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Technology Usage and Learning Outcomes of Students in the New Normal: Basis of Learning Continuity Plan

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Abstract. Technology in education plays a vital role, especially during the COVID-19 pandemic. Teachers can harness online learning as a powerful educational tool by integrating technology into existing curricula. Thus, this study determined the extent of technology usage and learning outcomes of the students in the different subjects in terms of the most essential learning competencies (MELCs). Moreover, significant differences and relationships were explored for further analysis. The results revealed that most of the students used technology to search and study their lessons, watched DEPED TV episodes to learn, participated in online courses, and answered modules. Additionally, usually installed apps on their phones, but they were unlikely to listen to the radio. As such, the student's learning outcomes are significantly high across subject areas despite of difficulties experienced. Relatively, highly significant differences and relationships were seen in some areas in terms of variables for both usage and learning outcomes. Therefore, technology is a factor in education. It is then recommended to utilize the continuity plan for improvement.

Keywords. *Education, Technology usage, Learning Outcomes, Descriptive- correlational, Philippines*

1. Introduction

Today, technology in education plays a vital role, especially during the COVID-19 pandemic. Teachers can harness online learning as a powerful educational tool by integrating technology into existing curricula [1]. Through this, the Department of Education designed a learning continuity plan amidst today's COVID-19 pandemic. It sought to ensure students' learning progress even amidst disasters such as natural calamities, storms, fires, and pandemics. Additionally, one of the Learning Continuity plans in this pandemic is the innovative use of technology for distance learning because there is a need to innovate and use current technologies [7].

The researcher's observation in a Public High School is that the poor economic status of their parents became a hindrance to purchasing good-quality gadgets or 50% of them had gadgets used for blended and flexible learning during the pandemic. This added to the problem of inadequate and unstable connections. During this pandemic, the high school students must be able to apply technology for learning. Digital skills prepare students to work, live, and

contribute to their communities. The students should meet the following standards and performance indicators: creativity and innovation, communication and collaboration, research and information fluency, critical thinking, problem-solving, decision-making, digital citizenship, and technology operations and concepts.

The purpose of this study was to determine the gap among the students in using educational technology and also to develop a better understanding of the expectations that schools have for students regarding the use of technology, the level of access students have outside of school, and whether students feel they have adequate access to and training in the appropriate technologies to meet the expectations of their teachers and school.

2. Methodology

This study used a descriptive-correlational research design to determine the extent of the technology usage and its learning outcomes in the new normal. Additionally, the respondents were 410 Grade 10 students at a Public National High School enrolled for the school year 2021-2022. A self-made questionnaire was used to gather data regarding the demographic profile of the students, the technology usage by the teachers and learners in the delivery of instruction, and the level of students' learning outcomes. The self-made questionnaire was checked and validated by the experts.

Frequency count and percentage distribution were used to determine the socio-demographic profile of the respondents. Likewise, mean, and standard deviation was used to measure the level of technology used by the learners and the level of learning outcomes of grade-10 students. Additionally, One-way ANOVA was used to measure the significant differences in technology usage and learning outcomes when grouped according to their socio-demographic profile. Finally, Spearman's rho was used to measure the significant relationships between the extent of technology usage and the level of learning outcomes.

3. Results and Discussion

Table 1.Extent of Technology Use

Subjects	**Mean**	**SD**	**DI**
Filipino	3.37	**0.87**	**H**
English	3.64	**0.73**	**H**
Math	3.77	**0.75**	**H**
Science	3.72	**0.73**	**H**
Aral Pan	3.64	**0.73**	**H**
ESP	3.67	**0.72**	**H**
TLE	3.70	**0.74**	**H**
MAPEH	3.74	**0.88**	**H**
As a whole	3.70	**0.63**	**H**

Table 1 presents the data to answer the problem of the extent of technology, and media utilization of the respondents in terms of Electronics Device/s used for Internet Connectivity and Learning Platforms. The results showed that technology usage was High Extent across all subject areas.

It was analysed that such technology enhances student learning motivation and attention since it implicates students in the practical processes of language learning via communication with each other. It recommended the use of multi-media technology in classrooms, particularly as its positive impact on the learning process aligns with the ongoing efficacy of the teacher [22]. Likewise, integration of technology into secondary education mathematics classes has been shown to increase student motivation and performance. In order for technology to be a

component of students' education, teachers must have training on various technologies available for their subjects of [26].

In a qualitative case study, it reported that the teacher used innovative technological techniques to engage students with the curriculum [28]. Moreover, mastering the Learning Competencies in Araling Panlipunan is expected to contribute to the development of a holistically developed citizen who is aware and knowledgeable of and critically analyses current social issues and concerns in the local as well as in global level. This awareness is an enlightened one and so leads him/her to respond ethically and participate actively in the resolution of these issues and concerns [18].

As mentioned, Educators know the benefits of ICT based materials in teaching. Despite this, many of them are resistant in using and integrating these technologies in teaching. This issue is due to several factors lack of time, lack of infrastructure, and tools to support the teachers and the learners more effectively. The lack of ICT skills is a common problem which can be addressed by having the personal desire to develop oneself. Some of the traditional teachers experienced difficulties in using ICT based instructional materials in teaching Edukasyon sa Pagpapakatao [6].

Indeed, the prospect of competent TVET teachers will bring about the needed manpower development in related fields of science and technology and will advance career opportunities by producing competent workforce who will drive dynamic economic growth and development [28]. Therefore, it could be argued that the competent TVET teacher means a teacher with sufficiency of skills, knowledge, and attitude or behavior. By extension these attributes can be regarded as competencies that teachers need to achieve academic outcomes.

MAPEH teachers use varying instructional materials and modes of assessments, pupils are expected to perform. Considering that it is composed of Music, Art, PE, and Health as learning components, it is obvious that grades would depend heavily on performances. There are teachers who have identified other Classroom Assessment Techniques [24].

Table 2.Extent of learning Outcomes

Subjects	**Mean**	**SD**	**DI**
Filipino	3.78	**0.76**	**H**
English	3.74	**0.74**	**H**
Math	3.62	**0.81**	**H**
Science	3.67	**0.86**	**H**
Aral Pan	3.73	**0.79**	**H**
ESP	3.78	**0.76**	**H**
TLE	3.74	**0.77**	**H**
MAPEH	3.73	**0.78**	**H**
As a whole	3.72	**0.67**	**H**

Table 2 discusses the extent of Learning outcomes in terms of subject areas. Also, this uses mean and standard deviation as tools. Lastly, this uses very low to very high to determine the extent of results. As such, results revealed a high extent learning outcome.

Students are bored in learning a Filipino subject if the teacher is not fluent in his/her teaching [9]. Additionally, it was found that computer-based communication is a beneficial feature for language learning. Computer-assisted discussion tend to feature more equal participation than face to-face discussion. Teachers or a few outspoken students are less likely to dominate the floor, resulting in class discussions that are more collaborative [21].

It also indicated the TPACK framework had failed as a concrete evaluation tool for effectively measuring how teachers combine the three areas when integrating technology in the

math classroom due to the complexity of countless variables. Also, this study looks more closely at how teachers used existing technology, a more feasible approach to first demonstrating to school districts the difference an investment in training teachers could make [12].

In science and technology education, it is important for students to structure their knowledge with technology-supported activities enabling them to be active in the course [3]. This awareness is an enlightened one and so leads him/her to respond ethically and participate actively in the resolution of these issues and concerns [19].

This study of Prospero (2022) focuses on the tenth-grade students' significant learnings, challenges, and coping mechanisms by investigating their learning experiences in Edukasyon sa Pagpapakatao (EsP) using self-learning modules. This result verifies the findings on the competencies of technology and livelihood education (TLE) instructors as input to a training module in Industrial Arts [10].

In addition, studies have shown that incorporating technology in the classroom can increase the learning, achievement, and motivation of students [25]. Music teachers use technology to facilitate multiple methods of learning, save valuable class time, and extend the reach of the instructor beyond the classroom walls—such as in practice and remote learning environments.

Table 3a. Different analyses on the extent of technology usage when grouped according to age.

Technology Usage	Age	Mean	T-computed value	Significance Value	Interpretation
Filipino	< 16	3.65	-2.782**	0.006	Highly significant
	16 >	3.91			
English	< 16	3.61	-1.487	0.138	Not significant
	16 >	3.72			
Mathematics	< 16	3.72	-2.012*	0.045	Significant
	16 >	3.88			
Science	< 16	3.71	-.618	0.537	Not significant
	16 >	3.75			
Araling Panlipunan	< 16	3.61	-1.473	0.142	Not significant
	16 >	3.72			
Edukasyon sa Pagpapakatao	< 16	3.59	-3.817**	0.000	Highly significant
	16 >	3.88			
TLE	< 16	3.64	-2.661**	0.008	Highly significant
	16 >	3.85			
MAPEH	< 16	3.70	-1.578	0.115	Not significant
	16 >	3.85			
As a whole	< 16	**3.65**	**-2.491**	**0.130**	**Not significant**

Table 3a revealed a highly significant difference in technology usage in Filipino, ESP, and TLE when grouped according to age. This implies that the presence of technology affected learning in this new normal. This implies that the respondent's age does not affect the technology usage in most essential learning competencies in the new normal.

An explanation for the age differences in the utilization of ICT resources is that younger lecturers are less concerned with scholarly work and may have little or no duty to communicate with the family [16].

Table 3b. Different analyses on the extent of technology usage when grouped according to sex.

Technology Usage	Sex	Mean	T-computed value	Significance Value	Interpretation
Filipino	M	3.74	.265	0.791	Significant
	F	3.72			
English	M	3.73	1.945	0.052	Significant
	F	3.59			
Mathematics	M	3.91	2.915*	0.004	Highly Significant
	F	3.69			
Science	M	3.72	-0.082	0.934	Not Significant
	F	3.72			
Araling Panlipunan	M	3.70	1.307	0.192	Not Significant
	F	3.61			
Edukasyon sa Pagpapakatao	M	3.72	0.889	0.375	Not Significant
	F	3.65			
TLE	M	3.78	1.540	0.124	Not Significant
	F	3.66			
MAPEH	**M**	**3.92**	**2.987****	**0.003**	**Highly Significant**
	F	**3.65**			
As a whole	**M**	**3.78**	**1.796**	**0.073**	**Not Significant**
	F	3.66			

Table 3b revealed a highly significant difference in the extent of technology usage in Math and MAPEH when grouped according to Sex. This implies that the presence of technology affected learning in this new normal. This implies that the respondent's sex does not affect the technology usage in most essential learning competencies in the new normal.
In Ogun State, Nigeria revealed also that male students showed higher levels of satisfaction with ICT and other academic facilities than their female counterparts [17].

Table 3c. Different analyses on the extent of technology usage when grouped according to Section.

Technology Usage	T-computed value	Significance Value	Interpretation
As A Whole	**5.735****	**0.000**	**Highly Significant**

Table 3c reveals a highly significant difference in the extent of technology usage when grouped according to Section. This implies that technology usage affected the learning of each section in this new normal. This verified that using technology to deliver the topic affected their knowledge.

Table 3d. Different analyses on the extent of technology usage when grouped according to Father's monthly income.

Technology Usage	T-computed value	Significance Value	Interpretation
As A Whole	**8.631**	**0.000**	**Highly Significant**

Table 3d reveals a significant difference in technology usage when grouped according to fathers' monthly income. This implies that technology usage affected the learning of each father's monthly income in this new normal. This reveals that whatever their father's income can support their studies and have the technology to be used in attending class as the new normal of education is being implemented.

Table 3e. Different analyses on the extent of technology usage when grouped according to Mother's monthly income.

Technology Usage	T-computed value	Significance Value	Interpretation
As A Whole	**5.879****	**0.000**	**Highly Significant**

Table 3e reveals a highly significant difference in technology usage when grouped according to the mother's monthly income. This implies that technology usage affected the learning of each mother's monthly income in this new normal. This reveals that their mother's income can affect their studies in attending classes as the new normal of education is being implemented.

Table 3f. Different analyses on the extent of technology usage when grouped according to the General Percentage average.

Technology Usage	T-computed value	Significance Value	Interpretation
As A Whole	**5.352****	**0.001**	**Highly Significant**

Table 3f reveals a highly significant difference in the extent of technology usage when grouped according to the general percentage average. This implies that technology usage affected the general percentage average of the learners in this new normal. By attending classes online or offline, technology is needed to support learning.

Table 3g. Different analyses on the extent of technology usage when grouped according to Budget For Internet.

Technology Usage	T-computed value	Significance Value	Interpretation
As A Whole	**2.384****	**0.038**	**Highly Significant**

Table 3g reveals a significant difference in the extent of technology usage when grouped according to Budget for Internet. This implies that technology usage affects the Budget for the Internet of learners in this new normal. By attending classes online or offline, there is a need to have a budget to support the learning.

Table 3h. Different analyses on the extent of technology usage when grouped according to the gadget.

Technology Usage	T-computed value	Significance Value	Interpretation
As A Whole	**4.890****	**0.000**	**Highly Significant**

Table 3h reveals a highly significant difference in the extent of technology usage when grouped according to the gadget. This implies that technology usage affected the availability of the gadget of the learners in this new normal. By attending class online or offline, there is a need to have the gadget to support learning. Online platforms such as Google Classroom, Google Hangouts, Skype, Facebook groups, Messenger, and Zoom were only some of the most used applications for conducting classes in the country [5].

Table 3i. Different analyses on the extent of technology usage when grouped according to Internet Connectivity At Home.

Technology Usage	T-computed value	Significance Value	Interpretation
As A Whole	**1.490**	**0.216**	**Not Significant**

Table 3i reveals no significant difference in the extent of technology usage when grouped according to Internet Connectivity at Home. This implies that technology users do not affect the availability of the gadget of the learners in this new normal. Those who have mobile data have a great extent of using technology. In addition, from another state university in the country, a study revealed the students' readiness for online classes however, the burden from computer and internet rentals in cafes exists [29].

Table 4a. Different analyses on the extent of Learning Outcomes when grouped according to age.

Learning Outcomes	T-computed value	Significance Value	Interpretation
As A Whole	**-.156**	**0.876**	**Not Significant**

Table 4a further revealed that the difference analysis on the extent of learning outcomes when grouped according to age was not significant. This implies that the respondent's age does not affect the learning outcomes in most essential learning competencies in all the subjects during the new normal. It studied the impact on academic performance when an online tool for collaborative work was used in a university computer science course [13].

Table 4b. Different analyses on the extent of Learning Outcomes when grouped according to Sex.

Learning Outcomes	T-computed value	Significance Value	Interpretation
As A Whole	**.592**	**0.554**	**Not Significant**

Table 4b further revealed that the difference analysis on the extent of learning outcomes when grouped according to their sex was insignificant. This implies that the respondent's sex does not affect the learning outcomes in most essential learning competencies in all the subjects during the new normal.

However, no significant gender differences were revealed in leaning outcomes because males were more stable in attitudes, while females performed well in engagement [15].

Table 4c. Different analyses on the extent of Learning Outcomes when grouped according to section.

Learning Outcomes	T-computed value	Significance Value	Interpretation
As A Whole	**4.590****	**0.000**	**Highly Significant**

Table 4c further revealed that the difference analysis on the extent of learning outcomes when grouped according to their section was highly significant. This implies that the respondent's section affected the learning outcomes regarding the most essential learning competencies. It can also be seen in the table that section Rosal has a high extent of learning.

Table 4d. Different analyses on the extent of Learning Outcomes when grouped according to the father's monthly income.

Learning Outcomes	T-computed value	Significance Value	Interpretation
As A Whole	**3.882****	**0.004**	**Highly Significant**

Table 4d further revealed that the difference analysis on the extent of learning outcomes when grouped according to their father's monthly income was highly significant. This implies that the respondent's father's monthly income affected the learning outcomes in most essential learning competencies. It can also be seen in the table that 41,000.00-50,000.00 income has a high extent of learning. A casual observation is that the children of affluent parents are more likely to succeed in life than the children of poor parents probably because the rich parents spend more than poor parents on their children and these “investments” lead to better outcomes for their children [14].

Table 4e. Different analyses on the extent of Learning Outcomes when grouped according to mother's monthly income.

Learning Outcomes	T-computed value	Significance	Interpretation

		Value	
As A Whole	**2.322****	**0.042**	**Significant**

Table 4e further revealed the significant difference analysis on the extent of learning outcomes when grouped according to their mother's monthly income. This implies that the respondent's mother's monthly income affected the learning outcomes in most essential learning competencies. It can also be seen in the table that 21,000.00-30,000.00 income has a high extent of learning. Parents who are more involved with their children's schooling become knowledgeable about school goals and procedures [11].

Table 4f. Different analyses on the extent of Learning Outcomes when grouped according to general percentage average.

Learning Outcomes	T-computed value	Significance Value	Interpretation
As A Whole	**2.254**	**0.082**	**Not Significant**

Table 4f further revealed that the difference analysis on the extent of learning outcomes when grouped according to their general percentage average was insignificant. This implies that the respondent's general percentage average does not affect the learning outcomes in most essential learning competencies. It can also be seen in the table that 90-100 on average has a high extent of learning. In online learning, students do much better than at traditional learning, and this can be seen through the increasing rates of course completion, student's satisfaction, and their motivation levels in order to acquire more knowledge from online learning [4].

Table 4g. Different analyses on the extent of Learning Outcomes when grouped according to budget for the internet.

Learning Outcomes	T-computed value	Significance Value	Interpretation
As A Whole	**6.625****	**0.000**	**Highly Significant**

Table 4g further revealed the difference analysis on the extent of learning outcomes when grouped according to their budget for the internet was highly significant. This implies that the respondent's budget for the internet affected the learning outcomes in terms of most essential learning competencies. It can also be seen in the table that the 301-400 budget has a high extent of learning.

Table 4h. Different analyses on the extent of Learning Outcomes when grouped according to the gadget.

Learning Outcomes	T-computed value	Significance Value	Interpretation
As A Whole	**.513**	**0.767**	**Not Significant**

The table 4h further revealed that the difference analysis on the extent of learning outcomes when grouped according to their gadget was insignificant. This implies that the respondent's gadget does not affect the learning outcomes in most essential learning competencies. It can also be seen in the table that many devices are to be used for a high extent of learning. Today's classrooms are equipped with the latest technology to enhance instruction [20].

Table 4i. Different analyses on the extent of Learning Outcomes when grouped according to Internet Connectivity.

Learning Outcomes	T-computed value	Significance Value	Interpretation
As A Whole	**.487**	**0.692**	**Not Significant**

Table 4i further revealed that the difference analysis on the extent of learning outcomes when grouped according to their internet connectivity at home was insignificant. This implies that the

respondent's internet connectivity at home does not affect the learning outcomes of most essential learning competencies. It can also be seen in the table that More than 1 internet connection at home has a high extent of learning. The group revealed that one of the three barriers and challenges that students encountered in online learning was a good internet connection [2].

In analyzing if a relationship exists between variables, the results revealed that there is a correlation between the extent of Technology usage and the extent of Learning Outcomes. This implied that a highly significant relationship existed. The need for construction and engagement means that the best types of learning will be those that involve choices that the student can make, and learning where there are meaningful contexts where the student is engaged [8].

Also, a study examined the effect computer use has on cognitive skills. This includes using tools such as computers, electronic organizers, navigation systems, etc. This can cause concerns about student growth in the classroom. Furthermore, research also shows some pros and cons and goes in-depth into why technology may or may not be beneficial [23].

4. Conclusion

Based on the findings of the study, it suggests that these factors play a role in determining the level of technology integration in education. Also, it indicates that factors have an impact on the effectiveness of learning outcomes in relation to essential competencies. Finally, it implies that the more students utilize technology for their education, the higher their learning outcomes tend to be in essential competencies.

5. Recommendation

It is then recommended that the Superintendent must have a radio program about the lessons so that the students can extend their learnings from the modules. Likewise, they may have a DepEd Local TV episode about their lessons relevant to the learner's current situation. Moreover, it recommends that Supervisors plan for a specific learning platform to be used by their teachers so their students can easily access it. Additionally, they may plan for a seminar-workshop on different strategies to develop learners' higher order thinking skills.

In the school level, it is recommended that the School Principal may plan to contextualize the learning competencies for the learners' development. Likewise, teachers may use other social media platforms to update the pupils in their lessons. Moreover, teachers may upload the learning materials so learners can download them easily and study or make their guardians teach them in advance. Thus, teachers may use the most essential learning competencies to deliver the topic with educational technology and may utilize the proposed learning continuity plan. In turn, future researchers may conduct a related study to relate to the learner's academic performance or extend the respondents to many schools.

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