

Appraisal of the technology and livelihood education-information and communication technology in the new normal

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ABSTRACT

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Online learning and modular learning have been promoted more and more deeply as a response to the issues of learning continuity during school closure due to the global pandemic. This study aims to determine the status of utilizing online and modular learning in the new normal in teaching Technology and Livelihood Education-Information and Communication Technology (TLE-ICT). Participants were two sections of grade 8 students: 42 under the modular learning modality and 42 under the online learning. T-tests on independent samples were conducted to determine if there were significant differences in the participants' academic performance between the modular or online learning modalities in TLE-ICT. Based on the findings, learners in modular learning have higher marks than those in online learning. However, various factors may contribute to the difference in the student's performance in both modalities. It is recommended that parents and learners in modular learning be oriented to the importance of learning and gaining skills rather than grades.

1. Introduction

In the new normal situation brought about by the global pandemic, technology in the academe and daily life became necessary to continue life moving forward. In line with this, the Department of Education (DepEd) mandated all schools to adhere to IATF or Inter-Agency Task Force Standards for the Management of Emerging Infectious Diseases. To ensure the students' safety, the DepEd Philippines issued DepEd order no. 014 s. 2020 about the Guidelines on the Required Health Standards in Basic Education Offices and Schools (DepEd Order, 2020). Schools are scrambling to set up the necessary digital and technical infrastructures to support any virtual learning model they adopt.

Technology plays a vital role in learning and teaching. Technology such as laptops, computers, and the internet catches the learners' interest (Durmus & Karakirik, 2006; Galvis, 2012). Using technology in the classroom motivates students and teachers and improves achievements (Halat & Peker, 2011). Online education has been heavily promoted since the outbreak of the pandemic as a way to overcome the difficulties of maintaining student learning when schools are closed. Zoom is now well-known due to videoconferencing, which is being utilized to replace classroom instruction. As instruction continues in their online classrooms' virtual spaces, access to videoconferencing tools and learning management systems has increased significantly. Online education has proven to be a very effective method for lifelong learning.

While some schools have done it successfully, others have encountered serious problems and objections from pupils, parents, and instructors. Teachers who are highly competent technology users tend to be more confident and have less anxiety regarding computer use (Halat & Peker, 2011). However, the technology's effectiveness depends on the teacher's understanding of technology's use (Li & Ma, 2010; McCulloch, Hollebrands, Lee, Harrison, & Mutlu, 2018). According to Li and Ma (2010), technology positively impacts students' attitudes toward learning. Also, it enhances critical thinking skills and problem-solving skills.

On the other hand, Technology and Livelihood Education (TLE) is a subject that has the potential to make meaningful contributions to society by addressing pressing issues like unemployment, poverty, and malnutrition (Hollweck & Doucet, 2020). The learning process of TLE, which aims to instill practical skills among learners, traditionally relies on face-to-face teaching methods. Since the education system needs to ensure the health and safety of the learners, multiple modalities are introduced in the new normal teaching-learning process: modular, television-based, radio-based instruction, blended, and online. All these modalities require the use of technology. However, introducing these modalities has posed two major challenges for TLE-ICT teachers and students. Firstly, teachers need to find effective ways to teach skills to learners through the different modalities, and secondly, students face difficulties in performing tasks and activities. The obstacles and limitations of teaching the TLE-ICT specialization course have been substantial, making it challenging. Furthermore, distance learning modalities present a challenge in accessing teaching-learning resources typically available in a classroom setting (Pura & Galicia, 2022).

Thus, this paper aims to determine the difference in the student's academic performance using different modalities, online learning, and modular learning. These modalities were used as a tool in the delivery of instruction in Technology and Livelihood Education-Information communication technology of the Grade 8 learners.

2. Theoretical background

The Situated Cognition Theory, which contends that a person's cognitive development is influenced by their unique environment, served as the study's theoretical foundation. Learning activities, material, and cultural background all relate to how well someone learns. The entire circumstance, encounter, or setting is called the context. In other words, context describes the social setting where a specific activity occurs and is required for social conduct. The theory highlights the impact of social interaction and communal life on one's cognitive development (Barton, McKellar, & Maharg, 2000). Traditional education involves reading books and lectures, which are abstract, out-of-context experiences. Contrarily, situated learning proposes that learning occurs through interpersonal connections and integrating past information with authentic, informal, and frequently unintentional contextual learning. In this case, the role of the pupil shifts from a novice to an expert. They become more involved and active in the social setting, where learning frequently occurs "unintentionally rather than deliberately." As a result, cooperation and "sharing purposeful, patterned activity" enable the social group to develop and learn (Reed et al., 2010).

On the other hand, the Symbol System Theory offers valuable insights into the diverse influences of media on the learning process (Ouyang & Stanley, 2014). This theory posits that various media employ distinct symbol systems, and these systems significantly impact how information is conveyed and the overall effectiveness of learning. Crucially, there is an emphasis on the media's capacity to facilitate effective learning upon the harmonious alignment between the symbol systems and the learners' specific learning content and activities. This alignment is central to optimizing the benefits of multimedia computation and has profound implications for its

development and application in educational contexts. By considering the symbiotic relationship between media symbol systems and learners' needs, Symbol System Theory lays a robust theoretical groundwork for enhancing the efficacy of multimedia-based learning approaches (Salomon, Perkins, & Globerson, 1991). The Technical-Vocational Education (TVE) in Technology and Livelihood Education (TLE) centers on the comprehensive development of technical skills across various disciplines. Within the exploratory phase (Grades 7 and 8), TLE incorporates five fundamental competencies, which are in accordance with the training regulations set forth by the Technical Education and Skills Development Authority (TESDA). These competencies encompass measurement and calculation, technical drafting, utilization of tools and equipment, maintenance of tools and equipment, and occupational health and safety. At the same time, Entrepreneurship Education-based TLE underscores the acquisition of essential life skills, organized into three domains: Personal Entrepreneurial Competencies, Market and Environment, and Process and Delivery. Notably, the five common competencies prescribed by TESDA are integrated into the Process and Delivery domain (DepEd Order, 2012).

TLE is crucial in fostering individuals' productivity within the contemporary workforce. By selecting a specific career path and subsequently pursuing technology and livelihood skills pertinent to that domain, students significantly enhance their prospects of success in their chosen career endeavors. Essentially, Technology and Livelihood Education encompass the essence of career training. Students must identify their preferred career path to embark on livelihood training effectively. Opting for educational institutions specializing in the skills associated with their chosen industry or field is an excellent approach to receiving top-notch livelihood training. In the present digital age, acquiring technological proficiency has become more accessible, even for individuals in later stages of life. Technology can simplify livelihood training with the aid of computers, recorders, gadgets, and cell phones, which expedite gathering information related to livelihood training. Such resources facilitate more efficient and effective learning experiences, enabling learners to obtain knowledge in a shorter span. According to Cavanagh and Mitchelmore (2011), teachers can manipulate computers to think it is practical for learners.

Moreover, Chen, Star, Dede, and Tutwiler (2018) state that technology activity does not make a difference, but how the teachers make the students experience the technology matters. A study also explains that teachers' views about technology are essential to students' success or failure (Quinlan, 2019). Without technology, students taking the exam will consume a lot of time. Therefore, it is essential to explore and discover the technology itself.

3. Methodology

3.1. Design

This study employed a pre-post test quasi-experimental design. Dependent measures were collected at two points for the two groups. Pretest measurement occurred during the first week of classes to test if both groups had similar academic performance before the pandemic. Posttest measurement occurred during the end of one grading period to check for no significant difference in their academic performance using the online and modular modalities in TLE-ICT.

3.2. Data gathering procedure

A survey was administered to determine the profile of the learners in the different modalities. Data mining was done to gather the pre-pandemic learners' academic performance in both groups to determine no significant difference. After establishing that both groups are performing similarly, both groups have undergone three months or one grading period of classes, examinations, and performance tasks.

After obtaining one grading period grade for online and modular learning, the data were analyzed using a T-test to test the significant difference. Results were then interpreted, and the findings, conclusion, and recommendations and formulated.

3.3. Participants

The study was conducted on the grade 8 learners of TLE-ICT. There were 42 learners using the online modality and 42 learners using the modular modality. After the initial validation that both groups performed equally on their pre-pandemic learners' academic performance in TLE, these groups were chosen to participate.

The demographic characteristics of the participants are presented in Table 1, age and gender; Table 2, combined monthly family income; and Table 3, availability of devices used.

Table 1

Age and gender of the participants

Age in years	Modular				Online			
	Male	Female	Total	%	Male	Female	Total	%
17 - 18	0	1	1	1.19	1	1	2	2.38
15 - 16	1	3	4	4.76	1	0	1	1.19
13 - 14	12	25	37	44.05	11	28	39	46.43
Total	13	29	42	50	13	29	42	50

Table 1 revealed that most TLE-ICT learners enrolled in online and modular learning modalities were female. Most participants who utilized both approaches belonged to the age bracket of 13 - 14 years old, which comprised 88.10% of modular learning and 93.86% of online learning of the sample size. According to the 2020 Global Gender Gap report of the World Economic Forum (WEF), 71.3 percent of women are enrolled in secondary education and 40.4 percent in college, compared to only 60.2 percent and 40.4 percent, respectively, among men. This is evident with the sample size of the participants gathered in this study.

Table 2

Combined monthly family income

Combined Monthly Income	Modular		Online	
	f	%	F	%
20,000 and above	4	4.76	7	8.33
10,001 - 20,000	4	4.76	12	14.29
5,001 - 10,000	14	16.67	13	15.48
below 5,000	20	23.81	10	11.90
Total	42	50	42	50

Table 2 shows that in the TLE-ICT modular learning modality, most participants have their family's monthly combined income of below P5,000, comprising 47% of the sample size. In addition, most learners who employed the online modality have a combined monthly family income belonging to the bracket of 5,001 - 10,000, comprising 31% of the sample size. Notably, most learners under the online modality have a combined family income of 5001 and above. In

contrast, the learner in modular learning has a higher number of learners whose family is earning below 5,000.

Table 3

Availability of devices

Availability of Devices Used	Modular		Online	
	F	%	f	%
Cellphone (Smartphone)	40	95.24	42	100.00
Personal Computer	2	4.76	12	28.57
Laptop	1	2.38	15	35.71
Internet Connection	11	26.19	23	54.76

Table 3 presents that most TLE ICT learners enrolled in either modular learning or online learning modality participants have their respective smartphones, comprised of 95% and 100%, respectively. Additionally, more than half of the learners who used the online learning platform have an internet connection (55%), while only 26% of the participants are in modular learning. The two participant groups also have a higher difference between personal computers and laptops. In the online learning set-up, 29% percent of the participants have a personal computer, and 36% have laptops at home. In contrast, a small percentage of the participants who utilized modular learning have a laptop and personal computer, comprising 5% and 2%, respectively. Technology such as laptops, computers, and the internet are essential materials for online learning since teachers will send activities and materials asynchronously or synchronously.

3.4. Statistical treatment of data

The results of the two participant groups enrolled in the TLE-ICT class were statistically described using the frequency distribution of the learners' academic performance. T-test for the independent sample was utilized to determine if there was no significant difference in the participants' academic performance during the learners' online and modular learning.

4. Results

This section presents the participants' academic performance in TLE-ICT in their respective modalities of the new normal learning: modular or online.

Table 4

Academic performance of the participant groups during the new normal class

Grades	Modular Learning				Online Learning			
	Normal		New Normal		Normal		New Normal	
	<i>f</i>	%	<i>F</i>	%	<i>f</i>	%	<i>f</i>	%
90 - 100 (Outstanding)	8	19.05	16	38.09	5	11.90	2	4.76
85 - 89 (Very Satisfactory)	12	28.57	14	33.33	15	35.71	20	47.62

Grades	Modular Learning				Online Learning			
	Normal		New Normal		Normal		New Normal	
	<i>f</i>	%	<i>F</i>	%	<i>f</i>	%	<i>f</i>	%
80 - 84 (Satisfactory)	18	42.86	8	19.05	15	35.71	7	16.67
75 - 79 (Fairly Satisfactory)	4	9.52	4	9.52	7	16.67	13	30.95
Total	42	100	42	100	42	100	42	100

Table 4 presents the TLE-ICT learners' academic performance in both pre-pandemic (normal) and during the pandemic (new normal). Before the pandemic outbreak or the usual face-to-face classes, most students in both modalities had been performing satisfactorily or very satisfactorily. Modular learners had 18 (42.86%) who were satisfactory, while 12 (28.57%) were very satisfactory. Of the online learners, 15 (35.71%) had satisfactory and very satisfactory grades.

However, during the new normal learning, there was an increase in the number of learners who obtained grades that belonged to the outstanding (16 participants or 38.09%) and very satisfactory (14 participants or 33.44%) in modular learning. While in online learning, a decrease in the number of outstanding learners was observed. There was an increase of very satisfactory (20 participants or 37.62%) and fairly satisfactory (13 participants or 30.95%). The increase in very satisfactory grades may be due to the decrease in students who obtained outstanding grades. The same is true with the increase in the number of students who obtained fairly satisfactory grades due to the decrease of students who received satisfactory grades.

Table 5

t-Test analysis on the difference between the academic performance of the participant groups in the modalities of the new normal

Group		Mean	<i>t</i> -value	<i>p</i> -value	Findings
New Normal	Modular Learning	87.14	1.89	0.03	Significant
	Online Learning	82.98			

As reflected in Table 5, the result shows a significant difference between modular and online learning in this new normal TLE-ICT education. In the comparison, learners who took the modular learning had a higher mean of 87.14 compared to the learners in the online learning with 82.98. This was due to a higher score of the learners of modular learning in the worksheets and home tasks compared to the scores of the learners of online learning.

5. Discussion

Table 4 presents the academic performance of the participants in both modalities. Learners in modular learning perform better than learners in the online learning modality in TLE-ICT. Several factors may have caused the decrease in the student's academic performance. Abante et al. (2021) found that there are various problems encountered in the new learning modalities, such as poor internet connection of both teachers and students, parents' financial status, unresponsive students and parents, coping mechanisms of students in terms of modular modalities and the lack of students' resources, specifically gadgets that can be used for online learning. Spencer and

Temple (2021) presented that students fared better academically in face-to-face classes compared to online. In addition, Kofoed, Gebhart, Gilmore, and Moschitto (2021) found that students in online courses performed worse than their peers in face-to-face classes. While the research to date supports the likely negative impacts of the abrupt shift to online or modular learning, it is also worth noting that there are several reasons why the magnitude of this effect may have been not as profound as some might expect. For instance, the combined shift to online or modular learning may substantially increase students' time to invest in their studies.

On the other hand, Table 5 results showed a significant difference between the learners' academic performance in the two modalities. Additionally, the learners in the modular modality have higher marks than those in the online learning modality. These findings did not align with the social cognitive theory and the symbol system theory since learners in TLE-ICT especially those enrolled in online learning, are exposed to various technologies. Thus, they were expected to perform better than the modular learners. These scores in modular learning may be affected by several reasons, such as the inclusion of the answer key in the learning modules received by the learners. Aside from that, there is a high chance of other individuals answering the modules on behalf of the learners. However, parents and guardians were advised that the learners should do modules. Parents' and guardians' contribution is limited to explaining and checking learners' progress in answering the modules. On the other hand, learners enrolled in the online modality were required to take examinations while turning on their cameras. This is to ensure that learners are honestly taking examinations on their own.

6. Conclusion

The study aims to determine the status of utilizing online and modular learning in the New Normal in teaching TLE-ICT. This study used the descriptive method of research. It utilized survey questionnaires for the participants and data from the school records of their academic performance before the pandemic. Learner participants were in modular and online sections, taking up TLE-ICT in grade 8. Data gathered were analyzed. The T-test results showed a significant difference between modular and online learning. Based on the findings, learners in modular learning have higher marks than those in online learning. However, several factors would serve as the reason for the increase in the learners' marks, such as the presence of the answer sheets in the modules given to them weekly. On another note, the academic performance of the TLE ICT online class and the face-to-face classes does have a significant difference since both have a class interaction with the teacher and supervision in answering examinations and activities.

7. Recommendations

Based on the study's findings, it is recommended that future researchers utilize the experimental research design to control other contributing factors that could have affected the results of the survey and the quasi-experimental study. This will give a different perspective on the issue of concern and specify the aspects of the teaching approach or modality that could have contributed to the research study's results.

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