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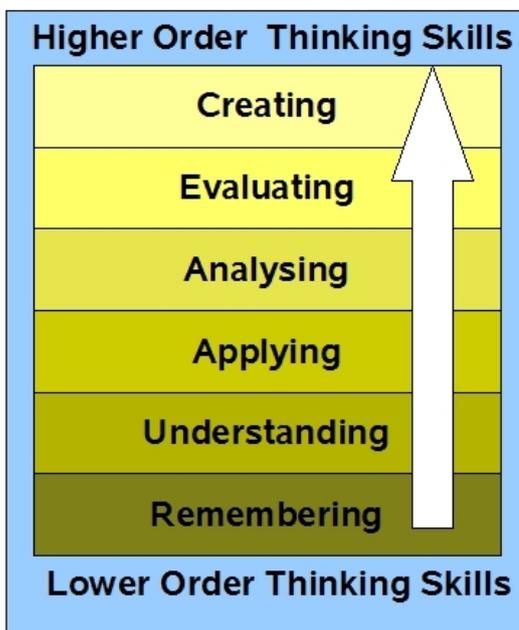**LEGISLATIVE ADVOCACY**

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By **Chris Toy**

Most educators know Benjamin Bloom's Taxonomy of Cognitive Processes. Some are familiar with Anderson and Krathwohl's updated 2001 version. Below is a chart illustrating their revision of Bloom's original work.
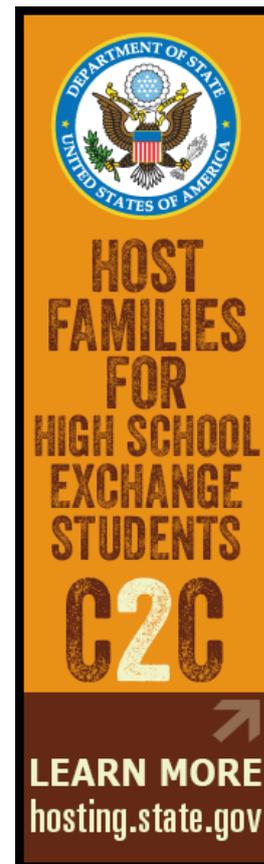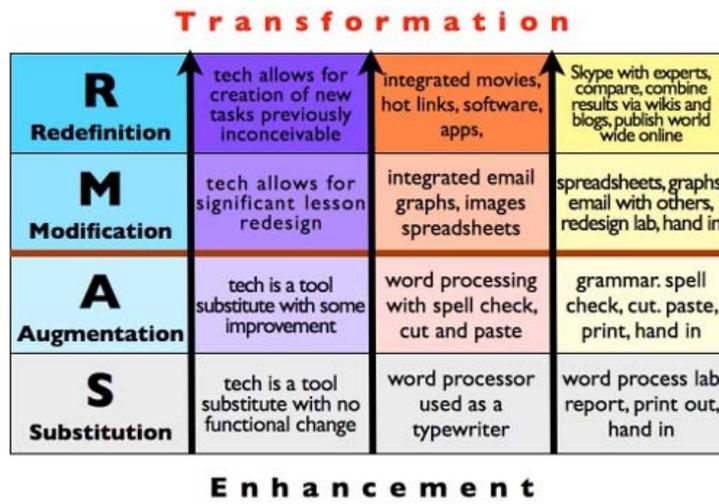

Bloom's taxonomy connects teaching activities with the student's level of cognitive functioning, with the goal of addressing lower- through higher-order thinking skills. Below is a chart that connects each of the levels with specific cognitive functions.

Anderson & Krathwohl (2001)	Characteristic Processes	
Remember	• Recalling memorized knowledge • Recognizing correspondences between memorized knowledge and new material	
Understand	• Paraphrasing materials • Exemplifying concepts, principles • Classifying items • Summarizing materials	• Extrapolating principles • Comparing items
Apply	• Applying a procedure to a familiar task • Using a procedure to solve an unfamiliar, but typed task	
Analyze	• Distinguishing relevant/irrelevant or important/unimportant portions of material • Integrating heterogeneous elements into a structure • Attributing intent in materials	
Evaluate	• Testing for consistency, appropriateness, and effectiveness in principles and procedures • Critiquing the consistency, appropriateness, and effectiveness of principles and procedures, basing the critique upon appropriate tests	
Create	• Generating multiple hypotheses based on given criteria • Designing a procedure to accomplish an untyped task • Inventing a product to accomplish an untyped task	

Lorin W. Anderson and David R. Krathwohl (Eds.), *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives, Complete Edition.* Longman. (2000)

Ruben Puentadora (**http://www.hippasus.com/rrpweblog/**) has developed a taxonomy for connecting how teachers integrate technology with its impact on lesson design. The SAMR model of technology integration is named after the levels it describes. The chart below represents each of the four levels, S-A-M-R.

Transformation

R Redefinition	tech allows for creation of new tasks previously inconceivable	integrated movies, hot links, software, apps,	Skype with experts, compare, combine results via wikis and blogs, publish world wide online
M Modification	tech allows for significant lesson redesign	integrated email graphs, images spreadsheets	spreadsheets, graphs, email with others, redesign lab, hand in
A Augmentation	tech is a tool substitute with some improvement	word processing with spell check, cut and paste	grammar. spell check, cut. paste, print, hand in
S Substitution	tech is a tool substitute with no functional change	word processor used as a typewriter	word process lab report, print out, hand in

Enhancement

When considering SAMR, there are key ideas to keep in mind. Any use of technology should improve the process or outcome. We must ask ourselves whether using technology is contributing to improved teaching and learning, be it a pencil, textbook, laptop, or tablet. Another point to keep in mind is that integration generally begins at the lower levels of enhancement and progresses upward, moving toward transformation, and this happens all along the SAMR continuum. Just as in Blooms Taxonomy, there is nothing inherently wrong with teaching at the basic levels, nor is it necessarily better to working at the upper levels. It all depends on what the teacher's intent is. The key, just as with Bloom's Taxonomy, is to connect the tools and process used with the targeted level.

In SUBSTITUTION there's simply trading out old technology for new technology without any significant change. Using a computer as a typewriter, printing the assignment, and handing it in is substitution. Reading *Romeo and Juliet* online would be another example. Similarly, having students research online, watch videos, and take notes on the Civil War, planetary motion, or some other topic represents substitution. They are good uses of technology for learning and not unlike addressing Bloom's lower levels of remembering and understanding.

The AUGMENTATION level is reached when technology results in some enhancement of teaching and learning, but doesn't transform how the process happens. Augmentation happens when students use powerful functions of word processing such as embedding charts, graphs, and images in assignments. Using more sophisticated layouts to create brochures, pamphlets, and books would be examples. Students could contribute to online blogs, reading and posting responses to the author's ideas. Both SUBSTITUTION and AUGMENTATION result in the ENHANCEMENT of teaching and learning. This sets the stage for the next two levels of tech integration leading to TRANSFORMATION of teaching and learning.

MODIFICATION happens when technology results in significant changes in how teachers and students work on their own or together. For example, e-mail changed how people communicated and collaborated. Administrators, teachers, parents, and even students could connect to share ideas, develop agendas, arrange meetings, share documents, complete and hand in assignments. Another set of technology tools that transformed education are Web 2.0 resources. These tools allowed teachers and students to create, gather, and combine information online. One example of a Web 2.0 tool that is popular with educators is **wordle.net**, where a body of text, including whole websites, can be used to create a graphic "word cloud" reflecting how often words or ideas are used in writing.

REDEFINITION takes place when technology use results in the creation of new teaching and learning processes that were inconceivable before the technology existed. The development of free online wikis, apps, and video conferencing has made it possible for students to connect with one another around the world, redefining what it takes to be a pen pal. Educators can now collaborate with other educators from the next town, the next state, or another continent. Students can interview authors, researchers, policymakers, and other experts no matter where they are. In addition, teachers and students can create their own multimedia productions to share what they know and are able to do. Moreover, they can create these productions in collaboration with any number of people anywhere in the world. These can be easily shared with anyone for feedback and commentary. Suddenly, the world is the audience and schools truly are without walls!

As leaders it is important to keep in mind the purpose of technology and how it can transform the classroom. We need to remember that, just as it is in the classroom with students, there is a range of experience and comfort in our faculties when it comes to learning about technology. As with Bloom's taxonomy, we must take them from where they are and support them along the continuum.

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