



Technology Integration Matrix (TIM) Model:

Our current series of ETIPs focuses on using the Technology Integration Matrix (TIM) Model as a framework for using technology to enhance learning. (Source: https://fcit.usf.edu/matrix/project/introduction-to-the-technology-integration-matrix/)

If you missed our previous ETIPs in the TIM series, check them out using the links below:

- <u>TIM ETIP Vol. 1</u> We took a look at using the TIM Instructional Planning Model to increase student engagement.
- <u>TIM ETIP Vol. 2</u> Introduces the Technology Integration Matrix (TIM) and takes a close look at the Active Learning Characteristic.
- <u>TIM ETIP Vol. 3</u> Takes a close look at the Collaborative Learning Characteristic of the Technology Integration Matrix (TIM).

Continuing along with the TIM Matrix, in this ETIP we are going to delve into the Constructive Learning characteristic.

CONSTRUCTIVE LEARNING: Making Connections

"The Constructive characteristic of the Technology Integration Matrix describes instruction in which students use technology tools to connect new information to their existing knowledge. Experienced teachers know well that with sufficient motivation, students can memorize and, in the short term, parrot back all sorts of information we teach them... But if the student hasn't tied that information to something they already understand, it's a structure built without a foundation and typically is soon lost." (Source: https://fcit.usf.edu/matrix/constructive-learning-making-connections/)

Characteristics	of a Meaningful Learning Environment
Students use t connect new i knowledge rat receive inform	Chnology tools to formation to their prior ler than to passively ttion. • TRANSFORMATION LEVEL: Extensive and unconventional use of technology tools to build knowledge • INFUSION LEVEL: Choice and regular use
	for building knowledge ADAPTATION LEVEL: Independent use for building knowledge; some student choice and exploration ADOPTION LEVEL: Guided, conventional use for building knowledge
	ENTRY LEVEL: Information delivered

Math Sample

In the examples below, a fifth-grade teacher is teaching the following standard:

Mathematics - Numbers and Operations in Base Ten

Perform operations with multi-digit whole numbers and with decimals to the hundredths.

5.NBT.7 Solve real-world problems by adding, subtracting, multiplying, and dividing decimals using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction, or multiplication and division, relate the strategy to a written method and explain the reasoning used.





Constructive - Entry Level:

At the Entry level, students are receiving information from the teacher via technology, and the teacher is using technology in more conventional ways to build knowledge and experience. (Source: Florida Center for Instructional Technology- TIM Observation Rubric)

In an Entry level lesson covering this standard, a teacher may introduce the idea of problem solving using a video that describes the steps to problem solving. This YouTube video from Miacademy is a good example of a video that can be used at a variety of age levels. After the class finishes watching the video, the teacher may lead the class through a sample word problem using a graphic organizer like this to help students organize their work.

Although this lesson may be appropriate for introducing the topic of problem solving, it does not allow students to use technology to help them make connections to their prior understandings of the topic. This lesson falls in the entry level, because the teacher is "feeding" information to the students, and not giving them much choice in how they learn and use the subject matter. Students are in a setting where information is being presented to them by the teacher.

Constructive - Adoption Level:

At the Adoption level, students are beginning to utilize technology tools to build on prior knowledge and construct meaning. The teacher is providing opportunities for students to use technology in conventional ways, and the students begin to make connections between prior knowledge and new learning. Teachers are still making the choices in how technology is used though. *(Source: Florida Center for Instructional Technology-TIM Observation Rubric)*

In an Adoption level lesson, a teacher might use the technology tool, <u>Padlet</u>, to get students more involved with the lesson. Using Padlet, teachers can pose the question to their students that would get them thinking about problem solving in their everyday lives. Questions like the following could be used; When have you needed to problem solve before? What might you use problem solving for in the future? Do you think problem solving is only used in Math? Check out <u>this</u> sample Padlet to see what this could look like in your class! To bring in the aspect of Math problem solving specifically, teachers could also use the tool, Padlet, to have students explain to their peers to process of solving addition, subtraction, multiplication, or division problems. This would allow them to activate prior knowledge on the four operations.

These questions begin to get students building on their prior knowledge of the topic, and construct meaning in why they may need this skill in the future. The tool itself is being used more conventionally, although there are many formats the teachers could use depending on the amount of interactivity they want to be included in the lesson. In this lesson, the tool is decided on by the teacher, and students have no other choice in what they use to construct meaning.

Constructive - Adaptation Level:

At the Adaptation level, students begin to use technology tools independently to facilitate construction of meaning. The teacher creates instruction where student use of technology tools is imperative to build an understanding of a concept. The teachers gives students access to technology tools and guides them in exploring and chooing appropriate resources. (Source: Florida Center for Instructional Technology- TIM Observation Rubric)

In an Adaption level lesson, teachers may provide students with a variety of scenarios that demonstrate problem solving. These scenarios could be centered around Math, but everyday life scenarios can be included as well to help students construct meaning as to why this skill is important in their everyday life. Some ideas for scenarios could be planning a room remodel, spending and saving money from an inheritance, or coordinating a service project for a local shelter. The teacher would likely compile these scenarios and sources in some type of portfolio tool like Google Slides. Students can independently or collaboratively read about and research these problems/solutions to come up with common trends on how the problem was solved. The idea behind this research is that students will develop their own steps to problem solving that can be applied to Math, but potentially other subject areas/everyday life as well. Students will build upon their own prior knowledge to develop these ideas as well. Once the research is complete, students can compile their findings and steps for problem solving in a tool like Google Slides, or Padlet.





This lesson idea still includes a lot of direction from the teacher, however, students are now using tools on their own to construct meaning in the topic. Additionally, they are not just passively receiving information from their teacher. Students may not relate to some scenarios provided by the teacher, but by including a variety of well-rounded scenarios, students may be able to find something they relate to. The technology tools in this lesson are more conventional, however students have a variety of things to look through. They can also practice safe internet search practices while looking into the scenarios provided. The research aspect of this lesson is integral in students building an understanding of the concept. This lesson also includes some choice in how they present their findings on problem solving.

Constructive - Infusion Level:

At the Infusion level, students consistently have opportunities to select technology tools and use them in a way that best facilitates their construction of understanding. The teacher consistently allows students to select tools to use in building an understanding of a concept. Technology tools are seamlessly integrated into a lesson, and is supportive of student autonomy in choosing the tools and when they can best be used to accomplish the desired outcomes. (*Source: Florida Center for Instructional Technology-TIM Observation Rubric*)

With an Infusion level idea, this would likely take more than one day for the teacher to implement with their students. Building from the problem scenario in the previous level, a teacher can take the idea of a room remodel and expand on that. Teachers can pose the following problem to their students. "The school is looking to replace flooring throughout the building. What should the school purchase (could be different for different spaces)? What should the school budget for this project?" This is an open ended "problem" that requires the students to rely on technology tools to plan and solve. This problem also integrates a variety of Math topics. They will have to research flooring that is best in schools, and they will have to calculate costs for product and installation of those flooring types. Students will have choice in the technology tools they use to research the project, plan the resolution, and store their work.

In this level, the students are not passively recieving information from their teacher. Instead, they are guiding their learning with support from the teacher. The technology tools in this project are integral to student success, and students are not being limited to one tool. Most students can relate to a remodeling project, whether they've experienced one in real life or have seen one on TV. This is an important piece, because students can take what they already know about the subject and apply it to this project. Teachers that are at this level have likely introduced students to a variety of technology tools in past lessons, so students have experience with enough technology tools to choose the ones that work best for them.

Constructive - Transformation Level:

At the transformation level, students use technology to construct and share knowledge in ways that may not be possible without technology. The teacher facilitates higher-order learning opportunities in which students regularly engage in activities that may be impossible to achieve without the use of technology tools. The teacher encourages students to explore the use of technology in unconventional ways and to use the full capacity of multiple tools in order to build knowledge. *(Source: Florida Center for Instructional Technology-TIM Observation Rubric)*

Building from the previous project described at the Infusion level, the students can take their final proposal to a wider audience to push it to the transformation level. In the remodeling project idea, students planned a "proposal" to share with their teacher and classmates. This would be an artifact that showed their problem solving process and their final idea. They would have choice on what they decided to present their proposal with and share their work. To make this lesson transformative, students can present their project to administration and Board of Education via a video conferencing tool of some kind. The teacher can even include professionals in the construction and remodeling industries to give feedback to the student's presentations.

Students used technology to construct knowledge on the problem solving process in the remodeling scenario, as well as refining their Math skills. This project idea helped students access their prior knowledge to build new knowledge, and the technology was imperative to this lesson for research and presentation purposes. In this project, the teacher posed higher order thinking questions





to the students to help facilitate new knowledge. They also allowed students access to technology tools that work best for their learning styles.

Stay Tuned...

Stay tuned for future <u>S3 EdTech E-tips</u> when we'll take a closer look at each of the characteristics at the various levels of the Technology Integration Matrix, along with examples, and lesson ideas, that you can use in your classroom.