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Research on the effectiveness of information technology in reducing the Rural–Urban Knowledge Divide

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ABSTRACT

To strengthen the information technology skills of students living in remote areas, the Ministry of Education of Taiwan advocated the 2008 Country Development Plan to diminish the gap between urban and rural education development. This study proposes a hypothetical model to evaluate the effectiveness of the government policy in decreasing the Rural–Urban Knowledge Divide in higher education. There were 427 participants in this study. From the research results, we found that the government policy had a significant impact on reducing the Rural–Urban Knowledge Divide in higher education, and it demonstrated that most hypotheses were supported. Finally, as a virtual teacher or classroom for students living in rural areas, this research provides several suggestions as strategies in building up prospective resources for a Digital Opportunity Center or e-learning environment beneficial for both rural and urban students.

1. Introduction

On a remote and rural island, it is usually in the shortage of resources and qualified teachers for island students. In this kind of environment, Internet is the easiest way to find answers for problems. Due to rapid development of information technology, time and space are no longer the problems in communication. Computers and Internet have become necessities in our life. An increasing number of people rely on information communication and technology to obtain the latest global news and information. For example, the smart phone with 3G wirelesses connects us to Facebook anytime and anywhere. We no longer have to stay in the office to work. With a tablet and cloud computing, work can be done in any place.

With increasing demand for higher education, colleges have become increasingly accessible for the last decade in Taiwan. In 2006, there were 163 universities in Taiwan. Quality of students has deteriorated since qualification for admission to universities has decreased. Furthermore, the lack of resources and teachers in remote areas has led to the gap of developing talents in higher education. To assist students living in remote areas in building up ability of using information technology, the Ministry of Education of Taiwan actively promoted the 2008 Country Development Plan. This plan was intended to decrease gap between urban and rural education development. On top of it, it aimed to coordinate with other departments on improving the overall learning environment in remote areas and narrowing the gap. The differences in application of Internet information, information comprehension, and search capability of students in urban and rural area create the proficiency gap in knowledge understanding. Also, people's understanding of computers differ with urbanization or other factors in their living area, a condition that contributes to the asymmetry of digital information and Knowledge Divide.

2. Research background

2.1. Digital divide and knowledge divide

Since computers and Internet have become essential elements in our life, Information and Communication Technology (ICT) has gradually become seen as a Social Equalizer, a powerful communication tool possessed not only by elites (Webster, 1995). Though the fees of

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using ICT are becoming increasingly cheaper, the information elites' capability and knowledge of computers and the Internet is similarly increasing, resulting in a widening gap between the information-rich and the information-poor. Those with inferior socio-economic status are unable to gain access to information technology and knowledge, and this lower usage of resources makes them become part of the information-poor. Hence, in the Information age, the application of ICT has become a necessary skill and a key factor in determining whether people can succeed (Haywood, 1998). However, the opportunity and experience of using and mastering ICT depend on various factors, such as gender, race, socio-economic status and residence, which contribute the formation of the so-called digital divide (e.g., Norris, 2001; Warschauer, 2004). Williamson (2009) and Watson, Mong, and Harris (2011) had identified two barriers of using IT in the classroom: high cost of computer hardware and software licensing, and the lack of knowledge of how to use IT for education. Knowledge gap always exists in people coming from different background. For example, Scientists often refer to information gap or the Knowledge Divide between the North and the South, i.e., between developed and developing countries, rural and urban (Karlsson, Srebotnjak, & Gonzales, 2007). The rural–urban gap and the imbalanced allocation of educational resources are in large measure responsible for the digital divide (CNNIC, 2011; Li & Ranieri, 2013; Li, Zhang, Wu, & Liu, 2009; Xue & Wang, 2011). However, if the aforementioned imbalances can be improved by upgrading the information infrastructure, the digital divide will gradually shrink (Akca, Sayili, & Esengun, 2007; Loo & Ngan, 2012). The chance for students in gaining more information can be increased by having more opportunities to Internet service. But most students living in remote areas still have limited chance to get enough valid knowledge they need. This condition further causes the wider Knowledge Divide (Karlsson, 2002; Marshall, Kinuthia, & Taylor, 2009). Regarding the difference between knowledge and information, Davenport and Prusak (1998) argue that knowledge comes from information. People have to participate in the process of transferring information into knowledge. They also think that knowledge is a kind of fluid mix, inclusive of such elements as structured experiences, value, and unique insights. For example, when the usage of ICT leads to intellectual property issues, it is important to understand whether students in urban and rural areas have sufficient experience and prior knowledge to resolve these issues. If not, the Rural–Urban Knowledge Divide is likely to emerge.

2.2. Overview of the application of information in Kinmen

Kinmen is an island that is uniquely located, under the jurisdiction of the government of the Republic of China (aka Taiwan) but very close to the port city of Xiamen of the People's Republic of China (a.k.a. Mainland China). It has an area of 150 square kilometers and a population of about 50,000. Kinmen had been militarily administrated for nearly 50 years, during which time there had been several skirmishes between Taiwan and Mainland China fought on and around Kinmen, which had played a key role in the defense of Taiwan. Socioeconomic statuses of most households in Kinmen are below the average of households in Taiwan. According to the survey performed in this research on Kinmen, many students found it inconvenient to access Internet at home even though most students thought it would be the same whether living in urban or rural area.

Internet equipment in Kinmen is inferior than it is in urban regions in Taiwan. This also suggests the uneven distribution of information and learning resources do exist in the development of education in urban and rural areas. Computer network provides a wealth of information. This is an important resource in contributing people's knowledge. The diverse fields of knowledge provided through the computer network are the best teaching aids that strengthen the shortage of teaching resources in rural area or remote small Islands (Karlsson et al., 2007). From the perspective of educational development, teaching with network technology is largely different from the traditional education because network technology boasts abundance and interaction. Students in remote or outlying islands can surf the Internet for answers or enter a virtual classroom to access educational resources and reinforce their learning goal (Lin & Wu, 2004). Even so, there are still many students who are unable to find satisfying academic knowledge or answers on the Internet. It is especially inadequate for those living in remote areas without enough Internet resources. For the past few years, Taiwanese government has finished the basic construction to promote IT hardware and software infrastructure in remote areas. Most of students nowadays can access Internet for teaching resources.

Currently college students living in outlying islands are faced with the situation of Knowledge Divide. It is caused by infrastructure issues, the source of quality information, and learning quality which require much attention from the government. The biggest problems of digital teaching materials and online learning are the license restrictions and the high cost of information sources, including legal responsibilities in preventing the counterfeiting or re-produced material and pictures. Publishers and authors in particular want to achieve the richness and convenient resource, including copyright restrictions (needs money to purchase document). The result leads to a new issue that contains the legal problem to re-edit textbooks, teaching materials and resource. However, government financial support, cooperation of academia, publishers, and education organizations are required in order to achieve this goal. To further understand the relationships between teaching and learning resources network of current higher education in outlying islands, this study will explore relevant factors, which may influence academic achievement. Government or school policy and digital teaching environment will also be discussed.

2.3. The Digital Divide in the developing world

In the world context, the global digital divide refers to the gap of developed countries possessing and using computers and the Internet and developing countries that do and do not use digital resources (Norris, 2001). For people in developing countries, access to information technology is constrained by financial issues (Gyabak & Godina, 2011). As it is impossible to expect or create the conditions for every family to own a PC, the setting up of public-use computer kiosks seemed to be a alternative solution. However, this restricted access thus precludes the possibility of using information technology anytime and anywhere. Information society researchers such as Castells (2002) and Van Dijk (2005), have indicated a structural inequality in developing countries that stems not only from the Digital Divide but also from the education divide, income divide, ethical divide, gender divide, ability divide and so forth. Zhou, Singh, and Kaushik (2011), studying the Digital Divide in South Asia, suggest that education plays a key role because it is the main prerequisite for access to computers and the Internet, for which English proficiency is still important. In addition, Fuchs and Horak (2008), taking as an example the African developed countries of Ghana and South Africa, both of which have signed WTO Telecommunication Agreement, suggest that Internet access and usage rates are still low for different social levels classified by income, education and health status. A severe Digital Divide thus still exists in Africa, mainly caused by inequality in the global network resources.