Technology-Aided Instruction and Innovation (TAII)

**Brief Introduction**
Technology-aided instruction and innovation (TAII) was previously called *Computer-Aided Instruction and Speech Generating Devices* in the National Professional Development Center on Autism Spectrum Disorders 2009 report. TAII involves instruction or interventions in which technology is the central feature supporting the acquisition of a goal for the learner. Technology is defined as “any electronic item/equipment/application or virtual network that is used intentionally to increase/maintain and/or improve daily living, work/productivity, and recreation/leisure capabilities of adolescents with autism spectrum disorders” (Odom et al., 2013).

**Description**
Technology-aided instruction and interventions (TAII) are those in which technology is the central feature of an intervention that supports a goal or outcome for the learner. Technology is defined as “any electronic item/equipment/application or virtual network that is used intentionally to increase/maintain and/or improve daily living, work/productivity, and recreation/leisure capabilities of adolescents with autism spectrum disorders” (Odom et al., 2013). TAII incorporates a broad range of devices, such as speech-generating devices, smartphones, tablets, computed-assisted instructional programs, and virtual networks. The common features of these interventions are the technology itself (as noted) and instructional procedures for learning to use the technology or supporting its use in appropriate contexts (Odom, 2013).

TAII meets evidence-based criteria with 9 group design and 11 single case design studies. According to the evidence-based studies, this intervention has been effective for preschoolers (3–5 years) to young adults (19–22 years) with ASD. TAII can be used effectively to address social, communication, behavior, joint attention, cognitive, school-readiness, academic, motor, adaptive, and vocational skills.

**Brief Adapted from**

**Matrix of TAII by Outcome and Age (years)**

<table>
<thead>
<tr>
<th>Social</th>
<th>Communication</th>
<th>Behavior</th>
<th>Joint Attention</th>
<th>Play</th>
<th>Cognitive</th>
<th>School Readiness</th>
<th>Academic</th>
<th>Motor</th>
<th>Adaptive</th>
<th>Vocational</th>
<th>Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>6-14</td>
<td>15-22</td>
<td>0-5</td>
<td>6-14</td>
<td>15-22</td>
<td>0-5</td>
<td>6-14</td>
<td>15-22</td>
<td>0-5</td>
<td>6-14</td>
<td>0-5</td>
</tr>
<tr>
<td>6-14</td>
<td>15-22</td>
<td>0-5</td>
<td>6-14</td>
<td>15-22</td>
<td>0-5</td>
<td>6-14</td>
<td>15-22</td>
<td>0-5</td>
<td>6-14</td>
<td>15-22</td>
<td>0-5</td>
</tr>
<tr>
<td>15-22</td>
<td>0-5</td>
<td>6-14</td>
<td>15-22</td>
<td>0-5</td>
<td>6-14</td>
<td>15-22</td>
<td>0-5</td>
<td>6-14</td>
<td>15-22</td>
<td>0-5</td>
<td>6-14</td>
</tr>
</tbody>
</table>

August 2015
Technology-Aided Instruction and Innovation (TAII)

Research Summary: Technology-Aided Instruction and Intervention (TAII)

<table>
<thead>
<tr>
<th>Ages</th>
<th>Skills/Intervention Goals</th>
<th>Settings</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>3–22 years</td>
<td>Communication, behavior, joint attention, cognitive skills, school readiness, academic, motor, adaptive, vocational</td>
<td>Home, school, community</td>
<td>EBP</td>
</tr>
</tbody>
</table>

*The information found in the Research Summary table is updated yearly following a literature review of new research and this age range reflects information from this review.

Research


Technology-Aided Instruction and Innovation (TAII)


Technology-Aided Instruction and Innovation (TAII)


Technology-Aided Instruction and Innovation (TAII)


References


Technology-Aided Instruction and Innovation (TAII)


Technology-Aided Instruction and Innovation (TAII)

Steps for Implementation

Computer/Tablet-Aided Instruction (CAI)

**Step 1. Identifying the Target of Instruction**

A. Refer to IEP or IFSP to identify the learner’s goals.

B. Discuss goals with IFSP/IEP team members, including family and learner.

C. Select and operationalize an observable and measurable goal as a target of instruction.

**Step 2. Collecting Baseline Data**

A. Collect baseline data appropriate for the targeted skill.

B. Collect data on at least three occasions to establish an accurate baseline for the targeted skill.

**Step 3. Identifying Technology Support**

A. Identify technology support personnel in the school/program building.

B. Identify technology support personnel within the district.

C. Review district policies concerning the use of computer technology.

**Step 4. Identifying Available Computers for Use**

A. Gather information about general computer specifications.

B. Check schedules for computer availability for classroom, media centers, or libraries.

C. Develop a schedule for the learner’s use of available computers and share with others.
Technology-Aided Instruction and Innovation (TAII)

Step 5. Identifying Appropriate Software

A. Check available software on existing accessible computers.
B. Ask school/program staff about their use of software.
C. Ask learners and their families about preferred software.
D. Inquire about appropriate software from vendors and retail stores, if necessary.
E. Examine preview options and return policies prior to purchase.

Step 6. Selecting and Installing Software

A. Select software that:
   i. explicitly teaches the target skills or behavior,
   ii. is age-appropriate,
   iii. is compatible with the computer(s) identified in Step 4, and
   iv. is user-friendly.
B. Install software and make it accessible for learners.

Step 7. Learning Software

A. Try out the program before introducing it to the learner.
B. Select a starting point that is a good match with the learner’s interests and abilities.

Step 8. Completing a Task Analysis of Steps for Using Software

A. Complete an analysis of the steps for accessing the designated software within CAI, and provide it to the learner.
B. Create a troubleshooting guide for the computer software and provide it to the learner.

Step 9. Teaching Software to Others Who Support the Learner

A. Introduce the software to those who work with the learner at school and at home.
B. Link the use of the software to the targeted skill.
C. Provide support persons with the task analysis for computer use.
D. Provide support persons with sufficient time to try out the program themselves and ask questions.
Technology-Aided Instruction and Innovation (TAII)

Step 10. Teaching the Learner Basic Computer Skills, if Necessary

A. Provide opportunities for the learner to practice basic computer skills.

B. If necessary, identify artificial reinforcers to pair with computer use to promote learner engagement and to teach basic computer skills.

Step 11. Introducing the Learner to Software

A. Explain to the learner how the program will help him/her learn and practice the targeted skills.

B. Model the task analysis for accessing the program.

C. Demonstrate basic program functions, if necessary.

D. Give the learner time to interact with the program while providing feedback and assistance.

Step 12. Providing Learner with Multiple Opportunities to Use Computer

A. Schedule regular times for the learner to use the CAI.

B. Identify other opportunities at school and at home for the learner to use the computer and program during free time.

Step 13. Providing Ongoing Support to Learner

A. Provide the learner with access to staff members for assistance and to answer questions during CAI time.

Step 14. Collecting Data on Acquisition of Target Skill

A. Collect data on the target skill in a format similar to baseline data collection.

B. Use these data to make instructional decisions regarding the targeted skill or behavior.
Step 1. Identifying and Setting Up the Device

A. Select an appropriate device, taking into account how the information is displayed, the learner’s present and potential abilities (e.g., attention span, experience with symbols, ability to establish joint attention), device portability, available training and technical assistance, and funding sources.

B. Introduce the device to the learner by having a device with few symbols and/or buttons with nothing on them.

C. Include desirable and undesirable symbols to facilitate the learner’s ability to discriminate.

Step 2. Introducing Direct Support Persons to the Device

A. Team members are identified and trained in how to program and use the device.

B. One or two key members of the team are identified as primary contacts regarding the device’s use.

Step 3. Identifying Environments Where the Device Will Be Used and with Which Communication Partners

A. The device is introduced during familiar routines that allow for frequent communicative attempts (e.g., circle time, English class, snack, lunch, free play).

Step 4. Identifying Vocabulary Appropriate to the Learner and the Environments

A. Words and phrases chosen for the device should:
   i. be age-appropriate,
   ii. be meaningful and motivating for the learner, and
   iii. serve an identifiable communicative function (e.g., greeting, requesting).

Step 5. Allowing the Learner to Explore the Device

A. Give the learner an opportunity to independently explore the device.

Step 6. Setting up Communicative Opportunities

A. Arrange opportunities within naturally occurring environments that provide the cues and motivation necessary for the learner’s success (e.g., takes into account materials needed and needs of learners; places items out of reach).

B. Instruct peers in how to respond to learner’s SGD use (e.g., responding to learner rather than teacher).

C. Use frequent questioning to facilitate communicative exchanges during routines and activities.
Technology-Aided Instruction and Innovation (TAII)

**Step 7. Providing as Few Prompts as the Learner Requires**

A. Allow pause time (i.e., 4–5 seconds) before using a prompt, depending on the needs of the learner.

B. Do not begin the communicative exchange by using prompts that are not needed by the learner (e.g., hand-over-hand assistance) when a subtler prompt would suffice.

**Step 8. Honoring the Communication**

A. Immediately grant the learner’s requests upon the communication even if it is not a desired item, object, or action.

B. Explain when a choice is no longer an option.

C. Give learners choices during routines and activities and follow their lead when appropriate communication is used (e.g., staying on playground to swing, playing on computer during reading time).

**Step 9. Reducing Prompts as Soon as Possible**

A. After a few successful trials, use a less restrictive prompt and provide pause time (i.e., 4–5 seconds) in which the learner may activate the SGD.

B. Be aware of learners’ attention, frustration, and motivation and adjust demands during routines and activities accordingly (e.g., more/less intensive prompts, more/less pause time).

**Step 10. Increasing the Environments Where the SGD is Used**

A. Provide opportunities for the learner to use the SGD in environments around the school, home, and/or community.

B. Encourage the use of the SGD with multiple communicative partners.

**Step 11. Increasing Vocabulary**

A. Increase the number of symbols in a single field as the learner becomes more proficient with the device.

B. Increase the number of overlays as the learner becomes more proficient with the device.

C. Introduce a new device as the learner’s needs require.