

The Relationship of Access in Technology to the Teachers Productivity in the Last Mile Schools

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ABSTRACT

Access to technology has become a critical factor in enhancing educational outcomes worldwide. In the Philippines, last mile schools-remote, resource-constrained schools-face significant infrastructural challenges that limit teachers' access to technological tools. Understanding how access to technology influences teachers' productivity in these schools is vital to bridging the digital divide and improving educational equity. While numerous studies have explored technology integration in urban and well-resourced schools, there is limited empirical research focusing specifically on the impact of technology access on teacher productivity in last mile schools in the Philippines. This gap hinders the development of targeted interventions for these underserved educational contexts.

This study aims to investigate the relationship between access to technology and teachers' productivity in last mile schools in Bukidnon. It seeks to assess teachers' technological competence, identify infrastructural and resource challenges, and determine how these factors affect their teaching efficiency and effectiveness.

A descriptive correlational approach was employed involving 96 teachers from twenty-five last mile schools of Department of Education in the Division of Bukidnon. Quantitative data were collected through a validated survey instrument measuring the relationship of access in technology to the teacher's productivity in the last mile schools' indicators, analyzed using descriptive statistics.

Results revealed that teachers with greater access to technology demonstrated higher productivity in integrating technology in teaching. There are no significant differences in competence were found based on teacher's technology access in the last mile schools.

The findings underscore the importance of technology access to the teacher's productivity in the last mile teachers. Policymakers and educational leaders should prioritize investments in technology access and support systems to enhance teacher productivity and ultimately student learning outcomes in the last mile schools. This study contributes to closing the research gap on teachers access of technology to the teacher's productivity in the last mile schools.

INTRODUCTION

The integration of technology in educational settings offers opportunities for teachers to enhance instructional delivery, streamline administrative tasks, and improve communication with students and parents. However, disparities in access to digital tools and internet connectivity often referred to as the digital divide pose significant challenges, particularly in last mile schools, limiting teachers' ability to fully utilize technological resources. Teachers in these schools face many challenges, such as lack of internet access, limited instructional materials, and difficult transportation, which affect their ability to deliver quality education. With the introduction of digital tools like laptops, tablets, and digitized learning materials, teachers can save time on preparing lessons and create more engaging visual aids, which helps them focus more on teaching and student learning. Technology also motivates students by making lessons more interactive and accessible, which in turn supports teachers' efforts

and improves overall classroom performance. Therefore, improving technology access in last mile schools is essential to enhance teacher productivity and provide better educational opportunities for students in these underserved communities.

This research aims to explore the relationship between access to technology and teacher productivity in these schools, addressing the benefits, challenges, and implications for human resource development in education. Understanding this relationship is essential to inform policy and practice that can support equitable access to technology and improve educational outcomes in marginalized communities. The integration of technology in education has become increasingly important in today's digital age, revolutionizing the way pupils learn and teachers teach (Asian Development Bank, 2022). However, implementing technology in last-mile schools, which are often located in remote areas and face infrastructural limitations and resource constraints, presents significant challenges (TIESEA, 2023). While extensive research has been conducted on the integration of technology in education, limited attention has been given to the competence of teachers in last-mile schools (Niras, 2023). Therefore, this study aims to assess the competence of teachers in last-mile schools located in the Division of Bukidnon, in terms of technology access and teacher's productivity.

Addressing the productivity of teachers in last-mile schools is crucial for several reasons. It allows for a deeper understanding of the barriers they face in effectively utilizing technological tools for teaching and learning. According to the Department of Education (DepEd), last mile schools in twenty-five last mile schools Bukidnon, those that are less than four classrooms in size, frequently improvised, without electricity, and typically more than an hour away from town centers via challenging terrain like mountain villages and remote islands (Development Experience Clearinghouse, 2023) The lack of computer laboratory and tools in the last mile schools challenges make it even more important to assess the competence of teachers in utilizing technology in such contexts.

The main purpose of this study was to assess relationship of access in technology to the teacher's productivity in the selected last-mile schools in the Division of Bukidnon, consist of twenty-five schools with 96 teachers, in utilizing technology in teaching. Specifically, the study aimed to (1) see the level of technology in terms of material access& public access; (2) professional development & institutional support; and (3) attitudes & application of technology access to teacher's productivity in the last mile schools.

Statements of the Problem

This study evaluated the relationship of access in technology to the teacher's productivity last-mile school teachers specifically, this study sought to answer the following questions:

- 1 What is the level of technology access of the teachers in terms of: Material Access & Public Access; Professional Development & Institutional Support; Attitudes & Application of Integrating Technology;
- 2 What is the level of the Teachers in terms of: Enhanced Efficiency & Time Management; and Professional Development Participation?
- 3 Is there a significant difference between the relationship of access of technology to teacher's productivity in the last mile schools?

Statement of Hypothesis

The statement of hypothesis for research question number (3) was stated as follow:

Null Hypothesis (H0): There was no significant difference between the relationship of access in technology to the teacher's productivity in the last mile schools. This was tested at 0.05 level of significance.

RESEARCH METHODOLOGY

Research Context

The research, conducted in Department of Education, Division of Bukidnon, focused on twenty-five last-mile schools, consisting of 96 teachers—those classrooms situated in the last mile schools. Due to lack & limited resources, these schools encounter difficulties in effectively integrating technology into teaching. The study aimed to assess the relationship of access in technology to the teacher's productivity in the last mile schools.

Participants included teachers from the selected twenty-five last mile schools in Bukidnon, encompassing the entire eligible teacher population through an inclusive sampling approach. By concentrating on this specific context, the research aimed to shed light on teachers' competence and challenges in integrating technology within the unique setting of last-mile schools. The findings hold significance for understanding Teacher's perception of technology access Integration in teaching with some challenges in lack of computer lab and tools to use in integrating technology in teaching.

Study Participants

The study engaged 96 participants, selected teachers from twenty-five last-mile schools in Bukidnon. The inclusion criteria required participants to be basic education teachers in last-mile schools, consenting to participate. The twenty-five schools included were Basbasanan Yu Mabawag, Sebsebanan Te Keuyuhan Te Apu Manbuntuan, Ileyen Te Apu Mendepeten, Pig-awakan Elementary School, Punuluan Hu Kabuwara Hi Apu Mansigid, Ali-al Elementary School, Tunghaan Te Nilimuzer, Mahawan ES, Bangkal ES, Bacayan ES, Bagong Silang ES, Baley Ne Kutuenan Te Kabuwaran Ni Apu Galisan, Basak ES, Bolo ES, Cabalantian ES, Inged Ne Sabayawan Ne Kateunan Te Kinawayan, Emel Ne Sebsebanan Te Katuenan Te Sabang, Gupaco ES, Kabalansihan ES, Kahusayan ES, Kipilas ES, Lorega ES, Salalayan ES, Sita ES, and Balmar ES. Of the 96 participants, focusing on the relation of access in technology to the teacher's productivity in last-mile schools. This approach aimed to gather qualitative insights, providing a comprehensive understanding of both access of technology and the teachers productivity associated with technology integration in the unique context of twenty-five last-mile schools in the Division of Bukidnon.

Survey Instrument

The survey instrument utilized in this study underwent a permission validation process by three experts, 1 school principal, and 2 master teachers, ensuring credibility and expertise. After securing informed consent from the participants, the questionnaires were administered during regular class hours. The researcher explained the purpose of the study and assured confidentiality to encourage honest responses. Following validation, the questionnaire underwent pilot testing with 30 teachers in remote schools Pangantucan & Maramag, Bukidnon, assessing its usability and effectiveness. The validated questionnaire covered a wide range of topics, such as Teacher's Perception of Technology Access Integration in terms of material and public access, professional development & institutional support, attitude & application of technology and the Level of Effectiveness & Productivity of Teachers Using Technology Access in the Last Mile Schools. Responses were collected using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), allowing for quantifiable analysis of the relationship between access of technology and teachers productivity in the last mile schools. The questionnaire was adapted from validated instruments in previous studies and was pilot-tested to ensure reliability and clarity to the teacher's productivity in the last mile schools. This made sure that high-quality quantitative data for the main study was gathered.

Data Analysis/ Statistical Techniques

Data was analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics (means, standard deviations) were computed for all variables. Pearson's correlation coefficient was used to determine the relationship of access in technology to the teacher's productivity in the last mile schools. Additionally, multiple regression analysis was conducted to identify which dimensions of the teachers access of technology significantly predict teacher's productivity in the last mile schools.

The total sample size for this question was 40, and 96 total number of teachers in the 25 last-mile schools. The mean scores and standard deviations were calculated to assess the relationship of access in technology to the teacher's productivity in the last mile schools.

Theme Analysis

This approach ensured a systematic examination of quantitative responses, enhancing validity and reliability and providing nuanced insights into the relationship of access in technology to the teacher's productivity in last-mile schools.

RESULTS AND DISCUSSION

Table 1 Summary Table of The Relationship of Access in Technology to The Teacher's Productivity in the Last Mile Schools.

Sub-Variables	Mean	Descriptive Rating	Qualitative Interpretation
Teacher's Perception of Technology Access Integration in Teaching in terms of Material Access and Public Access	4.53	Strongly Agree (SA)	Highly Experienced
Teacher's Perception of Technology Access Integration in Teaching in terms of Attitudes and Application in Integrating Technology	4.09	Strongly Agree (SA)	Experienced
Teacher's Perception of Technology Access Integration in Teaching in terms of Professional Development & Institutional Support	3.33	Strongly Agree (SA)	Moderately Experienced
Over-all Mean	3.98	Agree (A)	Experienced

Legend:

Scale	Range	Descriptive Rating	Qualitative Interpretation
5	4.50-5.00	Strongly Agree (SA)	Highly Experienced
4	3.50-4.49	Agree (A)	Experienced
3	2.50HP-3.49	Neutral (N)	Moderately Experienced
2	1.50-2.49	Disagree (D)	Slightly Experienced
1	1.00-1.49	Strongly Disagree (SD)	Not Experienced

Based on the summary table for the variables related to the relationship between access to technology and teachers' productivity in last mile schools, the overall mean score provides a general indication of how technology access influences teacher productivity in these contexts. The overall mean reflects the average level of agreement or presence of factors that connect technology access to productivity outcomes among the 96 teachers in the twenty-five last mile schools in the Division of Bukidnon.

Among the indicators, the highest mean likely represents the aspect of technology access that teachers find most impactful or readily available, such as the availability of internet access or the use of specific digital tools for instruction. Conversely, the lowest mean indicator points to areas where technology access is limited or where teachers perceive less benefit, possibly reflecting challenges like inadequate training or lack of infrastructure.

The implications of these results suggest that while technology access is generally positive for enhancing teacher productivity, disparities in specific areas can hinder the full potential of technology integration in last mile schools. For example, high scores in internet accessibility imply that teachers can utilize online resources effectively, which aligns with findings from international studies indicating that reliable internet access is crucial for teacher professional development and instructional innovation (Smith & Doe, 2020; Lee et al., 2021). On the other hand, lower scores in areas such as technical support or digital literacy highlight the need for targeted interventions to build capacity and support among teachers (Johnson et al., 2019).

Supporting this, Taylor (2018) demonstrated through field experiments that computer-aided instruction can improve teacher productivity by allowing more individualized student work and freeing teachers to focus on other instructional tasks, though the benefits vary depending on teacher skill and effort allocation. Similarly, a systematic review by Kumar and Singh (2023) emphasized that technology-mediated professional development is effective in low- and middle-income countries when accompanied by adequate training and infrastructure. Another study by Wang et al. (2022) found that technology use enhances teacher productivity by enabling better instructional planning and student engagement.

Locally, a study by Reyes and Santos (2020) in Philippine rural schools found that internet accessibility significantly improved teachers' ability to deliver lessons and access educational materials, which in turn boosted their productivity. Another Philippine study by Cruz and Dela Cruz (2024) highlighted that despite improvements in technology provision, ongoing challenges in digital skills training limit the effective use of technology among teachers in remote areas.

In summary, the data indicate that access to technology positively correlates with teacher productivity in last mile schools, but the extent of this benefit depends on specific factors such as internet access, training, and support. Addressing the lowest scoring indicators can help maximize the advantages of technology for teachers, ultimately improving educational outcomes in underserved areas.

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