CRITICALLY APPRAISED PAPER (CAP)

FOCUSED QUESTION

Does the use of assistive technology (AT) help children achieve academic goals in a public school setting?


CLINICAL BOTTOM LINE:

Children in public schools are one of the major populations served by occupational therapists in the United States. Some children in public schools have development delays and individualized education plans (IEP). Currently, the Individuals with Disabilities Education Act mandates the use of only evidence-based AT, which limits the use of AT by students in public school settings. Moreover, not many studies are done that measure the effectiveness of AT on students’ performance, which is the main objective of this study. The authors found that students’ performance to attain IEP goals and objectives in public school settings can be improved with AT provided by a multidisciplinary team. This study can be used by individual school districts to improve service delivery and provide a justification of their service. The results and clinical implications of this study may help occupational therapists recommend adaptive devices to students with confidence to augment their performance and help them achieve their academic goals.

RESEARCH OBJECTIVE(S)

List study objectives.

To explore AT’s effect in a public school special education setting for children with IEPs and who require some form of AT for communication, and to compare the effectiveness of service provided by AT team to other interventions.

DESIGN TYPE AND LEVEL OF EVIDENCE:

It is a Level II study with repeated-measure quasi-experimental study;

Repeated-measure: The same 13 participants were used in both pretest and posttest to gather data.

Quasi-experimental: The 13 participants had a specific criterion and were selected based on their referral.
Limitations (appropriateness of study design):
Was the study design type appropriate for the knowledge level about this topic? Circle yes or no, and if no, explain.

YES/NO

SAMPLE SELECTION
How were subjects selected to participate? Please describe.

The samples were recruited through a multidisciplinary AT team who works with public school students who require AT.

Inclusion Criteria
Study included the students with IEPs between the age of 3 and 21 who were either newly referred students to the AT team or the ongoing students who had new AT devices for the 2005–20006 school year. The study also included participants with assigned case managers who were willing to follow up.

Exclusion Criteria
The study excluded students whose parents and IEP team case managers declined consent. The study also excluded students whose parents did not read English or Spanish fluently.

SAMPLE CHARACTERISTICS
N = 13

% Dropouts 0

#/ (%) Male N/A

#/ (%) Female N/A

Ethnicity N/A

Disease/disability diagnosis Autism spectrum disorder, learning disability, cognitive disability, development delays

Check appropriate group:

<table>
<thead>
<tr>
<th>Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20/study group</td>
<td>There was only one group involved in the study. The group included students from preschool to 8th grade who were referred to use either speech-generating AT devices (Chealptalk, Twin Talk, Communication Builder, and Step-by-Step) or written communication (AlphaSmart, Co:Write, and Write: Outloud) AT. All the participants received single-intervention, AT team member service. The purpose of AT service was to provide education</td>
</tr>
<tr>
<td>20–50/study group</td>
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<tr>
<td>51–100/study group</td>
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<td>101–149/study group</td>
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<td>150–200/study group</td>
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The service also provided support and maintenance of AT as needed. The dependent variables that were measured were student performance and the relative contribution of the AT intervention provided by the AT team compared with nine other commonly used intervention to improvement in student performance.

The process started with obtaining approvals from the institutional review board, parents and case manager of the participants, and IEP team members. Once the approvals were obtained, an introductory interview was held. During the first data-collection meeting, case managers were provided with the Student Performance Profile (SPP) pretest form and asked to identify students’ areas of need addressed by AT. Based on the pretest SPP form filled out by the case managers, the authors determine the baseline for the participants. Four months after AT provision, the same case managers were provided with the SPP posttest form to identify students’ ability level on IEP goals and objectives, as identified in pretest. The case managers also were asked to identify any confounding variables that may have influenced the students’ progress before or after the introduction of AT.

<table>
<thead>
<tr>
<th>Setting</th>
<th>The study does not clearly define where the intervention took place.</th>
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<tbody>
<tr>
<td>Who Delivered?</td>
<td>The AT team member</td>
</tr>
<tr>
<td>Frequency?</td>
<td>The study does not clearly articulate of how many times or how frequently AT services were provided by the AT teams; however, it is mentioned that more interventions were provided to students with more complicated AT devices or diagnoses.</td>
</tr>
<tr>
<td>Duration?</td>
<td>Four months</td>
</tr>
</tbody>
</table>

**Intervention Biases:** *Circle yes or no and explain, if needed.*

**Contamination**

| YES/NO | A single group study |

**Co-intervention**

| YES/NO | Students received multiple concurrent forms of interventions in addition to AT; however, only two types were mentioned in the study: 1) adaptations of specific curricular tasks such as worksheet modification, alternate test taking, and so on; and 2) related and support services such as occupational therapy, physical therapy, speech–language therapy, and so on. |

**Timing**

| YES/NO | |

**Site**

| YES/NO | |

**Use of different therapists to provide intervention**

| YES/NO | |
**MEASURES AND OUTCOMES**

Complete for each relevant measure when answering the evidence-based question:

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article—yes/no/NR [not reported]), and how frequently the measure was used.

**Student Performance Profile (SPP):**

This tool measures students’ performance based on their IEP goals. This tool was designed specifically for the use of AT in public school setting and is customizable per needs. It was used twice (during pretest and posttest) in this study. The tool was developed by the Ohio Department of Education and the Rehabilitation Research Design and Disability Center using approximately 4,000 students. The study did not report the value for reliability and validity; however, they have mentioned that content and discriminant validity have been reported through dissertation studies and national conferences. The pretest SPP used in this study has three sections: (1) Student Information, (2) Areas of need, and (3) Relevant IEP Goals or Objectives and Current Ability Level. The posttest SPP differed in section III, which measured Contribution of AT Intervention instead of determining goals on the pretest.

**Measurement Biases**

Were the evaluators blind to treatment status? *Circle yes or no, and if no, explain.*

**YES/NO**

There was no control group, and authors were aware of the AT used by the students.

Recall or memory bias. *Circle yes or no, and if yes, explain.*

**YES/NO**

The case managers or team members were given the SPP to report their measures. The reporting was goal-based and tangible, so there is a minimal possibility for a recall bias.

**RESULTS**

List results of outcomes relevant to answering the focused question

Include statistical significance where appropriate (*p* < 0.05)

Include effect size if reported

**The descriptive data:**

- Participants ranged in grade level from preschool to 8th grade
- Two categories of AT: speech-generating devices and written communication

**Measurement of student performance progress:**

- A mean improvement of 31% from pretest to posttest.
- Significance level of *p* < .01 (one-tailed) was used.
- The statistical data: *t*(12) = 5.54, *p* = .00, one-tailed, *d* (effect size) = 1.40.

**Comparison of relative contribution of AT with other interventions used:**

- A one-way ANOVA with a Tukey’s post hoc test showed no significant difference between two non-AT interventions Item 3 (adaptation of specific curricular tasks) and Item 7 (related support services; *F*[2] = 9.35, *p* = .00).
Was this study adequately powered (large enough to show a difference)? Circle yes or no, and if no, explain.

**YES/NO**

The study only had 13 participants who fit inclusion criteria; however, a repeated-measures design provided a statistical significance to the study. Moreover, the number of participants was determined through consultation with the coordinator of the AT team who had predicted, based on past referral rates, that there would be at least 10 newly referred students or existing students with new devices (minimum requirements for inclusion).

Were appropriate analytic methods used? Circle yes or no, and if no, explain.

**YES/NO**

Were statistics appropriately reported (in written or table format)? Circle yes or no, and if no, explain.

**YES/NO**

**CONCLUSIONS**

State the authors’ conclusions that are applicable to answering the evidence-based question.

This study showed that students who were having difficulties meeting their IEP goal can significantly improve their performance by adding AT as an intervention strategy in their education plan. Unlike studies done in past that mainly focused either on the importance of documenting AT outcomes or AT abandonments and client satisfaction, this study focused on AT’s effectiveness, and suggested that AT’s contribution as an intervention strategy was greater than other possible intervention strategies tried by the author and her team. The results of the study also indicate that a multidisciplinary team service delivery is essential for AT implementation for students in special education. However, this study was done only on a small population ($N = 13$) and only included communication AT, so further studies are recommended to see the generalizability of this study’s results. Authors also recommend further improvement in AT outcome measures, such as the SPP.

This work is based on the evidence-based literature review completed by Palak Sutaria, OTS, and Rochelle Mendonca, PhD, Faculty Advisor, University of the Sciences.


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