

# The Instructional Role of School Leaders on the Teachers' Integration of Technology in Digital Era

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**Abstract:** *The primary aim of this study was to determine the effects of principals' technology leadership during the pandemic on teachers' technology integration. To achieve this aim, the researcher used a sample of 13 school heads and 698 teachers in the private schools in City of Malolos during the school year 2023-2024. To assess the school heads' leadership styles, the study adopted the UCEA Center for the Advanced Study of Technology Leadership in Education (CASTLE) on The Principals Technology Leadership Assessment (PTLA), which was based on the International Society for Technology Education (ISTE) 2009-National Education Technology Standards for Administrators (NETS-A). Meanwhile, 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 six variables of technology leadership affect the teachers' technology integration in varying extent as shown by the obtained B Coefficients 0.284 (leadership and vision), 0.994 (learning and teaching), 0.236 (productivity and professional practice), 0.063 (support management and operation), 0.747 (assessment and evaluation), 0.397 (social legal and ethical). Results of analysis of variance revealed an F ratio equal to .287 with an associated probability equal to .884. Since the p-value is greater than the significance level set at 0.05, the null hypothesis is accepted. It may be safely concluded that the technology leadership of principals did not produce significant combined effects on the technology integration of teachers.*

**Keywords—** Instructional role, school leaders, integration of technology, teachers, digital era

## 1. INTRODUCTION

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.

## 2. RELATED WORKS

A study stressed that in facing the 21st century, the advancement of technology calls for change and breakthrough for quality education in most schools worldwide and as technology now goes digital, technological leadership is deemed necessary so leaders must possess technology leadership abilities in pursuing the goal to improve the learners' potentials [2]. Globally, the education system must assume responsibilities in the technical aspect of the enormous changes. In preparation for the Industrial Revolution 4.0, there is a reform in the curriculum as mandated by Republic Act 10533, also known as the "Enhanced Basic Education Act 2013".

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 [4][5]. 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 [6]. Teachers who claimed to be student-centered, practicing constructivism and using technology in teaching still are considered strong or not innovative enough [7]. 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 [8].

Moreover, principals' technology leadership and how it influences teachers' technology integration has been the subject of different studies [9][10]. Another study revealed that there is a significant relationship between principals'

technology leadership and teachers' technology integration [11]. 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 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 effects of school heads leadership style on the teachers' technology integration. Despite the revelation on the findings of the studies conducted by several researchers who claimed that administrators' technology leadership affects the teachers' technology integration in a positive way with the others who argue that there is only little effect on the principals' technology leadership and teachers' technology integration, still, the researcher expects to involve the teachers and school heads of the private secondary schools in the City of Malolos. The study assessed the level of principals' leadership and the level of the teachers' technology integration leading to determining influences between the variables and probably recommended solutions to the existing problem.

### 3. STATEMENT OF THE PROBLEM

The major problem of the study is, "How may the effects of principals' technology leadership during the pandemic on teachers' technology integration knowledge be determined?" Specifically, the study sought answers to the following questions:

1. How may the principals' technology leadership be described in terms of:
  - 1.1 leadership and vision;
  - 1.2 learning and teaching;
  - 1.3 productivity and professional practice;
  - 1.4 support, management and operations;
  - 1.5 assessment and evaluation; and,
  - 1.6 social, legal and ethical issues?
2. What is the level of the teachers' technology integration knowledge in terms of:
  - 2.1 technology knowledge;
  - 2.2 content knowledge;
  - 2.3 pedagogy knowledge;
  - 2.4 technological content knowledge;
  - 2.5 technological pedagogy knowledge;
  - 2.6 pedagogical content knowledge; and
  - 2.7 technological pedagogical content knowledge?
3. Does Do the principals' technology leadership significantly affect the teachers' technology integration knowledge?
4. What management implications may be derived from the findings of the study?

### 4. METHODOLOGY

The descriptive-correlational method of research was used in this study to determine the effects of school heads' leadership style on teachers' technology integration. Correlational research is a systematic investigation of the relationship present between two or more variables. The study used a quantitative research approach in analyzing and understanding the predictor and criterion variables.

The respondents of the study involved 14 principals and 698 teachers in private schools in the City of Malolos during the school year 2023-2024. Guided by the universal sampling technique, the researcher got the total number of population of principals and teachers as the sample size of the study. Table 1 shows the distribution of the respondents by schools.

Table 1. *Respondents of the Study*

Private Secondary Schools in City of Malolos	Number of School Heads	Number of Teachers	Sample Size
School A	1	51	51
School B	1	305	305
School C	1	13	13
School D	1	39	39
School E	1	31	31
School F	1	28	28
School G	1	47	47
School H	1	16	16
School I	1	9	9
School J	1	21	21
School K	1	14	14
School L	1	33	33
School M	1	7	7
School N	1	84	84
<b>Total</b>	<b>14</b>	<b>698</b>	<b>698</b>

For confidentiality purposes, the researcher chose to indicate codes instead of the names of the secondary schools in the Schools Division of City of Malolos.

In determining the teacher-respondents, the researcher used the universal sampling technique which means that the total population was included as the sample size of the study.

This study used two adopted and previously validated instruments in assessing the effects of principals' technology leadership on teachers' technology integration.

To assess the principals' technology leadership, the study adopted a previously validated instrument from the UCEA Center for the Advanced Study of Technology leadership in Education (CASTLE) on The Principals Technology Leadership Assessment (PTLA) which was based on International Society for Technology Education (ISTE) 2009-National Education Technology Standards for Administrators (NETS-A).

The CASTLE survey, Principals Technology Leadership Assessment, was selected because of reviewing other existing instruments in the area of technology leadership. The other instruments varied in the question format, answer format, usefulness for online administration, and validity evidence. The said PTLA survey provides 35 statements pertaining to the six domains of the NETS-A performance indicators with five possible levels of leadership involvement. Experts in the areas of educational technology and school leadership reviewed and subsequently validated the survey questions. The PTLA had high overall reliability with a Cronbach's alpha of 0.95. The expert review provided evidence for face validity and reliability of the instrument. Specifically, the PTLA six (6) domains constituted the following: leadership and vision, learning and teaching, productivity and professional practice, support, management and operations, assessment and evaluations and social, legal and ethical issues. The said criteria are a considerable part of the principals' responsibilities, and each criterion has sub-questions that describe the extent of the administrator's technology carrying with a five-point Likert scale with corresponding interpretation [12].

Meanwhile, to assess the teachers' technology integration, a validated questionnaire from a study [13] entitled Developing an Instrument to Measure Perceived Technology Integration Knowledge of Teachers was utilized.

Further, the instrument which be used to measure the teachers' technology integration questionnaire 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.

Both instruments were the primary data gathering tools used in assessing the principals' technology leadership and teacher's technology integration.

The mode of the gathering was questionnaire and interview method. In gathering the data, the researcher observed the following procedures:

A letter was sent to school presidents, to ask permission to conduct the study. With their approval, the researcher prepared the google forms link indicating the consent form on the first part of the survey and then distribute them to the respondents

with the assistance of the researchers' contact persons per school/subject area.

In accordance with the Data Privacy Act of 2012, this study made sure that ethical standards set by the generic research ethics is followed. In so doing, the participants were informed about all the steps that would be taken in this research paper. The respondents are more important than the study, and therefore always respected. They were informed that the study is completely voluntary and would not affect their lives as principals and teachers and as persons, even their families, in any way. Hence, confidentiality was provided, as the respondents' personal information was not sought by anyone. Lastly, the data collection material was kept and destroyed upon completion of the study.

For the quantitative part, the data were tabulated and processed using Statistical Packages for Social Sciences (SPSS). To analyze and interpret the data gathered, the statistical measures such as mean procedures, and regression analysis were used.

## 5. RESULTS AND DISCUSSIONS

### Principals' Technology Leadership

The technology leadership of principals were generally described to a great extent. The highest level of assessment was noted on learning and teaching whereas the lowest level was noted on leadership and vision.

### Teachers' level technology integration

Teachers' level technology integration was manifested at a very satisfactory - indicative of the teachers' capabilities to bring about desired outcomes of the student engagement and learning process using technology especially in the new normal.

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Table 2. Regression Analysis of Principals' Leadership Styles on Teacher's Technology Integration Knowledge

Variables	Unstandardized		Standardized		
	Coefficients		Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.77			1.3	0.2
	2	2.718		.88	.24
Leadership and vision	0.28		0.37	0.1	0.8
	4	1.437	.7	.97	.51
Learning and teaching	0.99			0.2	0.8
	4	4.59	0.95	16	.37
Productivity and professional practice	0.23		0.26	0.1	0.9
	6	2.095	.1	13	.15

Support management and operation	0.06	0.06	0.0	0.9
	3	1.234	5	51
Assessment and evaluation	0.74	0.76	0.2	0.8
	7	3.048	3	45
Social legal and ethical	0.39	0.54	0.4	0.6
	7	0.837	1	74
R-squared = .032				
R=808				
F-value = .287				
p-value = .884				
alpha = 0.05				

The six variables of technology leadership affect the teachers' technology integration knowledge in varying extent as shown by the obtained B Coefficients 0.284 (leadership and vision), 0.994 (learning and teaching), 0.236 (productivity and professional practice), 0.063 (support management and operation), 0.747 (assessment and evaluation), 0.397 (social legal and ethical).

A closer look at the obtained Beta Coefficients, one could infer that of the six variable of school heads' leadership styles, it was the 'learning and teaching' that exert a greatest influence (Beta=.994) on the technology integration knowledge of teachers.

Results of analysis of variance revealed an F ratio equal to .287 with an associated probability equal to .884. Since the p value is greater than the significance level set at 0.05, the null hypothesis is accepted. It may be safely concluded that the technology leadership of principals did not produce significant combined effects on the technology integration knowledge of teachers.

**6. CONCLUSIONS**

Based on the results of the study, the following conclusions were drawn:

1. Based on the findings of the study, the following conclusions were drawn:

1. The technology leadership of principals were generally described to a great extent. The highest level of assessment was noted on learning and teaching whereas the lowest level was noted on leadership and vision.

2. 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.

3. The six variables of technology leadership affect the teachers' technology integration in varying extent as shown by the obtained B Coefficients 0.284 (leadership and vision), 0.994 (learning and teaching), 0.236 (productivity and professional practice), 0.063 (support management and

operation), 0.747 (assessment and evaluation), 0.397 (social legal and ethical).

4. Significant management implications were drawn from the findings of the study: (1) the need to further upgrade technology in order for them to be able to fulfill their role as leaders of the modern world; (2) the need to recognize the necessity of further honing their knowledge and skills in the use of educational technology resources in the teaching and learning process; (3) and the need to upgrade technology resources in schools like computers, laptops, LCD projectors, digital cameras, internet, software applications, and the likes.

**7. RECOMMENDATIONS**

Based on the results and conclusions of the study, the following recommendations are offered:

1. School principals may continue to further enhance their leadership skills. Further enhancement on the leadership and vision are recommended.

2. 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.

3. Since the variable on learning and teaching was noted as the highest predictor of teachers' technology integration, it is indeed important that school heads must influence their teachers in using technology and not the other way around. Teaching them could produce learning and their learning could eventually produce skills in teaching.

4. Future researchers may explore on other variables which may affect teachers' knowledge integration knowledge such as principals' crisis-self efficacy, crisis management leadership, or the school administrators support in implementing various learning delivery modalities especially during the pandemic.

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