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An examination of seven years of technology integration in Florida schools: Through the lens of the Levels of Digital Divide in Schools

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ABSTRACT

The purpose of this longitudinal research is to document the Information and Communication Technology (ICT) integration patterns in the state of Florida in relation to the Socio-Economic Status (SES) and school type (Elementary, Middle, and High Schools). This research is characterized by the Levels of Digital Divide in Schools model presented by Hohlfeld, Ritzhaupt, Barron, and Kemker (2008). We use seven years of secondary data collected by the Florida Department of Education: Technology Resource Inventory (TRI), and the percentage of students on Free-and-Reduced Lunch as a proxy for SES. The current study uses descriptive statistics, internal consistency reliability, exploratory factor analysis, and longitudinal multi-level models to examine the trends in ICT integration in the state of Florida by SES (High and Low) in each school type (Elementary, Middle, and High) over the seven-year period. Our results suggest that Florida has improved on several indicators related to the digital divide; however, some important differences still exist. For instance, Low-SES students generally use software more for computer-directed activities such as drill and practice or remedial work, while their High-SES counterparts are using software more for student-controlled activities such as creating with or communicating through technology. We discuss our findings in relation to the three-level model presented by Hohlfeld et al. (2008) and make recommendations to relevant stakeholders within the community.

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1. Introduction

Information and communication technologies (ICT) are no longer a convenience of modern life, but a staple of modern living. Warschauer and Matuchniak (2010) liken ICT to the evolutionary breakthroughs of language, writing, and print, and christen them as a new mode of information. However, ICT literacy is unattainable without ICT access and the ability to use the ICT both efficiently and effectively. Therefore, assessing the technology experiences of students both in and out of schools has been a priority of educational researchers interested in promoting equitable social and economic opportunities for all (Judge, Puckett, & Bell, 2006; Purcell, Heaps, Buchanan, & Friedrich, 2013; Warschauer & Matuchniak, 2010). Socioeconomic disparities are the primary domain of inequality, because of unequal distribution of economic resources, lack of opportunities

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to build human capital, and unavailable social resources (Carter & Reardon, 2014). Similarly, digital inequality is a form of social inequality where differences in technology access, skills and use have implications for human, social, and financial capital (Hargittai & Hsieh, 2013), and where larger issues such as race, sex, class and language can be exacerbated by factors associated with the digital divide (Gorski, 2009). Because digital inequality impacts society at large, the same issues exist in K-12 schools (Wood & Howley, 2012). In this paper, we consider the issues of ICT access, frequency of use, and purpose of use as they pertain to schools of different SES. We use seven years of longitudinal data about ICT integration in Florida public schools to characterize the digital divide in relation to SES of the school (SES - e.g., Low/poor and High/rich) and school type (e.g., Elementary, Middle, and High).

2. Conceptual framework

2.1. The digital divide

As research into the digital divide grows, the definition of the phenomenon has evolved as our understanding has matured. Traditionally, the definition of the digital divide has looked primarily at the question of access, but the digital divide is a more complex issue than merely addressing the ability to access information and technology. Van Dijk and Hacker (2003) suggest that the digital divide is dynamic and includes differences in motivation, skills, and usage. Yu (2006) describes a three-level hierarchy of factors which impact the digital divide: political and economic factors at the societal level, cultural and social factors at the community level, and personal factors at the individual level. Kim and Kim (2001) assert the crucial aspect of the digital divide is how ICT is used to improve personal quality of life (i.e., intellectual, emotional, aesthetic, physical, social, economic, and cultural conditions). In their Digital Human Capital Framework, Bach, Shaffer and Wolfson (2013) describe these key activities as civic engagement, influence on policy, social change, and economic advancement. To explain the dynamics of the digital divide within society in general, Warschauer and Matuchniak (2010) delineate multifaceted layers beginning with access, moving to technology use, and finishing with outcomes. The Levels of Digital Divide in Schools framework (Hohlfeld, Ritzhaupt, Barron, and Kemker, 2008) similarly delineates divide layers, specifically focusing on K-12 schools rather than society in general. This framework was selected for our study because of the focus on the digital divide within Florida K-12 schools, and is described in the following section. The framework also aligns nicely with the longitudinal data available related to access to, use of, and purposes for ICT within Florida K-12 schools.

2.2. Levels of the digital divide in schools

Utilizing ongoing research into digital divide questions, Hohlfeld et al. (2008) established a pyramid framework for conceptualizing the school's substructures potentially impacting and impacted by the digital divide. The digital divide in schools can be experienced at three levels. These levels are hierarchical, because an equitable outcome at each level supports a student having equitable participation in the next level. At the same time, these levels may not be devoid of interplay. During a school day, it is possible that a student may experience digital divides at all three levels while using different ICT tools during different instructional activities (e.g., science and language arts). Fig. 1 visualizes this framework.

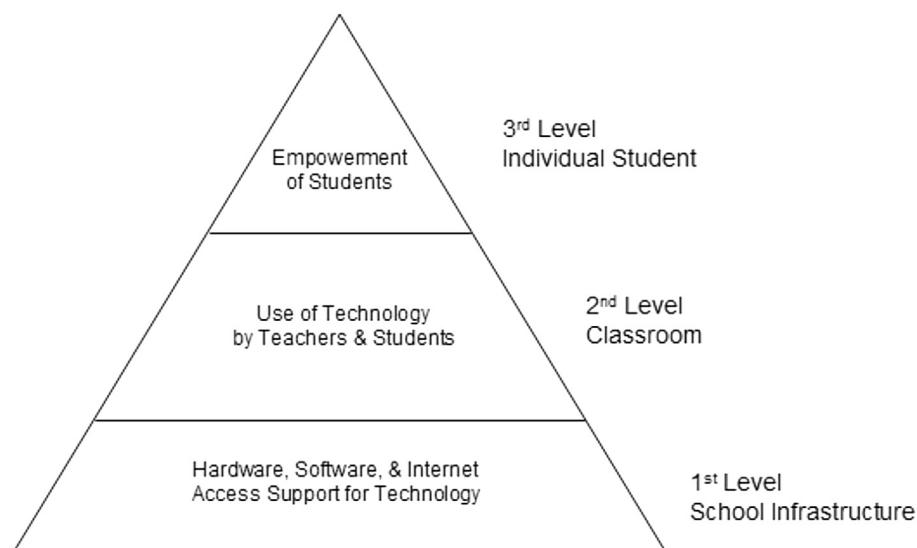


Fig. 1. Levels of the digital divide in schools (Hohlfeld et al., 2008).

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