Paper Title What Factors Impact on Primary Students Using the Internet and Media for Learning and Entertainment at Home?

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Objectives

With the increasing affordability of Information Communication Technology (ICT), children can now access Internet from home via multiple devices. In developed countries, earlier concerns about a 'digital divide' among children due to inequalities in access to ICT have been replaced by concerns on ways they use ICT in schools and at homes (Kerawalla & Crook, 2002). However, little is known about how students use Internet to learn at home. It is generally viewed that some students engage too much time in online activities, such engaging in new media, playing games, or participating social networking, we do not know to what degree are these activities educative or connected to school work, or if these activities are related with social factors. Recognizing the need for educators to understand relevant questions, this study adopts an exploratory approach to investigate how primary school students in China use Internet at home and the factors that influence their online activities.

Theoretical Framework

Compared with many studies focusing on how students use ICT in school settings, fewer have focused in non-school settings (Rideout et al., 2010; Roberts, Foehr, & Rideout, 2005). This study focuses on individual and context factors that impact on internet use at home.

Individual factors

Most relevant studies have reported gender differences in Internet use. Boys were found to have stronger computer skills and more motivation to get involved in computer-related activities (OECD, 2007; Rideout et al., 2010). Further, boys tend to spend more time playing online games and watching videos, while girls spend more time on online social networks (Luckin et al., 2008; Roberts et al., 2005).

Age is another factor influencing students' online activities. Studies in US and Europe have generally found that younger students and older students have different Internet use patterns. Older students tend to spend more time on Internet, and engage in more types of online activities (Lenhart et al., 2007; OECD, 2012; Rideout et al., 2010).

Academic performance is a focal point of ICT studies because people concern that Internet use may distract children's attention from learning. It is reported that heavy computer users generally have lower grades and lower confidence levels (Rideout et al., 2010). It is also found that this negative relationship was more evident among younger students (Wainer, et al., 2008).

Context factors

The context factors examined in this study include family SES (family income and parental education) and offline home activities (watching TV, reading books, and communicating with families).

Family income was assumed to cause the digital divide. As ICT devices become more affordable, the income gap is no more relevant. OECD (2012) reported that in Europe

more than 95% of teenagers have at least one device connected Internet at home. While Internet access is no longer an issue, the question how family income influences on children use Internet remains to be answered.

Parents' education levels are also found related to children's Internet use. Broos (2006) found that mothers' education level was significantly related to the online activity types of their daughters. Lenhart and his colleagues (2007) found that children from high SES families were more likely to try new Internet activities.

It is believed that new and traditional media are in competition. Recent studies show that students spend more time on Internet than 10 years ago but less time on watching TV (Rideout et al., 2010). However, this does not necessarily mean that teenagers replaced watching TV with surfing Internet. Heavy Internet users reported the same amount of time on watching TV as light Internet users (Rideout et al., 2010).

As Internet use becomes more popular among children, concerns are growing that they may spend less time in face-to-face communication with families (Bargh & McKenna, 2004). However, it was also reported that social networking opened new communication channels for children (OECD, 2008).

Young children and Internet in China

According to a 2011 national survey (Centre of Young Pioneers of China, 2011), 82% of Chinese families with 10-17 year old children had Internet access and 87.5% of Chinese families with younger children had Internet access. Students rated social interaction and entertainment as their primary reasons for going online, but they also said that Internet made learning easier. However, there is little research investigating how Chinese children use Internet at home.

This study investigates individual and contextual factors that influence internet use by primary students at home in China. There are two questions:

1) Are these factors related to their online learning activities, and if so, how?
2) Are these factors related to their online entertainment activities, and if so, how?

Methods

Participants

Two schools (one elite and one average) in a medium size city in eastern China were selected as convenient samples. Surveys were sent to all students from 3rd grade to 6th grade in both schools. 846 students from the elite school (response rate: 95.5%) and 619 students from the average school responded (response rate: 96.1%) to the surveys.

Survey design

We investigated how young students used Internet at home based on three Individual factors: Grade, Gender, Academic Scores, and three types of Context factors: Type of School (elite or average), family SES, and Offline Activities (watching TV, reading books, and communicating with families).

7 items on four point Likert-scale scale were developed asking how students use internet. They were divided into two categories: online learning and online entertainment. Confirmatory factor analysis showed good model fit (CFI is .97 and RMSEA is .045).

Data sources and data Analysis

Two types of data were collected for data analysis: (1) Exam scores and (2) Survey data. Since exam items differed for different grades and schools, raw scores were transformed into standardized Z scores. For survey items, averages were calculated on the items in two categories which were transformed into two dependent variables: *online learning and online entertainment*. Hierarchical multiple regression was used to examine the relationship between context and individual factors with two dependent variables respectively. The context factors were entered into the regression model in the first step and the individual factors were entered in the second step.

Results

Descriptive analysis

Data from 1465 students were collected and 61 of them were excluded due to missing major information. For activities relevant to Internet use, students generally reported that they used Internet more frequently for learning (Mean = 1.62) than for entertainment (Mean = 1.27). Online learning and entertainment are positively correlated (r =.18, $p < .01$).

Table 1: Descriptive analysis on the items in the survey

	Range	Min	Max	Mean	SD
Exam_Score	88.80	11.00	99.80	83.64	13.95
Online Activities					
Factor 1: Online Entertainment	3	0	3	1.27	0.75
Multimedia	3	0	3	1.36	1.09
Game	3	0	3	1.57	0.97
Chat	3	0	3	1.39	1.11
SNS	3	0	3	0.75	0.96
Factor 2: Online Learning	3	0	3	1.62	0.68
Discuss	3	0	3	1.44	0.94
Homework	3	0	3	1.44	1.08
Seek_Info	3	0	3	1.98	0.90

Exam_Score Average of math and Chinese exam scores, *Multimedia:* Viewing or downloading music, videos, photos, or pictures, *Game:* Playing games online, *Chatting:* Chatting with friends online, *SNS:* Visiting social network website, *Discuss*: Communicating online with classmates on learning, *Homework:* Writing homework or report online, *Seek_Info:* Searching information online for school work.

Multiple regression

In the regression model predicting *online learning*, all independent variables accounted for about 6% of variance. Mother's education level ($t = 2.92$, $p < .01$), Exam scores ($t = 2.36$, $p < .05$), Time spent reading ($t = 2.45$, $p < .05$), Grade level ($t = 4.93$, $p < .001$), and Time spent watching TV ($t = -3.50$, $t < .001$) were significant predictors.

In the regression model predicting *online entertainment*, all independent variables accounted for about 17% of variance. School ($t = 2.68$, $p < .01$), Family income ($t = 5.14$, $p < .001$), Time spent watching TV ($t = 6.31$, $t < .001$), Grade level ($t = 10.51$, $p < .001$), and Gender ($t = -5.82$, $t < .001$) were significant predictors.

Discussion and implication

This study explored the factors explaining home Internet use for learning and entertainment by primary school students in China. Results showed that home Internet uses for these two purposes are related but there are major differences in two models.

Online learning and entertainment at home: connections

Online learning and entertainment are found positively correlated, which implies that students spending more time learning online tend to spend more time on online entertainment. This finding goes against the assumption that online learning competes with online entertainment (Eynon & Malmberg, 2011). It suggests that there might be a synergy between online learning and entertainment in informal contexts.

The finding that older students spend more time learning online is consistent with earlier studies (Lenhart et al., 2007; OECD, 2012; Ofcom, 2007). Comparatively, age showed larger effects on entertainment than on learning, which may be due to the nature of school tasks in China. Thus, to motivate students to learn online, instructional design might borrow ideas from online entertainment.

Online learning and entertainment at home: different patterns

For the model explaining children's online learning, five significant predictors accounted for 6% variance. The better their academic performance, the more time they spend on reading print material, more time in online learning. Time for reading print media, students' academic performances and online learning are found positively related to each other. The possible explanation could be that students who performed academically better are more likely to develop the reading habit, and tend to extend the learning behaviour to network use. Mothers' education level was found to be positively related to students' network use for learning while fathers' was not. This result is consistent with most studies on parents' education in which mothers play a more important role in children's education (Beller, 2009; Korupp, Ganzeboom, & Van Der Lippe, 2002). The more time students watch TV, the less time they spend on learning online. Thus, watching TV is a competitor for students online learning

In the model explaining online entertainment, four significant predictors accounted for 17% of variance. Except for the age effect, the other three factors in online entertainment model are different from the factors in online learning model: gender, time spent on TV, and family income. The finding that children from families with higher income spend more time online for entertainment is consistent with findings in the literature (Livingstone et al., 2004; OECD, 2012). Families with higher income could afford their children more devices with Internet access, which allows them more time to explore or relax online. Surprisingly, parents' education did not have significant effects on children's online entertainment. Family income only has impact on online entertainment, while parents' education only has impact on online learning. Educated parents may be capable of teaching children how to learn online but not able to guide them for entertainment. On the other hand, high family income might ensure children's access to facilities for entertainment but not be helpful for learning.

Watching TV plays opposite roles in the two regression models. The more time students spend watching TV, the less inclined they are to learn online, but more possible to entertain. This finding provides a new perspective on the role of Internet and TV. TV is

mainly an entertainment medium, while Internet plays a more complex role even in the lives of primary school students: they go online not only for entertainment, but also for social interaction and learning. Gender has significant effects on online entertainment. Boys were found engaged in all entertainment activities more intensively than girls. This finding is similar to the finding of Hasebrink and his colleagues (Hasebrink et al. 2011) in UK, but goes against some previous studies (Lenhart et al., 2007; Livingstone et al., 2010; OECD, 2012) in which gender was found to have little influence on teenagers' Internet use.

Using Internet at home and at school: Understanding and Building connections

Many studies have identified discrepancies between school and home ICT use. Some researchers thought that inequalities in Internet access might be the reason (Jewitt et al., 2011); some studies revealed cultural differences between home and school use of ICT (Stevenson, 2011). This urges us to take a practical perspective to view ICT use in the home: when referring to online learning, it is difficult to differentiate between "formal" and "informal" as students might gain more applicable experience in online entertainment. Thus, to overemphasize the model of school ICT use might create difficulty for communication between the two settings. Though students might spend much time using technology for entertainment purposes, their report on the positive effects on using them (e.g., SNS) should be taken seriously by schools (Jewitt et al., 2011).

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