# "The Applied TIM Model":

# Equipping K-12 Environments To Integrate Instructional Technologies

Final Project

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## Introduction

Successfully integrating newer technologies into instructional environments is much like trying to change the tires on a moving vehicle - it's exceedingly difficult and requires a complete reevaluation of traditional training methods in order to prepare teachers for success.

Since the first industrial revolution, technology has rapidly grown in its prevalence, applications, specificity, power, cost-effectiveness, and cultural dominance in every industry. Contrast this with the current model of traditional education, which (with some exceptions in the past 15 years) has actually followed an industrial approach to education since the late 19th-century. What naturally follows is a critical breaking point - schools have consistently struggled to make full use of newer technologies in their instructional models, and many schools and teachers are seeking comprehensive approaches to improving their technological integration so they can take advantages of technology's greatest strengths.

This ID Model proposal utilizes an already-existing tool for evaluation and reverse-engineers a model that will help instructional designers (IDs) produce effective professional development for instructors. The preexisting tool is called the *Technology Integration Matrix* (or the TIM), and it was developed by the Florida Center for Instructional Technology to evaluate the degree to which instructors integrate technology into their instruction across five distinct aspects of learning.

Since the TIM is a tool used to evaluate teachers' use of technology, we can use its framework to develop a model that will help IDs prepare teachers to meet the expectations of the TIM. This model, which we will call the *Applied TIM Model*, will aid IDs on how to analyze and design instruction for teachers operating at different levels of proficiency within the TIM.

# Model Background

## Context

The context for this model is K-12 schools in the United States with a particular focus on those schools under some kind of larger oversight (like a school district or association). Research from private firms shows a dramatic trend in the increase of per-capita investment by schools in educational technology. Annual spending on tablets (e.g. iPads) by schooling districts broke $2.8 Billion in 2016 (up 22% from 2014), and Simba Information estimates that IT spending for schools will pass $7 Billion in 2018. In addition, in a study of more than 1,000 K-12 schools surveyed in the U.S., 81% reported goals for achieving 1:1 Computer-to-Student ratios in their districts in the near future; of those that reported these goals, the average predicted window for these goals is 3.1 years (approx. December of 2020).

It would be an understatement to say that schools have a vested interest in discovering the most effective ways to leverage technologies in their instructional environments, but while research indicates that teacher approval of tech is high (with IDC Government Insights reporting that 91% of teachers believe that “up-to-date training” on using technology in the classroom is important to achieving success in education), many teachers report being dissatisfied by their school’s training programs. GfK Verein reported that 63% of teachers aged 43+ said they “need more technology training to support their students,” while 37% of all teachers stated that they would “love” to use new technology in the classroom, but they “do not know how” to do so. 32% report dissatisfaction with the support their schools provide in this endeavor.

**The System**

The system is chiefly concerned with the professional development of K-12 instructors on the use of technology in the classroom - specifically the integration of a learning management system (LMS) like Google Classroom or Canvas. The role of instructional designers is in the design and development of training services that will help instructors demonstrate the desired skills indicated at the highest levels of the Technology Integration Matrix (TIM), which represent an excellent understanding of how to use technology to enhance each of the five (5) key elements in instruction.

**Suprasystem**

This model serves as a resource for the instructional designers responsible for training instructors on how to integrate technology into their classroom. It outlines the major steps and points of analysis that IDs must take when creating an effective learning experience for the instructors they serve.

**Purpose**

In alignment with the system and suprasystem stated above, the *Applied TIM Model* is primarily designed to do the following three things:

1. Identify Growth Opportunities - This model provides a framework for a clear and comprehensive front-end-analysis of any instructor's current use of a given technology. It helps schools and teachers to identify their most important areas of focus.

2. Organize Response System - This model weighs each instructor's performance and provides a detailed response mechanism for each status. It helps prioritize a task list and outlines a clear path.
3. Optimize Response Efforts - This model maximizes efforts by integrating two strategies that maximize the potential for "parallel solutions," saving time and other resources in the remedial stage.

Each of these purposes will be further outlined in the model's overview.

**Stakeholders / Audience**

In addition to the teachers immediately receiving the training produced by the *Applied TIM*, there are administrators, parents, and students that make up stakeholders for this context. These individuals benefit from their instructors having a deep understanding of how to use technology (whether for communicative, data-intensive, or curricular purposes), and in many cases discover higher engagement or workplace satisfaction among instructors themselves.

**Key Personnel & Their Roles**

| **Role** | **Description of the Role** |
|---|---|
| Evaluator | Conduct observations of instructors and review their curricula for the demonstrated traits of technological integration outlined in the TIM. This role can be performed by the instructional designer, an administrator, or by peer instructors as long as this distinction is consistently upheld. |
| Instructional Designer | Utilize the *Applied Tim* to identify potential causes of program or instructor weaknesses and propose solutions to them. |
| Instructors | Remain actively involved in and reflective on the process of identifying potential actions that can improve TIM performance. |

**Rationale**

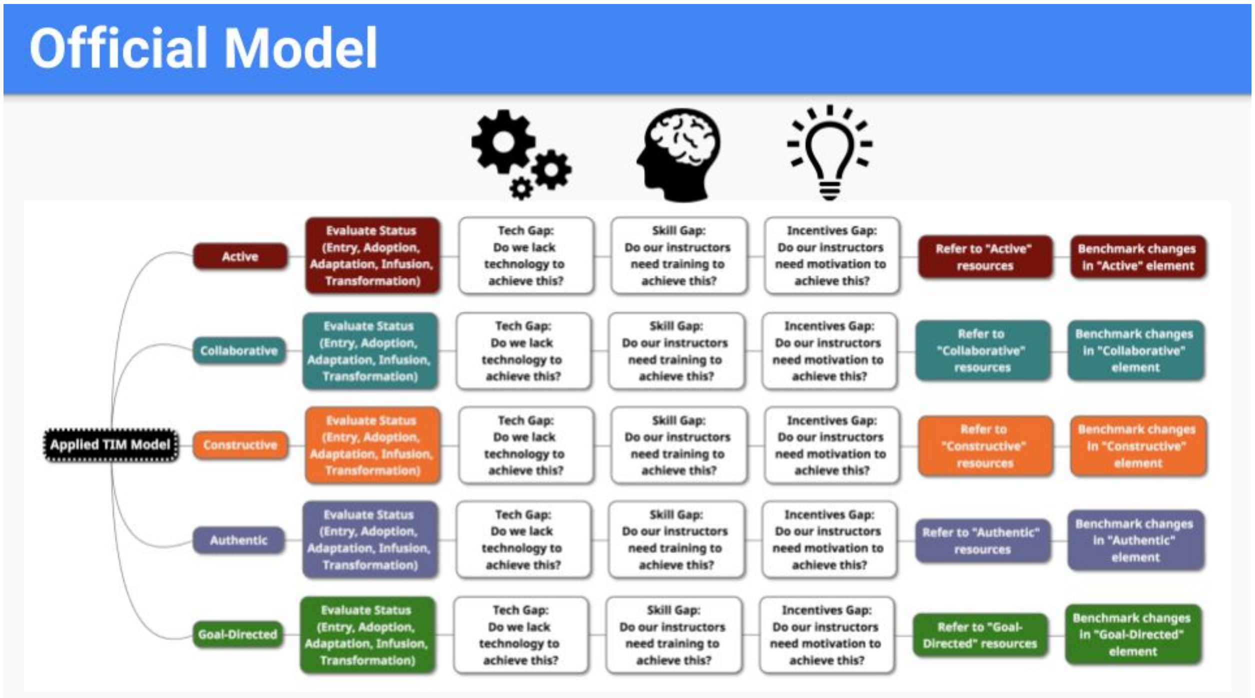
If K-12 schools desire to make greater use out of their technology in accordance with the Technology Integration Matrix, then this is the best model for analyzing, designing, and implementing that technology. Most importantly, the *Applied TIM* acknowledges the constraints on time and resources that all schools face - it helps to focus and coordinate response efforts by presenting a clear and detailed outline for how schools can address concerns while minimizing their costs through *parallel solutions* and a *sequenced gap structure*. Both of these ideas will be described in the model's outline below.

**Model Assumptions and/or Constraints**

- *Teachers are invested in the improvement process* - one requirement for this model is the active brainstorming of stakeholders on potential causes of any programmatic shortcomings. This means that teachers must be willing to reflectively consider ways they can improve their habits or strategies to aid in their instruction. Stubborn or apathetic instructors will not benefit from this model.
- *Technologies selected align with the five elements of learning* - this model helps equip teachers to use technology in accordance with the five elements outlined in the TIM. However, in rare cases there may be an instance of a technology being simply because it was desired by stakeholders for its own sake. If a technology cannot function as a part of aiding in *Active, Collaborative, Constructive, Authentic,* or *Goal-Directed* learning, then it should be scrapped.

- *Tech-based solutions are more likely to be more cost-effective than Skill-based solutions, which in turn are more likely to be more cost-effective than Incentive solutions* - There is no literary basis for this assumption, and so it stands to reason that in certain environments stakeholders might discover that a boost in teacher compensation rates (an incentive solution) is both cheaper and faster than a purchase of a new technology. The three-step solutions sequence is designed to help organize brainstorming, not dictate all decision-making.

**The Applied TIM Model: Graphics & Overview**




## Instructional Goals and Objectives

In accordance with the Technology Integration Matrix on which it is based, the *Applied TIM* is separated into five (5) rows that each devote attention to each of the five elements of effective learning: *Active, Collaborative, Constructive, Authentic,* and *Goal-Directed*.

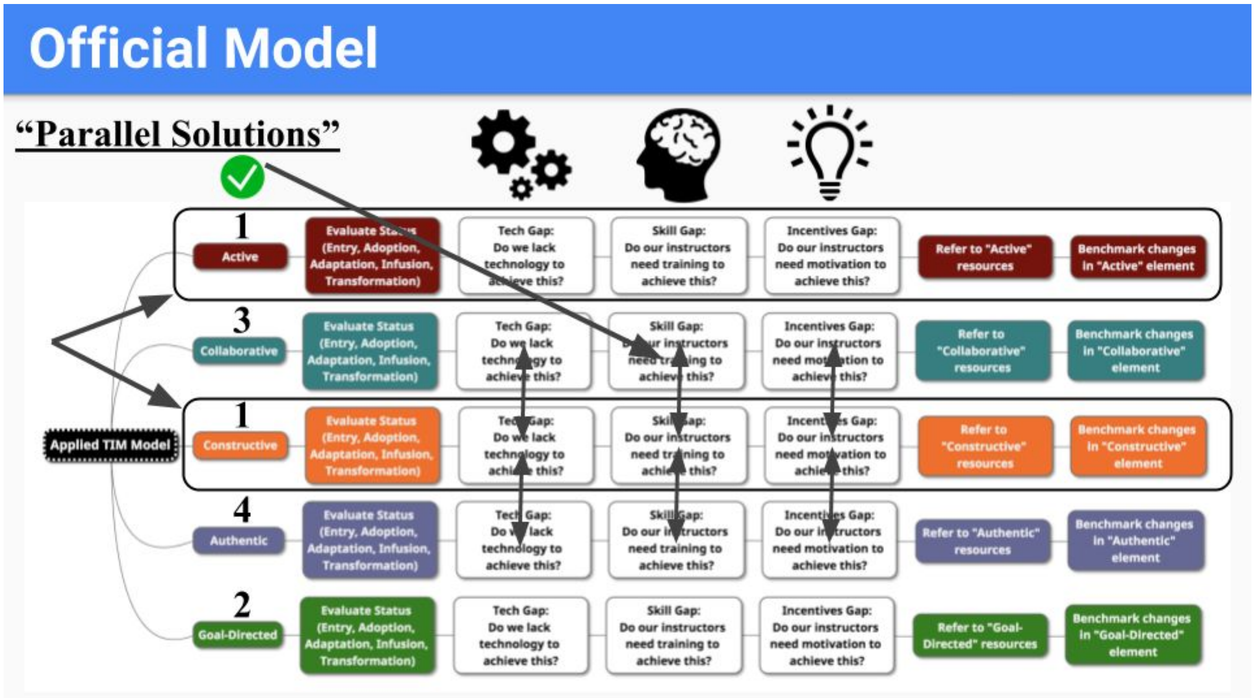
The TIM goes into much greater detail as to why these elements dictate effective learning, but the instructional goal of the *Applied TIM Model* is to maximize the extent to which students benefit from these five elements when engaging with instructional technologies. The five elements represent the five objectives that result from this model's literary basis.

**Front-End Analysis**

The first step in the model is to conduct an evaluation of a given instructor (or school's) performance in each of the five areas, which looks like this:


In this example, an instructor performs well in *Authentic* and *Collaborative* learning with regards to their use of technology, but struggles in *Active* and *Constructive* learning. The evaluation is performed by a third-party individual (or administrator) that observes their instruction and reviews their lesson plans.

Next, the scores from the evaluation are plugged into the *Applied TIM* and the instructional designer begins their analysis by starting with the weakest elements listed, as shown below:




As the stakeholders begin the process of brainstorming potential causes for the shortcomings of the program, they will iterate through three (3) different areas of consideration: a *Tech Gap*, a *Skill Gap*, and an *Incentives Gap*. These steps are sequenced for a particular reason - while it is likely that there are multiple causes for any particular program's weaknesses, a gap in technology is likely to be rectified much more quickly and comprehensively than a gap in skills or incentives. This model seeks to optimize response mechanisms by ensuring that if there are faster solutions that can address the problem that they are considered first.

**Response Mechanisms & Parallel Solutions**

Finally, the stakeholders enact any proposed solutions in the *Tech, Skill,* or *Incentives* gaps while considering their impact on each of the other four (4) rows. This is also for an important reason - it is likely that a solution that addresses a *Tech Gap* for one row (like "Active Learning") can also address a similar gap in a different row (like "Constructive Learning"). These are called *parallel solutions* (as shown in the figure above), and occur at any level in the model's application. This explains why stakeholders should begin their technological training by starting with the lowest-scored performance indicators first; they will be more likely to uncover solutions that address later considerations in higher-scoring categories.

**Formative & Summative Evaluation**

Once the gaps have been identified, the user is referred back to the resources provided by the Technology Integration Matrix (on the Florida Center for Instructional Technology's website) in order to create solutions for their areas of growth. The model then instructs them to benchmark their new status, a step that will be useful in future iterations of the *Applied Tim Model*.

Formative evaluation occurs as the stakeholders brainstorm and vet solutions to particular obstacles in each of the five categories. As strategies are implemented and benchmarking takes place, the school can re-evaluate particular approaches across the three gaps and optimize their efforts.

Summative evaluation can occur at the conclusion of one iteration of the *Applied TIM*. Once solutions have been enacted for all of the relevant elements, the school can replicate its initial data-collection procedure to find out how well its instructors are performing at the identified areas for growth. Thanks to the TIM, they should be able to clearly mark any differences in the teachers' performances. Thanks to the *Applied TIM*, they should also be able to connect those difference to the strategies enacted across any of the gaps in the instructional environment, identifying successful and unsuccessful strategies in their response process.

**Communication & Diffusion Plan**

While the *Applied TIM* can be used by individual instructors, it is best utilized by schools or districts taking a comprehensive view of their technology purchasing decisions or implementation/training programs. First, an administrator would review the model to ensure they understand the required processes and contingencies of such a plan. Second, a team of relevant personnel (evaluators, instructional designers, and policymakers) would begin to create their data collection process. Third, the evaluators would complete the data collection and analyze the data to arrive at a performance rating for each of the five (5) elements of effective learning. Fourth, the stakeholders would facilitate open discussions, strategic surveys, and interviews with important personnel to brainstorm potential causes and solution across the three (3) gaps. Fifth, the instructional designers would agree upon and enact solutions for the lowest-rated categories first, seeking potential parallel solutions with other categories as they work up the list. Finally, the evaluators would cycle-back to conduct a post-evaluation of the same metrics in order to measure any change in teacher performance thanks to the model's implementation.

This model does not prescribe specific solutions for particular environments or technology because it is designed as a framework for front-end analysis and brainstorming. Schools may use the *Applied TIM* to discover many different solutions ranging from professional development workshops to overtime pay to the installation of a new piece of software. The key is that this model helps coordinate, communicate, and focus the efforts of stakeholders on specific actions they can take to improve their performance in clearly-defined ways.

## Conclusion

The TIM is one of the most popularly-utilized rubrics for evaluating teacher success in the context of integrating technology in the classroom. The *Applied TIM* recognizes this strength and seeks to make use of it by creating clear and actionable steps surrounding its guided analysis. As instructors become trained in the use of the *Applied TIM*, our hope is that they will develop an internal protocol for addressing issues in the use of informational technology in education. Thanks to the simplified and efficacy-minded structure of the model, schools will be more likely to discover streamlined solutions to a diverse array of problems in their instructional environments.

Regardless of the model's application, it is encouraging to see how many teachers are enthusiastic about implementing newer technologies in order to support their students. The *Applied TIM* makes teachers an active part of the brainstorming process because it believes in the power of community efforts to make lasting changes in the landscape of instruction and the use of technology. My hope is that as a result of the *Applied TIM* and models like it, students will discover new and truly engaging ways of achieving deeper learning than they would have without the efforts of administrators, teachers, and instructional designers with a passion for this kind of work.

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