

MEASURERS OF SUCCESS

Six Instruments to Assess Teachers' Use of Technology

By Christopher Moersch

Subject: Assessing teachers' level of technology use/integration

Audience: Teachers, technology coordinators

Grade Level: K-12 (Ages 5-18)

Technology: Internet/Web

Standards: NETS•T I-III
(www.iste.org/standards)

Supplement: www.iste.org/L&L

During the past few years, a major trend throughout the United States has been to assess teachers' technology usage in the classroom. The motivation behind the movement to assess teachers, students, parents, and administrators has varied. Some stakeholders use the data to satisfy federal grant requirements or state mandates; others use the data to plan staff development classes and workshops for their colleagues. Teachers sometimes want to self-assess their technology skills or level of technology integration to create meaningful and targeted action plans for their own professional development.

However, major revisions in the Elementary and Secondary Education Act (ESEA) and the No Child Left Behind (NCLB) legislation are mandating stringent measures for accountability and evaluation of federally funded programs. Specifically, Title II, Part D of NCLB, Enhancing Education through Technology (EETT), provides both formula-based and competitive grants that require research-based evidence of effectiveness of instructional interventions to ensure they meet technology standards. (*Editor's note:* See Resources on p. 24 for the Web addresses of the NCLB text and other sites.)

What instruments exist to measure teachers' use of technology in the classroom? Several years ago, I introduced the Level of Technology Implementation (LoTi) Framework and its eight stages of developmental growth with technology use in an attempt to quantify instructional computing practices in the classroom (Moersch, 1995). I later formed these stages into a teacher technology survey known as the LoTi Questionnaire or "LoTiQ" (Moersch, 1997). The intent of this survey instrument was to provide stakeholders with specific needs assessment data to help shape future decision making around professional development options, budgeting priorities, and instruction and assessment issues.

I was not alone in my quest to monitor or assess technology use practices. Many organizations have developed technology assessment tools, each with unique attributes and idiosyncrasies. These instruments include:

- Profiler, from the High Plains Regional Technology in Education Consortium (HPR*TEC)
- iAssessment
- Mankato Survey of Professional Technology Use, Ability, and Accessibility
- enGauge, from the North Central Regional Educational Laboratory
- SEIR*TEC Faculty Technology Survey, from the SouthEast Initiatives Regional Technology in Education Consortium
- TAGLIT (Taking a Good Look at Instructional Technology)

Beyond putting together questions to form a technology survey, what is the philosophical basis that separates each of these technology assessment tools? In the case of LoTiQ, I wanted a survey that would align with the existing LoTi framework, focus attention more on instruction and assessment practices rather than technology, and provide a tool that could be used in research studies and dissertations as well as by school systems worldwide. However, others have included other aspects of technology implementation in their assessment instruments, such as computer skills (California Technology Assistance Program [CTAP, using iAssessment], Mankato Survey), system-wide use (enGauge), technology plans (enGauge, TAGLIT), higher-order thinking skills (enGauge), and professional development (CTAP).

Comparing the Assessment Tools

This article compares these technology assessment instruments, which are currently in use in the United States. Categories used in the comparison include:

- Item Analysis
- Feedback
- Summary Reports
- Survey Versions
- Standards Alignment
- Prescriptive Use
- Customization

Though some of these instruments include multiple versions for teachers, students, and administrators, the actual comparisons are based exclusively on the teacher survey.

The following sections define the seven categories and provide examples of which surveys are strong in certain criteria. Table 1 shows what each survey focuses on and what design features they include. The online supplement at www.iste.org/L&L provides a complete breakdown of each survey instrument, including a summary, advantages, and disadvantages.

Item Analysis The Item Analysis section breaks down each survey according to the number of questions embedded in the primary survey instrument, as well as by the following question types:

- technology integration
- instructional approach
- computer skills
- other

The CTAP survey, Indiana's MyTarget (using iAssessment), and Arizona's MyCompass (using iAssessment) all place a significant focus on teacher's computer skills, while enGauge and LoTiQ place primary emphasis on the

Higher-level use statements include those that made reference to higher-order cognitive processes, alternative assessment schemes, interdisciplinary/integrated instruction, and/or the changing role of the teacher in the classroom.

teacher’s technology integration and instructional practices.

Technology integration items focus on those statements involved with the use of computers in a classroom setting ranging from how computers are used to complement students’ understanding of the content to the manner in which computers are used to promote higher-order thinking processes. For purposes of this report, I further parceled these items based on their association with lower levels of technology implementation versus higher levels of technology use. Lower-level use statements include those that either addressed technology use as a supplemental or complementary tool in the classroom (e.g., enhanced instruction) or contained ambiguous terminology (e.g., “powerful ways”). Higher-level use statements include those that made reference to higher-order cognitive processes, alternative assessment schemes, interdisciplinary/integrated instruction, and/or the changing role of the teacher in the classroom.

The *computer skills* statements relate to personal computer skills outside of the classroom environment such as the ability to create a Web page, prepare a

multimedia presentation, or manipulate a spreadsheet program.

The *instructional practices* items focus on statements devoted exclusively to teaching styles, learning activities, and assessment practices.

The *other* section takes into account those statements beyond the classroom walls, such as professional development needs, administrative support for technology, and the use of the school’s technology plan.

Approximately 80% of the LoTiQ and the Kentucky Implementation of Technology Survey (using Profiler) comprise questions/statements involving technology integration compared to the Mankato (3%) and CTAP surveys (16%). enGauge and LoTiQ address teacher’s instructional practices, while TAGLIT and SEIR*TEC include survey items extending beyond the classroom (e.g., technology planning, infrastructure needs, administrative

support). The Mankato survey (97%) and CTAP (84%) focus heavily on teacher’s computer skills, compared to LoTiQ (10%) and enGauge (5%), which focus extensively on technology integration issues.

Feedback. The Feedback section addresses the type of feedback provided to the individual as well as to the group (e.g., school building, school district, state department of education). All of the technology survey instruments provide their clients aggregate feedback either in the form of a database file (Mankato, SEIR*TEC); charts and graphs (CTAP, Kentucky survey, TAGLIT); or detailed reports including data analysis, summaries, and recommendations (enGauge, LoTiQ). enGauge and LoTiQ provide prescriptive feedback to the end user, and enGauge, LoTiQ, Profiler, and TAGLIT include multiple versions based on the clientele, such as building administrators, support staff, and teachers.

Lower-level use statements include those that either addressed technology use as a supplemental or complementary tool in the classroom (e.g., enhanced instruction) or contained ambiguous terminology (e.g., “powerful ways”).

Table 1. Survey Focus and Design.

Item Analysis	iAssessment (CTAP)	Profiler (Kentucky survey)	TAGLIT
Primary Focus	Computer Skills	Technology Integration	Technology Support/Integration
Number of Survey Questions	298	16	70
Technology Integration	16%	81%	32%
• Higher Level	0%	19%	23%
• Lower Level	100%	81%	77%
Instructional Practices	0%	0%	0%
Computer Skills	84%	19%	21%
Other	0%	0%	47%
Survey Design			
Individual Feedback	Yes	Yes	No
Group Feedback	Yes	Yes	Yes
Survey Reports	5	No	1
Multiple Versions	No	Yes	Yes
Standards Based	Yes	Yes	Yes
Prescriptive	Yes	No	No
Customization	Yes	Yes	No

Survey Reports. These compare the number of formative/summative reports available to the school system based on the aggregate data generated from each survey.

Multiple Versions These track the number of versions of each survey available for different audiences. enGauge, LoTiQ, and TAGLIT include multiple versions for different stakeholders—such as building administrators, teachers, instructional specialists, students, and board members—as well as survey reports that show current trends for the entire school system based on the assessment data collected.

Standards Alignment. This category assesses the degree to which the assessment instrument is aligned to either state and/or national technology standards. A cursory scan of the surveys reveals that all instruments are standards-based within the context that each is based on ISTE's National Educational Technology Standards for Teachers (NETS•T) and/or a specific set of state/regional technology standards. For example, the Profiler tool used in Kentucky is specifically aligned to their state's Teacher Technology Standard

If your intent is to assess teachers' skill and comfort with using a personal computer and related peripherals, then ample instruments are available to meet your needs.

Continuum, whereas the enGauge, LoTiQ, and TAGLIT instruments are based on ISTE's NETS•T.

Prescriptive Use. This category explores the ability of the assessment instrument to deliver to the end user prescriptive feedback that could be used for future teacher professional development. Both LoTiQ and the iAssessment authoring tool, which is used in California, Indiana, and Arizona, provide prescriptive feedback to individual teachers in the form of recommended interventions to assist the teacher in elevating their level of technology use. The LoTiQ instrument also includes an online Professional Development Planner so teachers can sign up for courses, track their continuing education credits, and archive work samples electronically to demonstrate their technology integration skills through an ePortfolio.

Customization. This final category compares the ability of the instrument to be customized for different audiences

and purposes. Profiler and iAssessment enable the school entity (e.g., state department of education) to completely customize the survey according to the type of information they are attempting to gather.

Choosing the Appropriate Survey

When selecting a technology use survey, it is important to first determine your purpose in conducting the assessment. Is your purpose to generate a needs assessment for individual teachers, satisfy the mandate of a grant, or possibly research variables that may affect academic achievement in the classroom? Many of these survey instruments (e.g., enGauge, Profiler) provide individualized needs assessment data. Some others (e.g., LoTiQ, TAGLIT) provide adequate feedback for evaluating the success of a grant.

Another critical question involves the scope of the assessment. Will the scope of the technology survey examine

Surveys continued on page 24.

LoTiQ	enGauge	Mankato	SEIR*TEC
Technology Integration	TechnologySupport/Integration	Computer Skills	Technology Integration
50	98	60	58
80%	31%	3%	47%
63%	30%	0%	7%
37%	70%	100%	93%
10%	20%	0%	0%
10%	5%	97%	21%
0%	44%	0%	32%
Yes	Yes	No	No
Yes	Yes	Yes	Yes
13	3	No	No
Yes	Yes	No	No
Yes	Yes	Yes	Yes
Yes	Yes	No	No
Limited	No	No	No

Surveys continued from page 13.

all components affecting instructional computing practices ranging from the district technology plan to the computer skill level of the building administrator? Or, will the scope isolate a specific dimension such as computer skills or level of technology integration? The enGauge survey provides a comprehensive look at the perceptions, actions, and beliefs of all stakeholders involved with instructional computing. LoTiQ focuses almost exclusively on technology integration, instruction, and assessment practices at the classroom level. Other tools, including CTAP and the Mankato survey, place primary attention on the computer skill level of the teacher.

A third question to consider when selecting a technology use survey is the duration of the instrument. Teachers are extremely busy professionals with endless demands on their time from all stakeholders, including students, parents, community members, and administrators. "How long is the survey?" is a typical question expressed by most classroom practitioners. Some surveys may take a few minutes, and others may take an extraordinary amount of time based on the scope of the assessment.

The tool you finally select should fit your purpose, be worthy of the time needed to complete it, and provide adequate breadth of coverage to address the most critical areas affecting instructional computing.

The tool you finally select should fit your purpose, be worthy of the time needed to complete it, and provide adequate breadth of coverage to address the most critical areas affecting instructional computing. If your intent is to assess a teacher's skill and comfort with using a personal computer and related peripherals, then ample instruments are available to meet your needs.

However, if your purpose is to gauge a teacher's perception about using technology to pique student interest and academic performance in the classroom, then the pool of technology assessment instruments grows smaller. I highly recommend that you first conduct your own review of the available technology assessment instruments, field test them with a sampling of your constituency, and then decide on one that best fits your overall goals.

Resources

- CTAP2: www.iassessment.com/ctap.html
- enGauge Assessment: www.ncrel.org/engauge/asses/assess1.htm
- iAssessment: www.iassessment.com
- Kentucky Implementation of Technology Survey: http://profiler.hprtec.org/smf/survey.jsp?survey_id=174
- LoTiQ: <http://lotilounge.com>
- Mankato Teacher Technology Survey: www.isd77.k12.mn.us/resources/surveydatabase.html
- MyCompass: <http://mycompass.iassessment.org>
- MyTarget: <http://mytarget.iassessment.org>

- No Child Left Behind: www.nochildleftbehind.org
- No Child Left Behind legislation: www.ed.gov/legislation/ESEA02
- Profiler: <http://profiler.hprtec.org>
- SEIR*TEC Technology Survey: www.serve.org/seir-tec/surveys/
- TAGLIT: www.taglit.org/taglit/default.asp

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Christopher Moersch is the director of the National Education Alliance in Corvallis, Oregon, and author of numerous publications articulating the LoTi framework. School districts and state departments of education across the United States have used his materials for instructional technology assessment and professional development planning and implementation. His work with educational technology began in 1981 when Apple donated one Apple IIe to every California public school. Based, in part, on that excitement, he helped create a software product called Willy Byte in the Digital Dimension. It sold a total of nine copies worldwide!

How do you assess technology use?

Is there an instrument you've used successfully? An instrument you've created?

How do you use the results of these assessments in planning your professional development?

Share your best practices with L&L readers. Send a letter to letters@iste.org.



Technology Use Surveys

enGauge

Web site: www.ncrel.org/engauge/assess/assess1.htm

Notable Users: North Central Regional Education Laboratory (NCREL)

Description: The enGauge program represents a partnership between NCREL, the North Central Regional Technology in Education Consortium (NCR*TEC), and the Metiri Group. The enGauge framework consists of six Essential Conditions for assessing a school system's overall technology implementation status:

1. Vision
2. Practice
3. Proficiency
4. Equity
5. Access
6. Systems

Of the 98 items contained in the enGauge educator user survey, 41% is devoted to issues extending beyond the classroom (e.g., how the vision for technology may guide decisions about technology and curriculum.), while 34% addresses technology integration (e.g., Do students regularly use technology to consult with experts or consult with students in other schools?) The enGauge educator user survey represents just one of eight assessment surveys available to educational stakeholders. The others are targeted for district administrators, building administrators, building technology coordinators, district technology coordinators, board members, community members, and students. Reports are automatically compiled for educators, special projects, or for an entire school.

The intent behind the enGauge series of assessments is to enable school systems as well as individuals make data-driven decisions about the status

of teaching and learning on campus. The thoroughness of the descriptors for each of the Six Essential Conditions enables schools to readily augment the survey portion with structured interviews and clinical observations.

Advantages:

- Thoroughness in assessing all dimensions of technology use on campus
- Detailed feedback provided to individual educators and schools
- Consistency in using the enGauge framework throughout all aspects of the surveys

Disadvantages:

- Voluminous graphs, charts, and tables require some type of prior interventions for stakeholders to interpret and use in their technology planning

iAssessment

Web site: www.iassessment.com

Notable Users: California, Arizona, Indiana, Utah

Description: iAssessment is a Web-based service that enables school systems to create custom surveys to determine the end user's proficiency. Users can enter their own question sets and weigh the possible answers against pre-defined rubrics. The iAssessment service enables school systems to enter their own training and professional development resources, which, in turn, can be aligned to a specific rubric. The iAssessment service also provides limited feedback to individual users (e.g., teachers) and groups (e.g., school buildings, regions, and states) in the form of bar graphs based on the aggregate data from the survey. Most large-scale users of iAssessment have used the service primarily to track teachers' basic computer skills. In Arizona, California, and Indiana, the majority of the

questions (85%–90%) are directed at a skills inventory.

The California version of the iAssessment service, called the California Technology Assistance Program (CTAP), includes 298 questions divided into the following categories: General Computer Knowledge and Skills, Internet, E-mail, Word Processing, Publishing, Databases, Spreadsheets, Presentation Software, and Instructional Technology. Approximately 84% of the questions relate to computer skills (e.g., I know how to create and use an address book. I know how to find and replace text within a document. I know how to sort, match, and go to specific records.), while the remaining 16% address instructional uses of technology mostly at a low level of implementation (e.g., I regularly create appropriate charts for a content lesson.) Throughout the CTAP survey, only vague reference is made to the use of technology application with traits resembling any of the target technology goals (e.g., I select and implement appropriate e-mail tools to effectively support the teaching and learning process. I design curricular lessons that utilize databases to enhance learning outcomes. I know how to analyze best practices and research findings on the use of computer-based technology and design lessons accordingly.)

As mentioned earlier, one of the viable features of the iAssessment package is the ability to match professional development opportunities to individual results. In California, a teacher can investigate a variety of courses based on an identified need such as CTAP Personal Proficiency Courses for those individuals seeking additional assistance with e-mailing as well as their general computer knowledge and skill.

Advantages:

- Customized surveys to match local/state standards
- Provides individual and group feedback
- Allows users to explore professional development opportunities

Disadvantages:

- No uniform standard for defining *technology integration*

LoTiQ (Level of Technology Implementation Questionnaire)

Web site: <http://lotilounge.com>

Notable Users: Wisconsin, New Jersey, New Hampshire, Hawaii, Georgia, Delaware

Description: The LoTiQ was first conceptualized in 1995 in an effort to create a consistent set of measures that accurately reflected the progressive nature of teaching with technology. Based partially on the Concerns-Based Adoption Model (Hall, Wallace, & Dossett, 1973; Hall, George, & Rutherford, 1977; Hall & Loucks, 1979) and findings from Apple Classrooms of Tomorrow research (Apple, 1995), the LoTi instrument measures eight specific stages of technology implementation: Awareness, Exploration, Infusion, Mechanical Integration, Routine Integration, Expansion, and Refinement. The LoTi instrument provides an assessment of three critical attributes affecting technology use in the classroom: Current Instructional Practices (CIP), Personal Computer Use (CIP), and Level of Technology Implementation (LoTi).

Eighty percent of the LoTi instrument focuses exclusively on technology integration issues in the classroom (e.g., I have experienced past success with designing and implementing Web-based projects with my students that emphasize complex thinking skill strategies such as problem solving, scientific inquiry, and decision making), while 10% focuses on personal

computer use competencies (e.g., I am proficient with basic software applications such as word processing tools, Internet browsers, spreadsheet programs, and/or multimedia applications). The remaining 10% of the LoTi questionnaire addresses strictly instructional practices (e.g., Students' questions dictate both the context and content of my instruction) without a computer. The LoTi instrument has been used equally as a technology integration assessment tool at the local, district, and state levels as well as an empirically tested research tool to isolate variables associated with successful technology use practices.

Recently, the LoTi instrument has been folded into a larger, more expansive Web-based portal that enables teachers to create professional development plans, enroll in courses, and track their continuing education credits based on the results of their LoTi data profile.

Advantages:

- Formally evaluated for validity and reliability
- Feedback provided for individuals, schools, districts, and states
- Offers extensive professional development planner as part of the survey process
- Using multiple indices to arrive at an overall score for each individual

Disadvantages:

Primary focus is on behaviors and attitudes affecting teaching and learning practices in the classroom; less on computer skills

Mankato Teacher Technology Survey

Web site: www.isd77.k12.mn.us/resources/surveydatabase.html

Description: The Mankato Teacher Technology Survey is comprised of 60 items that focus on applications, frequency of use, location (where computers are being used), attitude about computers, inservice times for technology

inservice, and support for technology use. Approximately 97% of the items have little to do with technology integration in the classroom, but focus primarily on personal use and comfort level as well as frequency of use. The two items in the Mankato survey that do address "integration" do not specify or quantify any attributes describing what technology integration means (e.g., "I would like to integrate more technology into my classroom").

Advantages:

- Provides extensive measure of teacher's computer skills
- Allows for future data manipulation and analysis using FileMaker Pro

Disadvantages:

- No individual feedback
- No uniform standard for defining *technology integration*

Profiler (HPR*TEC)

Web site: <http://profiler.hprtec.org>

Notable Users: Kentucky, Nebraska, Massachusetts

Description: Profiler is an online survey-authoring tool funded by the U.S. Department of Education and provided by the High Plains Regional Technology Education Consortium. It was designed to be a collaborative tool to improve skills around a general topic (e.g., technology skills). To date, more than 800 school entities (state departments of education, school districts, school buildings), professional organizations, and special project leaders have used the capabilities of the Profiler to create custom assessments. Participants who complete the Profiler survey are given both individual and group feedback in the form of "Profiler badges" based on criteria established by the user.

The Kentucky version of the Profiler survey, comprising 16 questions, is designed to assist existing teachers and administrators in meeting the technology-related criteria for the state (16 different criteria). In the Kentucky



version, 56% of the questions/criteria address instruction and assessment issues while approximately 25% of the questions/criteria relate to non-instructional uses of technology. Of the questions addressing the instructional curriculum, 19% of the questions relate to higher level technology implementation statements associated with the Target Technology criteria (e.g., I integrate the impact of technology on society into my students' learning. I use research-based instructional practices that include technology, whenever appropriate.), while the remaining 81% align with lower level technology use statements (e.g., I use self-made multimedia presentations on a regular basis to enhance my teaching). Using the Profiler tool to create assessments for states such as Kentucky or for small projects is relatively painless; the developer just needs to input the questions, and the Profiler assessment tool takes care of the rest.

Advantages:

- Easy-to-create surveys
- Built-in tutorial mechanism
- Provides individual and group feedback

Disadvantages:

- Profiler badges sometimes difficult to analyze for either individuals or groups
- No uniform standard for defining *technology integration*

SEIR*TEC Technology Survey

Web site: www.serve.org/seir-tec/surveys/

Notable Users: Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina

The SouthEast Initiatives Regional Technology in Education Consortium (SEIR*TEC) teacher survey is one of seven surveys designed to assess the technology access, experience, attitudes, and needs of key stakeholders including teachers, students, parents, administra-

tors, technology coordinators, and community members. Of the 58 items contained in the SEIR*TEC teacher survey, 33% are devoted to teacher's impressions about the impact of technology on the school environment (e.g., student attendance, teacher communication, student achievement, time on task.) while 20% addresses teacher's expertise with various software applications and peripherals. The remaining 47% of the survey addresses teachers use of and perceptions about technology in an educational setting. Approximately 93% of these statements encompassing technology use address either lower levels of technology implementation or represent ambiguous terminology (e.g., Design and deliver instructions using technology. I would like to excite my students about technology integration.). The remaining 7% (two statements) potentially address higher levels of implementation based on how one might interpret them (e.g., Have students use technology to create products for critical review by authentic audiences. I am ready to develop an entire new learning environment to utilize technology.).

Advantages:

- Provides extensive measure of teacher's computer skills
- Allows for future data manipulation and analysis using FileMaker Pro

Disadvantages:

- No individual feedback
- No uniform standard for defining *technology integration*

TAGLIT (Taking a Good Look at Instructional Technology)

Web site: www.taglit.org

Notable Users: Bill and Melinda Gates Foundation

Description: TAGLIT is a suite of assessment tools designed to help principals and other school leaders gather, analyze, and report information about how technology is used for teaching

and learning in their schools. It was developed at University of North Carolina for a professional development program. The teacher instrument comprising 70 items is divided into nine sections:

- Your Technology Skills, Your Technology Use in Teaching and Learning
- Technology and the Way Your Classroom Works
- Your School's Technology Resources—Hardware
- Your School's Technology Resources—Software and Electronic /Online References
- Your School's Technology Resources—Technical and Instructional Support
- Your Technology Professional Development
- Your School's Technology Plan
- Open-ended Feedback Section
- Non-instructional Issues

Approximately 33 questions (47% of TAGLIT) address non-instructional issues ranging from professional development priorities to the level of instructional support given to the teacher.

Twenty-two of the TAGLIT assessment questions (31%) address some form of technology deployment in the classroom; 23% of these focus on higher-order technology implementation (e.g., As a result of your use of technology in teaching and learning, are you more inclined to involve students in activities that require higher-level thinking skills? As a result of your use of technology in teaching and learning, are you more inclined to assess student achievement based on products, progress, and effort?). The remaining 77% of the technology implementation questions are primarily lower-level questions relating to technology use (e.g., How far along are you in enhancing teaching and learning using e-mail? Overall, how far along

are you in using technology to enhance teaching and learning?). The remaining 22% of the TAGLIT questions fall in the personal computer skills category (e.g., How far along are you in learning to use presentation software to create a presentation?).

TAGLIT includes six different versions (elementary teacher, student, administrator, middle and high school teacher, student, and administrator) and one summative report. This report is created through a two-step process. First, schools receive a Data Summary with tables, graphs, and all responses to open-ended questions on teacher and student surveys. Next, school leaders analyze the data from the Data Summary and customize their TAGLIT Reports by adding their comments in a series of text entry boxes. The TAGLIT Report includes five sections:

1. Technology Plan
2. Teachers
3. Students
4. Community
5. "Stuff"

It includes data tables, graphs, and comments by the principal or other school leader.

Advantages:

- Generates program evaluation data for national comparison
- Multiple versions available for different constituents
- Prompts administrators to take an active interest in data collection and professional development planning

Disadvantages:

- No individual feedback for users
- No uniform standard for defining *technology integration*

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