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Computer use in educational activities by students with ADHD

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ABSTRACT

Aim: The aim of this study was to investigate computer use in educational activities by students with attention deficit hyperactivity disorder (ADHD) in comparison with that of students with physical disabilities and students from the general population. Methods: The design of the study was cross-sectional with group comparison. Students with ADHD (n=102) were pair-matched in terms of age and sex with students with physical disabilities and students from the general population (n=940) were used as a reference group. The result showed that less than half of the students with ADHD had access to a computer in the classroom. Students with ADHD reported significantly less frequent use of computers for almost all educational activities compared with students with physical disabilities and students from the general population. Students with ADHD reported low satisfaction with computer use in school. In addition, students with ADHD reported a desire to use computers more often and for more activities in school compared with students with physical disabilities. These results indicate that occupational therapists should place more emphasize on how to enable students with ADHD to use computers in educational activities in school.

Keywords: Information and communication technology (ICT), computer access, school-based practice, physical disabilities
INTRODUCTION

According to The Swedish National Board of Health and Welfare, the number of students with the diagnosis of attention deficit hyperactivity disorder (ADHD) has increased in recent years in schools in Sweden. The prevalence is estimated to be 3 to 6 percent of school-aged children, and boys are about three times more likely than girls to be diagnosed (1, 2). Students with ADHD display a higher risk, relative to the general population, of experiencing behavioural and educational difficulties in school that may have a negative impact on their educational performance; these difficulties frequently persist into adulthood (3-5).

Challenging behaviours include off-task and disruptive classroom behaviour, decreased work productivity, lack of study skills and difficulty with peer interaction (5, 6). Furthermore, there is considerable evidence that ADHD in students induces long-term negative consequences resulting in low grade-point averages (7) and a high school dropout rate (8, 9) compared with those of students without disabilities. Students with ADHD represent a significant proportion of students with disabilities who may struggle academically (5, 6); therefore, they may need an increased use of accommodations in a regular educational setting. According to the new Educational Act (10) in Sweden, support is to be provided by the school’s healthcare facilities, which are responsible for monitoring the students’ development and for protecting and improving the students’ medical and psychosocial health and special educational needs. Support can also be provided by multiprofessional teams from habilitation centres (HCs), as in this study. HCs are responsible for providing medical, psychological, social or educational accommodations to individuals in their immediate environment, in order to develop modifications for participation in education and community life (11). Occupational therapists are part of these multiprofessional teams working at these centres. Given that adolescents with ADHD may struggle academically, more knowledge is needed about how to support students with ADHD in educational activities (5). One type of accommodation in school that holds
promise for students with ADHD is the use of information and communication technology (ICT), such as computers and the Internet (12). Research on computer use for students with ADHD in school has focused on Computer Assisted Instruction (CAI) i.e. a computer-based instruction format, using multiple sensory modalities with immediate and frequent feedback and reinforcement. Computer use by students with ADHD can promote motivation for learning (13), active responding and attention (14) and prevent off-task behaviour during educational activities (5, 15, 16). It has been clearly suggested that computer use in school by students with ADHD can support oral reading fluency (17) and increase in periods of sustained reading and decrease in distractions (18). In addition, computer use may also support educational performance in mathematics achievement for students with ADHD, compared with written seatwork conditions, both in general educational settings (19) and special educational settings (20).

To date, research in occupational therapy on school participation has mainly focused on students with physical disabilities, not putting emphasis on the increasing number of students with psychosocial difficulties (e.g. ADHD) who may benefit from accommodations in educational settings. This, in turn, indicates that schools are more prepared to meet the needs of students with physical disabilities than those of students with psychosocial limitations (e.g. ADHD) (21, 22). An international study (22) has highlighted that there is a considerable risk that motor performance-related needs are the primary focus for provision of accommodations for adolescents with disabilities, indicating that students with ADHD may be overlooked regarding available accommodations compared with students with physical disabilities. Within the Swedish national school system, students with ADHD and students with physical disabilities participate in the same educational settings as other students and should have equal access to “modern learning tools” such as computers (10). Thus, this study will focus on
comparing access to, frequency of use and computer use in a variety of educational activities between students with ADHD, students with physical disabilities and students from the reference group. Earlier research (23, 24) suggests that students with physical disabilities have limited participation in a variety of educational computer activities compared to students from the general population. This in turn raises the question of whether the same shortcoming is experienced when it comes to computer use in school by students with ADHD. This study will also focus on the students’ perception about computer use in educational settings and the students’ level of satisfaction with computer use, as most studies fail to include measures of satisfaction, which is important for determining if students find interventions desirable in their daily activities (5). Accordingly, this study will focus on identifying factors associated with satisfaction with computer use in schools for students with ADHD. Thus, this study focuses on access to a computer in school and in a variety of locations, using computers for educational activities and the subjective experience of satisfaction with computer use in educational activities.

**AIM**

The aim of the current study was to investigate computer use in educational activities of students with attention deficit hyperactivity disorder.

The specific research questions were as follows:

- Are there differences in access to computers in school and location for computer use between students with ADHD and students with physical disabilities?
• Are there differences in the frequency of use and use of computers in a variety of educational activities between students with ADHD, students with physical disabilities and students without disabilities, who comprise a reference group?

• Are there differences in satisfaction with and perception of computer use in educational activities between students with ADHD and students with physical disabilities?

• Which factors associated with satisfaction with computer use in school can be identified for students with ADHD?

METHODS

The design of the present study was cross-sectional (25) with group comparisons being made between students with ADHD and students with physical disabilities, as well as students from the general population who are used as a reference group. The present study is part of a larger project investigating ICT use in school by students with various disabilities, compared to students from the general population. In 2007, HCs in both urban and rural areas in Central Sweden were invited to participate in the larger project. In total, 729 students with disabilities aged 10-18 years were identified from medical records, of which 254 participants had a primary diagnosis of ADHD and related disorders, such as disturbance of activity and attention, and dysfunction of attention, motor control and perception (DAMP). Data were collected using a questionnaire on ICT use in schools developed by Lidström (24) and colleagues. In order to enable comparison of computer use in school between students with disabilities and students from the general population, some of the questions in the questionnaire were replicated from a national survey “Information Technology in School”, conducted by the Swedish National Agency for Education (26). In addition, some questions
were specifically constructed for students with disabilities. Details concerning data collection procedure as well as results on computer use in school by students with physical disabilities have been presented previously (23-24, 27-28). Ethical approval for this study was granted by the regional ethics committee (2006/1101-31).

**Participants**

In total, 132 out of the 254 questionnaires were returned by participants with ADHD, giving a response rate of 52%. For the present study children aged 10-11 (n=25) and those with the diagnosis of a developmental disorder of scholastic skills, unspecified (n=4), and Tourette’s syndrome (n=1) were excluded, giving a total sample of 102 students (see Table I). The main reason for focusing on students aged 12-18 years were that middle school and high school implies new challenges such as multiple class rooms and teachers that may present an extra barrier to computer use in educational setting (29). Analysis of response bias regarding age and sex demonstrated no significant differences between the participants in the present study and non-respondents (p>0.05).

In order to enable comparison with students with physical disabilities, each individual in the ADHD group was pair-matched in terms of age and sex with students with physical disabilities. All except for 11 individuals were matched in relation to sex. In addition, in order to enable comparison of computer use in school between students with ADHD and students with physical disabilities, to students from the reference group, normative data were obtained from the national survey, from the Swedish National Agency for Education (26) mentioned above. The survey included 940 students from the general population, of whom 478 were boys and 462 girls. The age split was: 11 years (grade 5) (n = 292), 15 years (grade 9) (n =
340) and 17 years (level 2) (n = 308). The mean value for the tree groups is 14.5 years and
the median is 15 years.

Questionnaire

For detailed information regarding the process of developing the questionnaire, see Lidstöm (24). The reliability of the questionnaire in terms of internal consistency for students with ADHD has been calculated, that is, a Cronbach alpha of $\alpha=0.74$ was obtained.

The data for this study is based on 15 closed-ended questions (10 of these had between 4 and 12 statements). Overall the questions focused on computer use in school, including the use of a computer for a variety of educational activities, the frequency of computer use and satisfaction with computer use in school. For example, the question focusing on computer use in educational activities in school was as follows: “How often do you use a computer in educational activities for a) writing, b) searching for information on the Internet, c) making presentations, d) exercising skills (Doing practice exercises), e) e-mailing teachers and f) creating images/music/movies?” The participants graded their use on a multiple-choice five-point Likert scale, where 1 = never at all and 5 = often. The question concerning frequency of computer use read: “How often do you use a computer in school?” The participants graded their frequency of use on a 5-point Likert scale, where 1=never and 5=daily. Both of these questions were replicated from the survey “Information Technology in School” (26), enabling comparison with students from the general population. Satisfaction with computer use in school was formulated as: “How satisfied are you with your computer use in educational activities?” The participants graded their use on a five-point Likert scale, where 1 = not satisfied at all and 5 = very satisfied.
Statistical methods

Characteristics of the participants were dichotomized and differences between students with ADHD and students with physical disabilities were analysed using a chi-squared test with the statistically significant level set at p<0.05 (25). For subsequent analysis, dichotomous variables were created for categorical parameters with more than two values. The chi-squared test with a level of significance of p < 0.05 was used to investigate differences between students with ADHD and physical disabilities. Missing values were low (< 5 participants) for each item, except for one item where there were missing values for 12 participants. The Kruskal–Wallis test was used to compare computer use in a variety of educational activities between students with ADHD, students with physical disabilities and students from the general population. In the analysis, p<0.05 was considered significant (25). Binary logistic regression analyses were performed with the dichotomized dependent variable satisfaction with computer use in school for students with ADHD and a set of predictor variables such as students’ characteristics, frequency of computer use and educational activities with a computer (e.g. writing, searching for information, e-mailing with teachers). Age and sex were used as covariates. The results are presented as odds ratios (ORs) with 95% confidence intervals (95% CIs) and p-values (p<0.05). Statistical analyses were carried out using Statistica for Windows 8.0.

RESULTS

Characteristics of the participants

The characteristics of the students with ADHD and students with physical disabilities are presented in Table I. The majority of the students in the two groups were boys. The mean age for the groups of students was 14 years (SD=1.7; range 12-18; median=14). Chi-squared test
showed that students with ADHD attend classes with fewer than 16 students to a higher extent than students with physical disabilities \( (p<0.05) \). Students with physical disabilities walked with a walking aid or used a wheelchair to a higher extent than students with ADHD \( (p<0.05) \).

In addition, 14 students with ADHD reported using a walking aid or a wheelchair indicating that these students may have motor difficulties in addition to their ADHD diagnosis.

Access to and location for computer use in educational activities

The chi-squared test showed no significant differences concerning access to computers in school between students with ADHD and students with physical disabilities. However, fewer students with ADHD (14\% vs. 27\%) were provided with their own computer in school compared with students with physical disabilities \( (p<0.05) \). No differences in location for computer use were recorded between the two groups of students: students with ADHD and students with physical disabilities used them in a variety of locations, such as the classroom (42\% vs. 43\%), computer room (49\% vs. 52\%) and library (21\% vs. 22\%) \( (p>0.05) \).

Educational activities with a computer and frequency of computer use

A comparison of computer use in a variety of educational activities, as presented in Table II, between students with ADHD, students with physical disabilities and the reference group demonstrated that students with ADHD had limited participation in four out of seven educational activities, compared with both students with physical disabilities and students from the general population \( (p<0.05) \).
As far as the frequency of computer use in school is concerned, daily computer use was similar for students with ADHD (9%) and students from the general population (13%) ($p>0.05$), whereas for students with physical disabilities it was higher (21%) ($p<0.05$).

Satisfaction with and perception of computer use in educational activities

A chi-squared test concerning comparison between students with ADHD and students with physical disabilities concerning satisfaction with computer use revealed no significant differences between the two groups. Among students with ADHD, 55% reported being very or fairly satisfied with their computer use in school, compared to with 67% of students with physical disabilities. A chi-squared test on students’ perceptions of amount of computer use in school revealed that a higher proportion of students with ADHD (66%) wanted to use a computer more often in school compared with students with physical disabilities (47%) ($p<0.05$) and for more activities in school (63%) compared with students with physical disabilities (47%) ($p<0.05$). Although not significantly different, students in both groups, those with ADHD (40%) and those with physical disabilities (29%) reported that that their classmates used the computer more often in school than they did ($p>0.05$).

Factors associated with satisfaction with computer use in educational activities among students with ADHD

From the results of the multiple binary logistic regression analysis, as shown in Table III, three variables remained significantly associated with being satisfied with computer use in educational activities among students with ADHD: having access to a computer in school (OR
9.6, \( p=0.01 \), using a computer for writing (OR 3.3, \( p=0.01 \)) and using a computer for searching for information on the Internet (OR 2.9, \( p=0.01 \)).

> Insert Table III about here <

**DISCUSSION**

The aim of this study was to investigate the computer use in educational activities of students with ADHD in comparison with that of students with physical disabilities, as well as students from a reference group. Students with ADHD reported significantly lower use of a computer for almost all educational activities compared with students with physical disabilities and students without disabilities. The findings indicate that students with ADHD may be overlooked with regard to computer use in school. Computer use in school provides a novel alternative to traditional instruction that may capture the attention of students with ADHD. In addition, computer use can also lead to significant improvement in active engagement time, on-task behaviour, improvement in attention (5,14-16) and educational performance in reading (17-18) and maths (19-20), thus making these findings critical for students with ADHD.

The findings in the present study indicate a low level of satisfaction with computer use in school among students with ADHD and students with physical disabilities, with only half of the students with ADHD reporting being very or fairly satisfied with it. In addition, the results indicate that being able to use a computer for writing and for searching for information on the Internet was associated with a threefold higher likelihood of being satisfied with computer use. This indicates that there may be a connection between using a computer’s full potential
for a wide range of educational activities and being satisfied with computer use in school. Earlier research revealed that a high frequently use of computers in school was an important factor for participation in educational computer activities of students with physical disabilities (23).

According to Shaw and Lewis (16), students with ADHD may be particularly motivated to use a computer in educational activities as it allows them to work at their own pace, or perhaps because the computer does not rely on handwritten skills and enables them to manipulate their own work by deleting and using spelling and grammar checks. Students with ADHD reported using a computer for writing less than students with physical disabilities. This is not a surprising result since students with physical disabilities are provided with a computer as an assistive technology device for handwriting difficulties (30). Nevertheless, recent research suggests that handwriting difficulties, in terms of speed and legibility, are not uncommon in children and students with ADHD (31), indicating that some students with ADHD may also benefit from assistive technology devices.

Notably, only half of the students with ADHD and physical disabilities reported having access to computers in the classroom and one third of the students reported that their classmates used the computer more often than they did in school, indicating limited opportunity to use the computer in the classroom. More effort aimed at increasing accessibility to computers in the classroom is needed to enable students with ADHD to use computers in school. Furthermore, approximately one-third of students with ADHD used a computer to search for information on the Internet compared with half of the students with physical disabilities and two-thirds of the students without disabilities. The Internet offers a forum for knowledge gathering.
communication and entertainment and represents a new arena for designing the learning environment in schools in relation to individual needs. In this sense, these findings may reflect the increasing need to use the Internet for different online activities, an essential condition for everyday life in 21st century society. There is no reason to believe that students with ADHD should be less motivated and stimulated to use computers in educational settings than students with physical disabilities and students without disabilities. This, in turn, raises issues about the environmental barriers to computer use in schools for these students. Previous research on computer use for students with ADHD has identified environmental barriers that have a negative impact on computer use in educational activities. These include availability of computers and appropriate software and lack of support and adequate computer training for teachers (32). The less frequent use of computers in school by students with ADHD and physical disabilities may be a result of their limited access to computers and the Internet in the classroom. Moreover, if there is only one computer available in a classroom, students often have to share this computer. It is reasonable to consider that students with ADHD might not have easy accessibility to the one computer that is shared by the whole class, as a result of a lack of self-esteem due to past experiences of being socially excluded by their classmates (33, 34).

The results in the present study show that half of the students with ADHD attended classes with fewer than 16 students. Moreover, it is less common for students with ADHD to be frequent computer users, indicating that attending small classes does not necessarily increase students’ opportunities to use computers in school. This coincides with an earlier study (23) that indicated that an important factor for computer use in educational activities by students with physical disabilities was attending mainstream school, in classes with more than 16 students. More research on this topic needs to be undertaken before the associations between
attending small classes and participation in computer activities in school of students with ADHD are more clearly understood.

Together, these findings indicate that, the limited use of computers for educational activities and low level of access to computers in the classrooms for students with ADHD may result in decreased opportunities to develop the digital skills required for everyday life in a rapidly changing society. Being able to use computers for educational activities have all been linked to more favourable educational performance for students with ADHD in multiple areas of performance such as mathematics (19-20), science (16), oral reading fluency (17) and writing. Thus, from an occupational therapy perspective, it is important that occupational therapists develop strategies for computer use in educational settings and to promote students with ADHD to use computers in school, in order to develop conditions for computer use on equal terms. This study recognizes that the needs of students with ADHD are not fully acknowledged in Sweden and thus require further attention from habitation centres and the educational system. Furthermore, cooperation between occupational therapists, students and other important stakeholders, such as parents and representatives of the educational system, may benefit the students’ opportunities to use a computer in school.

Methodological considerations

The students in the present study are enrolled in habilitation centres and may therefore not represent the general population of students with ADHD receiving support from the general education system. It is important to bear in mind that the need for support varies among students with ADHD, from requiring long-term support to occasionally being in need of help from a healthcare centre. One limitation of the present study is associated with the response
rate (52%). This might reflect the fact that students and their families with a special interest in computer use in school responded to the questionnaire, which could limit the generalizability of the study.

CONCLUSIONS

The results in the present study indicate that students with ADHD report limited computer use in several educational activities in school compared with students with physical disabilities and students without disabilities. These results reveal that there are barriers in using the computer in school on equal terms with students with physical disabilities and students from the general population. From an equality perspective, it is essential to enable students with ADHD to use computers in educational activities. Focusing on promoting computer use in educational activities in the classroom for students with ADHD is an emerging issue in occupational therapy. The findings in this study demonstrate a desire to use a computer more often and for more activities in school, indicating that engagement in educational activities involving a computer is meaningful to students. Since research on computer use in educational activities of students with ADHD is scarce, further studies are warranted in this emerging field of occupational therapy.

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5. Raggi VL, Chronis AM. Interventions to address the academic impairment of children and students with ADHD. Clin Child Fam Psychol Rev. 2006;9:85-111.
LEGENDS OF TABLES

Table I. Characteristics of students with ADHD and students with physical disabilities.

Table II. Computer use in seven educational activities among students with ADHD, students with physical disabilities and students from the reference group.

Table III. Variables associated with satisfaction with computer use in educational activities among students with ADHD
<table>
<thead>
<tr>
<th></th>
<th>Students with ADHD (n = 102) N (%)</th>
<th>Students with physical disabilities (n = 102) N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys/Girls</td>
<td>81 (79.4)/ 21 (20.6)</td>
<td>75 (73.5)/ 27 (26.5)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 -15/16-18</td>
<td>78 (76.5)/ 24 (23.5)</td>
<td>78 (76.5)/ 24 (23.5)</td>
</tr>
<tr>
<td><strong>Age, years (mean/SD)</strong></td>
<td>14.2±1.7</td>
<td>14.2±1.7</td>
</tr>
<tr>
<td><strong>Diagnosis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention deficit hyperactivity disorder (ADHD) and related disorders</td>
<td>82 (80.4)</td>
<td></td>
</tr>
<tr>
<td>Dysfunction of attention, motor control and perception (DAMP) and related disorders</td>
<td>20 (19.4)</td>
<td></td>
</tr>
<tr>
<td>Cerebral palsy and related disorders</td>
<td>44 (43.1)</td>
<td></td>
</tr>
<tr>
<td>Spina bifida</td>
<td>7 (6.9)</td>
<td></td>
</tr>
<tr>
<td>Neuromuscular disorder</td>
<td>11 (10.8)</td>
<td></td>
</tr>
<tr>
<td>Other diagnosis</td>
<td>40 (39.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Residential area</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban/Rural</td>
<td>43 (42.2)/ 58 (56.9)</td>
<td>43 (42.2)/ 59 (57.8)</td>
</tr>
<tr>
<td><strong>School</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mainstream school/Special school</td>
<td>86 (84.3)/16 (15.7)</td>
<td>86 (84.3)/ 16 (15.7)</td>
</tr>
<tr>
<td><strong>Class size</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 16 students</td>
<td>49 (48.0)</td>
<td>29 (28.4)*</td>
</tr>
<tr>
<td><strong>Not writing with a regular pen</strong></td>
<td>11 (10.8)</td>
<td>13 (12.7)</td>
</tr>
<tr>
<td><strong>Alternative access solutions and specific software</strong></td>
<td>30 (29.4)</td>
<td>48 (33.8)</td>
</tr>
<tr>
<td><strong>Mobility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walks with a walking aid or using a wheelchair</td>
<td>14 (13.7)</td>
<td>28 (27.5)*</td>
</tr>
<tr>
<td>Receives help from assistants in school</td>
<td>11 (10.7)</td>
<td>19 (18.6)</td>
</tr>
</tbody>
</table>

1 Includes those stating that they have never or seldom used a regular pencil for writing.
2 Includes those using an alternative access solution, such as an alternative keyboard and mouse (e.g. Alphasmart, joystick, roller ball), and specific software, such as speech synthesis and special programs.
3 Of these 14, 2 students used a wheelchair.
Table II. Computer use in seven educational activities among students with ADHD, students with physical disabilities and students from the reference group.

<table>
<thead>
<tr>
<th>Educational activities with a computer²</th>
<th>Students with ADHD (n=102)</th>
<th>Students with physical disabilities (n=102)</th>
<th>Reference group (n=940)</th>
<th>Kruskal–Wallis test¹ Significant differences between groups 1, 2 and 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing</td>
<td>43 (41.2)</td>
<td>58 (56.9)</td>
<td>——³</td>
<td>1-2</td>
</tr>
<tr>
<td>Exercise skills</td>
<td>10 (9.8)</td>
<td>15 (14.7)</td>
<td>73 (7.8)</td>
<td>NS</td>
</tr>
<tr>
<td>Search for information</td>
<td>34 (33.3)</td>
<td>51 (50.0)</td>
<td>555 (59.0)</td>
<td>1-2, 1-3</td>
</tr>
<tr>
<td>Make presentations</td>
<td>11 (10.8)</td>
<td>22 (21.6)</td>
<td>349 (37.1)</td>
<td>1-2, 2-3, 1-3</td>
</tr>
<tr>
<td>E-mailing with teachers</td>
<td>2 (2.0)</td>
<td>11 (10.8)</td>
<td>136 (14.5)</td>
<td>1-2, 1-3</td>
</tr>
<tr>
<td>Create images/movies</td>
<td>5 (4.9)</td>
<td>13 (12.7)</td>
<td>174 (18.5)</td>
<td>1-3</td>
</tr>
<tr>
<td>Cooperate with students in other schools</td>
<td>3 (2.9)</td>
<td>3 (2.9)</td>
<td>88 (9.4)</td>
<td>NS</td>
</tr>
</tbody>
</table>

¹ An analysis using Kruskall- Wallis test with a p-value of p< 0.05.
² The students graded to what extent they used a computer in educational activities using a 5-point scale, where 1 = not frequently and 5 = frequently. This table presents the results of score 4 and 5 on the scale.
³ No reference data are available.
<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>(95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to a computer in school</td>
<td>9.6</td>
<td>2.0-46.1</td>
<td>0.00</td>
</tr>
<tr>
<td>Educational activities with a computer:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing</td>
<td>3.3</td>
<td>1.4-7.8</td>
<td>0.01</td>
</tr>
<tr>
<td>Exercise skills</td>
<td>1.8</td>
<td>0.4-7.4</td>
<td>0.40</td>
</tr>
<tr>
<td>Search for information on the Internet</td>
<td>2.9</td>
<td>1.2-7.2</td>
<td>0.01</td>
</tr>
<tr>
<td>Make presentations</td>
<td>3.2</td>
<td>0.6-15.8</td>
<td>0.13</td>
</tr>
<tr>
<td>Create images/music/movies</td>
<td>2.2</td>
<td>0.2-22.0</td>
<td>0.48</td>
</tr>
<tr>
<td>Cooperate with students in other schools</td>
<td>1.4</td>
<td>0.1-16.5</td>
<td>0.76</td>
</tr>
</tbody>
</table>

CI = confidence interval; OR = odds ratio