Ogata, H. et al. (Eds.) (2015). Proceedings of the 23rd International Conference on Computers in Education. China: Asia-Pacific Society for Computers in Education

Opportunities and Challenges in Implementing Digital Equity Initiatives in Remote Areas In Taiwan

Chientzu Candace CHOU
College of Education, Leadership, and Counseling, University of St. Thomas, Minnesota, USA

Abstract: This research project examines the outcomes and strategies in implementing digital equity initiatives by government agencies, non-profit organizations, and academic institutions for improving K-12 students' learning in Taiwan's remote areas. This study will utilize the case study approach to analyze several major initiatives aim at improving the performance of under-served students. I will work with the principle investigators of major digital equity initiatives to conduct research at strategic locations in Taiwan. The findings will provide recommendations for policy makers and educators in designing new initiatives to bridge the digital divide.

Keywords: Digital divide, digital equity, social responsibility, digital justice, service learning

1. Introduction

Bridging the digital divide has been a top concern for many countries (OECD, 2000). The divide is no longer understood only as obstacles to accessing ICT but also the ability to access ICT with the confidence and competence needed to participate fully in the modern economy and contemporary society (OECD, 2000). While advancements in information and communication technology (ICT) on Taiwan makes possible the creation of a *knowledge society*, the ROC (Republic of China) government has determined that the widening digital divide has had negative social consequences to those segments of society unable to connect via the internet to information knowledge. As a teacher and researcher, I believe that while ICT drives economic growth it should also enhance democratic and social goals.

Taiwan's digital divide has become more evident as the inequality in wealth distribution widens. The ratio of household income share of the highest 20% to that of the lowest 20% has risen from 4.21 in 1981 to 6.17 in 2011 (Statistics Bureau, 2014). Although it is relatively low compared with United States (14.71), Hong Kong (20.7), and China (9.59), rising inequality impacts the government and society at many levels. The proportion of social welfare spending to total central expenditure has risen from 8.45% in 1990 to 19.89% in 2006 (Chen, 2008).

Education is seen as key to reducing income inequality. The gap between the student performance in rural areas and non-rural areas in Taiwan has also significantly widened (Sheu, 2012), limiting rural options for colleges and careers. The Research, Development, and Evaluation Commission (RDEC) (2014) of Taiwan's Executive Yuan's has collected data on the digital divide and noted a significant gap along gender, generation, region, and ethnicity, especially between majority Han and minority Aborigine. In response, Taiwan's government nation-wide digital equity initiatives aim to provide digital resources to empower participants in remote communities.

This study will provide valuable analysis of what recent government digital initiatives mean to policy makers and educators and their impact on the lives of students. The study will (1) identifying factors that contribute to successful cases of digital equity initiatives; (2) examining factors that may inhibit the successful implementation of digital equity initiatives; and (3) determining strategies and components that are critical in the design, implementation, and evaluation of digital equity initiatives.

2. Background

In the social sciences, digital equity in education is achieved when "all learners have opportunities to develop the means and capacity to be full participants in the digital age, including being designers and producers (not only users) of current and future technologies and communication and information resources" (Solomon, Allen, & Resta, 2003, p. xiii). Fulton and Sibley (2003) proposed the following four critical components for educational equity in the digital age: (1) access to hardware/software and connectivity, (2) access to excellent and culturally responsive content and the opportunity to contribute to the content, (3) access to educators who know effective technology integration, and (4) access to systems whose leaders support change through technology (p. 14-23). Although the critical components may vary in different international contexts, they do provide a holistic framework for dialogues on digital equity in different regions of the world.

There have been many studies that explored the impact of digital equity initiatives on individual students or schools through case studies in Taiwan (劉旨峰 et al., 2013; 王雅芳 & 呂慈涵, 2012). More studies on the overall impact are essential for the implementation of future initiatives. I would like to use Fulton and Sibley's framework to analyze the overall impact of digital equity initiatives over the past ten years. Taiwan's current digital infrastructure plan seeks to provide access to digital resources to improve the life quality of under-served populations. A total of 168 Digital Opportunity Centers (DOC) have been established in remote townships and villages. Most DOCs utilize office space at local K-12 schools, libraries, non-profit organizations, or community centers.

The new phase of digital equity initiatives will be moving toward empowerment. A recent major initiative is titled *The Project of Online Tutoring for After School's Learning*, aka *eTutor* Program, which provides one-to-one learning opportunity through video-conferencing and customized curriculum for students in-need at various DOCs. The *eTutor* program will be the starting point for this study.

3. Research Methods

I will apply the case study approach to scrutinize the opportunities and challenges of digital equity initiatives. The case study method produces in-depth qualitative and quantitative examination of design, implementation, and evaluation of the digital equity initiatives. This approach can provide a holistic account of the phenomenon under investigation (Yin, 2003).

3.1 Participants and Settings

The participants for this study will be parents, K-12 students, *eTutor* volunteers, organizers of digital equity initiatives from Digital Opportunity Centers, University partners, and non-profit organizations in Taiwan. According to Ministry of Education, 24 university teams, 61 K-12 schools, 22 DOCs have participated in the initiative, totaling 1,420 university tutors and 1,064 K-12 tutees (Ministry of Education, 2014). More non-profit organizations will be identified as the research unfolds. A combination of surveys, interviews, and focus group discussions will be used to gain the perspectives of the participants at ten different Digital Opportunity Centers in Northern, Central, Southern, North-Eastern, and South-Eastern Taiwan.

3.2 Research questions

1. What efforts have been made by government agencies, university researchers, K-12 educators, and non-profit organizations to promote digital equity for students in remote areas in Taiwan? I will begin with an extensive literature review and examine government publications to gain a better understanding of the current development in the summer before I arrive.
2. What are the opportunities and challenges in implementing digital equity initiatives? In Taiwan, I will send surveys and conduct subsequent focus groups with the students and parents to learn from their perspectives on their achievements and obstacles in participating

in the various digital equity initiatives. I will also poll the project organizers and volunteers during in person interviews.

3. What are the different components of digital equity initiatives in Taiwan and how do these components promote educational opportunities? I will interview staff at Digital Opportunity Centers, university partners, tutors, and curriculum developers on their views of the essential components of the digital equity initiatives to promote learning.
4. What are the effects of the digital initiatives on student learning? Students GPAs or test scores before and after the eTutoring sessions will be one indicator of their performance. I will also observe onsite the videoconferencing between tutors and tutees. Student self-assessment via survey will also be collected to address this question.

3.3 Data Collection

The following data sources will establish a database of evidence to answer the research questions:

- Quantitative data: Online survey of students, tutors, project coordinators, public databases, and student GPA
- Qualitative data: onsite observation at the etutoring centers and remote sites, focus groups, and interviews with stakeholders.

4. Outcomes and Contributions

The results of this study will establish evidence-based best practices for practitioners in enhancing digital equity, empirical data for scholarly publications, and recommendations for policy makers in improving digital equity initiatives based on the voices of the participants. This project will contribute to increased international and intercollegiate collaboration of scholars on digital divide, a revised framework on digital equity, and a collection of real-life case examples as the base of a new graduate course on digital equity in international context for students who are interested in the issue.

References

Chen, C. L. (2008). The impact of income inequality on social welfare spending in Taiwan – county-level analysis. Unpublished MA Thesis. Retrieved from http://nccur.lib.nccu.edu.tw/handle/140.119/38823

Fulton, K., & Sibley, R. (2003). Chapter 2: Barriers to equity. In G. Solomon, N. Allen, & P. Resta (Eds.). *Toward digital equity: Bridging the divide in education* (pp. 14-24). Boston, MA: Pearson Education Group, Inc.

OECD (2000). Chapter 4: Emerging trends and issues: The nature of the digital divide in learning. In *Learning to bridge the digital divide* (pp. 51-62). Paris, France: Organization for Economic Co-Operation and Development. Retrieved from http://www.oecd.org/site/schoolingfortomorrowknowledgebase/themes/ict/emergingtrendsandissuesthenatureofthedigitaldivideinlearning.htm

Sheu, T. M. (2012). Impact of educational resource on junior high school student achievement in Taiwan rural and non-rural area. Grant report to Taiwan's Ministry of Education. Retrieved from https://srda.sinica.edu.tw/search/gensciitem/1398

Solomon, G., Allen, N. J., & Resta, P. (Eds.). (2003). *Toward digital equity: Bridging the divide in education*. Boston, MA: Pearson Education Group, Inc.

Statistics Bureau. (2014). Report on the survey of family income and expenditure. Taiwan's Statistics Bureau. Retrieved from http://eng.stat.gov.tw/np.asp?CtNode=1542

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks: Sage.

Chinese Bibliography

劉旨峰, 劉佩艷, 楊舒熏, 張琬羚, 張純瑜, & 邱馨瑩. (2013). 檢視數位學伴計畫國中小學生數學學習態度於輔導大學及上課場域之差異. *第十七屆全球華人計算機教育應用大會(GCCCE 2013),* 北京-北京大學.

王雅芳, & 呂慈涵. (2012). 弱勢學童數位課業輔導新興議題 - 數位學伴計畫─「偕同」概念與機制. *第十六屆全球華人計算機教育應用大會(GCCCE 2012),* 屏東-墾丁福華飯店.