SAMR: A Tool for Reflection for Ed Tech Integration

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Introduction

Technology is a part of everyday life as digital tools and devices are ubiquitous. As schools begin to increase technology available in the classroom, it is important for teachers to consider when, how, and why technology fits into a lesson. Used properly, technology is a powerful tool that can transform teaching and learning. It can be a means for collaboration, accessibility, personalization, differentiation, engagement, and innovation (US Department of Education, 2016). Technology should never be considered the classroom "babysitter" or the busy workstation. Rather, technology is used intentionally and strategically as a tool to allow students to engage meaningfully in authentic learning experiences (Herrington & Kervin, 2007).

What is and How to Use the SAMR Model

One way to consider technology use in the classroom is by using the SAMR Model (Substitution, Augmentation, Modification, and Redefinition). Created by Dr. Ruben Puentedura, the SAMR model helps teachers think about how and why they use technology and how it can help them evolve pedagogically as they grow more comfortable integrating technology into their practice (Puentedura, 2016). In brief, Substitution occurs when technology acts as a simple substitution with no functional change in the assignment; Augmentation is a substitution that is also an improvement in function in the assignment; Modification involves a significant redesign of the assignment through technology; and Redefinition is when technology is used to create new tasks not possible without the technology.   The SAMR Model can be compared to a ladder with Substitution on the lowest level and Redefinition on the highest level. When employing technology as a Substitution or an Augmentation, it is considered enhancing the learning experience, whereas when at the Modification or Redefinition levels, it is considered as transforming the learning experience.

As teachers begin thinking about technology integration into the classroom, they often have many questions about how they will effectively use technology. These questions build from the lower level of the SAMR Model upward.   For example at the Substitution level, "What will I gain by replacing the task with the technology?" At the Augmentation level, "Does the technology add new features that improve the task?" At the Modification level, "Does the task significantly change with the use of technology?" At the Redefinition level, "Does the technology allow for creation of a new task previously inconceivable?" (Brown, 2015).

The levels of the SAMR Model can be compared to the levels of Bloom's Taxonomy. As one proceeds upward, the complexity increases. Substitution and Augmentation within the SAMR Model align with Remember, Understand, and Apply in Bloom's Taxonomy and Modification and Redefinition align with Analyze, Evaluate, and Create. Figure 1 is the authors' illustration of the SAMR model and its alignment with Bloom's Taxonomy based on Puentedura (2014) and questions based on Brown (2015).
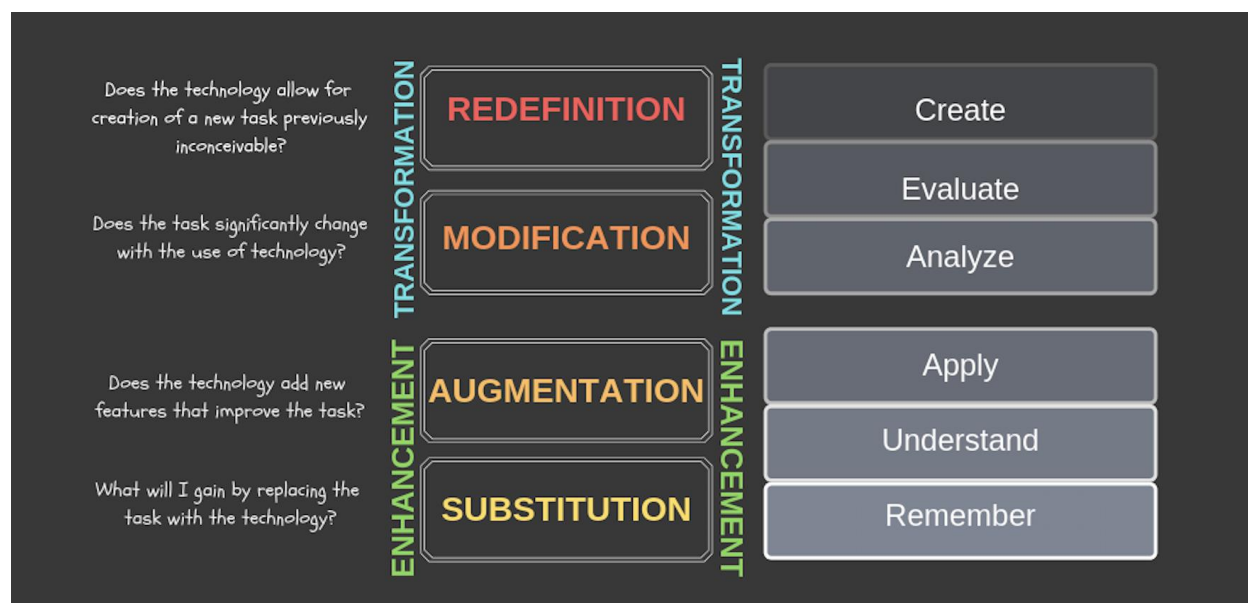
Figure 1: SAMR Model aligned with Bloom's Taxonomy (Puentedura, 2014) and questions to ask (Brown, 2015).

Substitution

When teachers first begin using technology in the classroom, Substitution typically is the easiest application, as it does not change the nature of teaching or learning.   With Substitution, for example, students move from hand writing their papers to typing them in a Word document or they move from reading a printed text to reading the text online. While Substitution is considered the most basic form of technology integration in the classroom, it can be a valuable addition to the classroom when considered closely. The question we, as teachers, should ask is, "What will I gain by replacing the task with the technology?"

Consider this classroom: the teacher is instructing a group of English language arts students. The students are working in small groups to analyze the character in a text. Because students have technology, students have the opportunity to make a choice. They can either analyze the character on paper or they can substitute the paper and use an online tool such as Storyboardthat.com to analyze the character. Similarly, in the same classroom, the teacher could ask the students to write a paper. The students may start writing on actual paper or type it in Word. Regardless, the teacher can require the finished paper to be submitted via Word. Additionally, teachers may tell students to submit their work through an online tool rather than turning in a hard copy, which adds another dimension for analyzing student work. While substitution does not alter the nature of teaching or learning, it can make the process of digitally documenting learning and providing feedback easier than through the traditional method (Portnoy, 2018).

In one of the author's classrooms, she found that using the method of substituting technology for paper, thereby giving students some choice in their medium of work, proved empowering. Her

students acknowledge that having choice helps meet their needs and engages them more in the lesson. Students who struggle to get ideas down on pen and paper may feel more confident with a computer screen. However, when teachers move to solely using technology, students may begin to miss the use of pen and paper. Therefore, allowing students to choose which to use gives them agency, helps engage them more in their work, and is a natural way to differentiate instruction. This still allows the substitution to occur and there may be some assignments where the teacher solely wants to substitute technology for paper. It is important to recognize that when technology is simply used to accomplish the same goal that would be accomplished otherwise, it fits into the category of Substitution. We can now answer the question of "What was gained by replacing the task with technology?" in these examples? Choice, as a digital platform, differentiation in instruction and assessment, and ease in providing feedback were all gained from using Substitution.

Augmentation

Augmentation is substitution with an improvement in the task. In other words, the technology replaces the textbook and/or paper with abilities that a textbook and/or paper could not afford. Augmentation is focused on ways that technology can improve the learning experience for the student and the teacher because functionality is present where it may otherwise not exist. The question here is, "Does the technology add new features that improve the task?"

Consider the new features in these learning examples. Teachers may ask students to apply what has been learned using a digital tool. Skitch is a digital tool that allows students to take pictures with a device, mark them up, then send them. For instance, students can take pictures of objects in the environment and then they can mark or trace the geometric figures they see. Students can use Skitch to record observations and collect data, or pictures can be taken of an area on the school grounds that students would like to redesign and then create scale drawings from their markings on the picture. Skitch can be used to capture and annotate almost anything (Bindel, 2013).

Similarly, Seesaw is another tool that allows students to interact with paper texts through taking pictures and then marking them up. Students are able to respond to activities that teachers assign through drawing, annotating, recording, writing, and captioning through this tool. Teachers can use this tool to track learning progress and create a portfolio of a student's work in a variety of mediums. This improves the learning experience because the student is able to respond to the same question in a variety of ways using one tool and the teacher is able to monitor the learning progress in one platform while seeing a variety of the student's work.

Flipgrid is another digital tool that can be used to augment instruction. Flipgrid gives students voice in a video discussion platform. One way to use Flipgrid is to have students introduce themselves to their classmates or respond to a prompt. The teacher could do this in the classroom with all the students present, but by using technology, the teacher is able to use this classroom time in a variety of ways and students are able to express their learning with different alternatives as well. Another possibility is for students to video themselves reading aloud or video

themselves playing their musical instrument. The teacher can leave private video feedback to each student. This also helps the teacher see the student's growth through practice when practice occurs outside of the classroom environment.

When Augmentation is used by a teacher in a classroom, the product that is created changes form to give a different picture of the learning. Another example of a way that Augmentation could be used comes in the form of Exit Tickets, which are responses to a question that a student jots down on paper as they leave the room. Augmentation occurs when, instead of jotting the answer to a question on paper, students use a tool such as Mentimeter.com to respond to the question.

The teacher can use this tool to rearrange the responses with a setting change of the tool into a word cloud to see what the students have learned from the lesson. Exit tickets on paper would not allow the teacher to do this; therefore, technology is used to "offer functional improvement" because learning can be viewed differently through the tool. Kahoot is another tool that can be used as an exit ticket. This platform is a fun and engaging way to formatively assess students that has many applications, including not only whole-class engagement, but individual practice as well. How did the technology add new features that improve the tasks? In these examples, a digital platform was substituted for an analog one and a new feature was added that provided new ways for students to engage with the content and each other.

Modification

Modification allows technology to be used for a significant task redesign. The question to be answered is, "Does the task significantly change with the use of technology?" Consider the example of Flipgrid given under Augmentation. Students' video responses to their peers' video posts can be used to foster dialog on a topic outside of class, this is an example of Modification. A learning experience of a single video post becomes modified when students reflect on a peer's comments and respond with their own. Students providing peer feedback on skills practice on Flipgrid is another example of Modification because students are now practicing not only for themselves or their teacher, but also for their peers and those peers will be using critical and analytical thinking to provide constructive feedback.

Students collaborating on multiple devices on a presentation in Google Drive or Office 365 using Slides, Pages, Docs, Forms, or Sheets in real time or asynchronously can be a redesign of a task where students would have worked on a presentation individually or on a single device during class time. Students creating digital books using bookcreator.com to demonstrate and curate their learning allows for a significant task improvement as students move up the SAMR model and Bloom's Taxonomy as well. The creation of flyers or posters that demonstrate understanding using Canva or Adobe Spark can provide new features of creation not possible with poster board and markers. In fact, Adobe products have a whole suite of tools that can be utilized to creatively modify learning experiences. As we consider each of these examples, we can answer the question, "Does the task significantly change with the use of technology?" with a resounding yes!

Redefinition

Redefinition is the designing of learning experiences that can only happen with the integration of technology. The question is, "Does the technology allow for creation of a new task previously inconceivable?" At this level of the SAMR model, we are truly at the higher levels of Bloom's taxonomy. Consider a multimedia project that incorporates music composed by students using Garageband and video captured and then edited using iMovie, or for younger students (grades 3-8) Green Screen by Do-Ink. These learning experiences are only possible using technology. What about virtual field trips? Common Sense Education offers a variety of reviews on virtual field trips. Patricia Brown (2014) also has a list of even more virtual field trips. When it is impossible to go on a field trip, virtual field trips can only occur using technology. A Skype session to a classroom on the other side of the world or a museum across the country or an interview with an author are opportunities that become available to students through Redefinition. Students can engage in online simulations using PHET (K-12 math and science simulations), Geogebra (6-12 - for creating math models and simulations), Walden, a game (grades 8-12-a simulation of Thoreau's experience at Walden). Redefinition allows the teacher to provide opportunities and learning experiences to the student in ways that were never possible before in the confines of a classroom. In these examples we can certainly answer the question, "Does the technology allow for creation of a new task previously inconceivable?" in the affirmative.

Considerations

There are a few things to keep in mind as you consider the SAMR model. The SAMR Model is a reflective tool used to gauge the level of technology integration. It is not a magic bullet for learning. It is possible to have technology integration at the higher levels of the SAMR Model, but still be at lower cognitive levels. For example, Google Maps is a technology that can afford certain learning opportunities that are not possible without it; however, just having students explore Google Maps, without a clear learning target that challenges them at the upper levels of Bloom's Taxonomy, is just using bell and whistles without the proper design to promote 21st century skills and higher order thinking.

Additionally, technology does not have to be used simultaneously by all students at the same time. In the instance where a teacher does not have one-to-one devices, teachers can utilize technology in small groups of student rotations or can utilize the functions of a lesson with one device to several students. Even without a full classroom of computers, the benefits of technology can be explored. The technology cannot replace the curriculum designer's (you, the teacher) content and pedagogical expertise, it can only offer opportunities and options.

As you begin, remember, you don't have to change everything all at once. Start with a learning experience that needs tweaking, a shot in the arm, if you will. Determine a way to substitute in technology or augment the lesson by adding technology that provides a functional improvement. Don't be afraid to experiment. It is easy to get overwhelmed with the many options. Start somewhere and work to get better. Try one strategy, and when you feel comfortable with that strategy, add a new layer. Often, the same tech tool can be used for multiple levels on the

SAMR Model depending on how the teacher designs the instruction. Keep in mind that some learning experiences are best suited for the enhancement levels (Substitution and Augmentation) and do not need to be "improved" to the transformational levels (Modification and Redefinition). Have an open-mind to what could be when considering your curriculum options. Follow teachers on Twitter who are technology savvy. Go to Commonsense.org/education and read the reviews and "how to's" on their website. Be brave and have a growth mindset that allows you to constantly improve your practice through your own growth and learning. You and your students deserve it!

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