ICT as cultural capital: The relationship between socioeconomic status and the computer-use profile of young people

Jo Tondeur
Research Foundation Flanders/Ghent University, Belgium

Ilse Sinnaeve
Ghent University, Belgium

Mieke van Houtte
Ghent University, Belgium

Johan van Braak
Ghent University, Belgium

Abstract
This study explores the relationship between socioeconomic status (SES) and the computer-use profile of 1241 school students in Flanders, the northern region of Belgium. More specifically, the article examines whether varying patterns of computer access, attitudes, competencies and uses can be seen as constituting differences in cultural capital. Additionally, gender was included in the survey as an important background characteristic in digital divide research. Path analysis was used to model the complex relationships between the influencing factors upon the ICT-related variables. What emerged from the analyses was that SES affects the computer-use profile only moderately. No relationship between SES and computer ownership was found. Moreover, the acquisition of ICT competencies can no longer be attributed to computer ownership. Apart from a small effect on ICT use (a higher SES tends to be associated with more ICT use), SES does not seem to affect the computer-use profile of young people in Flanders.

Corresponding author:
Jo Tondeur, Department of Educational Studies, Ghent University, Henri Dunantlaan 2, B9000 Ghent, Belgium.
Email: Jo.Tondeur@UGent.be

The results of this study indicate that the existing differences in SES on computer-use profile are not sufficiently marked to deduce that ICT can be seen as an indicator of differing cultural capital.

Introduction

The fast development of information and communication technology (ICT) has brought about profound changes in the way we live and work, creating what is referred to as a 'knowledge-based society' (Kozma, 2003; OECD/CERI, 2001; Resta and Laferrière, 2008; Selwyn, 2004). ICT allows us to create, collect, store and use knowledge and information; it enables us to connect with people and resources all over the world, to collaborate in the creation of knowledge and to distribute and benefit from knowledge products (Kearns and Grant, 2002; Loveless and Dore, 2002; Plomp et al., 2003). These changes clearly offer further opportunities, but also a number of risks. Many people do not have 'access' to ICT, resulting in a new form of exclusion often thought of as the 'digital divide'. Lack of access to these networks is believed to be one of the damaging forms of exclusion in our economy and in our culture (Castells, 1996).

Considerable academic attention has addressed the division between those who have access to ICT and those who do not (see Horrigan and Rainie, 2002; Norris, 2001; Selwyn, 2004). This early research was orientated towards the equalization of physical access to technology. Recently, an increasing number of studies suggest that researchers should go 'beyond access' (e.g. Looker and Thiessen, 2003) in investigating computer-use profiles. As argued by Warshauer (2002) and Gorski (2005), there are many variations and levels of access, and they suggested that those concerned should be thinking of a 'graduation' instead of a divide between those who can use ICT to access, adapt and create knowledge and those who cannot. The Flemish government frames this conceptual shift in focus from access to competency thus: 'Too much focus on technology also creates the risk of attention being distracted from what is really involved: the need to function properly in the knowledge society' (Vandenbroucke, 2007: 6).

Unfortunately, data about differential ICT usage and ICT competencies are still scarce and relatively new. A particular difficulty in this context is the multifaceted concept of ICT (see Tondeur et al., 2007). Any research on ICT use involves selecting specific facets. This includes making choices about what aspects of ICT use are important and how these should be measured. Another shortcoming in much research is that little academic attention has been paid to the 'digital divide' among children and young people. This is partly because children are widely perceived to be 'digital natives' or 'online experts' – labels they themselves relish (Livingstone and Helsper, 2007) – although some have challenged this as a prevailing myth (see Facer and Furlong, 2001).

In the present study, we analyze the findings of a broader research project on young people's use of ICT in order to examine whether inequities actually do divide them. A final

shortcoming of digital divide research is, according to van Dijk (2006), its lack of theory. The deeper cultural causes behind inequality of access have rarely been described. In this study, we adopt Bourdieu's theory of cultural capital (Bourdieu, 1986). People need cultural capital to use information in appropriate ways. This kind of capital is not equally distributed in society. According to Bourdieu (1966), cultural capital corresponds with certain cultural tastes and styles and participation in cultural activities such as literature, theatre, concerts and museum visits. By looking, therefore, for contemporary suppliers of relevant skills and competencies, ICT comes inevitably to the fore.

The aim of this study is to explore the relationship between socioeconomic status (SES) and ICT. More specifically, this article examines whether different patterns of ICT ownership, attitudes, uses and competencies can be seen as differences in cultural capital. In addition, gender was examined in order to investigate the differential effects of this predictor. Finally, the focus on children and young people in this study inevitably introduces the role of education. Because young people move through compulsory education, school is, according to the Flemish government (Vandenbroucke, 2007), the appropriate place to develop crucial ICT competencies. Nevertheless, the findings stated some decades ago by Bourdieu hold true: schools do not take into account that some students have little or no access to ICT or have little in the way of ICT skills, with the result that it is difficult for them to meet educational expectations (Broos, 2006). According to Facer and Furlong (2001), teachers show little understanding of students with low ICT competencies. It seems very likely, then, that ICT is an indicator of cultural capital.

Before presenting the results of the empirical study, we first describe the concept of 'cultural capital' and how it can be related to ICT. In the section following, we describe the development approach, building on a survey of 1241 secondary school students conducted by Ghent University and the K.U. Leuven. These data provide a wealth of measures of ICT activities, which this study attempts to relate to functional gratifications. The article concludes with a discussion of the results and the implications for future research.

Background

In this section, we review the theoretical and empirical literature grounding the importance of the variables and processes that can be linked to ICT access, attitudes, uses and competencies as aspects of cultural capital. In particular, we concentrate on studies that link these variables to the role of education. First, we elaborate on the concept of 'cultural capital'.

Cultural capital

The consolidation of education in the postwar period, accompanied by ideals of democratization, brought about a great interest among social and educational scholars in describing and explaining persistent social and racial inequalities (Coleman et al., 1966; Garnier and Hout, 1976; Kerckhoff, 1975; Lucas, 2001; Pelleriaux, 2001; Tan, 1998; Willis, 1981). From the 1960s onwards, understanding educational deprivation occupies a special place within educational research. A current explanation model points at

possible adjustment problems at school because of an incongruence between the social environment of the students and the features and requirements of the school context. A classic example following this model is Bourdieu's theory of cultural capital (Bourdieu, 1966, 1986; Bourdieu and Passeron, 1970), which has often been invoked to explain the disparity in educational achievement of students from weak social backgrounds (de Graaf et al., 2000; Katsillis and Rubinson, 1990) and of immigrant or ethnic minority students (Duquet et al., 2006; Roscigno and Ainsworth-Darnell, 1999).

Bourdieu states that individuals enter the educational system with different levels of cultural capital and cultural know-how, based on their social backgrounds. He presents the notion of cultural capital as: 'a theoretical hypothesis which makes it possible to explain the unequal scholastic achievement of children originating from different social classes by relating academic success […] to the distribution of cultural capital between the classes and class fractions' (Bourdieu, 1986: 243). To Bourdieu, it is obvious that the attitudes, features and behaviours of working-class students are incongruent with the middle-class attitudes, features and behaviours characterizing educational institutions. As a consequence, students from more disadvantaged socioeconomic backgrounds have more difficulties adjusting to a school situation, creating an increased chance of failure. Students from more advantaged backgrounds, on the other hand, have the same cultural experience at home as they encounter at school. They are already acquainted with the general culture, linguistic skills, knowledge, and so on of the educational system (Bourdieu, 1966; Bourdieu and Passeron, 1970).

Moreover, according to Bourdieu, educational institutions ignore the existing differences between students from different backgrounds, perpetuating and even increasing these differences by not paying attention to students' relative cultural deprivation. Schools tend to pass over the so-called 'cultural handicap' of certain students by treating them as equals and not adjusting teaching methods or criteria of assessment. In fact, cultural differences between students are perpetuated by presenting them as inherent, ascribed features, thereby legitimizing them (Bourdieu, 1966; Bourdieu and Passeron, 1970).

In summary, certain elements of the family life of students from middle-class backgrounds become 'cultural capital', giving those students an advantage at school. Students from lower-class backgrounds tend to miss this cultural capital, rendering the adjustment to school life more difficult (Bourdieu, 1966; Bourdieu and Passeron, 1970).

ICT as cultural capital

Although it is obvious that, for Bourdieu, cultural capital consists of familiarity with the dominant culture and especially the ability to understand and use 'educated' language, he has never been precise about which of the resources associated with upper-class homes constitute cultural capital (Sullivan, 2001; Vryonides, 2007). In Bourdieu's own work (e.g. Bourdieu, 1966), cultural capital corresponds with certain cultural tastes and styles and participation in activities, such as the appreciation of literature, cinema, theatre, concerts and museums. Hence, many researchers have been operationalizing 'cultural capital' in terms of participation in these kinds of cultural activities (see de Graaf, 1986; DiMaggio, 1982; Janssen and Ultee, 1994; Katsillis and

Rubinson, 1990). Because participation in these activities leads to the development of certain knowledge and skills, it is believed that it enables students to succeed at school (Elchardus and Siongers, 2002; Sullivan, 2001). As a result, the concept of cultural capital seems to denote knowledge of, or competence with, 'highbrow' culture, such as fine arts or classical music, yielding a very elitist approach to cultural capital that does not correspond with what Bourdieu initially meant by the concept and which has, more importantly, little applicability (Elchardus and Siongers, 2002; Lareau and Weininger, 2003). Furthermore, the traditional conceptualization of cultural capital seems outdated today.

Looking, therefore, for contemporary suppliers of relevant competencies and skills, ICT becomes paramount. Although time-use research demonstrates that people's recreational choices are still dominated by media and television, the use of so-called 'new media' increased notably between 1999 and 2004 (Glorieux et al., 2006). Moreover, the skills and competencies required at school are no longer connected to participation in 'high culture' such as theatre or opera. Traditional skills are completed by, or even ousted by, new skills that are mainly acquired by means of ICT. Still, as stated previously, some students have little or no access to ICT or have limited ICT skills, which makes it difficult for them to meet educational expectations (Broos, 2006). Teachers too easily and often wrongly assume that everybody has internet access and show little understanding for students with low ICT competencies (Broos, 2006; Facer and Furlong, 2001). It seems not unreasonable, therefore, to consider ICT as an indicator of cultural capital. Continuing from Bourdieu and Passeron (1970), Koivusilta and colleagues (2007: 102) suggest that, 'encouraging children to use computers for educational purposes would represent a form of transmission of upper- and middle-class values, so-called cultural capital, which is a major factor in educational success'.

Empirical studies on ICT as cultural capital

Previous empirical research has related ICT to cultural capital, but rather as a way to obtain cultural capital or as a consequence of having cultural capital (Broos, 2006), seldom as an indicator of cultural capital. In those studies where ICT is seen as an indicator of cultural capital, the focus is often on the ownership of a personal computer (PC) and access to the internet (Roscigno and Ainsworth-Darnell, 1999; Vryonides, 2007). To illustrate this, the annual survey by the Flemish Government (2007) reports that 24 per cent of Flemish households do not possess a computer and 32 per cent do not have access to the internet. The same survey also categorizes ICT resources by age group: 94 per cent of people between 18 and 30 years have a PC and 88 per cent have internet access at home (Flemish Government, 2007).

However, this way of dealing with ICT passes over Bourdieu's (1986) contention that cultural capital as objectified in material objects might be transmissible as legal ownership at home, but does not necessarily constitute the precondition for specific appropriation, namely: 'the possession of the means of […] using a machine' (1986: 247). In line with Bourdieu's vision of cultural capital, the possession of ICT can be seen as an indicator of economic capital, the appropriation and use of ICT in accordance with its specific purpose as an indicator of cultural capital (Bourdieu, 1986).

Even if digital divisions have diminished in terms of ICT access (Katz, 2002; Looker and Thiessen, 2003), significant gaps may remain in patterns of use and gratifications gained (Lazarus and Mora, 2000; Norris, 2001). It has been argued that these gaps remain a persistent problem to this day, especially in terms of age and SES (Selhofer and Hüsing, 2002; Wilson et al., 2003). However, research on these kinds of 'access' to digital capital is scarce. The study of Livingstone and Helsper (2007) is an exception; they mapped children and young people's internet literacy, identifying a range of sociodemographic barriers to and enablers of internet literacy, as well as showing how internet literacy mediates the benefits (and the risks) of internet use. In addition, Cho et al. (2003) suggest that those with a high SES are more likely to use the internet to strategically satisfy their motivations and to gain the desired gratifications.

Comparable differences appear in surveys relating ICT use to other demographic characteristics of users, such as gender. There is considerably more documentation of this gender divide than for other forms of inequalities (see Looker and Thiessen, 2003). Overall, the gender divide is seen mainly in terms of the ways that females are disadvantaged relative to males. At the output level, results indicate that females know less about ICT, enjoy using the computer less than male students and perceive more technology problems (Jansen Reinen and Plomp, 1997). Possible causes of these differences can also be explained by variations in social capital, such as parental support or the number of female role models, and the range and significance of activities carried out with the computer at home or at school.

The studies mentioned above all show significant differences among users of different social classes. As predicted by the theory of cultural capital, higher SES households maintain their position of advantage, first through gaining access and then through increasing the quality of that access (Bourdieu, 1986). However, some results are obviously not consistent with the conventional view of the digital divide and there are also many discrepant interpretations of what the results indicate (see Hacker and Mason, 2003). The study by van Braak and Kavadias (2005), for instance, suggests that socioeconomic background explains material differences between young people, but does not affect ICT competence. This finding matches the conclusion of van Dijk and Hacker (2003) that the current digital divide is a very complex and dynamic phenomenon.

Purpose of the study

From this background, we observed that the digital divide is not strictly digital, but a new aspect of cultural capital. Another important observation was that there is no one single divide, but rather several divides, a multitude of fault lines in the statistics on ICT. The positions of specific socioeconomic groups or individuals on that continuum change regularly. This study examines the situation in the context of secondary education in Flanders, the Dutch-speaking part of Belgium. Going beyond the binary view of access to a more detailed concept of the digital divide involves the following questions: 1) Do significant differences exist in students' ownership of, attitudes towards, use of and competencies in ICT? 2) If so, to what degree are these differences in ICT patterns associated with students' SES? 3) What is the combined impact of SES and gender on the different dimensions of ICT?

Research method

Sample

Data collection was restricted to young people in secondary schools in Flanders. A stratified sample of 45 schools was identified for the study. Thirty-nine schools took part, representing an 86.7 per cent response at school level. The data were collected in 2007–08 as part of the MICTIVO Study, a project to develop and validate an instrument for monitoring and measuring ICT integration in primary and secondary education in Flanders. This research project was initiated and supported by the Flemish regional government. Secondary education in Belgium is compulsory until the age of 18. The structure of this secondary education is composed of three stages of two years, and 1241 students from the 2nd, 4th and 6th years were surveyed. Pupils in special secondary education were not included in this research.

Procedure and instruments

In order to understand the ways in which socioeconomic status and gender may influence young people's computer-use profile (computer ownership, attitudes, competencies and use of ICT), we conducted a large-scale survey. The instruments employed in this study were constructed after a review of literature and existing instruments that measure (aspects of) computer-use profiles and were developed by adapting a wide range of items assessing the students' access, attitudes, competencies and use of ICT, on the one hand, and their sociodemographic background, on the other. Scales could be constructed for ICT attitudes, ICT competencies and ICT use and will be described in the following sections. ICT has ballooned to encompass many aspects of technological devices. While aspects of ICT are integrated within many technological devices, in the present study, we centre on computers (laptop, desktop) as the central technological tool, with or without peripheral devices. 'ICT' and 'computers' will be used as interchangeable concepts.

Sociodemographic background

We measured the SES of the students by means of the occupational prestige of the parents (Erikson et al., 1979), which was scored as follows: 1) unskilled manual workers; 2) specialized manual workers; 3) skilled manual workers; 4) routine non-manual employees; 5) self-employed and small proprietors; 6) lower-grade employees and administrators; 7) higher-grade administrators and executives; and, 8) professionals, entrepreneurs and large proprietors. The highest score of the two parents is used as an indicator of the SES of the family (cf. Forehand et al., 1987). The respondents have a mean SES of 5.1 ($SD = 1.88$). As for the determinant gender, the questionnaire response received was 46.9 per cent boys and 53.1 per cent girls.

Computer-use profile

The term ICT is generally used in this study in combination with perhaps the most important development in this context, the computer. As a first component of their computer-use

profile, respondents were asked to indicate the extent to which they used a computer in the classroom, for schoolwork and for leisure. For each of the items, respondents indicated their answer on a five-point scale: 1) never; 2) once or a few times a year; 3) once or a few times a month; 4) weekly; and, 5) on a daily basis. With princal components analysis (Gifi, 1981), the three-item scale 'ICT use' was constructed ($M = 3.75$; $SD = 0.64$; Min = 1; Max = 5).

The second component of the computer-use profile is 'self-perceived ICT competence', which gives an indication of the respondent's familiarity with different computer applications. The respondents had to report on how well they could handle a computer, for example: 'how well can you make a presentation on a computer?'; 'how well can you send an email to several people at the same time?'; 'how well can you integrate a graph or a photo into a text document?'; and so on. The respondents rated their own competence on a five-point scale: 1) I can't; 2) a little; 3) sufficient; 4) good; and, 5) excellent. The scale 'ICT competencies' consists of seven items and reveals a high internal consistency ($\alpha = 0.87$; $M = 4.13$; $SD = 0.72$; Min = 1; Max = 5).

The third component of the computer-use profile is 'computer attitude'. This was measured on a four-point scale: 'I am very interested in working with computers'; 'I like to know a lot about computers'; 'I like to talk about computers with other people'; and, 'I feel at ease when I use a computer'. The respondents indicated on a six-point scale to what extent they agreed: 1) completely disagree; 2) disagree; 3) more or less disagree; 4) more or less agree; 5) agree; and, 6) completely agree. The four-item scale 'computer attitude' has a high internal consistency ($\alpha = 0.80$; $M = 4.01$; $SD = 1.13$; Min = 1; Max = 6).

The access to ICT was measured by two items: 'do you have a computer at home?'; and, 'do you have your own computer?' Both items could be answered by: 'no'; 'yes, without internet access'; or, 'yes, with internet access'. Only 1.0 per cent of the respondents indicated that they didn't have a computer at home; 2.1 per cent had a computer without an internet connection; and a vast majority of 96.9 per cent had a computer with internet connection at home. The answers to the question about whether they possess their own computer are more distributed: 40.1 per cent of the respondents don't have their own computer; 5.5 per cent have a computer without internet access; and, 54.4 per cent have a computer with internet access. For further analyses, we constructed a binary variable 'computer ownership', which is based on personal ownership (40.1% 'not owners'/59.9% 'owners').

Data analysis

Path modelling (Bollen and Long, 1993; Loehlin, 1998) was used to investigate the complex relationships between the sociodemographic factors and the variables related to the computer-use profile. The goal of the analyses is to explore the strength of the direct and indirect effects of the predictor variables on the dependent variables. In our conceptual model, it is assumed that both gender and SES are related to the different aspects of the computer-use profile. We also assume a positive relationship between computer ownership and the other components of the computer-use profile. More precisely, we assume computer ownership positively influences levels of computer

attitudes, use and competence. Concerning the internal relationship between the three computer-use profile variables (attitudes, use and competencies), we assume that the level of computer competence is directly explained by both computer attitudes and computer use. It is widely accepted in the social psychology literature (e.g. Fishbein and Ajzen, 1975) that behaviour is predicted by attitudes. In many information systems acceptance models (e.g. Bagozzi et al., 1992), computer use is predicted by computer-related attitudes. In turn, it is assumed that levels of computer competence are directly influenced by computer usage and computer attitudes.

Direct effects on the endogenous variables were calculated as standardized beta-weight (path coefficients or βs). The path models were estimated using AMOS (Arbuckle, 2003). Different parameters will be tested to assess the fit between the hypothesized model and the data. Cut-off criteria for fit indexes recommended by Hu and Bentler (1999) were used: 1) the χ^2 statistic and corresponding *p*-value; the *p*-value should not be significant; 2) the Adjusted Goodness of Fit Index (AGFI) should be at least 0.9; 3) the Comparative Fit Index (CFI) should be close to 0.95; and, 4) the Root Mean Square Error of Approximation (RMSEA) should have a value of 0.05 or less.

Results

Correlations

Table 1 summarizes the bivariate correlations between research variables. The product moment correlations between SES and ICT-related variables vary between $r = -0.06$ and $r = 0.12$. Both 'ICT use' ($r = 0.12$, $p < 0.001$) and 'ICT competencies' ($r = 0.09$, $p < 0.01$) are significantly related to 'SES'. The results also suggest that there is a reasonable association between 'SES' and 'computer attitudes' ($r = -0.06$, $p < 0.05$). The only exception is the absence of connections between 'SES' and 'computer ownership'. Furthermore, the results suggest significant interrelationships between 'gender' and 'computer attitudes' ($r = 0.40$, $p < 0.001$). Apart from a minor correlation between 'gender' and 'ICT competencies' ($r = 0.06$, $p < 0.05$), 'gender' has no correlation with 'intensity of ICT use'. Finally, Table 1 indicates that the ICT-related variables 'ICT ownership', 'computer attitudes', 'ICT use' and 'ICT competencies' are closely related.

Table 1. Pearson product-moment correlation coefficients among the research variables (*N*=1241)

	1	2	3	4	5	6
1 SES	–	.00	–.03	–.06*	.12***	.09**
2 Gender	.00	–	.18***	.40***	–.04	.06*
3 Computer ownership	–.03	.18***	–	.22***	.12***	.18***
4 Computer attitudes	–.06*	.40***	.22***	–	.09**	.36***
5 ICT use	.12***	–.04	.12***	.09**	–	.33***
6 ICT competencies	.09**	.06*	.18***	.36***	.33***	–

*p < .05 ** p < .01 ***p < .001

The results give a first impression of the relationship among the research variables. Yet these correlation measures do not provide sufficient information on possible causal relationships when controlling for the effect of other variables. In the next step, the effects of SES on the ICT-related variables will be assessed, together with the influence of gender.

Path modelling

First, a full model was calculated and all individual paths between the variables were included as described in the data analysis section above. Second, non-significant paths were removed from the model. The path from SES to computer ownership appeared to be the only non-significant path, indicating that there is no direct relationship between SES and computer ownership. All other individual paths between variables were significant and indicated by standardized beta weights (β-coefficients). In Figure 1, the significance levels of the path coefficients are indicated as $***p < 0.001$, $**p < 0.01$ and $*p < 0.05$. The full results of the path model analysis are depicted in Figure 1. The levels of explained variance for the endogenous variables are indicated at the top of the variable rectangles (R^2). For all indexes, the tested model provides a very good fit to the data: $X^2 = 0.911$ and $p = 0.634$; AGFI = 0.997, CFI = 1.000 and RMSEA = 0.000 (Low 95% = 0.000; High 95% = 0.045).
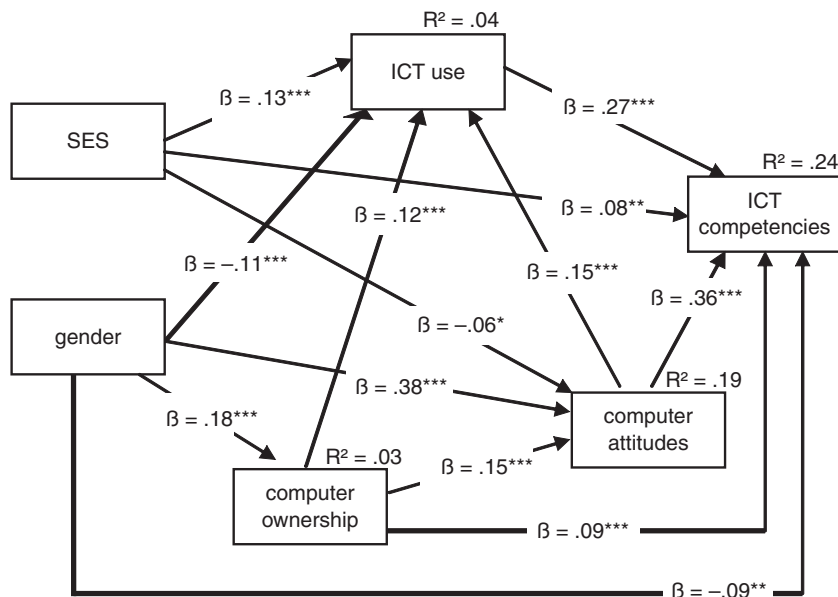

Figure 1. SES, gender and computer-use profile: estimates of direct and indirect effects: Final path model ($N = 1241$)

The results also show that SES is directly related to different aspects of the computer-use profile: ICT use (ß = 0.13), computer attitudes (ß = –0.06) and ICT competencies (ß = 0.08). The values are rather low, but statistically significant. In addition to SES, gender is also significantly related to specific components of the computer profile: computer ownership is higher among boys (ß = 0.18), boys have more positive computer attitudes (ß = 0.38). In contrast, boys report being less ICT competent (ß = –0.09) and they report lower levels of ICT use (ß = –0.11) when computer attitudes and ownership are taken into account.

Discussion

In this study, we explored the relationship between SES and different dimensions of the computer-use profile of young people: computer ownership, computer attitudes, computer use and ICT competencies. What emerged from the analyses was that no relationship between SES and computer ownership was found for this group of students. This corroborates previous research (Gorski, 2005; Looker and Thiessen, 2003; Warshauer, 2002), suggesting that access or computer ownership is no longer a unitary phenomenon. A few older studies (see Resta, 1992; Sutton, 1991) report fewer opportunities for computer ownership for poor and minority children. As stated earlier, this early research was orientated towards the equalization of physical access to technology. It can be assumed that in recent years, the technology gap between the social classes has been narrowed: computers have become more accessible in western countries. Nonetheless, differences on the basis of SES are still discernible both in some European countries and the US (Livingstone and Helsper, 2007).

The main aim of this study was to go 'beyond the binary view of access' to a more detailed conception of the digital divide. It could be hypothesised that significant gaps may remain in the use of computers (Selhofer and Hüsing, 2002; Wilson et al., 2003). An important result of this study was that SES affects the computer-use profile only moderately. Apart from a small effect on ICT use (a higher SES tends to be associated with more ICT use), SES does not affect the computer-use profile of young people in Flanders. The results show no relationship between SES and reported attitudes towards computers. Furthermore, the results of this study indicate that the existing differences in SES on the self-reported ICT competencies are not sufficiently marked to deduce that low SES contributes to fewer ICT competencies. These results are obviously not consistent with the conventional view of the digital divide, but are largely in accordance with the findings of the study by van Braak and Kavadias (2005), suggesting that SES does not strongly affect the ICT competencies of young people in Brussels (Belgium). A possible reason could be that young people are widely perceived to be 'digital natives' or 'online experts' (see Livingstone and Helsper, 2007). This leads to a question concerning the extent to which computer use in western society becomes so ubiquitous that the baseline computer-use profile is almost universal among young people.

The findings of this study suggest that the professional situation of the parents might affect the way in which children are socialized in the use of computers. In this respect, these findings only slightly support the idea of treating the computer-use profile as a contemporary indicator of differing cultural capital. Bourdieu (1966) theorized that the

adjustment of students from disadvantaged backgrounds to school is hampered by their lack of required attitudes, practices and competencies, which students from more favourable backgrounds obtain from their acquaintance with a middle-class cultural lifestyle. It is logical that, in his day, Bourdieu considered cultural manifestations such as literature, opera, theatre, and so on as sources of necessary attitudes and competencies par excellence. Now, other attitudes, practices and competencies are required, and as these new competencies evolved, so did the sources through which they were acquired. It might be useful to consider cultural capital as an evolving characteristic, with a variable interpretation according to time and place.

Computer attitudes, ICT use and ICT competencies might therefore be seen as contemporary indicators of cultural capital. In the cultural capital tradition, researchers need to examine whether any social differences in ICT use offer an explanation for social differences in school adjustment and school achievement. An important additional question is: to what degree and in what way do high levels of ICT use have positive effects on learning efficiency (see Facer and Furlong, 2001; van Dijk, 2006)? During the last two decades, a large number of studies have systematically examined the impact of ICT use on student outcomes (see Kulik, 1999; Schacter, 2001). Although the overall results of these meta-analyses show positive effects for teaching and learning with ICT, the knowledge base is not consistent. Moreover, research is needed on exactly what competencies and skills supplied by computer use are relevant to succeed in school. In fact, only these specific competencies and skills can be seen as cultural capital, enhancing the chance to succeed at school.

A limitation of the present study is the rather superficial measurement of computer use, attitudes and competencies. The concept of 'computer-use profile' was operationalized in this study on the basis of a number of quantitative parameters; thus, for example, no detailed qualitative information was gathered on the acquired ICT competencies. Probably our measurements do not cover the really relevant competencies and skills, while it might be the case that it is specifically these that are spread unequally along socioeconomic lines. An outstanding question remains as to whether stronger differences could be expected if higher order ICT skills, such as mastery of specific information-processing strategies or skills required to develop social networks using ICT, were included. Little research has systematically examined the implications of the unique uses that individuals make of ICT. It is in these differences that research can document the broader implications of cultural capital in ICT use. According to van Dijk and Hacker (2003), they will mean the ability to search, select, process and apply information from digital sources and to strategically use them to improve one's position in society (see Kearns and Grant, 2002; Loveless and Dore, 2002; Plomp et al., 2003). As such, if considering computer attitudes, ICT use and ICT competencies as contemporary indicators of cultural capital, it is necessary to go beyond a general measurement and to grasp more specific competencies and skills.

Another important limitation in this respect concerns the question of whether self-reports are valid measurements of actual ICT competencies. Self-reporting can result in overestimation or underestimation, yielding an invalid representation of students' capabilities (Hakkarainen et al., 2000). Therefore, future research needs to focus not only on more specific ICT uses and competencies, but also needs to work with observed instead

of self-reported digital competencies and uses if it wants to establish ICT use as an indicator of cultural capital.

The same argument could also be made with respect to gender differences. Although girls reported less favourable attitudes towards computers, boys report being less ICT competent when computer attitudes and ownership are taken into account. Shapka and Ferrari (2003) also found no gender difference for ICT outcomes and argue that gender differences are gradually dissipating. However, the study by Kennedy et al. (2003) illustrates gender differences in terms of types of ICT use: women, for instance, use the internet more for social reasons, while men use it more for instrumental and solo recreational reasons. As stated before, possible causes of these differences can be explained by variations in social capital, such as the number of female role models in instrumental capacities. An important question with respect to this study remains as to whether girls report less favourable computer attitudes because of expectations guided by gender roles and whether these differences affect proper functioning in a knowledge-based society?

Although the present study has provided an in-depth exploration of the relationship between SES, gender and an interrelated set of ICT variables, it also reflects some shortcomings. Apart from the added value of seeking an evaluation of the computer-use profile for other educational levels, and outside the Flemish context, there is also the question of the independence of students as units of analysis. In their computer-use profile, students are probably not only influenced by individual factors, but also by school-related factors (Tondeur et al., 2008; Vanderlinde et al., 2008). Schools differ, for example, with respect to their capacity and strategies for integrating ICT in teaching and learning activities (O'Dwyer et al., 2004; Tondeur et al., 2009). This indicates that further refinement might be needed to analyze both the impact of individual determinants and school-level factors upon the computer-use profile of young people.

Conclusion

In order to get a grip on the digital divide and on social inequality with regard to ICT, several aspects were taken into account in this study: computer ownership (an indicator of economic capital) and the quality of ICT access (indicators of cultural capital). Computer ownership seems no longer to be a relevant feature with respect to SES (in the context of secondary education in Flanders), since no effects at all were observed. As stated above, it can be assumed that in recent years, computers have become more accessible. Nevertheless, looking at, for instance, internet penetration by world region (Internet World Stats, 2009), it is clear that geographical location still matters a great deal when it comes to digital equity with respect to access (for an overview, see Resta and Laferrière, 2008).

The current study contributes to the literature on the digital divide in different ways. First, we examined the digital divide among young people to verify whether inequalities actually do divide them. Second, the deeper cultural causes behind inequality have been described by Bourdieu's theory of cultural capital (Bourdieu, 1986). Within the context of the digital divide, a range of definitions, classifications and typologies can be found, but the deeper cultural causes behind this inequality have rarely been described. However, this study makes clear the desirability of a more refined measurement of ICT use and ICT

competencies, especially when considering ICT as an indicator of cultural capital; that is, a measurement based on objective observations of uses and competencies that are relevant in terms of enabling and advancing students' educational achievement. Finally, differential effects of individual determinants could be identified in this study. SES, for instance, affected computer attitudes, use and competencies, but did not impact upon computer ownership. This finding confirms the conclusion of van Dijk and Hacker (2003) that the current digital divide is a very complex phenomenon.

References

Arbuckle JL (2003) *Amos 5.0 Update to the Amos User's Guide*. Chicago, IL: Smallwaters.

Bagozzi R, Davis F, and Warschaw P (1992) Development and test of a theory of technological learning and usage. *Human Relations* 45(7): 659–86.

Bollen K, Long JS (1993) *Testing Structural Equation Models*. Newbury Park, CA: Sage.

Bourdieu P (1966) L'école conservatrice. les inégalités devant l'école et devant la culture. *Revue Française de Sociologie* 7(3): 325–47.

Bourdieu P (1986) The forms of capital. In: Richardson JG (ed.) *Handbook of Theory and Research for the Sociology of Education*. New York, Westport, CT and London: Greenwich Press, 241–58.

Bourdieu P, Passeron JC (1970) *La réproduction. Eléments pour une théorie du système d'enseignement*. Paris: Éditions de minuit.

Broos A (2006) De digitale kloof in de computergeneratie: ICT-exclusie bij adolescenten, unpublished Phd dissertation, KULeuven, Leuven.

Castells M (1996) *The Rise of the Network Society*. Cambridge, MA: Blackwell.

Cho J, de Zuniga G, Rojas H, and Shah DV (2003) Beyond access: The digital divide and internet uses and gratifications. *IT & Society* 1(4): 46–72.

Clark LS (2003) Challenges of social good in the world of Grand Theft Auto and Barbie: A case study of a community computer center for youth. *New Media & Society* 5(1): 95–116.

Coleman J, Campbell E, Hobson C, Mcpartland J, Mood A, Weinfeld F, and York R (1966) *Equality of Educational Opportunity*. Washington, DC: US Department of Health, Education and Welfare, Office of Education, United States Government Printing Office.

de Graaf N, de Graaf P, and Kraaykamp G (2000) Parental cultural capital and educational attainment in the Netherlands: A refinement of the cultural capital perspective. *Sociology of Education* 73(2): 92–111.

de Graaf P (1986) The impact of financial and cultural resources on educational attainment in the Netherlands. *Sociology of Education* 59(4): 237–46.

DiMaggio P (1982) Cultural capital and school success: The impact of status culture participation on the grades of US high school students. *American Sociological Review* 47(2): 189–201.

Duquet N, Glorieux I, Laurijssen I, and van Dorsselaer Y (2006) *Wit krijt schrijft beter. Schoolloopbanen van allochtone jongeren in beeld*. Antwerpen/Apeldoorn: Garant.

Elchardus M, Siongers J (2002) Cultuurpraktijk van de ouders en schoolloopbaan van de kinderen, paper presented at the 10th sociaal-wetenschappelijke studiedagen, Amsterdam, 29–30 May.

Erikson R, Goldthorpe J, and Portocarero L (1979) Intergenerational class mobility in three western European countries: England, France and Sweden. *British Journal of Sociology* 30(4): 415–41.

Facer K, Furlong R (2001) Beyond the myth of the 'cyberkid': Young people at the margins of the information revolution. *Journal of Youth Studies* 4(4): 451–69.

Fishbein M, Ajzen I (1975) *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.

Flemish Government (2007) Digitale kloof: Evolutie van pc-bezit naar leeftijd, geslacht, opleiding, sociale contacten, gezinsinkomen, het al dan niet hebben van betaald werk en kinderen. Available at: http://www4.vlaanderen.be/dar/svr/Cijfers/Pages/Excel.aspx

Forehand R, Middleton K, and Long N (1987) Adolescent functioning as a consequence of recent parental divorce and the parental-adolescent relationship. *Journal of Applied Developmental Psychology* 8(3): 305–15.

Garnier M, Hout M (1976) Inequality of educational opportunity in France and the United States. *Social Science Research* 5(3): 225–46.

Gifi A (1981) *Nonlinear Multivariate Analysis*. Leiden: Department of Data Theory.

Glorieux I, Koelet S, Mestdag I, Minnen J, Moens M, and Vandeweyer J (2006) *De 24 uur van Vlaanderen. Het dagelijkse leven van minuut tot minuut*. Leuven: Lannoo Campus.

Gorski P (2005) Education equity and the digital divide. *Association for the Advancement of Computers in Education Journal* 13(1): 3–45.

Hacker KL, Mason SM (2003) Ethical gaps in studies of the digital divide. *Ethics and Information Technology* 5(2): 99–115.

Hakkarainen K, Ilomäki L, Lipponen L, Muukkonen H, Rahikainen M, Tuominen T, Lakkala M, and Lehtinen E (2000) Students' skills and practices of using ICT: Results of a national assessment in Finland. *Computers and Education* 34(2): 103–17.

Hermans R, Tondeur J, van Braak J, and Valcke M (2008) The impact of primary school teachers' educational beliefs on classroom use of computers. *Computers & Education* 51(4): 1499–1509.

Horrigan JB, Rainie L (2002) Emails that matter: Changing patterns of internet use over a year's time. *IT & Society* 1(1): 135–50.

Hu L, Bentler PM (1999) Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling* 6: 1–55.

Internet World Stats (2009) Usage and Population Statistics, URL (consulted 10 January 2010): http://www.internet worldstats.com

Jansen Reinen I, Plomp T (1997) Information technology and gender equality: A contradiction in terminis? *Computers & Education* 28(2): 65–78.

Janssen J, Ultee W (1994) De cultuur of de centen … Een nieuwe toetsing van hypothesen over culturele en economische hulpbronnen in de intergenerationele overdracht van onderwijs. *Mens en Maatschappij* 69(4): 400–19.

Katsillis J, Rubinson R (1990) Cultural capital, student achievement, and educational reproduction: The case of Greece. *American Sociological Review* 55(1): 270–9.

Katz YJ (2002) Attitudes affecting college students' preferences for distance learning. *Journal of Computer Assisted Learning* 18(1): 2–9.

Kearns P, Grant J (2002) *The Enabling Pillars: Learning, Technology, Community, Partnership*. Commonwealth of Australia. Available at: http://ictpolicy.edna.edu.au

Kennedy T, Wellman B, and Klement K (2003) Gendering the digital divide. *IT & Society* 1(5): 72–96.

Kerckhoff AC (1975) Patterns of educational attainment in Great Britain. *American Journal of Sociology* 80(6): 1428–37.

Koivusilta LK, Lintonen TP, and Rimpelä AH (2007) Orientations in adolescent use of information and communication technology: A digital divide by sociodemographic background, educational career, and health. *Scandinavian Journal of Public Health* 35(1): 95–103.

Kozma R, ed. (2003) *Technology, Innovation and Educational Change: A Global Perspective*. Eugene, OR: Information Society for Technology in Education (ISTE).

Kulik JA (1999) *Meta-analytic Studies of Findings on Computer-based Instruction, in Technology Assessment in Education and Training*. Hillsdale, NJ: Lawrence Erlbaum.

Lareau A, Weininger EB (2003) Cultural capital in educational research: A critical assessment. *Theory & Society* 32(5/6): 567–606.

Lazarus W, Mora F (2000) *On-line Content for Low-income and Undeserved Americans: The Digital Divide's New Frontier*. Santa Monica, CA: Children's Partnership.

Livingstone S, Helsper E (2007) Gradations in digital inclusion: Children, young people, and the digital divide. *New Media & Society* 9(4): 671–96.

Loehlin JC (1998) *Latent Variable Models: An Introduction to Factor, Path, and Structural Analysis*. Mahwah, NJ: Lawrence Erlbaum.

Looker ED, Thiessen V (2003) Beyond the digital divide in Canadian schools: From access to competency in the use of information technology. *Social Science Computer Review* 21(4): 475–90.

Loveless A, Dore B, eds (2002) *ICT in the Primary School: Learning and Teaching with ICT*. Buckingham: Open University Press.

Lucas S (2001) Effectively maintained inequality: Education transitions, track mobility, and social background effects. *American Journal of Sociology* 106(6): 1642–91.

Norris P (2001) *Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide*. Cambridge: Cambridge University Press.

O'Dwyer LM, Russell M, and Bebell DJ (2004) Identifying teacher, school and district characteristics associated with elementary teachers' use of technology: A multilevel perspective. *Education Policy Analysis Archives* 12: 1–33.

OECD/CERI (2001) *Learning to Change: ICT in Schools*. Available at: http://www.oecd.org

Pelleriaux K (2001) *Demotie en burgerschap. De culturele constructie van ongelijkheid in de kennismaatschappij*. Brussels: VUBPRESS.

Plomp T, Anderson RE, Law N, and Quale A, eds (2003) *Cross-national Policies and Practices on Information and Communication Technology in Education*. Greenwich, CT: Information Age.

Resta P (1992) Organizing education for minorities: Enhancing minority access and use of the new information technologies in higher education. *Education and Computing* 8(1): 119–27.

Resta P, Laferrière T (2008) Issues and challenges related to digital equity. In: Voogt J, Knezek G (eds) *International Handbook of Information Technology in Primary and Secondary Education*. Berlin, Heidelberg and New York: Springer, 765–78.

Roscigno VJ, Ainsworth-Darnell JW (1999) Race, cultural capital, and educational resources: Persistent inequalities and achievement returns. *Sociology of Education* 72(3): 158–78.

Schacter J (2001) *The Impact of Education Technology on Student Achievement: What the Most Current Research Has to Say*. Santa Monica, CA: Milken Exchange on Education Technology.

Selhofer H, Hüsing T (2002) The digital divide index: A measure of social inequalities in the adoption of ICT', paper presented at IST 2002 Conference, Copenhagen, 4–6 November.

Selwyn N (2004) Reconsidering political and popular understandings of the digital divide. *New Media & Society* 6(3): 341–62.

Shapka JD, Ferrari M (2003) Computer-related attitudes and actions of teacher candidates. *Computers in Human Behavior* 19(3): 319–34.

Sullivan A (2001) Cultural capital and educational attainment. *Sociology* 35(4): 893–912.

Sutton RE (1991) Equity and computers in the schools: A decade of research. *Review of Educational Research* 61(4): 475–503.

Tan B (1998) Blijvende sociale ongelijkheden in het Vlaamse onderwijs. *Tijdschrift voor Sociologie* 19(2): 169–97.

Tondeur J, van Braak J, and Valcke M (2007) Towards a typology of computer use in primary education. *Journal of Computer Assisted Learning* 23(3): 197–206.

Tondeur J, van Keer H, van Braak J, and Valcke M (2008) ICT integration in the classroom: Challenging the potential of a school policy. *Computers & Education* 51: 212–23.

Tondeur J, Devos G, van Houtte M, van Braak J, and Valcke M (2009) Understanding organisational and cultural school characteristics in relation to educational change: The case of ICT integration. *Educational Studies* 35(2): 223–35.

van Braak J, Kavadias D (2005) The influence of social-demographic determinants on secondary school children's computer use, experience, beliefs and competence. *Technology, Pedagogy and Education* 14(1): 43–59.

van Dijk J (2006) Digital divide research, achievements and shortcomings. *Poetics* 34(4/5): 221–35.

van Dijk J, Hacker K (2003) The digital divide as a complex and dynamic phenomenon. *Information Society* 19(4): 315–26.

Vandenbroucke F (2007) *Competences for the Knowledge Society ICT in Education Initiative (2007–2009)*. Brussels: Ministerie van de Vlaamse Gemeenschap.

Vanderlinde R, van Braak J, de Windt V, Tondeur J, Hermans R, and Sinnaeve I (2008) Technology curriculum and planning for technology in schools: The Flemish case. *TechTrends* 52(2): 23–6.

Vryonides M (2007) Social and cultural capital in educational research: Issues of operationalisation and measurement. *British Educational Research Journal* 33(6): 867–85.

Warshauer M (2002) Reconceptualizing the digital divide. *First Monday* 7(7). Available at: http://www.firstmonday.org/issues/issue7_7/warschauer/index.html

Willis PE (1981) *Learning to Labour: How Working Class Kids Get Working Class Jobs*. Aldershot: Gower.

Wilson K, Wallin J, and Reiser C (2003) Social stratification and the digital divide. *Social Science Computer Review* 2(2): 133–43.

Jo Tondeur is a postdoctoral researcher (Research Foundation Flanders) at the Department of Educational Studies at Ghent University (Belgium). His research interests are in the field of educational technology, school development and instructional design. His dissertation investigates the integration of ICT in primary education. He has published in journals such as *Computers & Education*, *Journal of Computer Assisted Learning* and *Computers in Human Behavior*. His actual field of research focuses on strategies to prepare student teachers to integrate ICT in classroom practice. *Address*: Department of Educational Studies, Ghent University, Henri Dunantlaan 2, B9000 Ghent, Belgium. [email: Jo.Tondeur@UGent.be]

Ilse Sinnaeve is currently working as a researcher at the Department of Educational Studies, Ghent University. Her research interests are processes of change management in

primary and secondary schools, including the use of new media. *Address*: Department of Educational Studies, Ghent University, Henri Dunantlaan 2, 9000 Ghent, Belgium. [email: Ilse.Sinnaeve@UGent.be]

Mieke van Houtte, PhD Sociology, is currently working as a lecturer in the Department of Sociology, Research Group CuDOS, at Ghent University. Her research interests cover diverse topics within the sociology of education, particularly the effects of structural and compositional school features on several outcomes for pupils and teachers. Her work has been published in journals such as *Journal of Curriculum Studies*, *Journal of Educational Research*, *School Effectiveness and School Improvement*, *Sociology of Education* and *American Educational Research Journal*. *Address*: Department of Sociology, Ghent University, Korte Meer 3-5, 9000 Ghent, Belgium. [email: Mieke.VanHoutte@UGent.be]

Johan van Braak is full-time professor at the Department of Educational Studies at Ghent University. He teaches curriculum development, educational innovation and educational effectiveness. He is the coordinator of the research group 'Innovation in Compulsory Education'. His research interests include ICT integration, educational beliefs, parental involvement and the relationship between educational research and practice. *Address*: Department of Educational Studies, Ghent University, Henri Dunantlaan 2, 9000 Ghent, Belgium. [email: Johan.vanBraak@UGent.be]