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The Digital Divide in Education and Students' Home Use of ICT

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1. Introduction

Existing literature reveals there is a clear difference between computer use at home and in school [1,4]. Students spend more time on computer at home than at school [4,8]. Students also have different perceptions toward computer use in school and home settings. In general, students have a relatively positive view of the use of ICT for learning at home. At home, they can enjoy a freer exploration and experimentation, whilst in school they are 'suffered' from technical limitations, inaccessibility and the constraints of school policy [5,7]. They also engaged in different ICT-related activities at home and school. Home computer use tended to be leisure-oriented, such as playing online games and media activities. In contrast, educational resources like charts, graphs and educational software are used at schools. Kent and Facer [3] concluded that school seems to act as an important gateway for young people to 'experience' a wide range of computer activities, with the home offering a complementary site for regular engagement with a 'narrower' set of activities. Yet, some studies have shown that home does not necessarily be a complementary site in terms of computer activities. Home computing indeed could provide students an alternative learning environment with potential educational benefits.

Studies have unveiled that students' use of computers is greatly influenced by their out of school experiences i.e. home [7]. In using computers in their homes, children are believed to gain educational benefits such as better academic achievement, new digital skills, new knowledge, and learning can even take place during computer game playing process. Based on the contrasting nature of the learning environment at school and home, Wellington [12] argued that more concern should be paid at home than school.

A number of studies indicated that parents do play a role in children's ICT use at home. Parenting styles could impact the frequency of home computer use, and the way computers are used, and hence affect the educational benefits derived from home computing [10]. Different family's cultural background is likely to induce different types of parental involvement, while different effects of parent involvement may reflect differences in levels of cultural capital [2,6]. The present study seeks to explore students' home use of ICT and articulate the digital divide in education with home computing.

2. Method

To examine students' home use of ICT, we conducted a survey which is appropriate to obtain students' attitudes, beliefs, behaviour and habits. In particular a survey is also an effective means to obtain a representative description of students' responses. A survey instrument was developed based on related literature included six major dimensions presented in Table 1.

Table 1: A summary of the variables and their description in the study

| Variables | Description | Cronbach's Alpha |
|-----------|--|------------------|
| iLearn | In the last 2 weeks, how often have you done the following learning activities (e.g. do assignment, exams, or projects) on the Internet at home? (5 items #) | 0.735 |
| iLeisure | leisure activities (e.g. play online games) (5 items #) | 0.738 |
| SchUse | How often do you use ICT for these activities (e.g. collaborate with peers) in school? (5 items #) | 0.727 |
| OwnRm | Use computer in your own room at home (1 item #) | N.A. |
| LiveRm | Use computer in the living room at home (1 item #) | N.A. |
| Pub | Use Internet in the following locations (e.g. public library)? (5 items #) | 0.740 |
| InfLit | Self-reported information literacy e.g. I am able to collect and / or retrieve information in digital environments (7 items ##) | 0.908 |
| CompLit | Computer literacy e.g. set up and configure a printer (5 items ##) | 0.876 |
| IntLit | Internet literacy e.g. download files from the Internet (5 items ##) | 0.878 |
| SelfAc | Self-acquisition of ICT skills (4 items ##) | 0.730 |
| OtherP | Learn ICT skills from other people (4 items ##) | 0.747 |
| FamCoh | Perceived family cohesion e.g. Family members really help and support one other. (7 items ##) | 0.894 |
| FamEnt | Family entertainment e.g. Watching TV or listening to the radio. (3 items ##) | 0.721 |



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|---------|---|-------|
| FamAO | Family achievement orientation e.g. Family members rarely worry about job promotions, school grade, etc. (2 items ##) | 0.661 |
| FamRule | Family rule e.g. There is a strong emphasis on following rules in our family. (2 items ##) | 0.461 |
| PWorry | Perceived parental worry e.g. My parents worry about me about the online risks, such as negative information, pornography, violence. (5 items ##) | 0.811 |
| PPart | Parental participation e.g. My parents always help me with the computer use. (4 items ##) | 0.763 |
| PPermis | Parental permission e.g. My parents allow me to chat with net friends. (3 items ##) | 0.785 |
| PMon | Parental monitoring e.g. My parents always ask me what I do with computer. (2 items ##) | 0.822 |
| PEnc | Parental encouragement e.g. My parents encourage me to use computers more. (3 items ##) | 0.605 |
| PRule | Parental rules e.g. My parents have to urge me to shut down the computer when time limit is due. (3 items ##) | 0.537 |
| MoEL | Highest educational level of your mother (1 item; where 1=Primary; 2=Secondary; 3=Tertiary or above) | N.A. |
| FaEL | Highest educational level of your father (1 item) | N.A. |

Items were rated on a 5-point scale: 1=Never; 2=Rarely; 3=Sometimes; 4=Frequently; 5=Always

Items were rated on a 5-point scale: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

The subjects in the survey were Hong Kong Secondary 2 (Grade 8) students studying in the 2011/2012 academic year, in which the schools are implementing the local curriculum. We invited 3 schools, representing different levels of student academic abilities, to participate in the survey. Altogether we collected data from a sample of 468 students.

3. Results

The results of regression analysis indicate that students' use ICT for learning activities (iLearn) at home is significantly related to the following variables in proper order: students' use of ICT in school, students' use computer in own room at home, family rules, and use computer in living room at home. For leisure activities (iLeisure) at home, students' use ICT is significantly related to the following variables in proper order: parental permission, students' use of ICT in school, students' Internet literacy, using ICT in public areas, students' use computer in own room at home, parental monitoring, and use computer in living room at home (Table 2).

Table 2: Regression Analysis (Dependent variables = iLearn & iLeisure)

| Independent variables | Beta (iLearn) | Beta (iLeisure) |
|-----------------------|---------------|-----------------|
| SchUse | .459*** | .210*** |
| IntLit | .015 | .207*** |
| OwnRm | .121** | .136** |
| LiveRm | .105* | .094* |
| Pub | .084 | .156** |
| FamRule | .114** | .030 |
| PPermis | -.024 | .275*** |
| PMon | .064 | .120* |
| df | 21, 421 | 21, 421 |
| Model R sq | .351*** | .287*** |

*p<0.05; **p<0.01; ***p<0.001

The ANOVA results indicate that the variables of mothers' education level have effect on the following variables: use of ICT in school, students' Internet literacy, family cohesion, and parental participation and parental encouragement in students' ICT use at home (Table 3).



Table 3: ANOVA (Mother's education level)

| Variables | Mother's education level | N | Mean | Std. Deviation | F |
|-----------|--------------------------|-----|-------|----------------|-----------|
| SchUse | Primary | 78 | 2.238 | .544 | 3.063* |
| | Secondary | 329 | 2.440 | .687 | |
| | Tertiary or above | 53 | 2.468 | .750 | |
| | Total | 460 | 2.409 | .676 | |
| IntLit | Primary | 78 | 4.408 | .537 | 3.780* |
| | Secondary | 328 | 4.251 | .695 | |
| | Tertiary or above | 53 | 4.075 | .792 | |
| | Total | 459 | 4.257 | .688 | |
| FamCoh | Primary | 78 | 3.112 | .672 | 4.702* |
| | Secondary | 328 | 3.319 | .677 | |
| | Tertiary or above | 52 | 3.467 | .698 | |
| | Total | 458 | 3.300 | .684 | |
| PPart | Primary | 77 | 2.458 | .830 | 12.038*** |
| | Secondary | 330 | 2.730 | .785 | |
| | Tertiary or above | 52 | 3.159 | .817 | |
| | Total | 459 | 2.733 | .815 | |
| PEnc | Primary | 77 | 2.515 | .737 | 3.804* |
| | Secondary | 330 | 2.719 | .739 | |
| | Tertiary or above | 52 | 2.859 | .671 | |
| | Total | 459 | 2.701 | .736 | |

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

The ANOVA results also indicate that the variables of fathers' education level have effect on the variables of students' family cohesion, and parental worry and participation in students' ICT use at home (Table 4).

Table 4: ANOVA (Father's education level)

| Variables | Father's education level | N | Mean | Std. Deviation | F |
|-----------|--------------------------|-----|-------|----------------|-----------|
| FamCoh | Primary | 56 | 3.161 | .649 | 5.411** |
| | Secondary | 317 | 3.273 | .679 | |
| | Tertiary or above | 78 | 3.518 | .715 | |
| | Total | 451 | 3.302 | .689 | |
| PWorry | Primary | 56 | 3.011 | .707 | 3.622* |
| | Secondary | 318 | 2.979 | .840 | |
| | Tertiary or above | 78 | 3.262 | .884 | |
| | Total | 452 | 3.032 | .837 | |
| PPart | Primary | 56 | 2.442 | .828 | 15.826*** |
| | Secondary | 318 | 2.675 | .791 | |
| | Tertiary or above | 78 | 3.157 | .767 | |
| | Total | 452 | 2.730 | .817 | |

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

In general, higher parental education level resulted in higher scores among the significant variables. However, there are two exceptional variables i.e. students' Internet literacy and parental worry.



4. Discussion

Since home has become an important landscape in children's ICT practice and potentially influencing their attitude and attainment, attempt should be made to enter and explore the 'secret garden' of children's ICT use at home [11]. Yet, studies have shown that home computing agendas often have very little connection to that of the school curriculum. Findings of the present study indicate that students' use of ICT in school is a crucial predictor to both students' ICT use for learning and leisure activities at home. Future research should focus on the 'messy' realities of ICT usage as learning happens at home as well as school [9].

In terms of ICT use, most parents tried to stay involved in their children's online lives. It is the complex set of family practices, which includes family's socio-economic status, parents' aspiration, parents' education level and parenting styles, that leads to why and how ICT is used at home and hence its outcomes. Parents take a crucial role in forming home cultures and transmitting the cultural influence to the next generation. Results of the present study appear to confirm findings of previous studies of parental roles in home computing. Further research should pay attention to students' ICT practices at home which is mediated by family cultures such as parenting styles.

The present study found that school-based ICT use were recognized at home use of ICT, but knowledge and skills acquired at home were not readily acknowledged in school [1]. There is a dynamic relationship between home and school, by looking at what is happening at home could help to understand better the role of ICT and also the issue of digital divide. Empirical studies on how different family cultures affect both school and home use of ICT need to be made available for policymakers and families. The digital divide is a widely acknowledged global problem in the information age. For example, the Hong Kong Government has recently launched a five-year "*i Learn at home*" program in 2011 to assist students from low-income families to purchase computers and pay for broadband services so that they can learn through the Internet at home. However, more recent discourses increasingly argue that the digital divide is not only about availability of networks and gadgets, but also about having or not having information. It calls for a refocus of the problem of the digital divide from a mere availability of computers and Internet network access to high order information literacy skills and education. Numerous studies indicate that the digital divide is a complex and dynamic phenomenon and the issue has been examined from a broader perspective. Students are now living with a sophisticated range of new and rapidly changing ICT tools. Thus, the digital divide in education, as an on-going concern, should not be constructed only as an issue of technical or resource support. Unpacking the social, cultural and contextual dynamics of how students use ICT in and outside school, particularly home use of ICT is inevitable in the future research of the digital divide in education.

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