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Designing Online Interactive Learning Program to Improve Chinese Migrant Children's Internet Skills: A Case Study in Hangzhou Minzhu Experimental School

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Abstract: The purpose of this study is to design and implement an online interactive learning program to improve migrant Children's Internet skills. With the help of Italian Association of Media Education, we designed an online program (http://yzj.edulife.eu/j/?lang=en), which included five interactive learning modules with lots of online activities allowing students to practice such skills as retrieving, assessing, storing, producing, presenting and exchanging information. During the Spring Semester of 2011, 143 4th and 5th grade students from Minzhu Experimental School were invited to attend the program with the guidance of three ICT educators and two researchers. Pre- and post-test and interview were used to examine the effectiveness of the program. Data analysis found that migrant children's Internet self-efficacy and Internet exploratory behavior were significantly improved by attending the program. While the study also found some limits of the program. Based on those reported constrains, suggestions were proposed in the last part of the study.

Key words: Online interactive learning program; digital divide; media literacy; media competency; Internet self-efficacy; Internet exploratory behavior

设计在线交互学习项目　提高进城务工人员子女的网络技能水平——来自杭州明珠实验学校的案例

摘　要：本研究的目的是调查进城务工人员子女的网络使用水平，并通过设计与实施一个基于网络的学习项目来探索进城务工人员子女网络技能水平的提高策略。在意大利媒体教育协会的帮助下，研究者设计了一个在线交互学习平台（http://yzj.edulife.eu/j/?lang=en），该平台上包括五个学习模块，其中包含多项在线活动，包括在线搜索、储存、加工、呈现、评价和交互信息等。2011 年春学期，来自杭州明珠实验学校的 143 名四、五年级学生和三位信息技术教师被邀请参与此项目，前后测结果显示，在参与了基于网络的学习项目之后，进城务工人员子女的网络自我效能和网络探索行为得到了显著的提高，教师反思的结果也显示该类学习项目有益于改善进城务工人员子女的网络使用行为以及网络自信心。不过，项目也发现了一些问题（包括实验控制、时间约束等），基于此，研究提出了一些改进策略。

关键词：在线交互学习项目；数字鸿沟；媒体素养；媒体能力；网络自我效能；网络探索行为

INTRODUCTION

One of the most relevant phenomena of the last decades is the raise and the development of the new digital media, which brought new opportunities as well as new challenges for the new generations of children. Indeed, as emphasized by the OECD (2011), the access to the Internet may have qualitative, as well as quantitative, consequences in terms of educational opportunities and the ability to navigate and use the Internet effectively makes a difference for full participation in a knowledge-based society.

People able to access useful information from all types of media and to create meaningful information for the public would definitely have more and better opportunities to survive in the current digitalized society. In this context, media skills become increasingly important for personal and professional development, and the concept of media literacy is drawing the attention of the public, especially among educational researchers, policy makers and school teachers.

In Western countries the reflection around the issues relating to the impact of media and technologies on literacy, education and society goes back at least to Seventies, by involving scholars from different fields (from cultural and communication studies to sociology, pedagogy and etc.) and bringing to the raise of new areas of study such as Media Education (ME). ME is defined as the educational process that takes place inside and outside formal educational institutions, through which media literacy is developed (Buckingham, 2003). Around the world, ME has more than eighty years' history. The pioneering countries include the United Kingdom (UK), Australia, Canada, the United States, Netherlands, Italy, Greece, Austria, Switzerland, and etc. Compared with this, China is just at its beginning. The concept of ME, indeed, was firstly introduced in Chinese literature only in 1997 (Bu, 1997). Although the first decade of the twenty-first century witnessed rapid development of ME in some Chinese urban schools (Peng & wang, 2008, 2010, 2012; Shao, 2006; Zhang, 2006; Zhang, 2009), ME-related instructional programs are still very rare in Chinese basic education system.

In this framework, this study presents and discusses the results of a web-based ME program addressed to elementary schools in Hangzhou (China), by focusing on the performance's analysis of the migrant children involved in the program. The study is part of a larger project called "The Chinese Way to Media Education" and supported by the Italian Association of Media Education (MED). The project aimed at improving Chinese teenagers' digital and media literacy through teachers' training and involving students into innovative practices of learning about the media.

Prior to describing the research study, we shall provide a brief review of the literature about media/digital literacy and some background information about the development of the "migrant children school" in China.

BACKGROUND

A quick overview on the concepts on media and digital literacy/ competence

The term 'media literacy' firstly emerged in the 1970s in the United States, as part of the television literacy programs within the academic curriculum (Buckingham, 2003). Today it is widely used around the world and some related expressions include

information literacy, digital literacy/competence, digital and media literacy, or information and media literacy. According to a popular definition, media literacy is the ability to access, analyze, evaluate, communicate and produce media (Aufderheide, 1993; Tyner, 1998).

In a similar vein, Celot and Tornero (2008) classified the skills and capacities of media literacy in four main types: access, analysis, evaluation, communication and creative production. (1) Access regards the possible effective use of media, including both the physical access to the contents and the capacity of using media in an adequate way. (2) Analysis is the capability of reading and understanding the media contents and the opportunity offered by the media. (3) Evaluation is the capacity of classifying media contents and media opportunities/constrains on the basis of a scale of values, including judgments about the value and meaningfulness of a message, identification of ethical, aesthetical and cultural values behind the message and the comparison between them and the values of the judging subject. (4) Communication and creative production include capacities needed to create a message using different types of codes (from the text to the audio visual, to the digital), and to disseminate it.

American scholar Hobbs (2010) used the expression 'digital and media literacy' and defined it as the ability to (1) make responsible choices and access information by locating and sharing materials and comprehending information and ideas, (2) analyze messages in a variety of forms by identifying the author, purpose and point of view and evaluating the quality and credibility of the content, (3) create content in a variety of forms for authentic purposes, making use of language, images, sound, and new digital tools and technologies, (4) reflect on one's own conduct and communication behavior by applying social responsibility and ethical principles, and (5) take social action by working individually and collaboratively to share knowledge and solve problems in the family, workplace, and community, and participating as a member of a community.

Besides the term 'media literacy,' some scholars proposed the concept of 'media competence' and pointed out that, while the traditional concept of 'literacy' refers to a capability, the notion of competence indicates a 'meta-capability' entailing the ability to mobilize such resources as subject knowledge, procedural knowledge, skills, practical and cognitive capacities, attitudes and dispositions (Parola & Ranieri, 2010). In particular, media competence involves a complex including different abilities such as:

(1) knowing how to read media, which is the capacity of reading and decoding media; (2) knowing how to write media, which is the capacity of producing the media text and to use digital instruments with creative/productive purposes; (3) knowing how to critically evaluate media, which is a complex attitude consisting in trying to take a distance from the observed object; and (4) knowing how to harness the media, which is the capacity of making aware decision in the consumption of media (in given places and situations) and choosing between more or less explicit and ambiguous messages, and in different situations (Parola & Ranieri, 2010).

The Framework for 21st Century Learning, which was proposed by the Partnership of 21st Century Skills, utilized a broader concept, named 'information, media and technology skills', including the skills of accessing and evaluating information, using and managing information, analyzing media, creating media products, and applying technology effectively (Partnership of 21st Century Skills, 2012). In this framework, those abilities are viewed as fundamental for active citizenship and functional to face the new challenges of the knowledge society characterized by information overload, rapid change of technologies and social networking.

Some remarks on "migrant children schools"

Since the late 1970s when the Opening-up Reform and a Market-oriented economic system were carried out in mainland China, the country has witnessed huge intra-national migration of farm workers into cities. According to the Ministry of Human Resources and Social Security of the P. R. China (MOHRSS), the number of farmer workers had reached 253 million by 2012 (MOHRSS, 2012). Among the huge population of migrant farm workers, a large portion had children aged 6–14 living together with them. In China, we call these children "migrant children". According to the Law of Chinese Compulsory Education, they need to receive 9 years of compulsory education and Chinese government has the responsibility to allocate them in the basic education system in the cities where they are living. However, due to the strict household registration system and the decentralized system of public education finance, these children could not be accepted by those urban public schools. Therefore, local government and some local educators or enterprises opened "migrant children's

schools" which are specifically addressed to such groups of children. Some migrant children's schools are public and are supported by local government, while other schools are private and depending by individual or local enterprises. To date, about 40 million students are attending migrant children schools in China (MOHRSS, 2012).

Zhejiang Province, which is located in the eastern coast of China, is now one of the most economically developed provinces in China. As a provincial city, Hangzhou attracts thousands of farmer workers from all over the country every year. Among them, many bring their school-aged children with them. Therefore, since the late 1990s, Hangzhou Bureau of Education has established many migrant children schools. According to the latest statistics, Hangzhou currently has 688.8 thousand children enrolled in primary or middle schools, receiving their 9 years of compulsory education. Among them, 209.1 thousand are migrant children (Hang Zhou Bureau of Statistics, 2012).

THE CASE STUDY

Context and Participants

In December 2010, the researchers from the College of Education (Zhejiang University), which were involved in "The Chinese Way to Media Education" project, invited four elementary schools located in Zhejiang Province to attend the program. Among the four schools, three were typical urban public schools and one was a migrant children school. The study here reported will focus mainly on migrant children's performance in the project. The migrant children school selected for the study was the Hangzhou Minzhu Experimental School. Founded in 1999, this school covers the whole compulsory education period (from 1st to 9th grade) and includes three campuses, i.e Shiqiao, Ganchang and Hangyang. Among them, Shiqiao and Ganchang campuses are for elementary school students (from 1st to 6th grade), while Hangyang campus is for middle school students (from 7th grade to 9th grade). All these campuses are located in the suburban area of Hangzhou.

For the study, 143 4th and 5th grade students from the Ganchang campus were randomly selected. The reason for selecting students from this school is that one of the ICT educators teaching in Ganchang campus is receiving his master program in the

College of Education, Zhejiang University during the 2010-2013 and he indicated great interest in applying the online interactive learning program in his ICT education course. Therefore, the researchers invited him and two of his colleagues (also ICT educators), together with their students, to attend the project.

As a typical migrant children's school, Hangzhou Minzhu Experimental School totally has 56 classes and about 2300 enrolled students in its elementary school part (Shiqiao campus and Ganchang campus). As introduced by one ICT educator, these migrant children come from across the country and they are mainly from provinces located in northern and western China, such as Heilongjiang Province, Anhui Province, Jiangxi Province, Shaanxi Province, Henan Province and etc. As to ethnic, most of them are Han and only a small portion of students are minorities, like Hui or Korean ethnics. Their parents are migrant workers working in all kinds of factories, companies or stores located in downtown or suburban area of Hangzhou and most of them may be construction workers, enterprise workers, small businessmen, or just housewives. Interviews with randomly selected students from the school found that most of their parents completed 9-year compulsory education and about one third of them completed 3-years' high schools and very few had higher education opportunities.

As to the profile of the teachers' group working at Hangzhou Minzhu Experimental School, at present, the school has 154 elementary school teachers. However, among these teachers, only 52 are formally registered teacher and the rest 102 were unregistered teachers who are working tentatively in the school. As to the educational background of the teachers, most of them have received secondary and/or post-secondary education and owned College Degree or Associate Degree. Few teachers owned Bachelor or higher degree.

Besides, it is worth to note that, in Chinese compulsory education system, students would receive formal ICT-education from the 3rd grade. Therefore, the 4th and 5th grade students are supposed to have a certain level of computer skills and be able to attend online courses. However, because Ganchang campus is a temporary campus that was rented from a factory and will be returned back in 2013, Hangzhou Minzhu Experimental School did not invest too much in its infrastructure, especially in its computer lab. Although there is a computer lab in this campus, which has about 30 computers, students' opportunities to do computer-assisted learning activities are very rare.

Aim of the Study

The aim of the study was twofold: first, it focused on the design and the implementation of an online interactive learning program on ME related issues; secondly, it attempted to investigate the impact of the online program on migrant children's media skills, particularly referring to the Internet. More specifically, it intends to explore the following research questions:

RQ1: What was the initial participants' Internet usage status in terms of autonomy of use, availability of social support, and online activities?

RQ2: What was the influence of the 'gender' variable on participating children's Internet skills? What was the influence of 'owing PC or not' on participating children's Internet skills?

RQ3: What was the impact of the online interactive learning program improve participating children's Internet skills, expressed by Internet self-efficacy and Internet exploratory behavior?

Designing and Implementing an Online Learning Program

The whole program was structured into three phases: (1) instructional design (October, 2010 – February, 2011); (2) development of online learning platform and pre-test (February – March, 2011); and (3) implementation of the program, post-test and teachers' interviews (April – November, 2011).

Stage One: Instructional Design

In stage one (October, 2010 – February, 2011), under the framework of the constructivist approach, researchers designed the instructional content of the program. Based on learner analysis, five interactive learning modules about media, such as comics, advertisement, newspaper, Internet, and audio/video (multimedia products) were designed.

To foster students' engagement as well as to connect their learning activities with their daily lives, researchers selected "environmental issues" as the theme of the

whole project and named it as "Exploring environmental issues in the media: Media Education in Chinese k-12 schools". Specifically, module one focused on 'Comics on environmental issues'; module two on 'Advertisement & environment;' module three on 'Newspaper on environmental issues;' module four on 'WebQuest on saving energy'; and module five on 'Digital storytelling about renewable energies' (Figure 1). Learning activities of each module were related to environmental problems or environmental protection activities.

Figure 1: Homepage of the program (Ice breaker video and course modules)

In designing the instructional contents, the researchers aimed to achieve two purposes: 1) to introduce basic ME knowledge to Chinese teenagers and to improve their media competences; and 2) to promote teenagers' awareness of environmental protection.

Stage Two: Development of Online Learning Platform

In stage two (February – March, 2011), with the help of an Italian e-learning company, an online learning platform (http://yzj.edulife.eu/j/?lang=en) was designed and implemented to support the ME project. The online learning platform highlighted interactivities among educators, learner and instructional contents by designing some featured contents, including (1) Presentation area, which was designed to allow students to access the instructional contents, (2) Deepening Area, which included extra

multimedia materials or Internet resources; (3) Dialogue Area, i.e. a discussion forum facilitating synchronous or asynchronous communication between students; (4) Online Experimentation Area, which was a working space where students could accomplish learning activities and also publish their learning products; and (5) Transformative Reflection Area, which was designed to support students' in the reflection and evaluation of their learning processes and outcomes. To make an example, Figure 2 shows the outlook of module one (Comics on environmental issues) in the learning platform.

Figure 2: Outlook of the online interactive media education platform

Besides developing the online learning platform, in stage two, researchers carried out a pre-test to collect data about migrant children's Internet usage status and their Internet skills before the implementation of the online program.

Stage Three: Implementation of the Program

In stage three (April – November, 2011), the study adopted a blended learning method to deliver program, taking advantages of both face-to-face instruction and web-based distance learning. As shown in table 1, in each module, students were supposed to do multiple online learning activities, such as reviewing module presentations or other resources, downloading some evaluation tools or newspaper models, searching information to accomplish assignments, uploading their assignments to the desired places, writing blogs, chatting with others, and etc. At the same time, due to time

limits in ICT Education course, students were also asked to accomplish several offline activities besides the ones carried out within the platform.

Table 1: Major activities involved in the five modules of the program

Modules	Main activities
Comics on environmental issues	Students recall their experiences with comics; Teachers introduce knowledge about comics, including history, main features, and etc.; Students search for comics on environmental issues on the Internet; Students use specific tools to analyze selected comics and then publish their analyses on the web; Students create their environmental protection issues -related comics and then publish them on the web; Students use evaluation tools to assess their own and other students' comics and then publish their evaluations on the web; Students use weblog and web-based discussion area to reflect on their learning experiences and to communicate with others.
Advertisement & environment	Students recall their experiences with advertisements; Teachers introduce knowledge about advertisement, including characteristics, procedures of production, and etc.; Students search for environmental protection-related advertisements on the Internet; Students use specific tools to analyze advertisement and then publish their analyses on the web; Students use weblog and web-based discussion area to reflect on their module activities and to communicate with others.
Newspaper on environmental issues	Teachers introduce knowledge about news and newspaper, including definition, history, features/elements, digital integration trend, and etc.; Students use 'keyword' to search for news on the Internet; Students evaluate various web-based information sources about the same news;

(Continued)

Modules	Main activities
	Students write a piece of news to report an environmental event; Students are divided into groups and make electronic newspapers and publish it on the web; Students use weblog and web-based discussion area to reflect on their module activities and to communicate with others.
WebQuest on saving energy	Teachers introduce knowledge about WebQuest, including history, features, principles, and etc.; Students are divided into groups and search, analyze, evaluate, and integrate web-based information to accomplish given WebQuest tasks (acid rain, white pollution, Haze day, and waste classification); Students make presentations about target topic; Students publish their WebQuest products on the web; Students use evaluation tools to assess their WebQuest products and then publish the results on the web. Students use weblog and web-based discussion area to reflect on their module activities and to communicate with others.
Digital storytelling about renewable energies	Teachers introduce knowledge about Digital Storytelling (DS), including history, features, some representative DS products, and etc.; Students are divided into groups and prepare renewable energies-related multimedia materials for DS through two ways: searching web-based or making by themselves; Students use prepared multimedia materials to make DS; Students publish DS products on the web; Students use DS evaluation tools to assess DS and publish their evaluations on the web; Students use weblog and web-based discussion area to reflect on their module activities and to communicate with others.

Since teachers involved in the program were unfamiliar to ME and web-based learning program, before implementing it, researchers visited the Hangzhou Minzhu

Experimental School in March, 2011, carrying out teachers' training activities addressed to the three ICT educators. Training contents included "Introduction about media education" and "Orientation about the online learning platform". At the end of the program, the researchers went to the school to administer a post-test and to do teacher interview.

Methodology

The study was based on the use of quantitative as well as qualitative methods to collect data. Pre-and post-test was used to measure migrant children's Internet usage status and their Internet skills before the implementation of the online interactive program; and (b) migrant children's Internet skills after the implementation of the online interactive program. The pre-test was used to answer RQ1 and RQ2, while a comparison between the results of pre- and post-test was made to answer RQ3.

The pre-test survey instrument was structured in four parts. The first part aimed at collecting data about participants' demographics, including age, gender, PC ownership (having PC or having no PC at home), owning PC's time (indicated by years), and using Internet's time per day (indicated by hours).

The second part aimed at collecting data about participants' autonomy of Internet use (Internet access at home and Internet access at school) and the availability of social support (training support, superiors' influence and parents' influence). Internet access at home or at school and training support were measured by 12 items (4 items for each variable) adapted from Martins and Kellermanns (2004). The sample statements were "I usually have a high-speed connection to the Internet at home", "I usually have a high-speed connection to the Internet at school," or "I have received adequate training in using the Internet at school". Participants could express their views according to a 7-point Likert scale: 1= Strongly Disagree; 4= Neutral; 7= Strongly Agree. Superiors and parents' influence was measured by 12 items (6 items for each variable) adapted from Igbaria, Parasuraman and Baroudi (1996). The sample statements were "My superior thought that I should use the Internet" or "My parents thought that I should use the Internet". Participants could express their views according to a 7-point Likert scale:

1= Strongly Disagree; 4= Neutral; 7= Strongly Agree.

The third part of the survey instrument aimed at collecting data about participants' online activities. Adapted from CNNIC (2008) and Nachmias et al. (2000), 13 items were used to measure participants' leisure and study use. The sample items were "Play online games" or "Find study related information using search engine". Participants could express their views according to a 5-point Likert scale: 1= Not at all (N); 2=Very Seldom (VS); 3=Seldom (S); 4=Frequent (F); 5= Very Frequent (VF).

The fourth part aimed at collecting data about participants' Internet skills, analyzed in terms of Internet self-efficacy and Internet exploratory behavior. Internet self-efficacy refers to an individual judgment of his/her capability to use the Internet (Torkzadeh & Dyke, 2001). Although Internet self-efficacy does not refer to the individuals' actual skills, it is a important predictor of one's real Internet skill. Since it was firstly introduced in 2001, the Internet self-efficacy concept was widely used as an indicator of one's Internet skill (Hsu & Chiu, 2004; Torkzadeh, Chang, & Demirhan, 2006). Internet self-efficacy was measured by 19 items adapted from Hsu and Chiu (2004). The sample statement was "I feel confident navigating the WWW by following hyperlinks". Participants could express their views according to a 7-point Likert scale: 1= Strongly Disagree; 4= Neutral; 7= Strongly Agree. Internet Exploratory behavior, as another indicator of Internet skills, was measured by 8 items adapted from Novak, Hoffman and Yung (1998) and Novak, Hoffman and Yung (2000). The sample statement was "I enjoy visiting unfamiliar websites just for the sake of variety". Participants could express their views according to a 7-point Likert scale: 1= Strongly Disagree; 4= Neutral; 7= Strongly Agree.

The post-test survey instrument was a simplified version of the pre-test instrument. It was only constituted by those statements related to the Internet skills (i.e., the Internet self-efficacy and the Internet exploratory behavior). In the subsequent analysis, we used the unweighted factor score as the final factor scores of these variables.

The pre-test was carried out in April, 2011, when the online learning activities were not started yet. The post-test was carried out in November, 2011 when participating students finished all of the five modules.

Besides pre- and post-test, researchers conducted teachers' interviews after the implementation of the program. Semi-structured interviews were used to investigate the