the table, at df = 28 and α = 0.05, the computed t-value is -1.38. Since the t-value is within the t-critical values of ±2.05, the null hypothesis is ACCEPTED. This means that there is a no significant difference between the posttest scores of the students who were taught using gamification and those taught in the traditional approach. The result is validated by the computed p-value of 0.179 which is greater than the significance level or α of 0.05. The figure simply reveals that though students in the experimental group had higher mean scores than those in the control group, the difference in their scores is not that significant. This means that gamification is only as effective as traditional approach in teaching. However, learning is not only measured by how students perform but also their level of engagement during classroom discussion where gamification addresses more.

Gamification boost students' active participation inside the classroom. Even though gamified strategy is only as effective as traditional method, incorporating games and technologies in the teaching and learning process motivates and improves the learning experience of the students inside the classroom. It also upholds collective and collaborative environment among learners and sharpens students' retention.

Table 6
Difference Between the Retention Test Scores of Controls and Experimental Groups

Groups	N	Df	t-value	t-crit	p-value	Interpretation	Decision
Control Experimental	15 15	28	-3.55	±2.05	0.001	Significant	Reject H_0

As revealed in the table, at df = 28 and α = 0.05, the computed t-value is -3.55. Since computed t-value is beyond the acceptance region of ±2.05, the null hypothesis is REJECTED. This proved the significant difference in the ability of the students taught using gamification and those taught in the traditional manner to retain information or concepts. The result is validated by the computed p-value of 0.001 which is less than the significance level or α of 0.05. The foregoing discussions simply revealed that students taught using gamification had better retention of information. This is due to the fact that students nowadays are digital natives. They engage most of their times in using technologies such as smart phones which become part of the study habits.

Students are now prone in technology and dynamic in many aspects. They are curious if they not trying things on their own. According to Dale's Cone of Experience, the more you engage the students the better the learning will be. This means students will retain the lesson once you engage them into different activities with new or different strategy.

4. Challenges Encountered by the Students in Gamification

Table 7
Challenges Encountered by the Students Taught Using Gamification

Indicators	*f	%	Rank
1. No or slow internet connection	6	40	2
2. Gadgets or devices are not available	4	27	4.5
3. Application is not compatible with the device	4	27	4.5
4. Time consuming	4	27	4.5
5. Classmates become unruly	4	27	4.5
6. Tempted to access different internet sites	9	60	1

*Multiple response

Table 7 presents the frequency and percentage distribution of the subject-respondents in terms of the challenges they encountered when taught using gamification.

As shown in the table, more than half of the subject-respondents were "Tempted to access different internet sites" while the lesson is on-going with 9 or 60 % responses. This is due to the fact that students are often playful and whenever they could get a chance, they would take a peek at other internet sites whenever online and sometimes they tend to do research for their assignment in their other subjects. 40% or 6 out of 15 subject-respondents have "No or slow internet connection". This is brought about by the fact that students only use data connection to go online and oftentimes, data connection is intermittent. Other students do not have enough money to avail load for their internet connection. Finally, the other challenges that the students encountered in gamification include "Gadgets or devices are not available", "Application is not compatible with the device", "Time consuming" and "Classmates become unruly" with 4 or 27 percent of the responses. This is due to the fact that some of the students or their parents cannot afford smartphones for their children to use.

5. Crafted Learning Action Cell (LAC) Plan for Gamification
Learning Action Cell (LAC) Plan was developed by the researcher to enhance the teachers' competence in using gamification in teaching and learning process.

CONCLUSION

Based on the findings, the following conclusion were formulated:
1. The academic performance of both control and experimental group on their first quarter grade in Food and Beverage Services is equal before the start of the experiment.
2. The performance of control group in pretest is slightly advance compared to the experimental group. During posttest, students taught using gamification, gained advantage over those taught using the traditional approach. And based on the retention test scores of the students, experimental group advances more over control group.
3. There is no significant difference between the post-test result of the students who were taught using gamification and those taught in the traditional approach. Based on the retention test scores of the students, this shows that there is significant difference in the ability of the students taught using gamification and those taught in the traditional manner to retain lesson taught.
4. Problems encountered by the students in gamification comes in accessing different websites while the lesson is on-going, no or slow internet connection, no gadgets available, compatibility of the application to the device, time consuming and it makes the class unruly.
5. A Learning Action Cell (LAC) Plan was developed to enhance the teachers' competence in using gamification in teaching and learning process.

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