Chapter 3: Models, Methods, and Modalities

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Learning Objectives

After reading this chapter learners will be able to:

1. Explain key vocabulary terms, theories, and resources relating to redefining learning with devices and complex cognition.
2. Classify a series of taxonomies within a single graphic.
3. Summarize course content and student contributions for the week.

The previous chapters discussed important research looking into the impact of technology on teaching and learning and also provided scores of vetted apps and websites to help educators integrate technology into the classroom to enhance instruction. In this chapter, we will look at three models that can guide educators in the intentional use of those apps and websites. The British statistician George Box was quoted as saying, "All models are wrong, but some are useful" (Box, 1976). The key to using the models we will discuss is to determine what you are trying to accomplish and

then select the model best designed to get you there. While there are other good models to aid in technology integration, these three will easily meet the needs of most educators. They are:

1. Substitution, Augmentation, Modification, and Redefinition - SAMR
2. Technological Pedagogical Content Knowledge - TPACK
3. Passive, Interactive, Creative - Replaces, Amplifies, Transforms - PICRAT

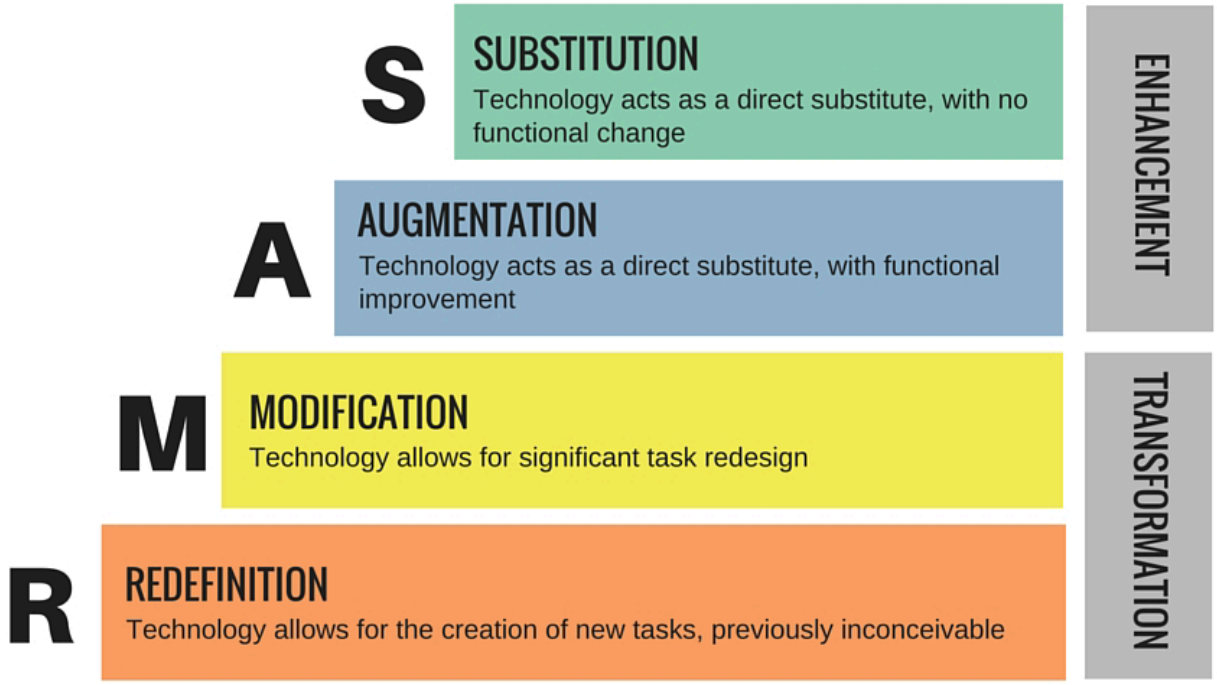
We will look at each model briefly.

The SAMR Model

The SAMR model was created by Dr. Ruben Puentedura. Dr. Puentedura created the SAMR model to show the impact of technology on teaching and learning. The model moves from the basic level of substitution to the transformative level of redefinition (See Fig 3.1)

Figure 3.1

SAMR Model Illustrated



At this point, let's listen to Dr. Puentedura explain the SAMR model.

The SAMR model is essentially a planning tool to help educators determine how they are using technology in their instruction.

Substitution is the simplest stage in which educators use technology as a direct substitute for traditional practices. An example might be having learners type their notes rather than hand write them or do an online quiz rather than the same quiz on paper. The task remains the same.

Augmentation adds something to the learning process. It is more than just convenience. Examples include the student giving an oral presentation and augmenting it with Prezi or PowerPoint, independently researching something on the internet instead of relying on teacher-provided resources, and gamifying the curriculum content and allowing students to track their own progress. Some popular gamification cite include Minecraft Education Edition, Classroom DoJo, and DuoLingo

Modification is used to design interactive and dynamic tasks that go beyond the limitations of a traditional classroom. For example, learners might create a podcast to share on the classroom website, create a video presentation to try to persuade the principal to increase the length of recess, or use online resources including audio and video tools to gain greater insight into the motivations of a particular literary character.

Redefinition is the most sophisticated level. At this level, the learner uses technology to create entirely new learning possibilities that wouldn't be possible without technology. Some examples of redefinition are having the learners work collaboratively with learners in other schools or even countries to investigate climate change at the local level and compare findings, having learners publish their writing on collaborative websites and open them to peer review and the broader community, and exploring a locale using Google Earth and create a video presentation of that location, including interviews with people who live there or have visited there.

Always remember that technology integration isn't about using technology for technology's sake. Ask yourself these questions:

- What am I trying to achieve with technology?
- How will this make a difference in student learning?
- Is technology really necessary to meet my objective?
- How much time do I have to invest in this unit?
- Do I have the necessary technology resources?

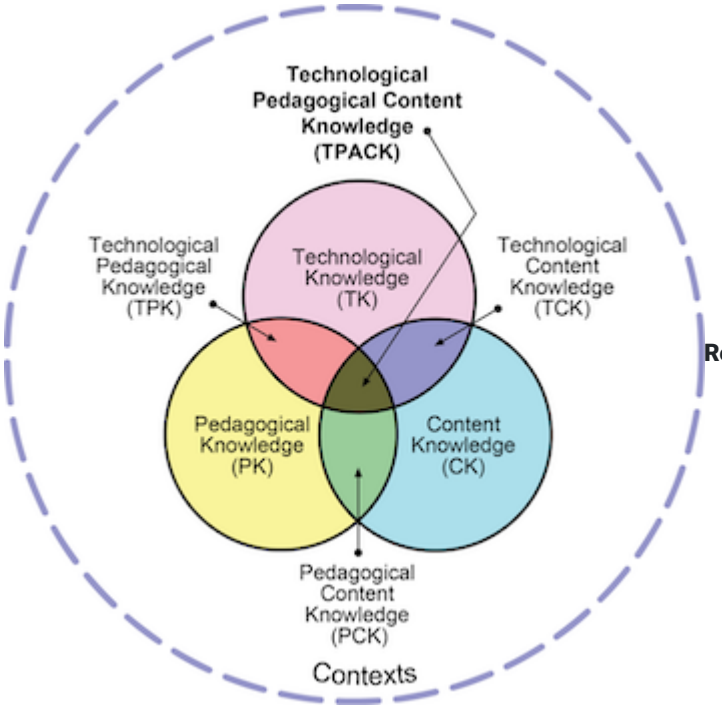
These questions will help you to determine which level of the SAMR model is the right one for your lesson.

TPACK

TPACK stands for Technological Pedagogical Content Knowledge is another helpful framework for you to look at when considering how educational technology fits into your current daily teaching practices. To begin to understand the TPACK model it helps to review the Venn diagram in Figure 3.2 below.

Figure 3.2

TPACK Model Illustrated



by tpack.org

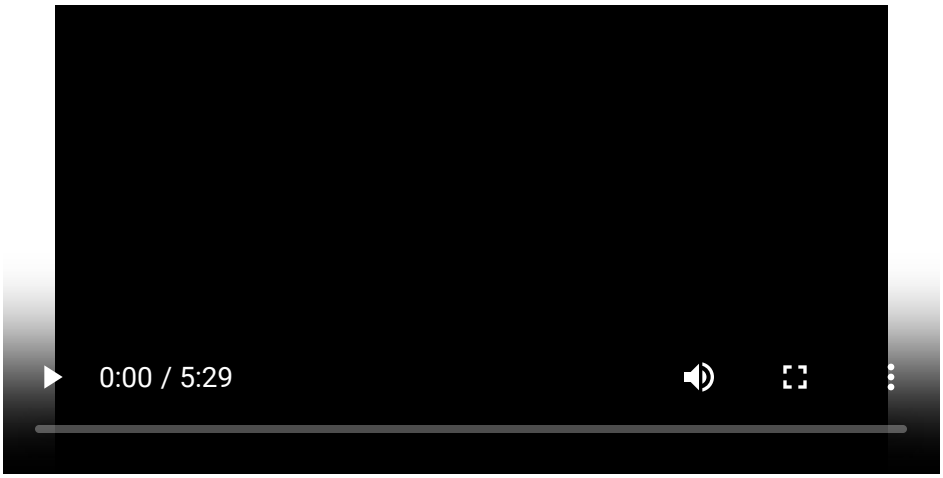
Punya Mishra and Matthew J. Koehle (2006) introduced the TPACK model in response to technology being seen as a separate skill set. They identified three types of knowledge:

- **Pedagogical Knowledge** - a teacher's understanding of strategies and methods
- **Content Knowledge** - a teacher's understanding of a subject area
- **Technological Knowledge:** a teacher's understanding of digital tools, programs, and resources (which are frequently evolving)

Their research looked at the various intersections of the three types of knowledge.

- **Pedagogical Content Knowledge (PCK, the green intersection):** one's understanding of how best to vary instructional strategies to transform a specific subject for individual students' needs.
- **Technological Content Knowledge (TCK, the purple intersection)**: one's understanding of how applied technology can enhance and/or constrain how content is represented and delivered
- **Technological Pedagogical Knowledge (TPK, the pink intersection)**: one's understanding of how digital tools can affect the teaching and learning of desired outcomes

Confusing? Maybe, but as usual, Common Sense Education has a great video to help make the TPACK model easy to grasp.
https://video.commonsensemedia.org/education/Intro_to_TPACK_model_RB2016.mp4



What are the differences between SAMR and TPACK? The SAMR model emphasizes the roles that technology can fill in an educational environment. The substitution and augmentation levels are seen as enhancement while the modification and redefinition levels are viewed as transformational. Bray, Oldham, and Tangney (2013) write, "The interventions deemed most successful, according to the review, are those that are classified as being within the transformation space in the SAMR hierarchy, that is, those that achieve significant task redesign or the creation of new, previously inconceivable tasks, through appropriate use of technology" (p. 78).

TPACK is a structural understanding of how an instructor’s knowledge of technology needs to be integrated into their educational framework. This framework also focuses on the technology, but the knowledge related to technology, with content and pedagogy.

PICRAT

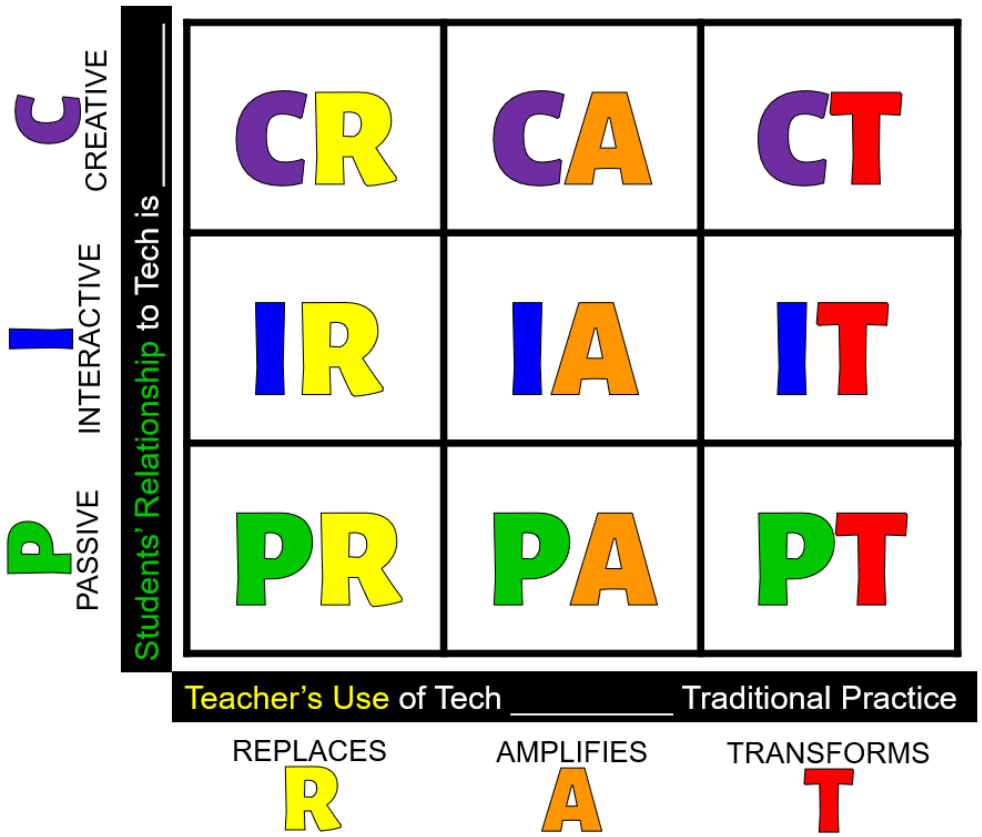
The final model we look at in this chapter is PICRAT. The PICRAT model was introduced by Kimmons, Graham, and West (2020) This model focuses on two different ways in which technology impacts teaching and learning. The PIC side of the model looks at how students are interacting with technology, either passively, interactively, or creatively. The RAT axis looks at how technology impacts instruction as opposed to traditional teaching, replacing, amplifying, or transforming. Figure 3.3 is a common visualization of the PICRAT model. The x-axis indicates the student's relationship to technology. The y-axis shows how technology influences the teacher's practice as opposed to traditional instruction.

Kimmons et. al. write, "As a theoretical model to guide teacher technology integration, PICRAT enables teacher educators to encourage reflection, prescriptively guide practice, and evaluate student teacher work. Any theoretical model will explain particular attributes well and neglect others, but PICRAT is a student-focused, pedagogy-driven model that

can be effective for the specific context of teacher education —comprehensible and usable by teachers as it guides the most worthwhile considerations for technology integration" (Kimmons, Graham, and West, 2020, p. 184)

Figure 3.3

. PICRAT Model Illustrated



For those of you who learn better by seeing, here is a short video that does a very nice job of explaining the PICRAT model.

As you can see, SAMR, TPACK, and PICRAT have different foci. Which is the best one for you? It depends on what you are trying to accomplish. If you are looking at ways to move from a traditional approach and move toward redefining the way you teach SAMR would be a good choice. If you want to focus on blending content, teaching strategies, and technology then TPACK would be a logical choice. If you want to see how technology is being used by the student and also how it is changing the way you teach then it would be PICRAT. I go back to the George Box quote at the beginning of this chapter - "All models are wrong, but some are useful."

While these models are all useful, educators have to always keep content and pedagogy top of mind. A visual that many have found helpful is the Padagogy Wheel (Carrington,

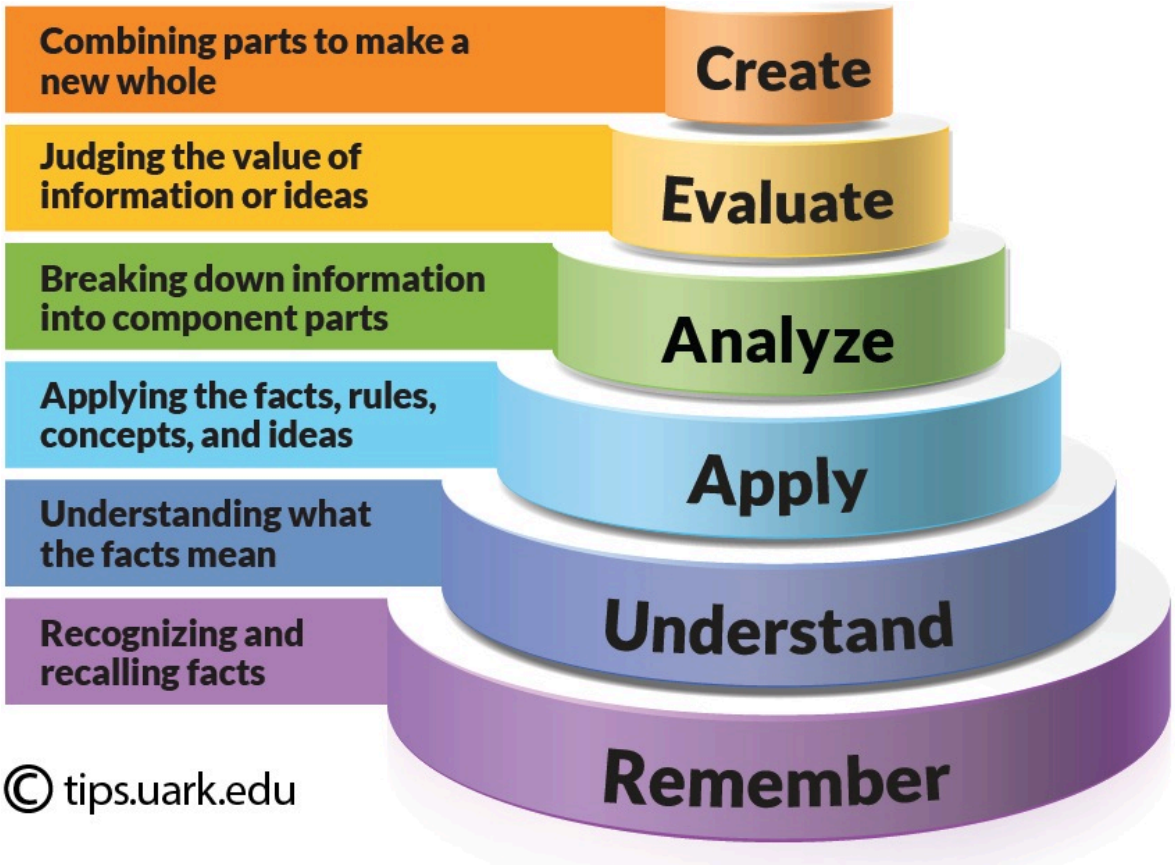
2022). Along the outside where of the Padagogy Wheel you see the SAMR categories. Toward the hub of the wheel are the levels of Bloom's Taxonomy. Moving out one layer from Bloom's descriptors are action verbs that can be associated with those Bloom's levels. One more layer out toward the edge are activities associated with Bloom's. These types of wheels aren't new and certainly aren't technology focused, however, one more layer outward you will find scores of apps that can be used with the activities and action verbs to create technology-enhanced lessons that take both Bloom's Taxonomy and the SAMR model into account.

But wait - there's more

Higher Order Thinking (HOTS)

Basic skills including memorization and factual knowledge are essential to learning, but educators can challenge their learners by developing their higher-order thinking skills. Identifying reliable information and analyzing data often require more complicated thought processes and intentional work. This kind of critical thinking was also discussed in the previous chapter under the heading of fake news. Higher-order thinking skills can help learners (and adults) solve problems by finding connections between different ideas.

Bloom's Taxonomy and HOTS



Graphic by *Jessica Shabatura.*

Bloom's taxonomy is taught in a majority of teacher education programs in the United States, including at The Teachers College at Emporia State University. In case it's been a while since you learned about Bloom's Taxonomy (or in case you

were sleeping when it was presented) ESU has a great refresher - Ways to Use Bloom's Taxonomy in Teaching.

The aim of the taxonomy is to promote higher forms of thinking in education, such as analyzing, synthesizing, and evaluating, rather than just teaching students to memorize facts and formulas. Sue Watson (2019) writes, "The top three levels of Bloom's taxonomy—which is often displayed as a pyramid, with ascending levels of thinking at the top of the structure—are analysis, synthesis, and evaluation. These levels of the taxonomy all involve critical or higher-order thinking. Students who are able to think are those who can apply the knowledge and skills they have learned to new contexts."

4 C's of 21st Century Learning

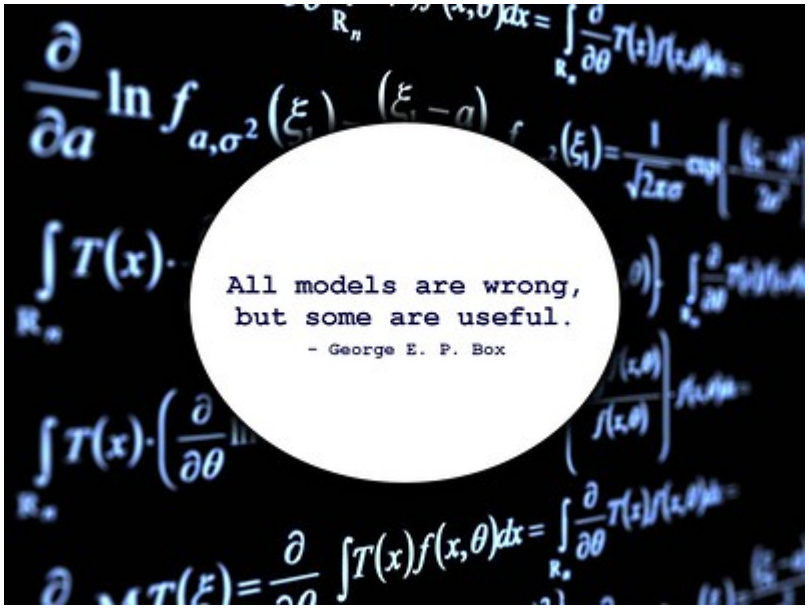
The 4 Cs, are four skills that have been identified by the United States-based Partnership for 21st Century Skills (P21) as the most important skills required for 21st-century education. The 4 C's are critical thinking, communication, collaboration, and creativity. These 21st-century skills have been identified and supported by national educational and political leaders in the United States, including President Obama.
In January 2016 members of the US House of Representatives created a bipartisan Congressional 21st Century Skills Caucus.
The Four Cs have been adopted and implemented into the curricula of schools, school districts, and professional development programs throughout the United States and beyond.

> ***Critical thinking*** *in the 21st century is described as the ability to design and manage projects, solve problems, and make effective decisions using a variety of tools and resources.*
>
> ***Communication*** *in a 21st-century context refers not only to the ability to communicate effectively, orally, in writing, and with a variety of digital tools but also to listening skills.*
>
> ***Collaboration*** *in a 21st-century context requires the ability to work in teams, learn from and contribute to the learning of others, use social networking skills, and demonstrate empathy in working with diverse others.*
>
> ***Creativity*** *is often described as the pursuit of new ideas, concepts, or products that meet a need in the world. Innovation contains elements of creativity and is often described as the realization of a new idea to make a useful contribution to a particular field.*

Learn more about the 21st-Century Partnership 4 C's by watching the following short video created by Joseph D'Addario (2016).

Conclusion

This chapter has been all about frameworks and modalities. We end this chapter as we began it with the quote from George Box.



"All models are wrong" by ryan2point0 is marked with Public Domain Mark 1.0.

Application:

Using the Padagogy Wheel as a mentor text, design your own, original, one-page poster that incorporates at least 3 of the following elements. Also, you must correctly demonstrate how the **3 selected elements** connect and interact with each other--so the layout, organization, wording, etc. will play a significant role.

- As you create your poster, be sure to select technology (apps/tools) that:
  - Align with at least **2** of these categories:
    - SAMR Level
    - Bloom's Taxonomy Verbs &/or Levels - University of Arkansas resource
    - Costa's Levels of Inquiry
    - 4 Cs of 21st-Century Skills
  - Align with at least **1** of these categories (refer to your school/district documents):
    - Content Area Standards
    - Sample Questions/Question Stems
    - Sample Activities
    - Applicable Websites/Apps
    - Interdisciplinary Connections

Extension Activity

Create a modified lesson plan or PD session utilizing the SAMR Model.