Use of Assistive Technology Devices in Mainstream Schools: Students’ Perspective

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OBJECTIVE. The use and nonuse of assistive technology devices in school by students with physical disabilities was investigated, and the students’ experiences in using these devices is described.

METHOD. We used a mixed-methods approach with predominantly qualitative methods to collect and analyze data, which included observations of and interviews with 20 students with physical disabilities and the number and type of assistive technology devices provided.

RESULTS. It is vital that devices be integrated into educational practice and that students experience immediate benefits for their function in everyday school activities without detrimental effects on their social participation. The latter was often more important than being able to perform activities independently.

CONCLUSION. The students adopted both a functional and a psychosocial perspective of their devices, and providers should neglect neither. Children and youth need both verbal information and practical experience using devices to be able to make informed decisions.


Assistive technology devices (ATDs) have been adopted in some educational settings to enable children with physical disabilities to participate more fully in various activities (Bain & Leger, 1997; Coupley & Ziviani, 2004; Derer, Polsgrove, & Rieth, 1996; Swinth, 2001). Although it is evident that ATDs can enhance school participation (Cradock, 2006; Skär, 2002; Todis & Walker, 1993), research indicates use is far from optimal (Coupley & Ziviani, 2004). Research conducted to date, however, has concentrated on professionals’ experiences and, accordingly, highlights their concerns (Carey & Sale, 1994; Seymore, 2005; Wessels, Dijicks, Soede, Gelderblom, & De Witte, 2003). This study investigates the use and nonuse of ATDs in school from the students’ perspective to provide a complementary viewpoint.

The investigation was conducted in Sweden, where the publicly funded community health care system supports children with disabilities through professionals based at habilitation centers. Occupational therapists working at these centers are obliged to offer habilitation and ATDs to children living in their district and may also be involved in the provision of ATDs in schools. For example, although schools are responsible for making the school accessible and for supplying basic equipment, the occupational therapist provides ATDs for personal use in school and may be consulted about how to make the school accessible.

Making recommendations and writing prescriptions for ATDs to give children with disabilities optimal opportunities in life are an integrated part of occupational therapy. The aim is to compensate for the child’s disability and to increase participation in activities to enhance learning and development (Coupley & Ziviani, 2004;
In school, students with physical disabilities may benefit from using both low-tech devices, such as writing utilities, adapted desks, and special chairs, and high-tech devices, such as power mobility devices and information and communication technology (ICT; Coupley & Ziviani, 2004). For example, an intervention to improve student performance and participation in writing tasks can be to recommend a low-tech device such as an adapted pencil or a high-tech device such as a computer (Freeman, MacKinnon, & Miller, 2004). The rapid development of ICT, including computers, is a particularly promising area because it is already possible for providers to support students with special needs successfully in writing, spelling, reading; understanding curricular materials; and knowledge gathering (Craddock, 2006; Gillette, 2006).

In spite of these advantages, the research, albeit limited, indicates that ATDs have not been integrated into children’s everyday lives because the surroundings in which children are educated and pass their time do not make use of possibilities inherent in ATDs (Coupley & Ziviani, 2004; Craddock, 2006; Wessels et al., 2003). Several issues have been identified as barriers to the current use of ATD in schools: inadequate funding, lack of information, failure to provide training and support to staff, a deficiency of follow-ups, and negative staff attitudes (Carey & Sale, 1994; Coupley & Ziviani, 2004; Craddock, 2006; Derer et al., 1996). Hemmingsson, Gustavsson, and Townsend (2007) revealed that the level at which ATDs were used in school was partly related to lack of cooperation between therapists and teachers that, in turn, resulted from nonexistent organizational pre-requisites for such cooperation. Other barriers identified were some of the technology’s lack of mobility and difficulty in maintaining systems in a good state of repair (Carey & Sale, 1994). Sparse research regarding perceptions held by children and youths on ATDs reported that one reason ATDs were not used by students in postsecondary education was that the ATD threatened the person’s sense of “fitting in” because it attracted unwanted attention from peers (Craddock, 2006). Skär and Tamm (2000) found that different ATDs had a status value to children ages 6 to 12 years that was estimated in relation to peers, rather than to the usefulness of the aid, where a wheelchair had the highest status value and a specially adapted chair had the lowest status value.

From the literature presented previously, it is apparent that the issues highlighted are often related to the interests of teachers and therapists rather than those of the children concerned. Although the opinions of these people regarding ATDs in school are necessary, the picture will remain incomplete as long as children’s views are barely described. This blind spot is most interesting because studies of ATDs used with respect to adults have found that users’ perspective is essential to whether an ATD is used in everyday life (Scherer & Craddock, 2002; Scherer & Galvin, 1994). For example, Larsson Lund and Nygård (2003) found that ATDs could have a strong negative symbolic value for some adults, making them reluctant to use ATDs. The vital role of the user in the intervention process has also been put forward in conceptual models of ATDs (Lenker & Paquet, 2003; Scherer & Craddock, 2002). In particular, the use of ATDs is based on the user’s belief in his or her own capacity and on whether he or she thinks the ATDs meet a real need in daily life (Scherer, 2000). Such influencing aspects evolving from users themselves may be relevant when it comes to children and young people as well.

Research that addresses children and youths’ experiences of ATD use in schools is lacking. A better understanding of the students’ views on and experiences of barriers to and facilitators of ATD use in school will help health professionals to suggest optimal ATDs for each child and situation. Occupational therapists support children and young people with disabilities in schools and need specialized knowledge to address educational needs (Harris & Alley, 1999; Smith, 2001; Unsworth & Townsend, 1997). An important proficiency is the ability to suggest appropriate ATDs that students will use and appreciate because they are able to support participation (Isabelle et al., 2002; Swinth, 2001).

**Aim**

The aim of this study was to investigate the use and nonuse of ATDs in school by students with physical disabilities and to describe students’ experiences of using these devices. In particular, this investigation included the characteristics of the ATDs students want to use because these devices might be those that support participation in school.

**Method**

The design of the study was a mixed-methods nested strategy that adopted a predominantly qualitative approach (Creswell, 2002). Data were collected during field observations and semistructured interviews with therapists and students. In the first phase of the analysis, interviews and field observations were used to identify the number and the type of ATDs provided, including whether students wanted to use these devices or not. This phase provided background information for an examination of students’ experiences of using ATDs in school.

**Informants**

Several occupational therapists based at two local habilitation centers in a large city in Sweden and others from a regional
habilitation center in the middle of Sweden agreed to participate in the study and identified students with physical disabilities in their caseloads. Inclusion criteria targeted students who (1) had physical disabilities with motor limitations, (2) attended mainstream schools, and (3) received an ATD in school from the therapist within the past 3 to 6 months. Students with intellectual disabilities were excluded. The occupational therapists were asked to look for students from different grades, from different schools, and with different levels of disability to obtain as much variation in data as possible. Twenty-two students who met the criteria were invited to participate. The occupational therapists contacted the students and their parents and provided them with verbal and written information about the study and formal invitations to participate. If the student agreed to participate, the school’s headmaster and the student’s main teacher received written information about the study and were asked for permission to conduct observations in class.

Data Collection and Procedure

Interviews With Occupational Therapists. The first step of data collection was a semistructured interview with the therapists ($n = 17$) who had identified students (Kvale, 1997). All participating therapists were women who had at least 5 years of experience working at a habilitation center. Questions focused on the number and type of ATDs students had received in school. In addition, therapists were asked for demographic data (e.g., age, gender, diagnosis) on the students with disabilities. Therapists used students’ case records to provide supplementary information. All interviews were audiotaped and transcribed verbatim. On the basis of information provided by the therapist, a list of ATDs used in school was drawn up for each student. All ATDs to which students had access in school were included, both devices they had received specifically for use in school and those they used in school but had received before school started, such as mobility or communication aids.

Observations and Interviews at Students’ Schools. Three to 6 months after the last intervention specifically concerning ATDs had been made by the occupational therapist, each student’s use of and experience with ATDs in school were investigated by observation in his or her school, followed by an interview with the student. The time lapse of 3 to 6 months was chosen to enable the student to have sufficient time to integrate use of recently provided ATDs in the school environment.

Observations. A day-long school observation was conducted for each participating student. The observations were planned and discussed in cooperation with each student’s parents and teacher to ensure that the observation fit with the individual student and the classmates’ schedules and requirements. The school observation was conducted to ensure that contextualized information was obtained concerning students’ ATDs and their use and integration in the school situation. Observations were also conducted to facilitate the interview with the student by making it possible to ask questions on the basis of observations of actual actions (Curtin, 2000). Helena Hemmingsson and Helene Lidström acted as a partial onlookers during the observation and did not participate in activities or interrupt social interactions in class (Patton, 2002). The observer followed the student in all activities, including breaks. The observational focus was on the student’s use of ATDs, and detailed field notes were taken that consisted of both descriptive and reflective material (e.g., relating to settings, conversation, and observer’s comments; Bogdan & Biklen, 2007). The field notes were then transcribed by the observer.

Interviews With Students. After observation, data collection was completed with a semistructured interview with the student (Kvale, 1997). Interviews lasting between 45 and 90 min were conducted on a one-on-one basis and were audiotaped. Questions concerned the student’s use of and experiences with ATDs in school and why he or she used or did not use certain devices. Previously collected information on each case gathered from the therapist interview, the established list of ATDs, and observations made in class were used to adjust the interview guide individually for each student. The interview procedure was designed to allow children over a wide age range and with different cognitive abilities and communication difficulties to respond and express themselves. Despite this design, students’ descriptions differed in quantity and content, depending on their motivation and their abilities to express themselves. All interviews were audiotaped and transcribed verbatim.

Data Analysis

Phase 1: Type, Numbers, and Use or Nonuse of ATDs. The starting point for data analysis was to identify (1) the number of ATDs students had been provided with in school, (2) the ATDs they used, and (3) students’ preferences (i.e., whether they wanted to use the ATD provided or not). The definition of use in this study is “the devices being used at this moment in time” (Wessels et al., 2003, p. 232), referring to the occasion when the researcher visited the school. Thus, broken devices were included in the nonuse category. The list of ATDs obtained during interviews with occupational therapists was compared with field notes and students’ statements of their ATD use in school and with their preferences for use. When an inconsistency appeared in data regarding whether the student used an ATD in school, students’ statements and the field observation were considered to be superior to information provided by occupational therapists.
Phase 2: Students’ Experiences of Their Assistive Devices.

In the second phase of the analysis, students’ experiences of using ATDs in school were explored. Here, all accumulated data from students’ interviews and observations were used. The data were analyzed independently by Helena Hemmingsson and Helene Lidström before individual analyses were discussed in an attempt to compensate for single-researcher bias (Curtin & Fossey, 2007). First, interviews and field notes were read through several times for each student. All data were coded systematically in a line-by-line analysis. The primary focus of this coding procedure was students’ perceptions of provided ATDs and their experiences of using them in school. Up to this stage, field notes and interviews were analyzed separately for each student.

Codes for each student were then compared to identify similarities and differences among students and grouped together on a more general level (Bogdan & Biklen, 2007). During this step, we found that the students explained why they preferred certain ATDs and rejected others, and some students were able to describe the underlying reasons for their behavior. They also expressed feelings toward ATDs and clarified when and how ATDs enabled activities in school, which helped us refer to new content areas (Graneheim & Lundman, 2004). During analysis, all emerging themes were constantly compared with data obtained from interviews and with the school observation to ensure that they were based on the interviews and observations (Patton, 2002). In the final step, relationships between themes were investigated to identify characteristics of the ATDs students used and appreciated. These characteristics were carefully checked against all existing data. Peer examination was conducted continuously throughout the research process to investigate credibility of the analysis by experienced researchers and doctoral students within the field of occupational therapy (Krefting, 1991).

Ethical Considerations

When children are involved in research, it must be conducted with respect for their integrity; therefore, adaptations may have to be made to the method (Curtin, 2000). As an example, children are often not familiar and comfortable with face-to-face interviews, so the interviewer was ready to explain questions if necessary, depending on the age and ability of each child to communicate (Davis, 1998). Another example of a preparatory measure was the interviewer’s participation in class, which was conducted to ensure that the interviewer would be able to base questions on the child’s everyday experiences. Karolinska Institutet’s ethical committee, Huddinge University Hospital, approved the study.

Results

Twenty students, all of whom attended regular classes in mainstream schools, participated in the study. The students (9 boys and 11 girls) ranged in age from 8 to 19 years. Twelve students attended first to fifth grade, 5 attended sixth to ninth grade, and 3 were in high school. Six students had been diagnosed with muscle disease, 5 with cerebral palsy, 5 with spina bifida, and 4 with some other neuromuscular disorder. Although all students had motor limitations, their mobility varied considerably: Five students always used wheelchairs, 8 walked with aids and only used a wheelchair occasionally, and 7 walked without aids. Sixteen students had access to a teaching assistant.

As a first step, illumination of the use of ATDs in school from the perspective of students with disabilities requires that the number of ATDs provided be determined in relation to students’ use and preferences (i.e., whether they wanted to use the ATDs provided or not). Table 1 displays the number of ATDs provided in school, divided according to the number the students used and did not use and by the number of ATDs the students wanted to use or not use. The analysis revealed a huge discrepancy between the number of ATDs students had been provided for use in school and the number they actually used. As shown in Table 1, students used fewer than two-thirds (58%) of the 125 ATDs provided. An unexpected finding was that students who had received ATDs did not use even though they said they wanted to use them. As displayed in Table 1, students wanted to use 89 (71%) of 125 ATDs provided in school, although they only used 73 (58%) of the devices.

These results led us to search for patterns concerning the types of ATDs students had received in school and to assess which of these types of devices they wanted or did not want to use. Table 2 displays types of ATDs provided in school, the number of devices students wanted to use, the number of ATDs used by students, and the number of ATDs provided. As shown in Table 2, students stated that they wanted to use some types of ATD more than they used them. For example, students wanted to use 20 of the ICTs for writing and reading, but they only used 12 of the 25 provided; similarly, they wanted to use 16 of the provided modifications for accessibility, but they used only 10 of the 19 provided.

By contrast, students reported that they wanted to use only 11 ATDs for sitting and standing, but they used 15 of the 24 provided ATDs for sitting and standing.
With these results as background information, we turned to describing students’ experiences of the ATDs provided and the reasons they gave concerning whether they used them. Analysis resulted in the following themes:

- Immediate ATD benefits for functioning
- ATDs as a sign of deviance
- ATDs as possessions
- ATDs as alien to the learning situation

These themes represent different aspects that influenced students’ decisions of whether to use ATDs in school or not. Although these aspects were presented separately to students in the information provided, we discovered that they were generally intertwined when students chose whether it was worthwhile to use an ATD.

**Immediate Benefits in Terms of Functioning**

**Problems With Long-Term Goals.** A central finding was the importance students placed on experiencing immediate benefits in their functioning. For most students, it was difficult to appreciate preventive ATDs or devices provided to increase the student’s performance opportunities later on in life. An 8-year-old girl, for example, had been provided with orthoses to enable her to exercise and to increase her walking skills during breaks, with the goal of walking independently later on in life. Although she knew why she needed to use them, she did not experience any immediate benefits from doing so. She said that she hated the orthoses and that they made her fall and prevented her from participating in play activities during breaks. Accordingly, she did everything she could to avoid using them. Like this girl, most students held opinions of ATDs that were closely linked to their own experiences of the advantages and shortcomings of using the devices in specific situations, without reflecting on effects on their future opportunities.

**Experience of Increased Function.** ATDs that students appreciated facilitated performance in class and made students more independent, as writing or communication aids might do or as using a wheelchair would when playing tag on the playground. For example, one of the boys who walked indoors explained that he used his wheelchair “at breaks, because then we play tag, and then I am much faster [than my classmates].” For this boy, using a wheelchair when playing tag facilitated his performance and gave him an advantage over his peers. Although some students gave such examples, the most common use of ATDs was to increase function so as to diminish the performance gap between them and their peers without disabilities.

Facilitating performance or increasing independence in an activity, however, were not the only or even the predominant reasons for deciding to use an aid. A student might prefer to have assistance in writing, instead of writing independently using a computer, when keeping up with the pace in the classroom was considered to be most important. Accordingly, students appeared to consider contextual demands in relation to performance opportunities when they chose whether ATDs were worth using.

ATDs that facilitated function by providing the student with increased comfort and safety in school-related activities were also appreciated. For example, students might state that having a stool in the gym shower was useful because they might fall otherwise or that they liked their special chairs in class because they were soft and comfortable. The students’ reasons for using ATDs because they were fast, soft, safe, or comfortable indicated that the children’s perception of benefits was based on their own experiences of facilitated functioning rather than on information provided by others.

### Table 1. Number (and Percentage) of Assistive Technology Devices (ATDs) Provided at School

<table>
<thead>
<tr>
<th>ATDs</th>
<th>No. ATDs Used</th>
<th>n (%)</th>
<th>No. ATDs Not Used</th>
<th>n (%)</th>
<th>No. ATDs Provided</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wanted to use</td>
<td>62 (49.6)</td>
<td>27 (21.6)</td>
<td>89 (71.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not want to use</td>
<td>11 (8.8)</td>
<td>25 (20.0)</td>
<td>36 (28.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>73 (58.4)</td>
<td>52 (41.6)</td>
<td>125 (100.0)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. ATDs are divided according to the number students used and did not use and by the number of ATDs students wanted to use or not use.*

### Table 2. Number of Assistive Technology Devices (ATDs) Students Were Provided With, Number They Wanted to Use, and Number They Actually Used

<table>
<thead>
<tr>
<th>Types of ATD</th>
<th>No. of ATDs</th>
<th>No. of ATDs</th>
<th>No. of ATDs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Students</td>
<td>Used by</td>
<td>Provided to</td>
</tr>
<tr>
<td></td>
<td>Wanted to</td>
<td>Students</td>
<td>Students</td>
</tr>
<tr>
<td>Mobility*</td>
<td>24</td>
<td>23</td>
<td>28</td>
</tr>
<tr>
<td>Information and communication</td>
<td>20</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>technology for writing and reading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sitting and standing</td>
<td>11</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>Modification for accessibility</td>
<td>16</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>Communication and planning</td>
<td>8</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Desks</td>
<td>5</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>73</td>
<td>125</td>
</tr>
</tbody>
</table>

*Includes manual and powered wheelchairs, rollers, and special orthoses for walking.

*Includes computers with equipment and education software.

*Includes special chairs, different kinds of stools, and orthoses for standing.

*Includes ramps, elevators, automatic door opener, lifts, and bars.

*Includes low- and high-tech communication devices, specialist watches, special schedules, diaries, and the like for assistance with time and planning.

*Includes special desks for sitting or for standing.

*Includes scissors, a heavy ruler, special pencils, and the like.
**ATDs as a Sign of Deviance**

A frequently mentioned reason for students’ nonuse of ATDs was that the ATD itself was perceived as a visible sign that marked the student as being different. Like most youngsters, students with disabilities want to be as much like their classmates as possible. Because ATDs could be felt to be an additional sign of deviance, their use complicated the students’ aim to be as much like everyone else as possible. A 17-year-old girl with arthritis, who struggled with a walker even though the therapist and her parents questioned her choice, explained it as follows: “I do not want to use a wheelchair, because I want to walk like everybody else does and not sit in a wheelchair, because when I do so, I feel like I am of less worth.” According to this girl, a wheelchair made her more unlike her classmates than a walker did, because she would have to sit instead of walking as everyone else did. She prioritized her own longing to be as much like her peers as possible rather than accept her parents’ and the therapist’s recommendations to use a wheelchair to protect her knee joints. Thus, ATDs could be perceived as a visible sign of deviance that made students feel like they were on an unequal footing and thereby complicated their aim of being like everybody else. By avoiding use of an ATD, even when it had been provided, as with the girl who resisted using the wheelchair, students tried to reduce characteristics that marked them as people with disabilities both to ensure that they would fit in as much as possible and to enhance their self-image as ordinary youngsters.

**ATDs as Possessions**

Another aspect that influenced children’s readiness to use ATDs in school was their feeling of personal responsibility toward ATDs. In Swedish schools, most classroom objects are not private and can be used and shared by all children in that class. The ATD, by contrast, was specifically provided for students with disabilities and, most often, was not supposed to be used by their classmates. Accordingly, the ATD was perceived as being one of their possessions, a personal belonging for which they were responsible. Although students appreciated having a desirable object that was attractive to their peers, such as computers or sharp scissors, having to take care of and protect the ATD so that it did not get broken or disappear was sometimes thought to be an unwanted burden.

Another aspect of getting a device for personal use only was the risk of being exposed to different trials from and conflicts with peers. Considering the school context, in which personal belongings are unusual, it is not surprising the classmates sometimes became jealous when one child received an object to which they did not have access. One girl told about her classmates’ reaction when she got a personal computer to be used as a writing aid: “At the beginning, all the boys in class got jealous because I had received a computer and so on, but then I told them why I had received it and then they said okay, but it is unfair anyhow.”

Interviews demonstrated that students were aware of their classmates’ jealousy and of the fact that peers sometimes wanted to borrow or play with the ATD. Because the children felt a personal responsibility for their belongings, conflicts sometimes arose when they tried to protect their device from unofficial use, and adults assumed that the children’s peers would respect students with special needs and leave their ATDs alone. Nevertheless, because the children with disabilities had experiences in which their peers did not respect their needs or requests to leave their devices alone, they were in a difficult situation. For this reason, an aid that adults might perceive to be beneficial might be experienced as a hindrance to social participation and might create more difficulties than advantages for students.

**ATDs as Alien to the Learning Environment**

So far, results have shown that students’ experiences and opinions of the ATDs influenced their use and even determined whether they were used at all. However, as the first part of the results revealed, several ATDs were not used despite students’ saying they wanted to use them. Here, an influential aspect was whether the ATD was accessible and integrated into everyday school activities. Observations and interviews confirmed that ATDs that were accessible and integrated into activities were more likely to be used than those that were not. Yet these characteristics were often beyond students’ influence. Several examples from observations and interviews showed the following:

- ATDs were not accessible when needed.
- Teachers did not include the ATD in learning activities.
- ATDs were placed in a separate room from that in which classmates were working, which meant that students using ATDs would feel excluded.
- ATDs were broken, and the school did not have routines for servicing them.

Thus, to some degree, ATDs were like aliens in the schools, neither included in schools’ organization nor incorporated in teachers’ plans for teaching and learning.

Students appeared to be particularly sensitive to teachers’ readiness or lack of readiness to integrate ATDs in learning situations. For example, if teachers did not include the ATDs in classroom activities, the device was usually not used by the student. One boy, who was provided with a speech recognition program for his computer for writing, explained why he hardly ever used his computer in class, “They have to give me some tasks. Otherwise, I have to make up something by
myself and all.” This boy wanted to use his computer for writing, but he did not know how and when to use it if tasks were not provided. Another problem was associated with having different classrooms for different subjects because students said they could not carry the equipment around in school. Thus, although ATDs had been provided, they were not always available when needed. The schools’ approach toward ATDs was sometimes to view them as alien—something that had unexpectedly turned up and was unwanted—which appeared, in turn, to increase students’ perceptions of ATDs as things that were deviant and abnormal. Hence, both organization of teaching and learning and teachers’ approach toward use of ATDs in school could hinder students’ optimal use of the devices in school.

**Characteristics of ATDs That Students Appreciated and Used**

Results revealed a pattern of use and nonuse of ATDs by students that can be described as interplay between opportunities provided by the school and students’ willingness to use the ATD. One main finding, as shown in the example of the girl with the orthoses, was that, when possible, the student’s choice and decision was based on his or her own experiences of an ATD’s benefits rather than its shortcomings in an actual situation. These experiences, gained by students from their performance of everyday school activities, appeared to be more influential than information provided by others. For that reason, students might avoid ATDs linked to future goals because they could not experience the ATD’s benefits in the actual situation. Other aspects that influenced students’ use and willingness to use an ATD in school were the ATD’s functionality (which included that the ATD facilitated the performance opportunities, as well as increasing comfort and safety), the device’s accessibility, and the school’s readiness to integrate the ATD into school activities. Those aspects, however, were not decisive.

Psychosocial aspects, such as how the ATD influenced students’ self-images and peer reactions to the ATD, appeared to be important from the students’ perspective. For that reason, students tried to avoid ATDs that made them feel different or deviant or that complicated or threatened social interaction with peers. If they did so, students might choose to do without an ATD, even if its use would increase performance opportunities. Accordingly, from students’ perspectives, the utility of an ATD appears to be linked to whether it facilitates participation in real-life situations when performance opportunities, accessibility, and the feeling of being accepted by a peer group are taken into account. Thus, the main characteristics of ATDs that students with disabilities appreciated and wanted to use in school were the ATD’s integration into teaching and learning and the students’ experience of the ATD as enabling functioning in everyday school activities without threatening or complicating their social participation with peers.

**Discussion**

This study was designed to investigate characteristics of ATDs that facilitated participation. One of the most decisive characteristics for students was that the ATD could be used without threatening or complicating students’ social participation with peers. Results revealed that even if an ATD enhanced independence in school activities, it might be rejected if peer relations were jeopardized. This finding, in turn, indicates that students evaluated ATDs as much from a psychosocial perspective as from a functional one.

Traditionally, health professionals have considered only functional perspectives of ATDs they recommend and prescribe (Hocking, 1999; Long, Woolverton, Perry, & Thomas, 2007). The functional perspective often assumes that the intended positive aspect of an ATD is self-evident to any user, so that the user cannot fail to be aware that the ATD compensates for loss by increasing function. Negative side effects of using ATDs are therefore hardly discussed in the literature. Even if many students appreciated their ATDs, results in this study demonstrate that students had experienced negative consequences from using them that sometimes made them reject the ATD provided. For example, an ATD could be experienced as being a visual sign of deviance, making students feel they were not equal. In addition, an ATD might be felt to be a burden because the student to whom it was assigned felt responsible for taking care of it and protecting it from unauthorized use. Closely associated was the fact that having an ATD could make peers jealous and thereby expose students to conflicts with their peers.

The finding that children evaluate their ATDs in relation to the psychosocial impact they have on peers is supported in the literature (Craddock, 2006; Skär, 2002). On the basis of our results, we argue that providers of ATDs in educational settings need to seriously consider the psychosocial impact of each ATD and ensure that no ATD decreases any student’s social participation in class. To do so, the provider will have to understand students’ perspectives of the use of ATDs in school along with ATDs’ functional impact.

An interesting finding with implications for client-centered practice with children was that a student’s own experience of the utility of an ATD in an actual situation overshadowed information provided about the ATD’s intended utility by adults. Consequently, students seldom appreciated ATDs that had long-term goals because when using such devices, they could not experience any immediate benefits for their function. This finding is supported by Todis and Walker...
(1993), who found that long-range goals often bring about conflicts between the child with disability and adults close to him or her. This situation presents a dilemma for occupational therapists, parents, and teachers. From an adult perspective, it is obvious that an ATD could be used to prevent physical problems later in life and to stimulate the child’s development (Swinth, 2001). The perspective of the child must be considered, however. Thus, for example, should the girl in our investigation who hated her orthoses be allowed to forsake them, or should she be forced to use them? This and similar questions are not answered easily.

According to Wehmeyer (1997), allowing self-determination to children is not the same as having complete control over all choices and decisions. The child’s age, capacity, and circumstances may have an impact on his or her degree of self-determination and, for that reason, on the extent of his or her choice making. Thus, selecting sensibly among alternatives on the basis of individual preferences can be difficult for a child (Wehmeyer, 1997). Still, to prepare children for active participation in society, their opportunities to influence decisions and take responsibility for personal issues are of utmost importance (Law, 1998). In client-centered practice for adults, it is recommended that occupational therapists provide expert information to enable clients to make informed decisions (Canadian Association of Occupational Therapists, 1997).

With respect to children and youths, our results indicate that oral information needs to be supplemented by the opportunity to try out ATDs in real life before an informed decision can be made concerning their use. Moreover, when ATDs are provided to meet long-term goals that might not give the user any immediate increased function, occupational therapists need to be especially attentive to children’s reactions and, in cooperation with parents, try to find flexible solutions to motivate children to use the ATDs.

A discouraging result was that several ATDs were not used by students wanting to use them in school and in performing related activities. Reasons for nonuse in these situations varied but focused on the school environment, a lack of accessibility, and teachers’ attitudes toward ATDs in the classroom and their incorporation in activities. These reasons for nonuse of ATDs have been reported before (Carey & Sale, 1994; Coupley & Ziviani, 2004; Derer et al., 1996; Wessels et al., 2003). Our research showed that students themselves actually wanted to use some ATDs, specifically ICT for reading and writing and modifications for accessibility. Some teachers claim that they do not make a great deal of effort to include ATDs because students with disabilities want to be as much like their peers as possible (Hemmingsson et al., 2007). Although this desire to be like peers is typical, the results of our investigation demonstrate that it does not explain all nonuse. It also demonstrates that students want to be able to use certain ATDs more than they are able or willing to, given the situations in which the devices must be used. Results indicate that social support in the student’s immediate environment was lacking (Wessels et al., 2003). For that reason, occupational therapists need to consider how best to cooperate with schools to ensure that the ATDs provided are integrated into teaching to increase students’ ability to receive the equal learning opportunities they are guaranteed by law.

The point of departure of this research was students’ use of ATDs and whether they wanted to use the ATDs provided. Often, previous research has assumed that the number of ATDs provided is the “right” number (Wessels et al., 2003). When such a perspective is adopted, reasons for nonuse tend to be related to clients (Hocking, 1999). The approach taken in this study made it apparent that adults’ and students’ perspectives on ATDs are not necessarily congruent. From the students’ perspective, the number of ATDs provided could certainly be discussed because they did not want to use all ATDs provided. This finding, in combination with the discovery that some ATDs were not used because of a lack of social support, needs attention. Resources are not spent efficiently if the ATDs provided are not used. An ATD can be an expensive and time-consuming intervention for all parties involved. Accordingly, from both an individual and a societal perspective, it is most important that ATDs are provided to those who need and will use them.

Occupational therapists play an integral role in the selection, provision, and support of ATDs for students in educational settings (Isabelle et al., 2002). Research has reported that pediatric occupational therapists have less than adequate training in implementation of policies governing ATD services (Long et al., 2007) and organization and function of the service system (Harris & Alley, 1999; Unsworth & Townsend, 1997). This study suggests that pediatric occupational therapists also need to be provided with in-service training regarding psychosocial effects of using ATDs, including how to cooperate effectively with schools so that the ATDs provided can be used efficiently by students.

Limitations and Further Research

One study limitation is the age range of participants. It would be reasonable to ask whether, given this age range, students’ cognitive development influenced results. For that reason, age was considered in the analysis and taken into account for all results obtained. However, we did not find any specific age-related differences with respect to our main themes. At all ages represented in this investigation, students considered ATD functionality against the psychosocial influence it had on their everyday lives in school, and
they valued a device’s immediate benefits. Still, the small sample size limits ability to generalize results. Further studies with larger samples are needed to investigate age-specific preferences and choices related to use and nonuse of ATDs in school.

Numbers presented in the results should be interpreted with caution because no statistical analysis was performed. Nevertheless, some comparisons with existing research were made because so few studies have reported on schoolchildren’s use of ATDs in school. The usage rate of ATDs found in this study was consistent with that of a population study on adults with various disabilities (Philips & Zhao, 1993), which found that about one-third of devices were rejected. Korpela and Koivikko (1992) reported that among students ages 6 to 16, the average number of ATDs used in school per student was a little more than three, which is close to the number found in this study. Moreover, one conclusion from that study was that some ATDs, such as computers and software programs, were lacking in schools. In our study, conducted nearly 15 years later, computers were more common as ATDs; nevertheless, students do not appear to have opportunities to use them as much as they would like. This area needs to be developed, and research is urgently required to provide the best educational opportunities for children and youths with disabilities.

References


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