Quantitative Study – The Digital Divide and its Impact on the Achievement Gap

Manuel F. Negron

New Jersey City University

Introduction

 Despite strong initiatives to integrate technology in the classroom to promote active learning, many schools still lack technology and the use of it. Literature has shown that there is a disparity in the accessibility and integration of technology in K-12 public schools with ethnic minority student populations. Studies have proven that minority students own computers at a lower rate when compared to students from majority households (Chisolm, 2001). “Digital divide” is a term that is frequently used which simply defines the inequality amongst schools and students that have technology and those who lack it. The term has been further extended as the “digital-use divide”, which states that although schools may have technology; it is not being incorporated in the curriculum or integrated into lessons.

The use of technology increases throughout society on a daily basis. Minorities and those from low-income families are the population that is most affected by the digital divide (Chisholm & Carey, 2002; First & Hart, 2002).

Problem Statement

Pablo Freire (2002) states, there is no such thing as a neutral educational process. Some educational systems are preserving the current “caste” system where minorities and low-income families permanently remain at the bottom or they are part of an extremely slow process that would allow students to progress from their current situation. The focus of this study was on the digital divide and the impact that it has on the student achievement gap. This study will examine the extent of the digital divide in an urban school and the influence of the Principal to narrow the divide.

Purpose

Incorporating and integrating technology in the curriculum in K-12 public schools plays a vital role in the improvement of teaching and learning and in the overall academic success of students. Information, Communication, and Technology (ICT) in today’s society provides major opportunities to partake in educational and global development. In order for an individual to progress from ones’ current socioeconomic status, they must be trained in computer literacy and technology (Eisner, 1985). It is important to realize that the accessibility and use of technology in today’s classrooms pose a major impact on the teaching and learning process. Without equality on the digital accessibility and use amongst K-12 public schools; we will continue to see an achievement gap amongst our ethnic minority students and those from low-income homes.

Research Questions

 This study will seek to answer the following three research questions:

1. To what extent do teachers realize that the “digital divide” exists?
2. According to teachers, how is the term “digital divide” defined?
3. What is the relationship between professional development and the use of technology in active learning?

Literature Review

 This review will focus on literature that links students’ accessibility and use of technology in education and the impact it has on student achievement. The focus of the review is to analyze student achievement gap between ethnic minority and low-income students, accessibility to technology, and the use of technology in regards to teaching and student learning.

 Why is the accessibility and use of technology so important when linked to academic achievement? In schools today, most formative, summative, and state assessments are taken on an online platform with interactive features. K-12 public schools are ranked or considered high/low performing based on state assessment results. Students may have knowledge based on content, standards, skill, or strategies taught by the teacher, but if the content was not taught through the integration of technology, then how are students to meet or exceed the expectations on the assessment without ever having used the technological features and functions required to submit responses on the assessment.

**Achievement Gap**

 The achievement gap is referred to as the disparities or “gaps” in academic performance amongst various student groups. According to the National Center for Educational Statistics, between 1992 through 2015, the average reading scores for White 4th-, 8th-, and 12th-graders were higher than those of their Black and Hispanic peers. Between 1990 and 2015, the average mathematics scores for White 4th- and 8th-graders were higher than those of their Black and Hispanic peers.

**Accessibility to Technology**

 Linda Darling-Hammond, Faculty Director of the Stanford Center for Opportunity Policy in Education (SCOPE), states, “When given access to appropriate technology used in thoughtful ways, all students—regardless of their respective backgrounds—can make substantial gains in learning and technological readiness. Unfortunately, applications of technology in schools serving the most disadvantaged students are frequently compromised by the same disparities in dollars, teachers, and instructional services that typically plague these schools. These disparities are compounded by the lack of access to technology in these students’ homes” (Darling-Hammond, 2014).

**Use of Technology – Teaching & Learning**

 In a recent report titled *Using Technology to Support At-Risk Students’ Learning*, Professors Linda Darling-Hammond and Shelley Goldman at the Stanford Graduate School of Education and doctoral student Molly B. Zielezinski, determine the following three components to effectively use technology with students in urban schools:

* Interactive learning
* Use of technology to explore and create rather than to “drill and kill”
* The right blend of teachers and technology.

“Drill and Kill” is a strategy that occurs when computers take the place of teachers. Students are given information that they are expected to memorize and then assessed on it.

**Summary**

 Overall, accessibility and use of technology in schools promotes student collaboration and strengthens active learning. With accessibility, students do not just learn in schools, they learn all day. They have access to limitless information and resources, which allows them to explore and share information. Technology should not be considered to replace teachers, but rather integrated with teaching to enhance lessons. Teachers provide students with emotional support that cannot be provided by technology. Teachers also provide students with interventions to support technology when students are struggling. To realistically close the achievement gap and narrow the digital divide, school districts need to create a plan before they make huge investments in purchasing technology to effectively implement a technological initiative that supports both teachers and students in improving teaching and student learning.

Methodology

**Introduction**

School districts develop technology plans that require budget allocations that tend to increase each year, but urban schools still face a divide in terms of accessibility and use of technology. According to the National Center for Education Statistics report (2010) on *Teachers’ Use of Educational Technology in U.S. Public Schools*; results differed by low and high poverty concentration of the school for the percentage of teachers that reported their students used educational technology sometimes or often during classes to prepare written text (66 and 56 percent, respectively), learn or practice basic skills (61 and 83 percent, respectively), and develop and present multimedia presentations (47 and 36 percent, respectively). It is crucial that the achievement gap is narrowed down amongst ethnic minority students and those from low-income homes though the accessibility, use, and integration of technology in schools. By narrowing the digital divide, students will have opportunities for academic success.

Research Design

 The research conducted will be based on survey research, which is a quantitative method. I will provide a sample of teachers in an urban school with a set of predetermined questions. This method will be used to quickly gain some general details about the teachers and the school to connect how the digital divide affects student achievement.

Population & Sample

 To collect my data, I will be conducting simple random sampling of teachers in a K-8 public school so that they have an equal probability of being selected from the entire school population. Every teacher will be assigned a unique number and a random number table will be used to select the teachers for the sample. The sample size will be determined using a sample size formula. The intent is to select a large sample to avoid potential errors.

Instrument

Teacher surveys will be used as the main source of data collection. Surveys will be anonymous and consistent in the data collection process by allowing uniformity amongst all participants. The survey will have a cross-sectional design in which the data will be collected at a specific time of the school year to determine the current attitude or beliefs on the digital divide and its impact on the student achievement gap (Creswell, 2015). The foundation of the survey will reflect the survey instrument created by the Metiri Group for the SETDA Profiling Educational Technology Integration (PETI) project (PETI, 2010). Prior to conducting the survey, I will review the instrument with district technology administrators for feedback and make modifications if necessary prior to is being formally distributed to teachers.

Procedures

**Data Collection**

The data from this study will be collected directly from the building administrator and through a technology-based platform. Teachers participating in this study will have the option of taking the survey via an on-line link that will be given to them or paper-based. I will send a letter to the building administrators requesting permission to conduct the survey, an explanation of the study, and the survey. Paper-based surveys will be mailed as one packet to the researcher within the given timeframe. Survey results will be used to analyze the school’s accessibility and use of technology and its impact on student achievement.

**Data Analysis**

In order to analyze the quantitative data, I must complete the following steps:

**Step I – Preparing Data for Analysis**

* Determine how to assign numerical scores to the data, assess the types of scores that will be used, select a statistical program, input the data, and clean up the database for analysis.

**Step II – Begin Data Analysis**

* Conduct a descriptive analysis, conduct inferential analysis, and report the results using figures along with a discussion of the main results.

**Step III – Interpret the Results from the Data Analysis**

* Summarization of the results, comparison of results with past theories, limitations of the study and suggestions for future research. (Creswell, 2015, p. 173)

References

Chisholm, I. M., & Carey, J. (2002). Information technology skills for a pluralistic society: Is the playing field level? Journal of Research on Technology in Education, 35(1), 58-79.

Cullen, R. (2001). Addressing the digital divide. Online Information Review, 25(e), 311-320.

Creswell, J. W. (2015). Educational research: Planning, conducting, and evaluating quantitative and qualitative research. Saddle River, NJ: Pearson.

Darling-Hammond, L., Zielezinski, M. B., & Goldman, S. (2014, September 10). Technology can close achievement gaps, improve learning [Webinar]. Washington, DC.

Eisner, E. W. (1985). The educational imagination: On the design and evaluation of school progress (2nd ed.). New York: MacMillan.

First, P. F., & Hart, Y. Y. (2002). Access to cyberspace: The new issue in educational justice. Journal of Law and Education, 31(d), 385-411.

Freire, P. (2002). Pedagogy of the oppressed (30th anniversary ed.). New York: Continuum International.

PETI - Evaluating Educational Technology Effectiveness. (2010, December 12). Retrieved March 19, 2018, from https://www.immagic.com/eLibrary/ARCHIVES/GENERAL/SETDA\_US/S101212P.pdf

Status and Trends in the Education of Racial and Ethnic Groups 2017 (Publication). (n.d.).

U.S.Cong. (2010). Teachers use of educational technology in U.S. public schools, 2009: First look (L. Gray, N. Thomas, L. Lewis, & P. Tice, Authors) [Cong.]. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Dept. of Education.

Using Technology to Support At-Risk Students’ Learning (Rep.). (n.d.).

Appendix

Letter for Consent to Conduct Survey

Consent Letter to Conduct Research

March 18, 2018

To Whom It May Concern:

My name is Manuel F. Negron and I am a Doctoral Candidate at New Jersey City University. I am writing to request permission to allow me to conduct a survey among the teaching staff in your school. My research is titled “Digital Divide in Urban Schools – The Role of the Principal in Narrowing the Divide and the Achievement Gap”. I will be conducting the survey to teachers amongst K-12 public schools.

The survey will take approximately 15 minutes and will not interfere with instructional time. It will be conducted before/after school, during lunch, or prep periods. Participation in this survey is voluntary and there are no known/anticipated risks associated with its participation. The data collected in this survey is strictly confidential and will be used for academic purposes only. The names of participants or of the school will not be disclosed in my research.

If you approve, please sign below giving me permission and consent to conduct this survey in your school. Your anticipated approval to conduct this survey is greatly appreciated and if you have any questions or concerns, please feel free to contact me at your earliest convenience.

Respectfully,

Mr. Manuel F. Negron

NJCU Doctoral Candidate