International Journal of Academic Multidisciplinary Research (IJAMR)
ISSN: 2643-9670
Vol. 5 Issue 8, August - 2021, Pages: 206-211

Teachers' Technology Integration in Teaching Home Economics during COVID-19 Pandemic

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Abstract: *The primary aim of this study was to determine the level of teachers' technology integration in teaching Home Economics subjects during the COVID-19 pandemic. To achieve this aim, the researcher used a sample of 3 school administrators, 6 Home Economics teachers, 63 senior high school students during the school year 2020-2021. To assess the teachers' technology integration, a validated questionnaire from Hosseini and Kamal (2012) entitled Instrument to Measure Perceived Technology Integration Knowledge of Teachers was used. Analysis of data revealed that the teachers' level technology integration was manifested at higher level - indicative of the teachers' capabilities to bring about desired outcomes of the student engagement and learning process using technology especially in the new normal. Based from the findings and conclusions of the study , the researcher hereby recommended that teachers may consider the further improvement of their technology integration from very satisfactory to outstanding rating. Attending webinars about the use of technology might not be enough but a hands-on and actual training may be of great help in order for them to acquire new technological skills. Specifically, they must equip themselves in designing their online classrooms and in solving technological problems through proper coaching and mentoring sessions with their Schools Division's Information Technology Officer.*

Keywords—Teachers' Technology Integration, Teaching Home Economics, COVID-19 Pandemic, Descriptive Study

1. INTRODUCTION

The COVID-19 pandemic traumatized the entire world. The economic conditions of the whole world suffered a lot, which resulted in increasing poverty and even the closure of many businesses that marked economic devastation and disruption of the balance of the country's economic welfare. The COVID-19 was found to begin in November 2019 with a severity acing since January 2020 and is still existing throughout the globe. COVID-19 is characterized as a disease caused by a new strain of coronavirus. 'CO' stands for corona, 'VI' for the virus, and 'D' for the disease. Formerly, this disease was referred to as '2019 novel coronavirus' or '2019-nCoV.' (UNESCO, WHO, January 2020).

The continuous increase of COVID-19 cases all over the country triggered the closure of all educational institutions. Consequently, it prompted education experts to change the learning pedagogies of teaching and learning that will prove to be sustainable with the current global health crises. Also, to ensure that knowledge would be possible even in the pandemic, the Department of Education (DepEd) developed policy guidelines (Basic Education-Learning Continuity Plan - BE-LCP) that would be used to sustain quality learning in times of pandemic.

Meanwhile, as a study stated, the global system of education today has to embrace the fast approaching Fourth Industrial Revolution, as the job soon to be available in the market is the product of the advancement of digital technology, artificial intelligence, automation and robotics[1]. However, they emphasize that related human abilities would still be pertinent as a sort of human capital needed for the industrial era. Thus, it posts a great challenge for principals and teachers to brace the fast-paced modern world, the changes and advances due to progress in technology. In fact, the primary role of a principal being the manager, instructional and curricular leader now has evolved to that of a technological leader.

The Department of Education (DepEd) pays attention to the call to teach 21st-century skills with the implementation of the K to 12 Basic Education Program. It is vital that the principal act as technology leaders and teachers as a channel for the students to gain the skills and knowledge for 21st-century learning[2]. Technology evolves much more quickly than other industries. Computer laboratories used to be the sign of a technically advanced school. Students carry much more powerful computers in their pockets. Digital tools offer an instrumental learning and engagement boost, but, especially in the classroom, schools need solutions that are easy to navigate while offering comprehensive classroom management.

The rapid acceleration of technological development has made the teaching and learning process more complicated with teachers. It is a challenge for the teachers and the principals in the 21st century to look for better ways of integrating technology in the classroom practices. Teachers who claimed to be student-centered, practicing constructivism and using technology in teaching still are considered strong or not innovative enough. Principals must be equipped with the ICT skills and knowledge to inspire and lead teachers to integrate technology in the teaching and learning processes, administration and management of the school.

Moreover, principals' technology leadership and how it influences teachers' technology integration has been the subject of different studies. A study revealed that there is a significant relationship between principals' technology leadership and teachers' technology integration [3]. In the Philippines, as earlier mentioned in the study, several older teachers and principals are still enjoying the profession. Undoubtedly, these educators and leaders are assets of the institution, and their experiences are beyond compare, which

definitely contributes to the shaping of teachers and other future leaders. The knowledge and expertise of these educators are very vital, yet to note the technology impairment is equally important in the education sector. There must be a detailed and comprehensive study that would bridge the gap of the teachers and principals equally with the competitive technological advancement in education.

It is at this point that the researcher is motivated to conduct this study with the intention of determining the level of the teachers' technology integration in teaching home economics subject during the COVID-19 pandemic.

2. RELATED WORKS

As mandated by the Department of Education (DepEd), technology must be integrated into the teaching and learning process. This indicates the innovation of the country's educational system as incorporated in the K to 12 Basic Education Program to be learner-centered, inclusive and research-based (RA 10533). To tap the potentials of the learners to become shapers of the future of the country, DepEd integrated four 21st century skills in the reformed curriculum, namely: Information, Media and Technology Skills, Learning and Innovation Skills, Effective Communication Skills and Life and Career Skills. The reform in the curriculum would like to develop learners to become "the whole person." Based on Republic Act 10533 or an Act Enhancing the Philippine Basic Education System by strengthening its curriculum and increasing the number of years for basic education, appropriating the funds therefor and other purposes. For this purpose, the State shall create a functional basic education system that will develop productive and responsible citizens equipped with the essential competencies, skills and values for both life-long learning and employment. In order to achieve this, the State shall give every student an opportunity to receive a quality education that is globally competitive based on a pedagogically sound curriculum that is at par with international standards.

A study affirm to come up with the same problem, the study showed that teachers are willing to employ the use of technology but due to lack of technology in the classrooms and lack of teachers' skill and knowledge on the newer technologies affects their willingness to use it in the classrooms [4]. If the teachers lack the skills and knowledge of technology, the principals' role as a mentor is necessary. But a study revealed that mentoring of the principal to make the teachers prepared for the technology integration were weak.

Teachers make a difference, and individual teachers do not always generalize the teaching profession as a whole. Teachers' preparation programs do not always share the respect to afford others professional preparation or economic rewards indeed across varied considerably. Practitioners needed to separate three streams in information technology. First, is the initial outsourcing decisions and its influences. Second, is the execution of the outsourcing contract and dynamics outsourcing relationships, and lastly, measurement of outsourcing results and long term organizational consequences of outsourcing, which are needed to identify theories and methods used. In 21st Century Competency a self-directed learner who questions, reflects, perseveres and takes responsibility for his own learning.

Students nowadays feel more comfortable with new technologies, which increase their motivation and, as a result, improve their academic performance. In the last two decades, the use of information communication technology has been increasing in many disciplines in higher education. Online learning or e-learning has been used and integrated into the curriculum around the world [5]. Previous claim was supported by a study, as they said that the use of multimedia driven instruction in college courses is an emerging practice designed to increase student s' knowledge. However, limited research has validated the effectiveness of using multimedia to teach students about functional behavioural assessments (FBAs) [6].

Moreover, in the studies about the use of multimedia in education [7], it has been reached that multimedia increases students' success, affects students' attitudes in the positive way and makes lessons more enjoyable and understandable. In this study, multimedia tools were used in social studies to contribute to the field. The study aimed to outline the effect of multimedia on the academic success of social studies students. New findings from research laboratories can inform the design and development of e-learning. However, much of this research published in technical journals is inaccessible to those who actually design e-learning material. By collecting the latest evidence into a single volume and translating the theoretical into the practical, e-Learning and the Science of Instruction has become an essential resource for consumers and designers of multimedia learning.

A study employed eye-tracking technology to investigate the effect of visual cues in multimedia-based, self-directed online instruction [8]. Eye tracking data such as fixation time, fixation count, and movement trails were collected to document how participants directed their attention during their online learning process. Compared with the learning experience without visual cue presence, this study provides empirical evidence on how visual cues affect online learners' learning pattern, learning experience, and learning outcome, and proposes tentative guidelines for designing effective multimedia instructional content for online or blended learning environments. Hence, multimedia instructions have more effect on learning achievement and retention of skills in craft practice. The study recommended that multimedia instructional tool is an effective tool for enhancing teaching and learning of practical skills in mechanical craft [9].

In this view, a study reinforced the importance of pedagogically sound instructional design, as it may especially benefit those with lower WMC and equate learning across working memory abilities [10]. A study made a strong claim that for multimedia to have any significant effect on education, the educational multimedia applications must be designed by the teachers of those classes [11]. The arguments supporting this claim are presented in the headlines: curriculum, software, hardware and evaluation. The paper started with an

introduction discusses what is a multimedia and a multimedia authoring tools and describes some typical areas of multimedia application development. Finally the paper ends with the action plan and concludes that we must and need as educator to create our own multimedia applications if we really want to make use of the multimedia applications as an effective tool in education.

In a study, differentiated instruction was provided through the use of three levels of storybooks and 6 of the students benefited from this differentiated instruction [12]. Results indicated that increased vocabulary development may be supported by the use of multimedia storybooks. The appropriate use of multimedia principles that include using pictures, images, and visualizations in general will positively influence student attention and learning [13]. A study provided evidence that multimedia demonstration may be suitable for administration of the TGMD-2 [14]. The also investigated efficiency of use of supplementary video content in multimedia teaching. Integrating video clips in multimedia lecture presentations may increase students' perception of important information and motivation for learning. Because of that, students can better understand and remember key points of a lecture. Those improvements represent some important learning outcomes. This research showed that segmentation of teaching materials with supplementary video clips may improve lecture organization and presentation in order to achieve effective teaching and learning.

Today's learners are new generation of diverse individuals with greater needs and demands for learning [15]. Indeed, because of this new breed of learners, educators are pushed to the limit and are challenged to adapt, innovate, and be creative in the teaching-learning process. The goal of teaching is not to impress but to be understood. However, teachers should be attuned with the new trend in conveying knowledge to students, hence, the creativity of the teacher is dared. This necessitates great impression to inspire and motivate learners. Traditional teachers today have different educational orientations in terms of instructional delivery that compel them to deal with the new breed of highly-technical individual learners.On the result of the relationship between the level of ICT proficiency of teachers and their extent of multimedia utilization it is concluded that that almost teachers in the district are satisfactory in their level of ICT proficiency and less often utilized multimedia resources in their classroom.

3. STATEMENT OF THE PROBLEM

The primary aim of this study was to determine the level of teachers' technology integration in teaching Home Economics subjects during the COVID-19 pandemic. Specifically, this sought answer to the following question:

1. How may the level of teachers' technology integration in teaching Home Economics subjects during the COVID-19 pandemic be described in terms of:
   - 1.1. technical knowledge;
   - 1.2. pedagogy knowledge;
   - 1.3. content knowledge;
   - 1.4. pedagogical content knowledge;
   - 1.5. technological pedagogical knowledge; and,
   - 1.6. technological pedagogical content knowledge?

4. METHODOLOGY

The researcher utilized an assessment type of research since this study aims to assess existing educational practice related to teaching and learning process. According to Creswell (2014), educational assessment or educational evaluation is the systematic process of documenting and using empirical data on the knowledge, skill, attitudes, and beliefs to refine programs and improve student learning. Specifically, this study aims to determine the technology integration of teachers in teaching Home Economics subjects during COVID-19 pandemic.

The respondents of the study involved 3 school administrators, 6 Home Economics teachers, 63 SHS students during the school year 2020-2021. The researcher involved these three groups of respondents to avoid bias and to perform triangulation of the data. The study used universal sampling technique wherein it involves the total population of Home Economics as the respondents.

To assess the teachers' technology integration, a validated questionnaire from Hosseini and Kamal (2012), in their study on Developing an Instrument to Measure Perceived Technology Integration Knowledge of Teachers was utilized. Further, this instrument has undertaken validation by experts. With regard to the reliability of the instrument, the Cronbach's alpha value was found to be .895. The alpha reliability of the instrument ranged from .851 to .906, indicating that the questionnaire had a good internal consistency. The instrument consists of fifty-three (53) items allocated to seven (7) categories corresponding to the components of Technology, Pedagogy, Content and Knowledge (TPCK). The seven components which serve as bases of the assessment include the following: technology knowledge, content knowledge, pedagogy knowledge, technological content knowledge, technological pedagogy knowledge, pedagogical content knowledge, and technological pedagogical content knowledge. Each criterion has statements that centered on the teachers' technology integration. The said criteria for teachers' technology are measured using a five-point scale.

The mode of the gathering was a questionnaire method. In gathering the data, the researcher followed the following procedures: (1) a letter was sent to the school principal to ask permission to conduct the study; (2) with the approval of the school principal, the researcher asked for the contact teacher in the school and then distribute the questionnaire link to the respondents through google forms.

The data were tabulated and processed using Statistical Packages for Social Sciences (SPSS). It is a versatile and responsive program designed to undertake a range of statistical procedures. Specifically, the researcher used the mean procedures and frequency schemes to analyze and interpret the data gathered.

The following ethical considerations was put into place for this research undertaking: (1) the dignity and well being of learners will be protected. They will not be harmed in any form or placed in an uncomfortable position; (2) the researcher will obtain from the parents and learners informed consent that includes essential information. They will also be informed that participating in the study is voluntary, ensuring no coercion or deception in participation; (3) the research data will remain confidential throughout the study; (4) the researcher will obtain the student's permission to write their real names on the survey to navigate their records at the said school more conveniently. They will also be informed that their names will not appear in the final output.

5. RESULTS AND DISCUSSIONS

The teachers' technology integration knowledge was assessed in terms of technical knowledge, pedagogy knowledge, content knowledge, pedagogical content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge.

Technology Integration Knowledge in terms of Technology Knowledge. Data analysis in Table 1 would show that the technology of teachers in terms of technology knowledge got a very satisfactory rating with an average score of 3.75. This was displayed by the ability of teachers to solve my own technical problems (3.90), learn about technology easily (4.11), keep up with important new technologies (4.13), frequently play around the technology (3.73), know about a lot of different technologies (3.57), have the technical skills they need to use technology (3.75), have had sufficient opportunities to work with different technologies (3.64), use technology tools to process data and report results (4.10), use technology in the development of strategies for solving problems in the real world (3.85), and to have the ability to design webpages and to use authoring software (2.87).

It cannot be denied that technology integration knowledge in terms of knowledge has a greater impact on the learners and even in the area of administrative requirements in compliance with the school principals. In fact, educational technology can provide valuable information and knowledge for students to have a related career as a subject of interest position in the future since many researchers agree that technology can be used effectively as a cognitive tool as well as an instructional media Undoubtedly, technology makes the learning process more interactive and, consequently, more exciting and memorable.

Technology Integration Knowledge in terms of Content Knowledge. Analysis of the data presented in Table 2 revealed that teachers' technology integration knowledge in terms of content knowledge got a very satisfactory as shown by 3.91 mean percentage score. This was manifested through six different indicators namely: that teachers have sufficient knowledge about (the particular content) (3.92), can use (the particular subject) as the way of thinking (3.97), have various ways and strategies of developing their understanding of (the particular content) (3.97), have sufficient knowledge about the structure of knowledge (the particular content) (3.85), know concept, facts, theories and procedure within the (the particular content) (3.85), and believe in the validity and reliability of the (the particular content) (3.90).

This result may be based on the Dep Ed's provision of training to all the teachers. Simply, the training is not necessarily intended for the students, but there are jobs that require the processing of the students' data that are accomplished using technology. Part of the ongoing challenge in the education system is the rapid evolution and availability of technologies. School boards make decisions about which technologies are permissible and available, and from those, teachers are ultimately left to make decisions regarding which technologies they will incorporate into their classrooms.

Technology Integration Knowledge in terms of Pedagogy Knowledge. In Table 3, it was shown that the technology integration knowledge of teachers in terms of pedagogy knowledge got a very satisfactory with an average score of 4.24. This was specified by ability of teachers to know how to assess student performance in the classroom (4.30), adapt their teaching based -upon what students currently understand or do not understand (4.20), can use a wide range of teaching approaches in a classroom setting (collaborative learning, direct instruction, inquiry learning, problem/project-based learning etc.) (4.21), familiar with common student understandings and misconceptions (4.12), know how to organize and maintain classroom management (4.30), can assess student learning in multiple ways (4.25), and can adapt their teaching style to different learners (4.27).

The majority of the teachers are switched-on in terms of technology. Yet, A teacher must not be contented with this positive finding. The negative situation on teachers' integration in pedagogy knowledge occurs. A major part of the problem related to technology integration is that most educators have not addressed the pedagogical principles that will guide their use of technology for teaching and learning. The intricate relationship between technology and pedagogy has not been adequately explored. As teachers explore the process of technology integration and search for ways that can be effectively accomplished, they will develop the rationale to examine the appropriateness of the technologies they are using and whether such technologies are compatible with their lesson plan and learning outcomes. The process of exploring the relationship between technology in education and pedagogy could encourage critical thinking on the part of teachers as they practice technology integration.

Technology Integration Knowledge in terms of Technological Pedagogical Knowledge. The data in Table 4 revealed that the technology integration in terms of technological pedagogical knowledge got a very satisfactory as shown by the average score of 4.10. This technology integration was demonstrated by the following practices of teachers to choose technologies that enhance the teaching approaches for a lesson (4.18), choose technologies that enhance students' learning for a lesson (4.14), think critically about how to use technology in their classroom (4.06), adapt to the use of the technologies that they learn about different teaching activities (4.11), that their teacher education program

has caused them to think more deeply about how technology could influence the teaching approaches they use in the classroom (4.02), use technology resources to facilitate higher-order thinking skills, including problem-solving, critical thinking, decision-making, knowledge and creative thinking (4.13), use technology tools and information resources to increase productivity (4.13), infuse technology to strategies of teaching (4.07), use technology for more collaboration and communication among students and with the teacher too (4.04), and to know how to use technology to facilitate academic learning (4.11).

The result implied that the teachers demonstrate technology integration in technological pedagogical knowledge. The finding is expected of a teacher, particularly in the public schools, where the processing of documents was managed through technology as mandated by the agency through the principals down to the teachers. Explicitly, in teaching, students must also be exposed by technology integration in terms of pedagogy.

Technology Integration Knowledge in terms of Pedagogical Content Knowledge. It may be gleaned in Table 5 that the teachers' technology integration knowledge in terms of pedagogical content knowledge got a very satisfactory as shown by 4.11 mean percentage score. Specifically, it indicated that teachers know how to select effective teaching approaches to guide student thinking and learning in (the particular content) (4.10), know the purposes and objectives for (the particular content) (4.16), able to manage my students' learning about (the particular content) (4.15), have the curricular knowledge (horizontal and vertical) of (the particular content) (4.05), know instructional strategies that are suitable for the topic (content) (4.13), and know prior knowledge of students about (the particular content) (4.08), know how and what to assess (the particular content) (4.13).

By simultaneously integrating knowledge of technology, pedagogy and content, expert teachers bring Technology Pedagogy and Content Knowledge (TPCK) into play any time they teach. Each situation presented to teachers is a unique combination of these three factors, and accordingly, there is no single technological solution that applies to every teacher, every course, or every view of teaching. Rather, solutions lie in the ability of a teacher to flexibly navigate the spaces defined by the three elements of content, pedagogy, and technology and the complex interactions among these elements in specific contexts.

Technology Integration Knowledge in terms of Technological Pedagogical Content Knowledge. It may be perused in Table 6 that the technology integration knowledge of teachers in terms of technological pedagogical content got a very satisfactory as shown by the average score of 4.03. This practice reveals that teachers can teach lessons that appropriately combine (the particular content), technologies and teaching approaches. (4.08), can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn (4.10), can use strategies that combine (the particular content), technologies and teaching approaches that I learned about in my coursework in my classroom (4.08), can provide leadership in helping others to coordinate the use of (the particular content), technologies and teaching approaches at my school and/or district (3.99), can choose technologies that enhance the learning of (the particular content) for a lesson (4.03), can evaluate and select new information resources and technological innovations based on their appropriateness to specific tasks in (the particular content) (4.02), and can use (the particular content)-specific tools (e.g., software, simulation, environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research (3.94).

Ignoring the complexity inherent in each knowledge component or the complexities of the relationships among the components can lead to oversimplified solutions or failure. Thus, teachers need to develop fluency and cognitive flexibility not just in each of the key domains (T, P, and C), but also in the manner in which these domains and contextual parameters interrelate so that they can construct effective solutions. This is the kind of deep, flexible, pragmatic, and nuanced understanding of teaching with technology we involved in considering TPCK as a professional knowledge construct.

6. CONCLUSIONS

Based from the findings of the study, the researcher hereby conclude that the teachers' level technology integration was manifested at higher level - indicative of the teachers' capabilities to bring about desired outcomes of the student engagement and learning process using technology especially in the new normal. In this view, teachers recognize that in facing the 21st century, they need to respond to the call for change. They need to recognize the necessity of further honing their knowledge and skills in the use of educational technology resources in teaching and learning process. The ultimate goal of technology integration is to redefine teachers instructional modality, and this means changing the the landscape of classroom instruction, from the traditional chalk-talk board method to the more interesting use of educational technology resources in the teaching and learning process.

Facing the challenges of the new global system also requires advancement in technological laboratory facilities and equipment. Computer laboratories used to be the sign of a technically advanced school. The need to upgrade technology resources in schools like computers, laptops, digital cameras, internet, software applications, and the like is a big challenge to technology leaders in order to produce significant improvement in the delivery of instruction in teaching Home Economics subjects even with a limited face to face engagements with the students.

7. RECOMMENDATIONS

Based from the findings and conclusions of the study, the following recommendations are hereby offered: that teachers may consider the further improvement of their technology integration from very satisfactory to outstanding rating. Attending webinars about the use of technology might

not be enough but a hands-on and actual training may be of great help in order for them to acquire new technological skills. Specifically, they must equip themselves in designing their online classrooms and in solving technological problems through proper coaching and mentoring sessions with their Schools Division's Information Technology Officer.

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