



TECH

# Technology Connections for Learning: Assistive & Instructional Technology Integration for Academic Success

**David Davis**

Florida Instructional Technology Training & Resource Unit  
Panhandle Area Educational Consortium  
david@fdlrstech.com . www.fdlrstech.com . www.paec.org



**Assistive Technology** – Technology that, when used by a student, enhances the performance or functioning of a target skill, including cognitive processes, learning, communication, and physical abilities.

**Digital Text** – Text that can easily be altered to fit a student's or teacher's learning and instructional needs. Examples include chunking, changing size and presentation, text-to-speech, text-to-audio, and reading level.

**Engram** – A model for the formation of memory due to a biochemical change in the brain, including the development of neural networks.

**Expressive/Communication Technology** – Technology tools that enable students to share thoughts and ideas with others, as well as research what others have to say.

**Externalized Thinking** – The process of writing, drawing, sketching, gesturing, recording thoughts and ideas so an individual can reflect on, organize, expand, and archive those ideas.

**Instructional Media** – The use of a variety of media to present information within the context of instruction. Instructional media can be adapted for students' needs in terms of content, structure, and presentation.

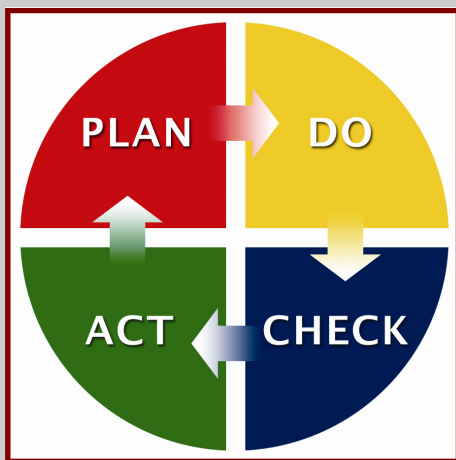
**Instructional Technology** – Technology that, when used by a teacher, enhances the instructional process.

**Long-Term Potentiation** – The increasing persistence of a memory due to repeated activation of an engram.

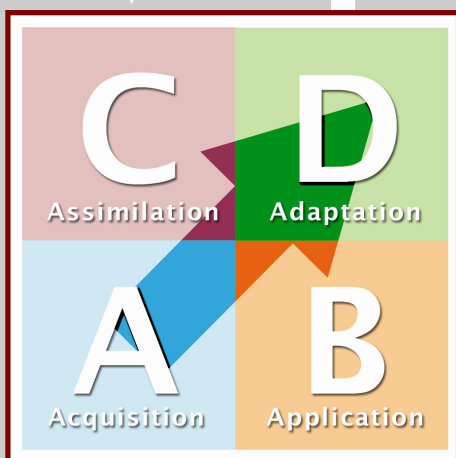
**Long-Term Depression** – The decreasing persistence of a memory due to the repeated activation of the engram of a related memory.

*The more a **student** can self-customize a variety of technology tools and strategies to solve problems, the more intelligent that student will be perceived, and the more intelligent that student will be.*

*The more a **teacher** can self-customize a variety of technology tools and strategies to solve problems, the more professional that teacher will be perceived, and the more professional that teacher will be.*



Continuous Improvement



Rigor & Relevance

The **Florida Continuous Improvement Model (FCIM)** provides a guide on planning, implementation, and revision of the instructional process and can also be used as a guide for technology integration in an effective instructional setting.

The **Rigor & Relevance Framework** is based on two dimensions of learning. The first is moving from simple to complex ways of thinking. The second is moving from simple to complex ways of using information, as in problem solving. The highest quadrant, "D", involves the use of complex thinking skills to solve predictable and unpredictable, complex problems. <http://www.daggett.com/rigor.html>

## ◆ PLAN

### Analyze the Data

A part of data analysis should include FCAT data by student, and if possible looking at data over the course of several years. Some districts use technology like *SP SnapShot* ([www.studentperformance.com](http://www.studentperformance.com)) to provide this type of data to teachers.

Additional curriculum specific data can be gathered using technology based assessment tools, such as the *Skills Detective* series ([www.riverdeep.com](http://www.riverdeep.com)) that assesses language arts, math, and critical thinking skills for upper elementary and middle school grades.

### Calendar Development

There are a couple of technology related issues that can affect planning an instructional timeline. The first is making sure you have basic technology tools available for your students to use. Free tools include: **1) OpenOffice** - Win.Mac ([www.openoffice.org](http://www.openoffice.org)) word processor, spreadsheet, presentation, drawing, and database, **2) Picasa** - Win ([picasa.google.com](http://picasa.google.com)) image editing, **3) Audacity** - Win.Mac ([audacity.soundforge.net](http://audacity.soundforge.net)) audio editing, **4) CMap** - Win.Mac ([cmap.ihmc.us](http://cmap.ihmc.us)) graphic organizer. Windows and Mac operating systems also include video editing software and web browsers. All of these tools can be useful in every quadrant of the rigor and relevance framework.

The second issue to address is instructional media. If you have a diverse classroom that includes students who are gifted, at risk, have disabilities, or are learning English then you need flexible, digital instructional media that provides the best options for on-the-fly customization to meet individual student needs. AutoSummarize in *WORD* can extract main ideas from factual text, helping students who struggle with condensing information. Digital text tools such as Kurzweil 3000 ([www.kurzweilededu.com](http://www.kurzweilededu.com)) *Read & Write Gold* ([www.texthelp.com](http://www.texthelp.com)) and *Key to Access* provide text-to-speech from within almost any software program as well as providing a variety of writing and study tools that can be used as needed. Talking word processors, such as *SOLO* ([www.donjohnston.com](http://www.donjohnston.com)) and *Classroom Suite* ([www.intellitools.com](http://www.intellitools.com)) provide a variety of text-to-speech features and writing guides that can be customized quickly.

*netTrekker d.i.* ([www.nettrekker.com/di](http://www.nettrekker.com/di)) provides tools that enable students to self-customize the results of a web search by grade level and reading level, supporting all students in rigorous research activities. *Read & Write Gold* and *ReadingBar* ([www.readplease.com](http://www.readplease.com)) will also read web pages aloud. *Free* (<http://www.freetranslation.com/free>) provides some basic language translation tools.

## ◆ DO

### Instructional Focus

There are a lot of instructional software programs that can be used to provide primary instruction and supplemental instruction. Some students benefit greatly from being able to practice an instruction activity repeatedly. Having a variety of instructional software available also benefits students who have problems engaging in instruction by giving them choice in their learning activities.

Some instructional software programs include features specifically to support struggling students. *Thinking Reader* ([www.tomsnyder.com](http://www.tomsnyder.com)) embeds reading comprehension strategies around core literature titles. *Soliloquy* ([www.soliloquylearning.com](http://www.soliloquylearning.com)) listens to students as they read and provides correction and support when they have problems. *Go Solve* ([www.tomsnyder.com](http://www.tomsnyder.com)) uses graphic organizers to help students solve math word problems, and *Classroom Suite* ([www.intellitools.com](http://www.intellitools.com)) provides extensive virtual manipulatives for math.

Virtual manipulatives are very useful technology tools. They support complex thinking activities, enable students to experiment with various solutions to problems, and provide a visual way of looking at data. In addition, students with gross or fine motor problems can often use virtual tools easier than real tools. *bright clique* ([www.indivisuallearning.com](http://www.indivisuallearning.com)) is a set of basic math manipulatives that are easy to use. *Gizmos* ([www.explorelearning.com](http://www.explorelearning.com)) is an extensive set of online manipulatives and virtual labs for math and science, grades 6-12. You can try out some of the Gizmos at the web site. The available Gizmos to try out are changed when you refresh the web page.

Graphic organizers like *CMap* ([cmap.ihmc.us](http://cmap.ihmc.us)), *Inspiration*, *Kidspiration*, and *InspireData* ([www.inspiration.com](http://www.inspiration.com)) can be used to guide students through the various stages of a complex instructional process. Experimental and problem solving processes can be mapped out visually to help students move from simple to complex ways of using information and manipulating data. Graphic organizers are also a great tool for students with learning disabilities.

## ◆ CHECK

### Assessment

On-going assessment is often included in many instructional software applications. Programs like *Soliloquy* and *Go Solve* include progress reporting modules. The *Write Out:Loud* module of *Solo* includes reporting on a variety of writing indicators across writing activities so the teacher can track writing improvement. *Classroom Suite* also includes assessment and record keeping features.

General assessment tools, such as the *Skills Detective* series from Riverdeep can be used at different times in a year to track progress in a variety of curriculum areas. Programs like *FCAT TestMaker* ([www.fcattestmaker.com](http://www.fcattestmaker.com)) give teachers and students a way to compare focused instructional progress to FCAT style questions.

## ◆ ACT

### Tutorials/Enrichment

When there is a need for remediation or intervention, don't forget to address the issue of accommodations, tools and memory strategies. There may be assistive technology tools (see the back page for some ideas) that would support the student in the current instruction. Also check the FCAT Accommodations flyer ([www.firn.edu/doe/commhome/fcatasd.htm](http://www.firn.edu/doe/commhome/fcatasd.htm)) for ideas on accommodations for students with disabilities.

There are many intervention software programs available in a variety of curriculum areas. *Earobics* ([www.earobics.com](http://www.earobics.com)) and *Sound Reading Solutions* ([www.soundreading.com](http://www.soundreading.com)) target phonemic awareness, phonics, and early reading. *FASTT Math* from Tom Snyder targets basic math fluency. Online tools include *Web-math.com* which provides example problem solving from general math to calculus.

Simulations provide excellent tutorial and enrichment opportunities. *Sodaplay.com* is an online model creation tool for basic robotics. *Pintar VirtuaLabs* ([www.pintarmedia.com](http://www.pintarmedia.com)) and the *Virtual Lab* series from Riverdeep include a wide range of lab environments where students can work on solving complex problems.

## Assistive Technology for Thinking/Cognition

Classroom activities are full of opportunities for students to externalize their thinking. Activities such as writing, drawing, sketching, speaking, and gesturing provide a vehicle for using technology to assist students in cognitive processes they may be having problems with. Students with learning disabilities, for example, often have significant problems organizing information and making sense of key concepts. The process of externalized thinking enables students to keep a record of their ideas and then reflect on and order their thoughts, seeing new patterns and understanding new concepts. These technologies can also be used to help students move through the quadrants of the rigor and relevance framework by guiding students through higher order thinking processes. Examples include:

*Classroom Suite* (Win & Mac) Includes text-to-speech for young learners

[http://www.intellitools.com/products/classroom\\_suite/home.htm](http://www.intellitools.com/products/classroom_suite/home.htm)

*CMap* (Win & Mac) A free graphic organizer tool

<http://cmap.ihmc.us/>

*Curio* (Mac) Information organizer and writing tool with extensive features

<http://www.zengobi.com/products/curio/>

*EverNote* (Win) A free writing journal and information organizer

<http://www.evernote.com/en/>

*Inspiration* (Win & Mac) Graphic organizer with extensive image library & writing tools

<http://www.inspiration.com>

*OmniOutliner* (Mac) One of the best writing outliners available

<http://www.omnigroup.com/applications/omnioutliner/>

*OneNote* (Win) Microsoft information organizer

<http://office.microsoft.com/en-us/FX010858031033.aspx>

*PlanPlus* (Win) Dayplanner software, organizes information by month and day

<http://www.franklincovey.com/planplus/>

*SMART Board* (Win & Mac) You can download the software to try out the interactive features

<http://www.smarttech.com/support/software/index.asp>

*Solo* (Win & Mac) A literacy support program with customizable writing/thinking guides

<http://donjohnston.co.uk/catalog/solofp.htm>

## Assistive Technology for Memory

Engrams are memories, neural networks created from our experiences. When experiences are repeated over the course of time long-term potentiation occurs and these memories tend to be persistent. But if a new engram is created that includes part of another neural network, long-term depression occurs and the first memory is weakened. An interesting aspect of these processes is that they involve related memories. So for some students, for example, starting to learn a new unit of social studies could start to depress the previously learned social studies material, and the same holds true for any curriculum area.

Externalized thinking, again, provides a method of using technology as a memory tool. One strategy is to create richer engrams by associating different media. For example, using *Inspiration* a student can both organize information and assign icons or graphics to each item of information. This association process creates a richer engram and a stronger memory. Other programs noted above, such as *Curio* and *SMART Board* software, include features that can be used to associate various media.

A second strategy is to use memory journals. Students write or record main ideas each day and then spend some time each morning reviewing past learned information, a daily long-term potentiation activity. This strategy can help decrease the effects of long-term depression. Programs above like *Evernote*, *Curio*, *OmniOutliner*, and *OneNote* can be excellent memory journals. Most interactive whiteboard software, such as the *SMART Board* software, provide tools for teachers to create memory journals for entire class activities and are great for reviewing information prior to an assessment. Students not only review the information but they see the information in the original media and format, activating a more persistent engram.

### Research references can be downloaded at

[http://www.paec.org/fdlrstech/Handouts/General\\_References.doc](http://www.paec.org/fdlrstech/Handouts/General_References.doc)

FDLRS/TECH is funded as a Specialized Center by the Florida Department of Education, Bureau of Exceptional Education and Student Services, through federal assistance under the Individuals with Disabilities Act (IDEA), Part B funds, awarded to Brevard County, and is operated as a coordinated project between Brevard County and the Panhandle Area Educational Consortium.