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Article

ASCERTAINING THE TECHNOLOGICAL LEADERSHIP OF SCHOOL HEADS IN BASIC EDUCATION

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Abstract:

In today's rapidly evolving world, technology plays a crucial role in shaping various aspects of our lives, including education. As we move further into the digital age, educational institutions are recognizing the importance of integrating technology into the learning process to prepare students for the challenges of the future. While technological advancements bring numerous opportunities, they also present unique challenges that require effective leadership at all levels of the education system. Finding showed that school heads possess strong technological leadership in terms of technological transfer which was rated as the highest weighted mean of the administrator, while technology forecasting was the least technological leadership. Moreover, technological transfer and innovation was rated by the teacher as the highest technological leadership of the school head and technology forecasting was also the least. Moreover, finding showed that technological leadership significantly predict school head performance. However, budget limitations can be a significant challenge for schools when it comes to investing in technological leadership. Thus, schools can prioritize investment in key areas where technology can have the greatest impact on teaching and learning.

Keywords: Technological Leadership, School Heads, Basic Education

Introduction

In this rapidly evolving digital era, technology is playing an increasingly important role in leadership and management, particularly in the education sectors. Given the importance of technology in the educational environment, it has increasingly become controlled by a great deal of technology growth and progression (Litvineko, 2020). According to Qader et al. (2022) as educational

leaders, it is important to place a strong emphasis on enhancing the effectiveness and efficiency of education, in particular about the use of web-based applications and technological learning, both of which have significantly altered the traditional mode of educating students (Tatnall, 2020). The most significant thing that a manager who aspires to be a leader can do to increase their chances of success is to implement various technological solutions into their daily operations (Attaran, 2020). Moreover, it is much simpler for leaders to guide personnel toward the accomplishment of corporate goals when they make use of the most recent technological tools (Begum et al., 2022). Thus, the leaders in education should be able to successfully incorporate technology into the educational activities. This should not merely be seen as a shift in the way that learning and teaching are managed; rather, it should be seen as a shift in the mindsets and approaches that we have towards the way that we think about the processes of learning and teaching (Karakose et al., 2021).

Technology has the potential to revolutionize the traditional teaching and learning process. Ahmed & Opoku (2022) emphasized that technology can eliminate the barriers to education imposed by space and time and dramatically expand access to lifelong learning. Students no longer must meet in the same place at the same time to learn together from a teacher and the use of information technology in education has made it possible for tutors to teach students much more easily (Szymkowiak et al., 2021). Moreover, by using audio and visual technological materials, students can develop a better understanding of the topics being taught (Bagila et al., 2019).

Another benefits in using technology in the school shows that it is now much easier to perform demonstrations and put some practical aspect to the theory taught in class. (Soliman et al., 2021). Slow learners, therefore, have an opportunity to catch up with those who had grasped whatever was initially taught in class (Hayat et al., 2021). It is possible to keep student records in a more systematic and secure manner using technology. Unlike in the past when records used to be kept manually and there were many cases of lost files, the incorporation of information technology in education has made it possible for safe and proper record keeping (Yoon, 2020). Retrieving of information has, therefore, become much easier. With video conferencing technology, teachers can easily conduct virtual classes and deliver high quality learning experience to students from anywhere at any time (Limiansi et al., 2020). Apart from this, it improves the communication among parents, teachers & other staff member as PTA meeting, conferences, training session and more can be easily conduct without the requisition of the physical presence of the attendees (Hoshim, 2022).

Technology evolved again in the 21st century to what we have come to know as Web 2.0 technologies and while many of the inherent teaching and learning affordances of ICT were retained, Web 2.0 technologies represented a qualitative shift in how information is

created, delivered, and accessed (Dabbagh, 2019). Web 2.0 became as much a concept as a technology, embodying characteristics such as openness, personalization, collaboration, social networking, social presence, and user-generated content. Information Technology offer countless benefits for education industry (Du et al., 2022). Mahoney et al. (2021) emphasized that If implemented correctly it enhances the learning experience of students, improve communication among teacher, students & parents as well as improve the productivity of admin and other staff members. Like the above-mentioned technology, (FEDENA, 2022) is also a school management technology which help in automating the day to day of institution and let your institute run effectively. From managing PTA Meetings to Online Fees Payments to Conducting Online Classroom, every aspect can be managed hassle-free. It also offers mobile app & integration with your favorite device, so that you can handle every process smoothly and efficiently (Rahmadi, 2021).

More specifically, social media technologies are empowering students to take charge of their own learning, prompting them to create, organize and package learning content around their goals, interests, and preferences resulting in learning that is increasingly self-directed (Dabbagh et al., 2019). Consequently, higher education institutions are integrating social media technologies and platforms as ICTs to support learner- centered and personalized education systems. Additionally, emergent patterns of learning interactions are evolving towards the use of multiple technologies, multiple platforms, and multiple devices, making it increasingly difficult for faculty and educational institutions to control the learning environment (Pardo, 2013). Dede and Grimson (2013) posit that learners and instructors in higher education contexts are using ICTs as 'bricoleurs', "improvising what they need from the broad palette of tools 'ready to hand' in their everyday experience, whether social networks, cloud computing tools, mobile apps, physical meetups, or other emerging resources". Given the importance of Web 2.0 technologies in education and the emergent learning affordances, more research is needed to better understand what digital technologies college students are using and how they are using these technologies for learning to inform our teaching and learning practices (Oon et al., 2023).

Technology is crucial to leadership and management, especially in education. Technology has taken over the workplace, especially during pandemics and as educational leaders, they must emphasize enhancing effectiveness and efficiency, especially in cyber learning and other web-based technologies that have transformed education. Thus, evaluating the school heads technology integration in the school is the most crucial step administrators who want to lead.

Methodology

The descriptive method of research was used in this study, which described data and the characteristics of the population under study. This method answered the questions who, what, where, when, and how. In particular, the present conditions of the respondents as regards to technological leadership of school heads. Data will be described and analyzed through data gathered using the research instrument. Demographic profile aims to gather data on the respective demographic profiles of the students. These includes the age and gender, highest educational attainment, years in service and relevant training and seminars attended. Technological Leadership of School. The technological Leadership Scale could be considered as a valid instrument to assess administrators and teachers' perception of the Technological Leadership of School Heads. These data were analyzed and interpreted in order to arrive at a more conclusive statements and implications of the results. The findings of the study will serve as basis in formulating an action plan. This study utilizes the 5-point Likert Scale from 5 to "strongly agree" to 1 "Disagree".

Results and Discussions

Table 1. Technology Transfer

Indicators	School Heads		Teachers	
	Mean	VD	Mean	VD
Discovers intellectual property-related guidelines and creativities necessary to encourage the transfer and dissemination of technology to school community.	4	A	4.45	SA
Adopts for promoting technology transfer and dissemination of technological transfer to other schools' division.	4	A	4.58	SA
Implements and analyze the technological standing of the school targeted to the activity in order to increase the likelihood of technological success.	4	A	4.32	SA
Advocates for preserving and firming school technology transfer policies.	5	SA	4.54	SA
Promotes activities to advance school technology transfer by providing a webinar series on the utilization of educational technologies.	5	SA	4.52	SA
Grand Mean	4.4	SA	4.47	SA

Table 1 presents the data the perceptions of the respondent groups in terms of technology transfer. Based on the data gathered, the statements refer to advocates for preserving and firming school technology transfer policies and procedures and promotes activities to advance school technology transfer by providing a webinar series on the utilization of educational technologies got the highest weighted

mean of 5.0 which verbally described as strongly agree, while the statements refer to discovers intellectual property-related guidelines and creativities necessary to encourage the transfer and dissemination of technology to school community, adopts for promoting technology transfer and dissemination of technological transfer to other schools' division and implements and analyze the technological standing of the school targeted to the activity in order to increase the likelihood of technological success got the lowest weighted mean of 4.0 which verbally described as agree as rated by the school heads. Teachers on the other hand, the statement refers to adopts for promoting technology transfer and dissemination of technological transfer to other schools' division got the highest weighted mean of 4.58 which verbally described as strongly agree, while the statement refers to implements and analyze the technological standing of the school targeted to the activity in order to increase the likelihood of technological success got the lowest weighted mean of 4.32 which verbally described as strongly agree as rated by the teachers. According to Zhao et al. (2021) technology transfer can help teachers and school heads to develop new teaching methods and approaches that can improve learning outcomes for students. Moreover, technology transfer can play an important role in enhancing the quality of education and preparing students for the challenges of the digital age (Mansir & Karim, 2020). This indicates that by embracing technology transfer, schools can stay up to date with the latest advancements in technology and education and ensure that their students are well-equipped to succeed in the 21st century.

Table 2. Technology Forecasting

Indicators	School Heads		Teachers	
	Mean	VD	Mean	VD
Provide input to estimate based on the demonstrated knowledge in an area related to the technology usage for school.	4	MA	3.42	A
Evaluate the performance of technological efficiency and effectiveness in school.	4	A	3.67	A
Anticipates opportunities and threats from technological changes used in teaching and learning process.	3	MA	3.81	A
Provides well-informed research and development decision-making on the utilization of technology.	4	A	3.67	A
Decides on the right norms and situatable approaches for a given situation by predicting the right technological change in a certain coming school year.	4	A	3.56	A
Grand Mean	3.8	A	3.63	A

Table 7 presents the data the perceptions of the respondent groups in terms of technology forecasting. Based on the data gathered, the

statements refer provide input to estimate based on the demonstrated knowledge in an area related to the technology usage for school, evaluate the performance of technological efficiency and effectiveness in school, provides well-informed research and development decision-making on the important utilization of technology and decides on the right norms and situatable approaches for a given situation by predicting the right technological change in a certain coming school year got the highest weighted mean of 4.0 which verbally described as agree, while the statement refers to anticipates opportunities and threats from technological changes used in teaching and learning process got the lowest weighted mean of 3.0 which verbally described as moderately agree as rated by the school heads. Teachers on the other hand, the statement refers to anticipates opportunities and threats from technological changes used in teaching and learning process got the highest weighted mean of 3.81 which verbally described as agree, while the statement refers to provide input to estimate based on the demonstrated knowledge in an area related to the technology usage for school got the lowest weighted mean of 3.42 which verbally described as agree as rated by the teachers. Overall, school heads got the final weighted mean of 3.80 while the teachers got the overall weighted mean of 3.63 which also verbally described as agree. Awan et al. (2021) suggested that in schools, technology forecasting can be a valuable tool for planning and decision-making. Grijalvo, Segura & Nunez (2022) also noted that technology forecasting is an important tool for schools to stay ahead of the curve and provide the best possible education for their students. Moreover, technology forecasting can help schools to prepare their students for the future. By introducing students to emerging technologies and teaching them how to use them effectively, schools can equip their students with the skills and knowledge they need to succeed in the digital age (Swede et al., 2019). This indicates that by anticipating changes in technology, schools can make informed decisions about resource allocation, curriculum development, student preparation, and institutional partnerships.

Table 3 presents the data the perceptions of the respondent groups in terms of technology management. Based on the data gathered, the statements refer to manages techno-based tool designed to support teachers and learners in measuring technology use in the school got the highest weighted mean of 5.0 which verbally described as strongly agree, while the statements refer to demonstrates effective management on the use of a computer system in learning and teaching, manages the use of technology throughout the school by observing how technology is used, demonstrates knowledge of legal and ethical issues relating to the effective management of technology and develops managerial strategies that integrate technology to meet the teachers and student's

needs got the lowest weighted mean of 4.0 which verbally described as agree as rated by the school heads.

Table 3. technology transfer

Indicators	School Heads		Teachers	
	Mean	VD	Mean	VD
Demonstrates effective management on the use of a computer system in learning and teaching.	4	A	4.22	SA
Manages the use of technology throughout the school by observing how technology is used.	4	A	4.11	A
Demonstrates knowledge of legal and ethical issues relating to the effective management of technology.	4	A	4.5	SA
Manages techno-based tool designed to support teachers and learners in measuring technology use in the school.	5	SA	3.43	A
Develops managerial strategies that integrate technology to meet the teachers and student's needs.	4	A	4.5	SA
Grand Mean	4.2	A	4.15	A

Teachers on the other hand, the statement refers to develops managerial strategies that integrate technology to meet the teachers and student's needs got the highest weighted mean of 4.50 which verbally described as strongly agree, while the statement refers to manages techno-based tool designed to support teachers and learners in measuring technology use in the school got the lowest weighted mean of 3.43 which verbally described as agree as rated by the teachers. Overall, school heads got the final weighted mean of 4.40 while the teachers got the overall weighted mean of 4.15 which also verbally described as agree. Technology management involves the planning, implementation, and control of technology resources and processes within an organization. According to Olszewski & Crompton (2020) technology management is essential for schools to effectively leverage technology to support teaching and learning. This indicates that technology management is crucial for ensuring that technology is effectively used to enhance teaching and learning.

Table 4 presents the data the perceptions of the respondent groups in terms of technology innovation. Based on the data gathered, the statements refer to monitors the learner's and teachers to newly innovated learning flatform and introduces new innovative technology in teaching in the school got the highest weighted mean of 5.0 which

verbally described as strongly agree, while the statements refer to ensures the utilization of Technology in the schools, encourages teachers to use educational technology in the classroom and adapts for the newly innovated educational learning through technology got the lowest weighted mean of 4.0 which verbally described as agree as rated by the school heads.

Table 4. Technology Innovation

Indicators	School Heads		Teachers	
	Mean	VD	Mean	VD
Ensures the utilization of Technology in the schools.	4	A	4.32	SA
Encourages teachers to use educational technology in the classroom.	4	A	4.57	SA
Monitors the learner's and teachers to newly innovated learning flatform.	5	A	4.42	SA
Introduces new innovative technology in teaching in the school.	5	SA	4.57	SA
Adapts for the newly innovated educational learning through technology.	4	SA	4.25	SA
Grand Mean	4.4	SA	4.43	SA

Teachers on the other hand, the statement refers to introduces new innovative technology in teaching in the school and encourages teachers to use educational technology in the classroom got the highest weighted mean of 4.57 which verbally described as strongly agree, while the statement refers to adapts for the newly innovated educational learning through technology got the lowest weighted mean of 4.25 which verbally described as strongly agree as rated by the teachers. Overall, school heads got the final weighted mean of 4.40 while the teachers got the overall weighted mean of 4.43 which also verbally described as strongly agree. Falloon (2020) emphasized that technology innovation refers to the development of new and improved technologies that can be used to enhance teaching and learning in schools. Moreover, innovative technologies can be used to create new and engaging learning experiences for students (Garcia-Penalvo, 2021). This indicates that technology innovation is important in schools because it can help to enhance student engagement, increase student achievement, prepare students for the future, encourage creativity and innovation, and improve accessibility.

Table 4presents the data the perceptions of the respondent groups in terms of technology assessment. Based on the data gathered, the statements refer to ensures that educational technology used are DepEd verified, creates balance technological assessment system and assess techno-learning prospects for both learners and teachers during the integration of technology got the highest weighted mean of 5.0 which

verbally described as strongly agree, while the statements refer to uses e-assessment data to effectively improve learning inferences among teachers and learners and practice e-learning procedures and strategies towards e-teaching and learning were assessed all the time got the lowest weighted mean of 4.0 which verbally described as agree as rated by the school heads.

Table 5. Technology Assessment

Indicators	School Heads		Teachers	
	Mean	VD	Mean	VD
Ensures that educational technology used are DepEd verified.	5	SA	4.20	A
Uses e-assessment data to effectively improve learning inferences among teachers and learners.	4	A	4.12	A
Practice e-learning procedures and strategies towards e-teaching and learning were assessed all the time.	4	A	4.54	SA
Creates balance technological assessment system.	5	SA	4.12	A
Assess techno-learning prospects for both learners and teachers during the integration of technology.	5	SA	4.18	SA
Grand Mean	4.40	SA	4.31	SA

Teachers on the other hand, the statement refers to practice e-learning procedures and strategies towards e-teaching and learning were assessed all the time got the highest weighted mean of 4.54 which verbally described as strongly agree, while the statement refers to uses e-assessment data to effectively improve learning inferences among teachers and learners and creates balance technological assessment system got the lowest weighted mean of 4.12 which verbally described as agree as rated by the teachers. Overall, school heads got the final weighted mean of 4.40 while the teachers got the overall weighted mean of 4.31 which also verbally described as strongly agree. According to Suartama et al. (2019) technology assessment involves evaluating the effectiveness of technology implementation and use in achieving educational goals. In schools, technology assessment is important for measuring the impact of technology on teaching and learning (Lai & Bower, 2019). Moreover, technology assessment can help schools to evaluate the effectiveness of technology in achieving educational goals (Alam, 2021). Thus, by measuring student performance and engagement, schools can determine whether technology is having a positive impact on teaching and learning. This indicates that technology assessment is important in schools because it can help to evaluate the effectiveness of technology implementation and use, identify areas for improvement, demonstrate the value of

technology investment, guide decision-making, and facilitate continuous improvement.

Table 6. Significant Relationship between school head performance and level of technological Leadership

R Squared = 0.9234					
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Remarks*
'Technology Transfer	9.669421	7.32559671	1.3199500	0.01767	S
technology forecasting	0.231404	9.89563737	1.0233845	0.98346	NS
Technology Management	11.66942	7.32559671	1.5929653	0.02181	S
Technology Innovation	9.292307	6.80803176	0.3649036	0.05634	NS
Technology Assessment	11.29230	6.80803176	0.2586743	0.03576	S

The test of significant relationship between school heads' performance and level of technological leadership reveals interesting findings. The R-squared value of 0.9234 indicates that approximately 92.34% of the variance in school heads' performance can be explained by the level of technological leadership. Among the specific dimensions of technological leadership assessed, Technology Transfer and Technology Management show statistically significant relationships with school heads' performance. This suggests that effective transfer and management of technology resources and initiatives positively influence their overall performance. On the other hand, Technology Forecasting, Technology Innovation, and Technology Assessment do not show statistically significant relationships, indicating that these dimensions may have less impact on school heads' performance or that other factors may be more influential. These findings emphasize the importance of technological leadership, particularly in the areas of Technology Transfer and Management, in driving school heads' performance. School heads who excel in these dimensions are likely to demonstrate better overall performance in managing and leading their educational institutions. This may include successful integration of technology into teaching and administrative practices, efficient allocation of technology resources, and effective implementation of technology-related initiatives. However, it is important to note that while these findings suggest a significant relationship, they do not imply a causal relationship. Other factors such as leadership skills, pedagogical knowledge, and organizational dynamics may also contribute to school heads' performance. Therefore, a comprehensive approach that considers various aspects of leadership and management is essential for achieving optimal outcomes in educational settings.

To enhance technological leadership and subsequently improve school heads' performance, targeted professional development programs and support can be provided. Additionally, ongoing evaluation and feedback mechanisms can help school heads identify areas for improvement and further refine their technological leadership skills. Overall, the test results highlight the significance of technological leadership in shaping school heads' performance. Cultivating strong technological leadership competencies, educational institutions can foster an environment that effectively utilizes technology for improved teaching, learning, and administrative processes, ultimately leading to enhanced overall performance.

Table 7. Issues and Concerns

Issues and Concerns	Rank
Budget Limitations.	1
lack of in-service training	2
lack of resources	3
Poor Network Infrastructure	4
No Systems in Place to Utilize Technology in Curriculum	5
Unreliable Devices and Software.	6
Lack of student engagement and focus in online learning	7
limited technical support	8

Table 7 presents the data in terms of perceived issues and concerns school head technological Leadership. Finding shows that budget limitations was rated as rank number 1 issue of the respondent groups, followed by lack of in-service training, lack of resources, poor network infrastructure, no systems in place to utilize technology in curriculum, unreliable devices and software, lack of student engagement and focus on online learning, and limited technical support. Findings indicates that budget limitations can be a challenge for schools when it comes to investing in technological leadership, there are a variety of strategies that schools can use to maximize their impact and support the effective use of technology in education.

Conclusion

Finding showed that school heads possess strong technological leadership skills may be better technological leadership and equipped to manage and implement technology resources in their schools, which can improve efficiency and effectiveness. Additionally, finding showed that school head technological leadership effectively communicate with teacher can lead to better collaboration and engagement. However, budget limitations can be a significant challenge for schools when it comes to investing in technological leadership. Thus, schools can prioritize investment in key areas where technology can have the greatest impact on teaching and learning.

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