**Instructional Practice Inventory – Technology**

The IPI process was developed in 1995-96 by Dr. Jerry Valentine, a professor at the University of Missouri, along with a graduate research assistant, Brian Painter. In 1998-2002 the IPI was used to support school improvement in other Missouri school as well as nationally recognized middle schools. In 2002 a set of protocols and standards were developed to support professional development and the implementation of the IPI process in additional schools. Since its development, more than 22,000 educators have participated in and completed the IPI Level I Basic Workshop.

Early discussions in 2010-2011 among Valentine, technology specialists, teachers, and school leaders, already using the IPI data collection process, led to the piloting and field testing in 2011-12 of the IPI-T data collection process. The IPI-T is an 'add-on' component designed for schools that have experience with the IPI process and are currently 1:1 (one technology device per student) or planning to soon become 1:1 or high-tech schools. The IPI-T process builds upon the work of the basic IPI process and provides additional data that allow the faculty to understand student cognitive engagement when technology is being used to support the learning experience as compared to classes when technology is not associated with the learning experience. Additional components are documented as well: (a) how technology is being used to support learning; (b) the type of technology used to support the learning experience; (c) the designer of the technology; (d) the primary user of the technology, the teacher or student. Data can be disaggregated by faculty multiple ways to match their goals for student cognitive engagement (Valentine, 2015a; Valentine, 2015b).

**Instructional Practices Inventory- Technology Process.** The IPI-T process is led by teacher-leaders and carried out school-wide to collect data about student cognitive engagement, how students are thinking when using technology. Shortly after the collection of data the teacher-leaders facilitate faculty collaborative sessions in an effort to disaggregate the data and participate in collaborative conversations. In comparison to the IPI process:

The IPI data collection protocols for collecting basic IPI data are followed when the IPI-Technology Component is added. The observation/data collection process, however, is more complex. In the IPI-T process, the data collector documents the total number of students and the numbers using and not using technology and makes two IPI engagement codes, one for all students and one for 'only the tech students'. The data collector also documents how technology is being used for learning. (Valentine, 2015a, p. 2).

Once again it is important to note neither the IPI or IPI-T process should not be used for evaluative purposes or by district administrators. In addition, during the data collection process individual teachers are not noted but rather the observation number, class period, subject, and whether the class is part of the core courses or non-core courses. All persons being observed remain anonymous.

**Instructional Practices Inventory- Technology Categories.** There are six IPI-T categories. Each category describes the level of student cognitive engagement and are referred to as (1) Student Disengagement; (2) Student Work with Teacher Not Engaged; (3) Student Work with Teacher Engaged; (4) Teacher-led Instruction; (5) Student Verbal Learning Conversations; (6) Student Active Engaged Learning. The IPI and the IPI-T both utilize each of the six categories. It is important to note that the categories are not considered a hierarchy but rather

“six distinct ways to categorize student engagement” (Valentine, 2017). Categories 6 and 5 include learning activities that fall within the higher-order/deeper thinking spectrum of Bloom’s Taxonomy and Bloom’s Digital Taxonomy such as analysis and creating while categories 4, 3, and 2 include lower-order surface thinking activities such as recalling simple facts and googling for answers. A description of each category is listed below:

**Category 6** Students Active Engaged Learning: Students are engaged in higher-order thinking and developing deeper understanding through analysis, problem solving, critical thinking, creativity, and/or synthesis. Engagement in learning is not driven by verbal interaction with peers, even in a group setting. Examples of classroom practices commonly associated with higher-order/deeper Active Engaged Learning include: inquiry-based approaches such as project-based and problem-based learning; research and discovery/exploratory learning; authentic demonstrations; independent metacognition, reflective journaling, and self-assessment; and, higher-order responses to higher-order questions.

**Category 5** Student Verbal Learning Conversations: Students are engaged in higher-order thinking and developing deeper understanding through analysis, problem solving, critical thinking, creativity, and/or synthesis. The higher-order/deeper thinking is driven by peer verbal interaction. Examples of classroom practices commonly associated with higher-order/deeper Verbal Learning Conversations include: collaborative or cooperative learning; peer tutoring, debate, and questioning; partner research and discovery/exploratory learning; Socratic learning; and, small group or whole class analysis and problem solving, metacognition, reflective journaling, and self-assessment. Conversations may be teacher stimulated but are not teacher dominated.

**Category 4** Teacher-Led Instruction: Students are attentive to teacher-led instruction as the teacher leads the learning experience by disseminating the appropriate content knowledge and/or directions for learning. The teacher provides basic content explanations, tells or explains new information or skills, and verbally directs the learning. Examples of classroom practices commonly associated with Teacher-Led Instruction include: teacher dominated question/answer; teacher lecture or verbal explanations; teacher direction giving; and, teacher demonstrations. Discussions may occur, but instruction and ideas come primarily from the teacher. Student higher order/deeper learning is not evident.

**Category 3** Student Work with Teacher Engaged: Students are engaged in independent or group work designed to build basic understanding, new knowledge, and/or pertinent skills. Examples of classroom practices commonly associated with Student Work with Teacher Engaged include: basic fact finding; building skill or understanding through practice, 'seatwork', worksheets, chapter review questions; and multi-media with teacher viewing media with students. The teacher is attentive to, engaged with, or supportive of the students. Student higher-order/deeper learning is not evident.

**Category 2** Student Work with Teacher Not Engaged: This category is the same as Category 3 except the teacher is not attentive to, engaged with, or supportive of the students. The teacher may be out of the room, working at the computer, grading papers, or in some form engaged in work not directly associated with the students' learning. Student higher-order/deeper thinking is not evident.

**Category 1** Student Disengagement: Students are not engaged in learning directly related to the curriculum.

**Tech-Use Categories and Definitions.** Following is a brief explanation of the Tech-Use Categories and definitions. The categories provide faculty with details about how students are cognitively engaged for each form of tech use.

1. Word Processing. The students are using technology to produce written documents. This category includes note taking, composing papers, editing, formatting, and printing the written material.

2. Math Computations. The students are using technology to perform mathematical computations. This category includes calculating, charting, and plotting with hand-held calculators, spreadsheets, and statistical formulae.

3. Media Development. The students are using technology to collect, manipulate, and/or create media. This category includes the use of technology to collect, edit, and/or design photo, video, and/or audio data and presentations, as well as programming, writing code, and web development.

4. Information Search. The students are using technology to search and/or gather information for their learning task. This category includes the use of the Web and/or other media to access facts, information, and/or insights available through the use of technology.

5. Collaboration Among Individuals. The students are using technology to interact with and/or collaborate with others to accomplish their learning task. This category includes the use technology for all forms of synchronous (same time, usually verbal), communication and many forms of near-synchronous (intermittent or streamed, usually text chat) communication.

6. Experience-Based Technology. The students are using technology to engage in a tech-driven, immersion learning experience. This category includes the use of technology to

engage students in game-based software, intense interactive simulations, and virtual reality associated with classroom learning goals.

7. Interactive/Presentation Technology. The students and/or teacher are using an interactive or presentation tech tool to support the learning task. This category includes us of software that supports the transfer of information among students and between students and teachers.

8. Other. Occasionally the data collector may determine that none of the seven options adequately describes how students are using technology. This "other" option should be marked if that is the case. However, selection of this "other" option is extremely unusual.

**Instructional Practices Inventory- Technology Protocols.** The IPI and the IPI-T both utilize each of the six student cognitive engagement categories as well as components of the protocols. The IPI-T data collection process requires more time in each classroom (3-5 minutes vs. 1-3 minutes for the IPI data collection process) and additional steps:

***Before you enter the learning setting.***

A. Record the Page Number at the top right portion of the Data Recording Form.

B. Record the Observation Number on the upcoming observation.

***Upon entry into the learning setting.***

C. Make a whole-class mental "snapshot" of student engagement, same as when collecting basic IPI data.

***During your time in the learning setting.***

D. After taking an entry snapshot, work the learning setting, moving among the students and talking with the students and teacher, if necessary, to obtain the specific details of the big picture snapshot taken upon entry. Next, determine the IPI Category that most appropriately defines

student cognitive engagement for that learning setting. The IPI data collection protocols explained in the basic IPI Workshop govern both the IPI and IPI-T category codes. Leave the learning setting before recording the student engagement codes for both the IPI and IPI-T student engagement category codes.

E. Count the total number of students in the learning setting. Record the "total number" for the whole class during or immediately after leaving the learning setting.

F. Count the number of students (if any) who are not engaged in the learning task(s). Record the "disengaged" number for the whole class during or immediately after leaving the learning setting.

G. Count the number of students (if any) who are using technology (and those who are supposed to be using technology) as part of their learning experience. Record the "total number" of tech users and supposed-to-be users during or immediately after leaving the learning setting.

H. Count the number of students who are supposed to be using technology but are disengaged from the learning task(s). Record the "technology disengaged number" during or immediately after leaving the learning setting.

***Determine the IPI-T Tech Use Category.***

I. During the time spent in the learning setting (classroom) it is necessary to determine student head counts and IPI/IPI-T Codes. In addition, determine how technology is being used by the students or by the teacher if only the tech user is the teacher.

J. The IPI-T Tech-Use Categories provide the faculty with details about how students were cognitively engaged for each form of Tech Use. Therefore, the data collector must identify the Tech-Use Category that represents how the greatest number (most) of the "technology engaged"

students are using technology (or, how the teacher is using technology if the teacher is the only user of the technology and no students are actively engaged in the use of technology). Record that "Tech Use Category" number on the Data Recording Form. When students are using technology in multiple ways, the data collector will need to count the varied uses and then select the Tech Use Category most frequently used. Data collectors are encouraged to record information and make margin notes if needed. If no students are using, or supposed to be using technology, record a "0" in the appropriate locations on the Data Recording Form.

***After leaving the learning setting.***

K. Determine the primary user of the technology. Student use carries precedent in the coding process over teacher use for identifying the Tech-Use Category (i.e. if students and the teacher are using technology, student use, not teacher use, is coded). For student use, the technology must be fostering active/direct student engagement, not passive engagement. For example, if the teacher is writing information from the students on a SMART Board, the teacher is the primary user of the technology, not the students. If the students are using their technology to engage with the learning task then the students are the primary user of technology. If the teacher is the tech user (and no students are using tech) an IPI-T Category code is not given. Only student use generates a cognitive IPI-T engagement code.

L. Determine the producer/developer of the technology. Code "1" if the tech being used was developed commercially specifically for education; "2" if the teacher developed the technology or modified existing technology to personalize the learning experience for the students; "3" if a student(s) developed the technology being used to support learning; or, "4" if the technology was developed commercially and not specifically for education. If the teacher influenced the learning

experience (left a thumbprint) then the teacher is given credit as a producer/developer. Thus, teachers can understand student cognitive engagement when they have/have not personalized the technology for their students. Finally, double check each row and be sure to have either marked a code for all cells or placed a “line” through items on the row that did not need a code.

## References


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