



Prepared by
Learning Quest
on 11/21/2003

LoTiSM Technology Use Profile

2002-2003 National LoTi Profile



Introduction

- * During the 2002-2003 school year, a technology use profile was conducted throughout the United States to create baseline data as to the current level of technology implementation in schools throughout the nation. Such information will enable all stakeholders to target funding sources and provide professional development opportunities directed at moving the nation's educators to a higher level of technology implementation in the classroom, and in doing so, better prepare students for the challenges facing them in a highly competitive, technology-oriented society.
- * A 50 item survey referred to as the Level of Technology Implementation (LoTi) Questionnaire was administered to 32,560 participants in the United States. A separate version of the LoTi Questionnaire was administered to six different groups throughout the country: Inservice Teachers, Preservice Teachers, Instructional Specialists, Media/Technology Specialists, Building Administrators, and Higher Education Faculty.
- * The nationally-validated LoTi assessment instrument was used to help answer the following questions surrounding technology acquisition and use around the county:
 1. What is the nation's educators current level of technology implementation profile throughout the country?
 2. What areas of professional development should the nation's educators focus on to ensure the best possible teaching and learning with technology?
 3. What interventions have contributed the greatest impact to teachers using technology (e.g., computers) in the classroom?
- * The LoTi Technology Use Profile focused on the use of technology as an interactive learning medium because this particular component has the greatest and lasting impact on classroom pedagogy and is the most difficult to implement and assess. The questionnaire generated a profile for each respondent in three domains: Level of Technology Implementation (LoTi), Personal Computer Use (PCU), and Current Instructional Practices (CIP). The Level of Technology Implementation (LoTi) profile approximated the degree to which each respondent was either implementing technology (i.e., computers) into the curriculum (i.e., inservice teacher, instructional specialist) or modeling/supporting the implementation of technology (i.e., building administrator, media/technology specialist). The Personal Computer Use (PCU) profile addressed each respondent's comfort and proficiency levels with using computers. The Current Instructional Practices (CIP) profile revealed each respondent's inclination toward instructional practices consistent with either a subject-matter or learner-based curriculum design.



Introduction

- * The creation of the LoTi Questionnaire and the identification of a LoTi profile for individual teachers, instructional specialists, preservice teachers, media/technology specialists, and building administrators were based primarily on the work of Moersch (1995) and his identification of specific levels of technology implementation (see Table 1). These levels range from Nonuse (Level 0) to Refinement (Level 6). As a classroom teacher progresses from one level to the next (Level 3 to Level 4) of the LoTi framework, a corresponding series of changes to the instructional curriculum is observed. The instructional focus shifts from a teacher-centered to a learner-centered orientation while the use of computers shifts from an emphasis on isolated uses (i.e., drill & practice applications) to an expanded view of technology as a process, product, and tool to augment and enhance students' critical thinking and help them find viable solutions to real world problems (see Table 2).



Introduction

Table 1: The Levels of Technology Implementation (LoTi) Framework

Level 0 - Nonuse

Technology-based tools (e.g., computers) are either (1) completely unavailable in the classroom, (2) not easily accessible by the classroom teacher, or (3) there is a lack of time to pursue electronic technology implementation. Existing technology is predominately text-based (e.g., ditto sheets, chalkboard, overhead projector).

Level 1 - Awareness

The use of technology-based tools is either (1) used almost exclusively by the classroom teacher for classroom and/or curriculum management tasks (e.g., taking attendance, using grade book programs, accessing email), (2) used to embellish or enhance teacher-directed lessons or lectures (e.g., multimedia presentations) and/or (3) is one step removed from the classroom teacher (e.g., integrated learning system labs, special computer lab pull-out programs, central word processing labs).

Level 2 - Exploration

Technology-based tools supplement the existing instructional program (e.g., tutorials, educational games, basic skill applications) or complement selected multimedia and/or web-based projects (e.g., internet-based research papers, informational multimedia presentations) at the knowledge/comprehension level. The electronic technology is employed either as extension activities, enrichment exercises, or technology-based tools and generally reinforces the content under investigation.

Level 3 - Infusion

Technology-based tools including spreadsheet and graphing packages; multimedia and desktop publishing applications; and the internet complement selected instructional events or multimedia/web-based projects at the analysis, synthesis, and evaluation levels. Though the learning activity may or may not be perceived as authentic by students, emphasis is placed on using a variety of thinking skill strategies (e.g., problem-solving, decision-making, experimentation, scientific inquiry) to address the content under investigation.

Level 4a - Integration (Mechanical)

Technology-based tools are integrated in a mechanical manner that places heavy reliance on prepackaged materials, outside resources, and/or interventions that aid the teacher in the daily management of their operational curriculum. Technology is perceived as a tool to identify and solve authentic problems as perceived by the students relating to an overall theme/concept. Emphasis is placed on student action and/or on issues resolution that requires higher levels of cognitive processing and in-depth examination of the content.

Level 4b - Integration (Routine)

Technology-based tools are integrated in a routine manner whereby teachers can readily design and implement learning experiences (e.g., units of instruction) that empower students to identify and solve authentic problems relating to an overall theme/concept using the school's available technology with little or no outside assistance. Emphasis is placed on student action and/or on issues resolution that requires higher levels of student cognitive processing and in-depth examination of the content.

Level 5 - Expansion

Technology access is extended beyond the classroom. Teachers actively elicit technology applications and networking from outside sources to expand student experiences directed at problem-solving, issues resolution, and student activism. The complexity and sophistication of the technology-based tools used are now commensurate with (1) the diversity, inventiveness, and spontaneity of the teacher's experiential-based approach and (2) the students' level of complex thinking and in-depth understanding of the content at hand.

Level 6 - Refinement

Technology is perceived as a process, product, and/or tool for students to find solutions related to an identified "real-world" problem or issue of significance to them. Technology provides a seamless medium for information queries, problem-solving, and/or product development. The classroom content emerges based on the needs of the learner according to his/her interests, needs, and/or aspirations and is supported by unlimited access to the most current computer applications and infrastructure available.



Introduction

Table 2: Stages of Instructional Practices

<u><i>Element</i></u>	<u><i>Stage 1</i></u>	<u><i>Stage 2</i></u>	<u><i>Stage 3</i></u>
Content	Content organized and delivered by traditional scope & sequence; Focus on teacher-based questions	Concepts and processes organized and presented based on the interests of the teacher and/or the learner	Concepts and processes emerge based on the needs of the learner; Focus on learner-based questions
Learning Materials	Organized by the content; heavy reliance on sequential instructional materials	Emphasis on hands-on investigations and pre-defined problem solving strategies	Determined by the problem areas under study, extensive and diversified resources
Learning Activities	Traditional verbal activities; problem solving activities (e.g., worksheets; story problems)	Emphasis on student's active role; problem solving strategies with little or no connection to a broad concept or theme (e.g., verification lab from a science kit)	Emphasis on student activism and issues investigations and resolutions; authentic hands-on inquiry related to a problem under investigation; focus on experiential learning
Teaching Strategies	Expository approach	Facilitator; resource person	Co-learner/facilitator
Evaluation	Traditional evaluation practices including multiple-choice, short answer, and true/false questions	Uses multiple assessment strategies including performance tasks, and open-ended and problem-based questions	Multiple assessment strategies integrated authentically throughout the unit and linked to the problem/concept; use of portfolios, open-ended questions, performance tasks, self-analysis, and peer review
Technology	Drill & practice computer-based programs (e.g., integrated learning systems), computer games; little connection between technology use and overall concept/topic	Technology integrated into isolated hands-on experiences (e.g., tabulating and graphing data to analyze a survey or experiment; information searches using the Internet/CD-ROM)	Expanded view of technology as a process, product, and tool to find solutions to authentic problems, communicate results, and retrieve information (e.g., spreadsheets, graphs, probes, databases, CD-ROM-based simulations, Web page development)



Introduction

- * Current research has found strong links between student academic achievement and the manner in which technology is used in the classroom. According to the National Assessment of Educational Progress (NAEP) study (1998), eighth grade students whose teachers used computers primarily for higher order thinking performed better on NAEP than students whose teachers did not. Conversely, eighth grade students whose teachers used computers primarily for “drill and practice”— generally associated with lower order thinking skills — performed worse. Still, the majority of the research findings point to the teacher’s role in the instructional planning process as the most important element in promoting student higher order thinking. Many of these studies investigating technology use practices and student performance (e.g., Flescher, 1997; Archer, 1998; Alvarez, 1998; Oliver, 1999; and Wiburg and Carter, 1994) discuss the importance of emergent curricula that engage students in meaningful ways as essential factors tied to student demonstration of higher order thinking.
- * The LoTi Questionnaire was created for the purpose of assessing classroom practices tied to higher order thinking skills and relevant, engaging curricula. The LoTi Questionnaire enables decision-makers to determine how all stakeholders at the school building level (e.g., inservice teachers, building administrators, media/technology specialists, instructional specialists) are either implementing or supporting the use of technology tied to powerful teaching and learning opportunities directed at student achievement.
- * The information provided in this report was based exclusively on the perceptions of the staff who participated in the survey. A total of 32,560 of our nation’s educators completed the Level of Technology Implementation (LoTi) survey. The subsequent data analysis including all findings, goals, and recommendations are based on these returns.

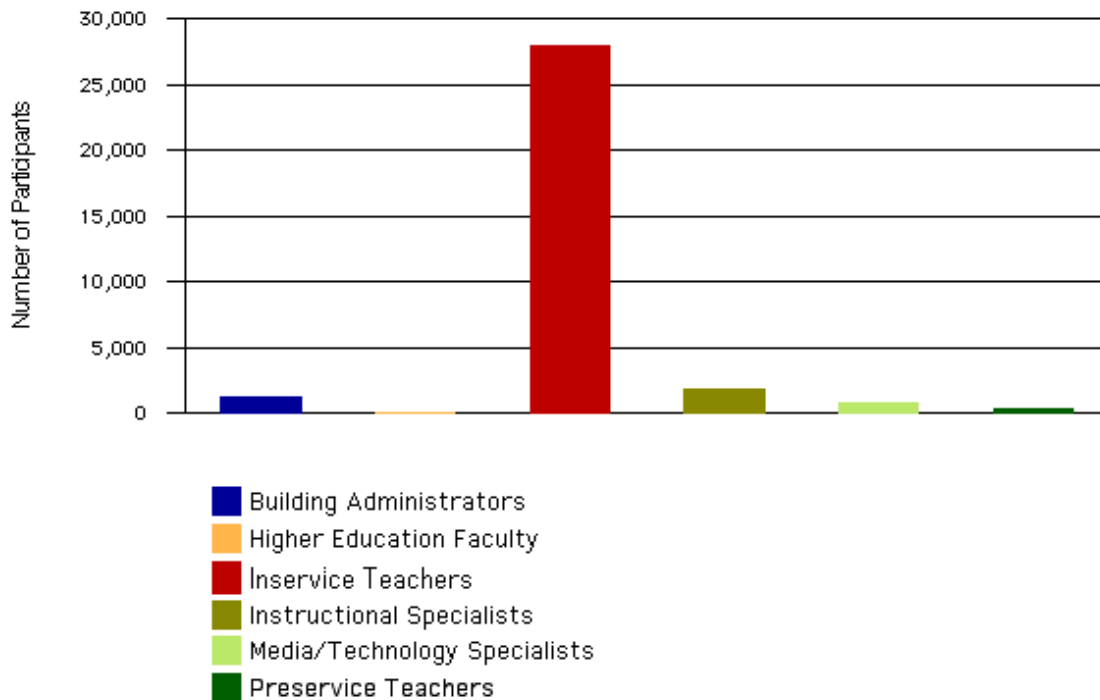


LoTi Profile

* Figure 1 compares the number of participants who completed the LoTi survey by Survey Type throughout the nation during the 2002-2003 school year. Based on their responses, 86% of participants (28,077 participants) were Inservice Teachers compared to 6% Instructional Specialists (1,858 participants), 4% Building Administrators (1259 participants), 3% Media/Technology specialists (881 participants), 1% Preservice Teachers (365 participants), and less than 1% Higher Education Faculty (120 participants).

Figure 1

LoTi Survey Type

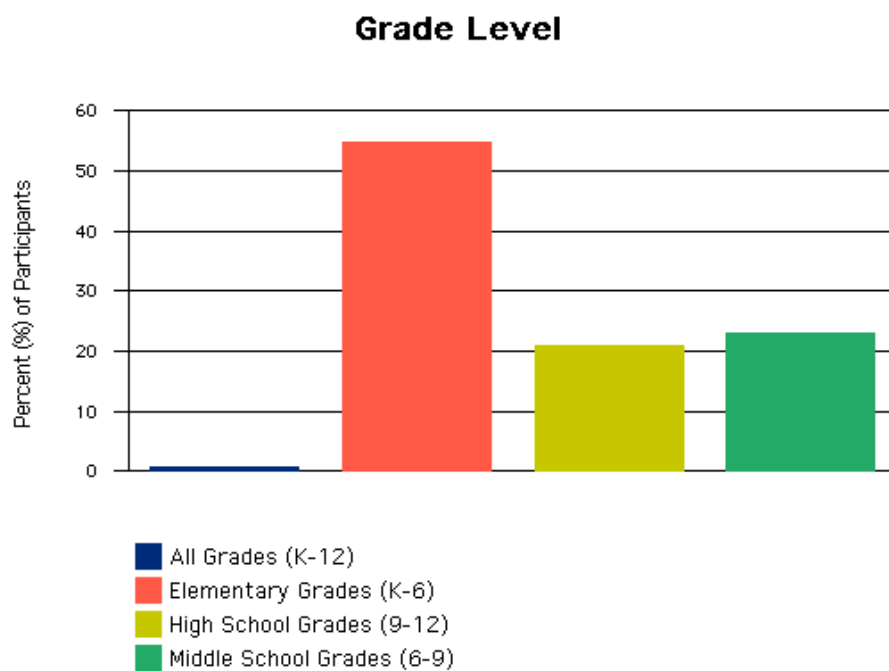




LoTi Profile

* Figure 2 exhibits the percentage of participants who took the LoTi survey by Grade Level throughout the nation. Based on their responses, 55% of participants were Elementary (K-6) educators compared to 23% Middle School (6-9) educators, 21% High School (9-12) educators, and 1% educators who represented All Grades (K-12).

Figure 2

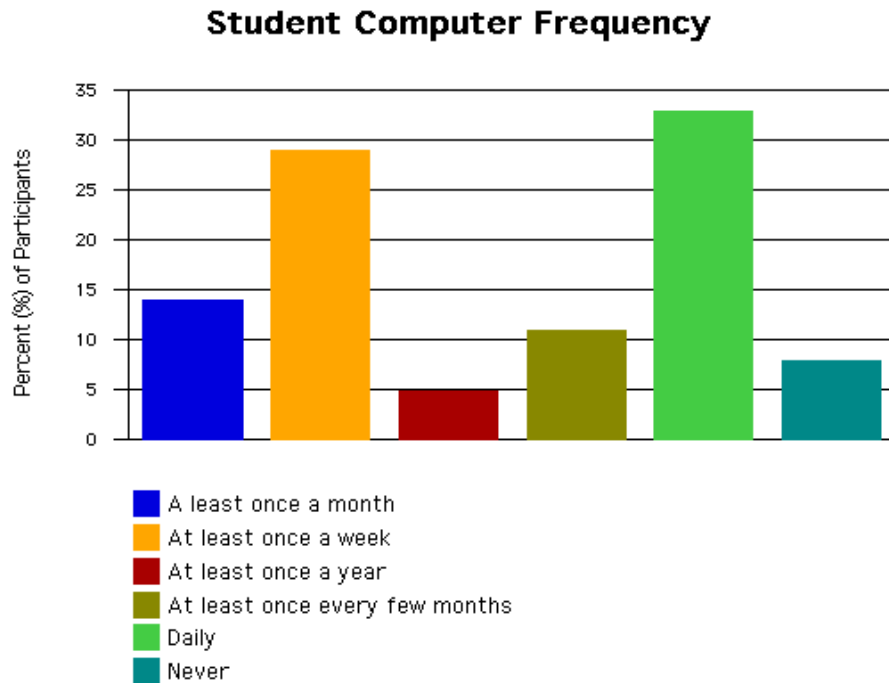




LoTi Profile

* Figure 3 exhibits the percentage of participants who took the LoTi survey by Frequency of Student Use of Computers throughout the nation. Based on their responses, 33% of participants responded "Daily" compared to 29% of participants who responded "At least once a week". Approximately 14% of participants responded "At least once a month" while 11% of participants responded "At least once every few months", 8% of participants responded "Never", and 5% of participants responded "At least once a year".

Figure 3

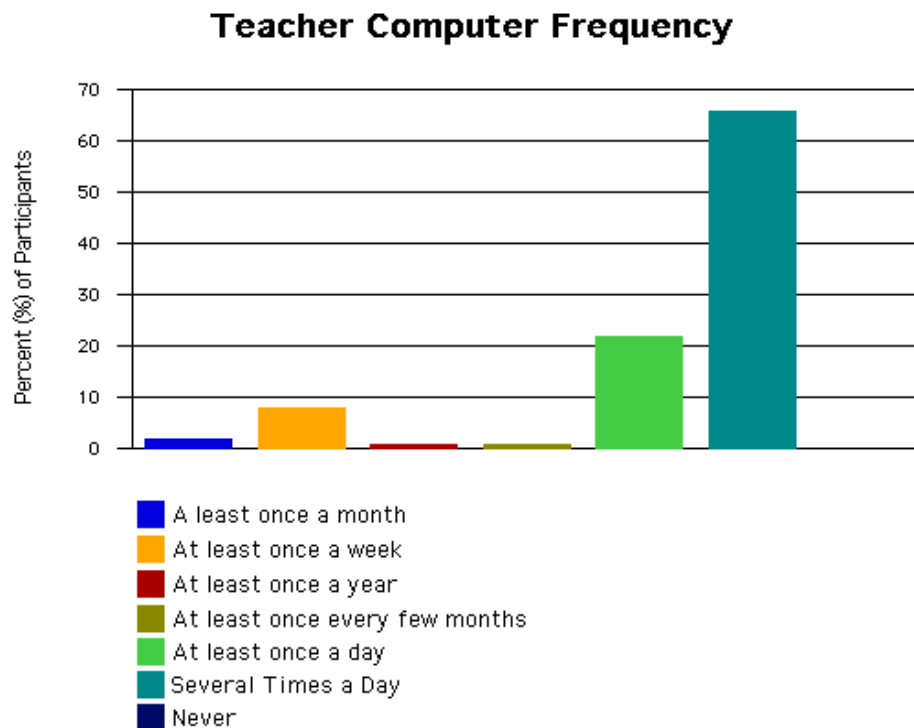




LoTi Profile

* Figure 4 exhibits the percentage of participants who took the LoTi survey by Frequency of Teacher Use of Computers throughout the nation. Based on their responses, 66% of participants responded "Several times a day" compared to 22% of participants who responded "At least once a day". Approximately 8% of participants responded "At least once a week" while 2% of participants responded "At least once a month". Only 1% of participants responded "At least once every few months" and "At least once a year", and less than 1% of participants responded "Never".

Figure 4

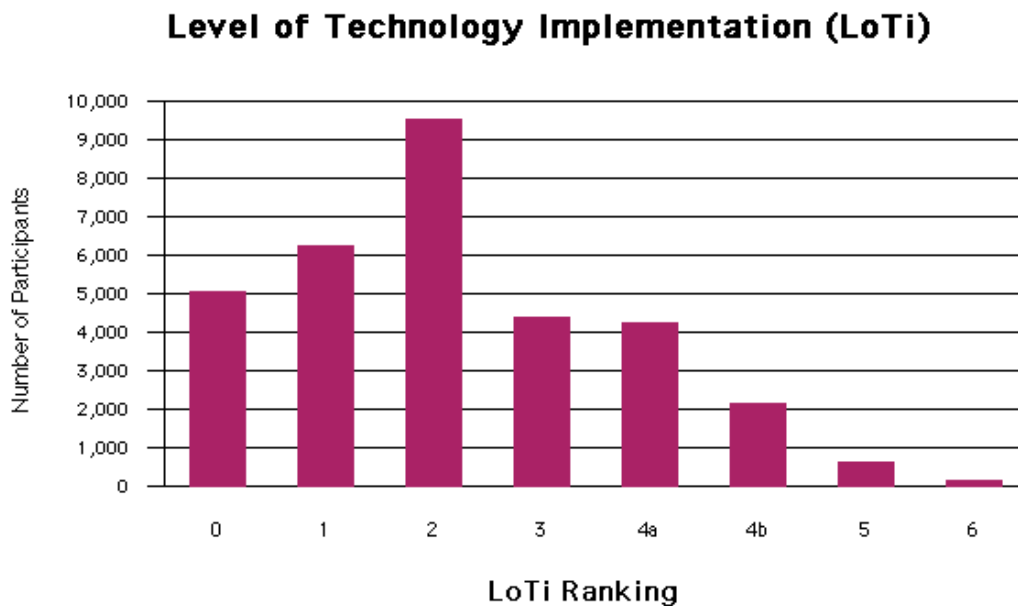




LoTi Profile

- * Figure 5 compares the Level of Technology Implementation (LoTi) ranking for the 32,560 participants throughout the nation. The LoTi profile approximates the degree to which each participant is implementing or supporting the implementation of computers into the curriculum. Based on their responses, the predominate level of technology implementation was at a Level 2 (Exploration) in the United States .
- * A Level 2 implies technology-based tools supplement the existing instructional program (e.g., tutorials, educational games, basic skill applications) or complement selected multimedia and/or web-based projects (e.g., internet-based research papers, informational multimedia presentations) at the knowledge/comprehension level. The electronic technology is employed either as extension activities, enrichment exercises, or technology-based tools and generally reinforces the content under investigation.

Figure 5



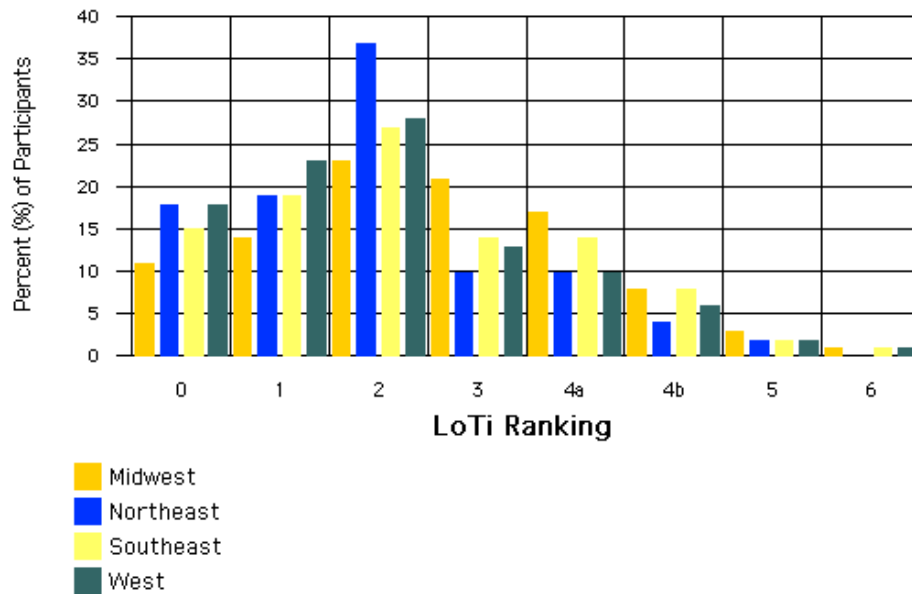


LoTi Profile

* Figure 6 compares the percentage of respondents positioned at each of the LoTi Levels throughout the nation during the 2002-2003 school year according to US Region. The graph shows that the predominate level of technology implementation across all regions was LoTi Level 2 (Exploration).

Figure 6

LoTi vs. US Region

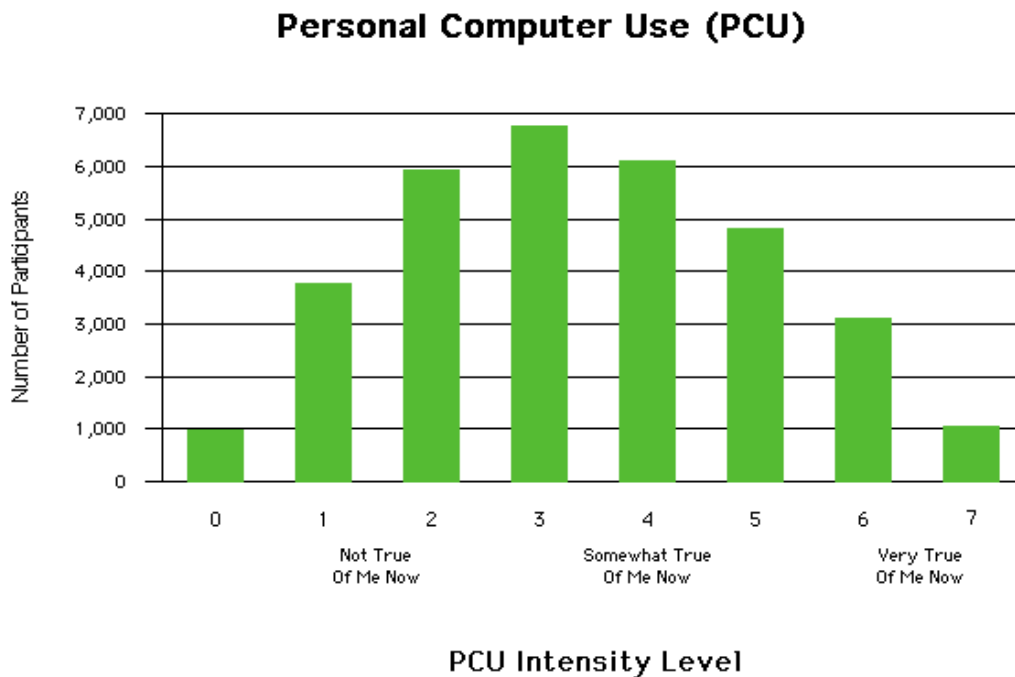




LoTi Profile

- * Figure 7 displays the Personal Computer Use (PCU) ranking for the 32,560 respondents throughout the nation. The PCU profile addresses an individual's comfort and proficiency level with using computers (e.g., troubleshooting simple hardware problems, using multimedia applications). During the 2002-2003 school year, the predominate intensity level ranking for the 32,560 respondents from throughout the nation was in the "Somewhat True of Me Now" range (Intensity Level 3) regarding their ability to either use basic software applications, troubleshoot routine computer problems, or use computers routinely in the workplace.
- * A PCU Intensity Level 3 indicates that the participant demonstrates moderate skill level with using computers for personal use. Participants at Intensity Level 3 may begin to become "regular" users of selected applications such as the internet, email, or a word processor program. They may also feel comfortable troubleshooting simple "technology" problems such as rebooting a machine or hitting the "Back" button on an internet browser, but rely on mostly technology support staff or others to assist them with any troubleshooting issues.

Figure 7



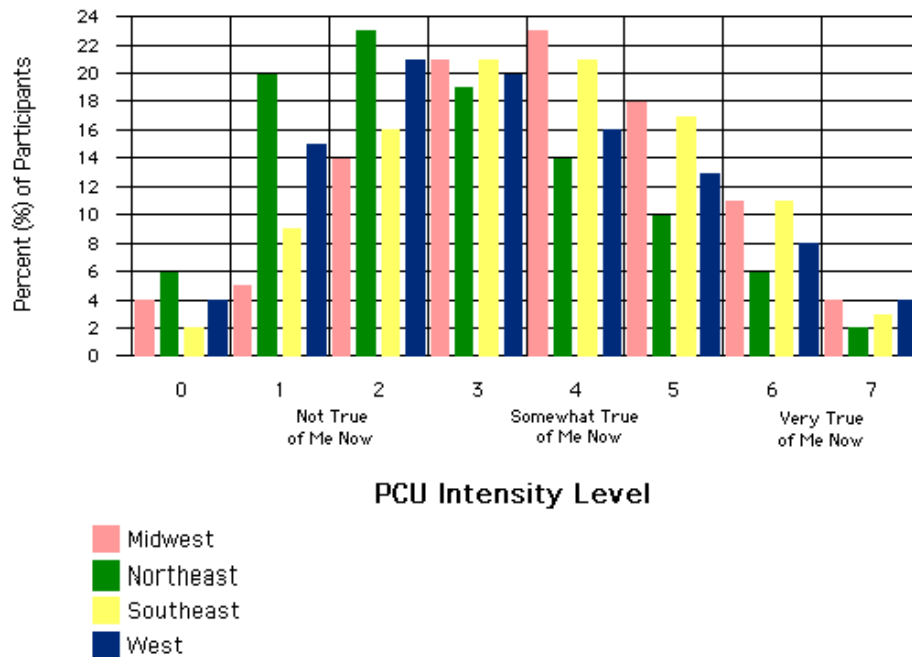


LoTi Profile

* Figure 8 compares the percentage of respondents positioned at each of the PCU Intensity Levels throughout the nation during the 2002-2003 school year according to US Region. The graph shows that the predominate intensity level ranged regionally from “Not True of Me Now” (PCU Intensity Level 2) in the Northeast and West to “Somewhat True of Me Now” (PCU Intensity Level 4) in the Midwest and Southeast.

Figure 8

PCU vs. US Region



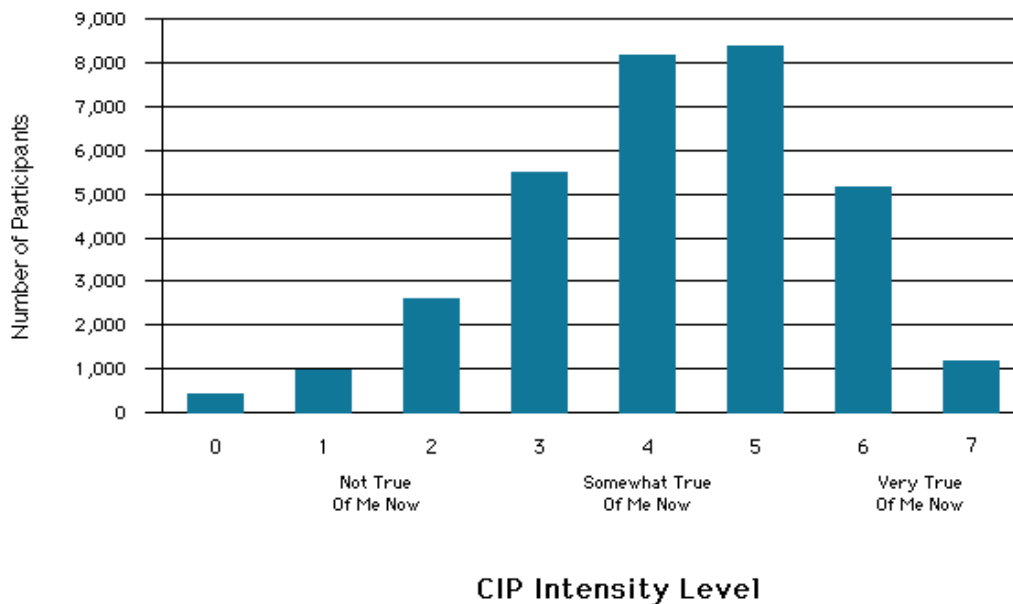


LoTi Profile

- * Figure 9 displays the Current Instructional Practices (CIP) profile for the 32,560 respondents throughout the nation during the 2002-2003 school year. The CIP profile reveals the participant's inclination toward instructional practices consistent with a learner-based curriculum design (e.g., learning materials determined by the problem areas under investigation, multiple assessment strategies integrated authentically throughout the curriculum, teacher as co-learner/facilitator, focus on learner-based questions). During the 2002-2003 school year, the predominate intensity level for the 32,560 participating staff members from throughout the United States was in the "Somewhat True of Me Now" range (Intensity Level 5) regarding their use of a learner-based versus a subject-matter based curriculum approach.
- * At a CIP Intensity Level 5, the participant's instructional practices tend to lean more toward a learner-based approach. The essential content embedded in the standards emerges based on students "need to know" as they attempt to research and solve issues of importance to them using critical thinking and problem-solving skills. The types of learning activities and teaching strategies used in the learning environment are diversified and driven by student questions. Both students and teachers are involved in devising appropriate assessment instruments (e.g., performance-based, journals, peer reviews, self-reflections) by which student performance will be assessed. However, the use of teacher-directed activities (e.g., lectures, presentations, teacher-directed projects) may surface based on the nature of the content being addressed and at the desired level of student cognition.

Figure 9

Current Instructional Practices (CIP)



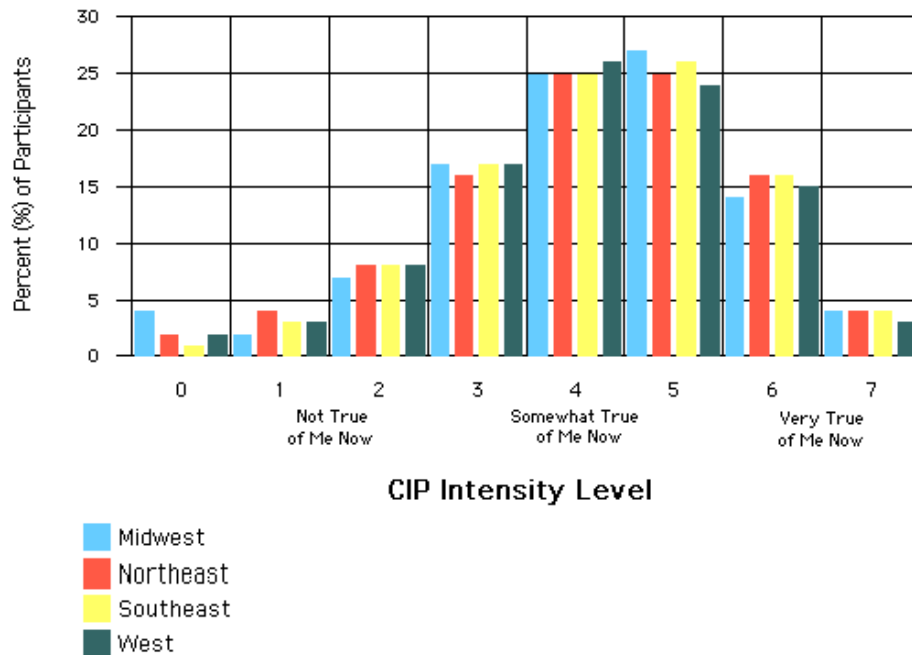


LoTi Profile

* Figure 10 compares the percentage of respondents positioned at each of the CIP Intensity Levels throughout the nation during the 2002-2003 school year according to US Region. The graph shows that the predominate intensity level was in the “Somewhat True of Me Now” category at a CIP Intensity Level 4 in the West and a PCU Intensity Level 5 in the Midwest, Northeast, and Southeast.

Figure 10

CIP vs. US Region



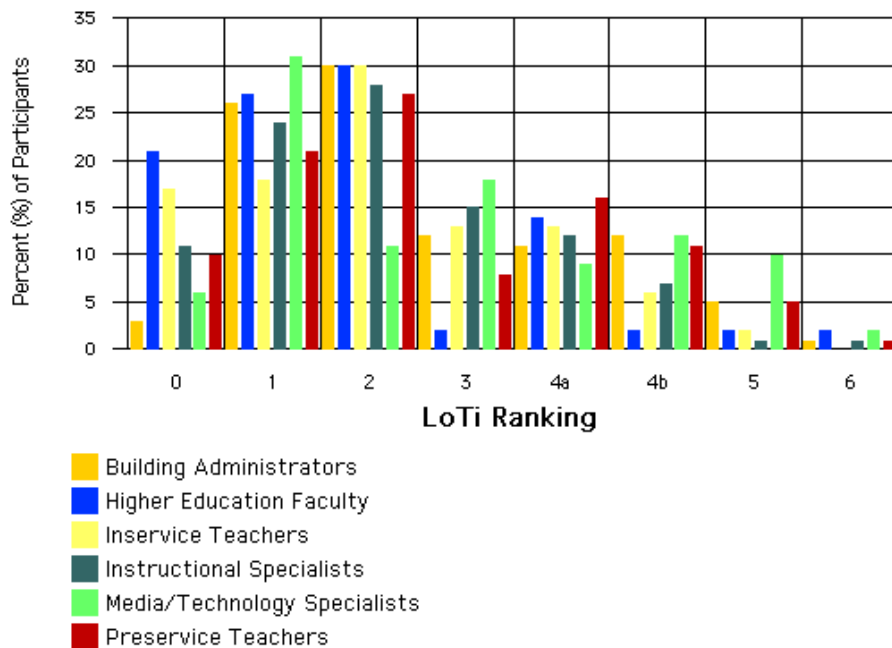


LoTi Profile

* Figure 11 compares the percentage of respondents positioned at each of the LoTi Levels throughout the nation during the 2002-2003 school year according to Survey Type. The graph shows that the predominate LoTi Level for Inservice Teachers, Higher Education Faculty, Preservice Teachers, Instructional Specialists, and Building Administrators was LoTi Level 2 (Exploration) while Media/Technology Specialists self-assessed themselves at a predominate LoTi Level 1 (Awareness).

Figure 11

LoTi vs. Survey Type

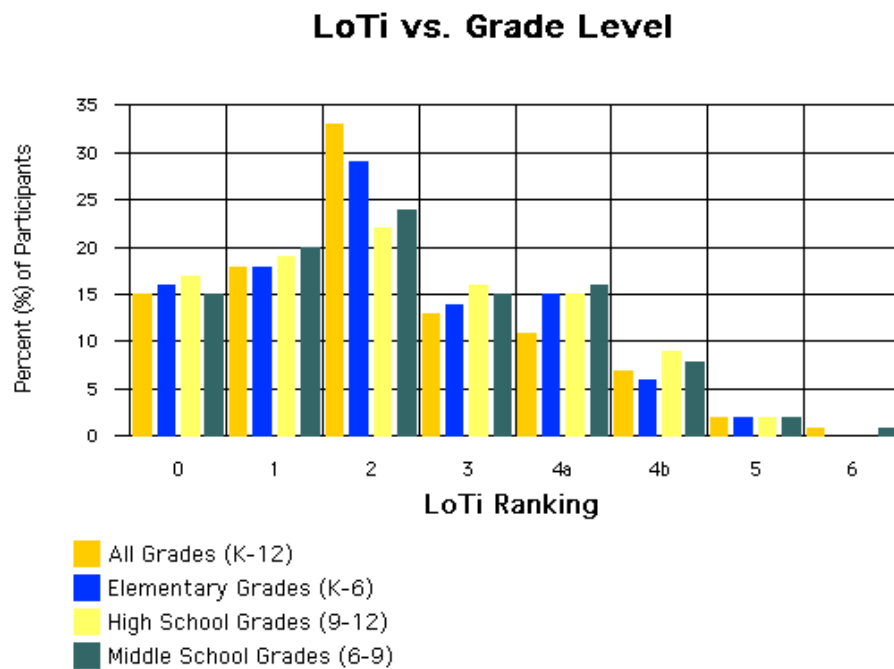




LoTi Profile

* Figure 12 compares the percentage of respondents positioned at each of the LoTi Levels throughout the nation during the 2002-2003 school year according to Grade Level. The graph shows that the predominate level of technology implementation for all frequency categories was a LoTi Level 2 (Exploration).

Figure 12

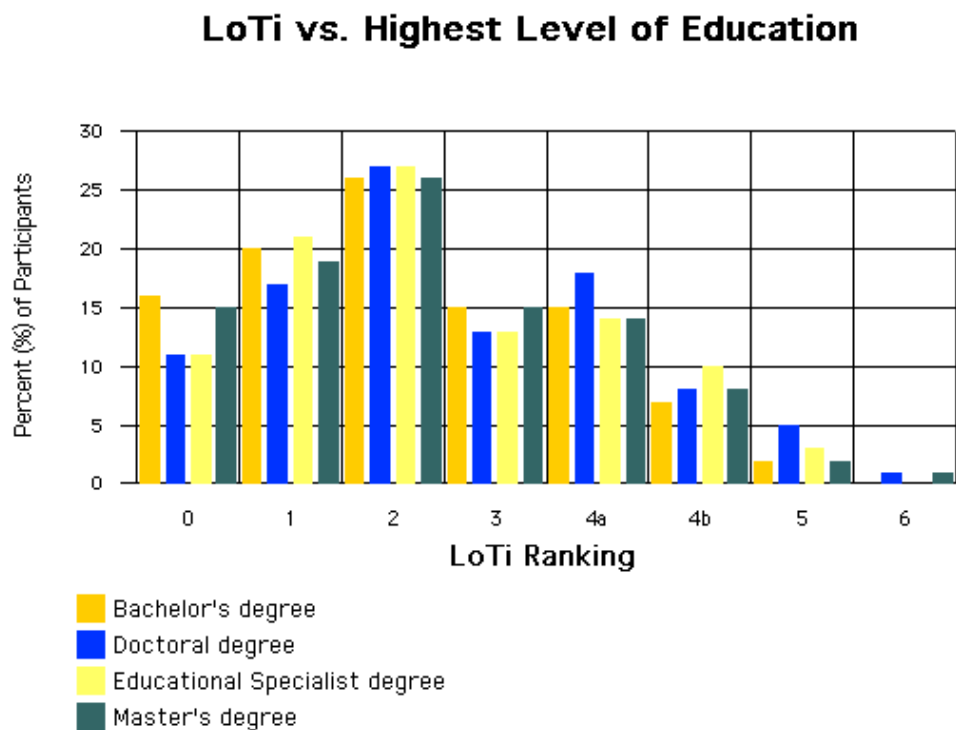




LoTi Profile

* Figure 13 compares the percentage of respondents positioned at each of the LoTi Levels throughout the nation during the 2002-2003 school year according to Highest Level of Education. The graph shows that the predominate level of technology implementation for all frequency categories was a LoTi Level 2 (Exploration).

Figure 13

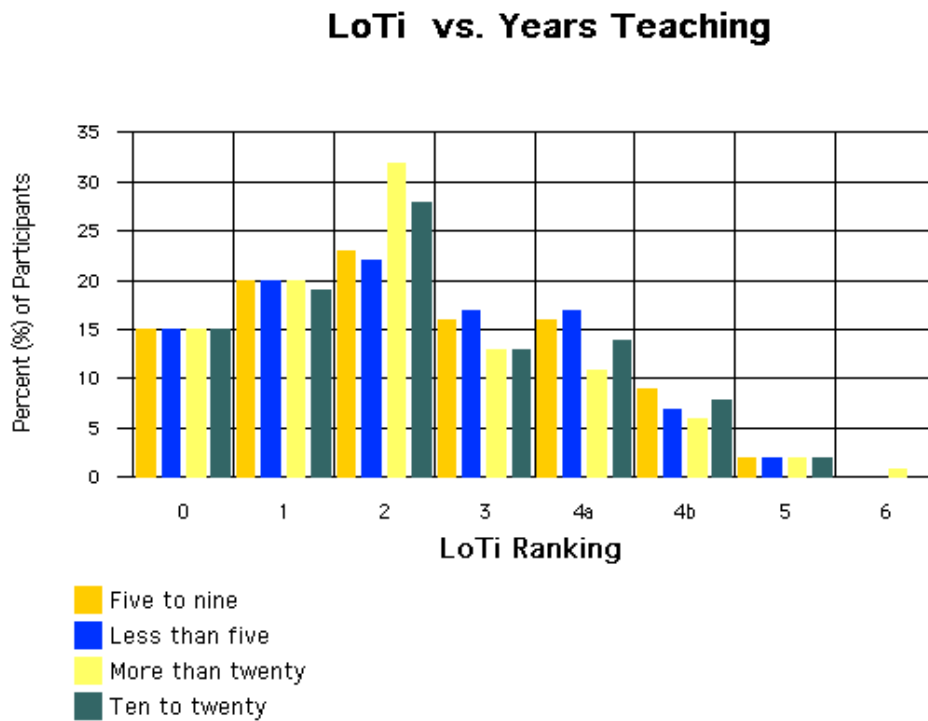




LoTi Profile

* Figure 14 compares the percentage of respondents positioned at each of the LoTi Levels throughout the nation during the 2002-2003 school year according to Years Teaching. The graph shows that the predominate level of technology implementation for all frequency categories was a LoTi Level 2 (Exploration).

Figure 14

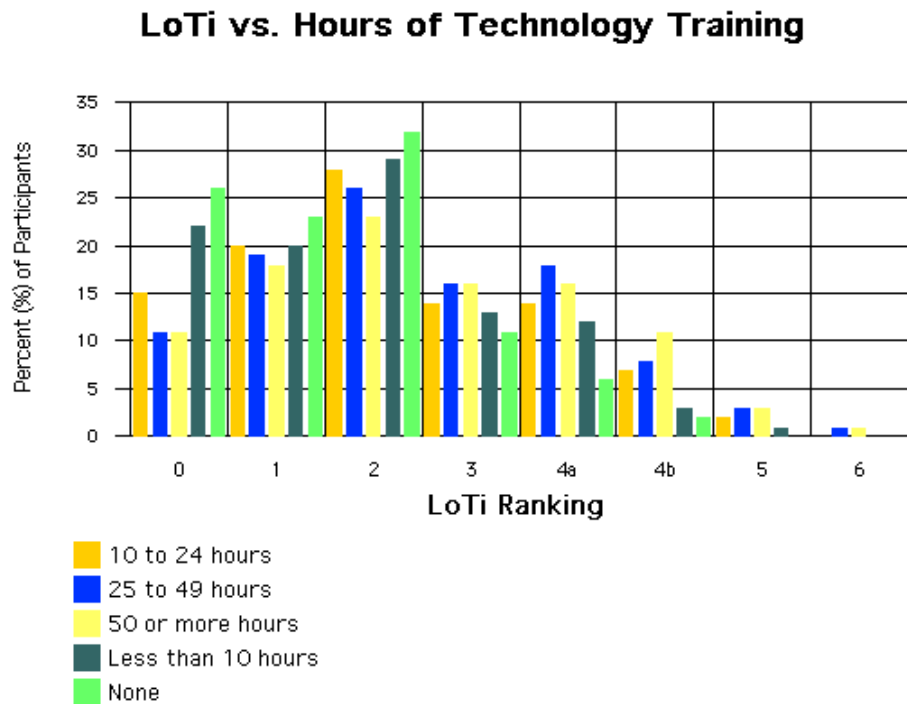




LoTi Profile

* Figure 15 compares the percentage of respondents positioned at each of the LoTi Levels throughout the nation during the 2002-2003 school year according to Hours of Technology-related Training. The graph shows that the predominate level of technology implementation for all frequency categories was a LoTi Level 2 (Exploration).

Figure 15





LoTi Findings

- * Approximately 9% of the nation's educators that completed the Level of Technology Implementation (LoTi) Questionnaire self-assessed themselves at the Target Technology Level as defined by the National Education Technology Standards (NETS) and Technology Standards for School Administrators (TSSA). This level is characterized by technology use embedded in challenging and engaging learning experiences that promote problem-solving, critical thinking, and self-directed learning.
- * Approximately 64% of the 32,560 State of nation's participants were clustered in Levels 0 through 2. These levels represent the lower portion of the LoTi Framework (see page 4) and focus primarily on teacher's use of productivity tools, student use of tutorial programs, and "project-based" learning opportunities at the knowledge/comprehension level.
- * Though 99% of the nation's participants reported having instructional access to computers for teacher and student use, only 67% of the nation's educators who participated in this study felt comfortable using computers at home and in the workplace (e.g., accessing email, creating multimedia products, troubleshooting computer problems).
- * The LoTi data showed that media specialists and building administrators self-assessed themselves at LoTi Levels 1 and 2, respectively. Given the pivotal role of building administrators and media/technology specialists as instructional technology leaders, this finding may suggest why more classroom teachers are not at the Target Technology level (LoTi Level 4b and above) due to lower level expectations for technology use in the classroom being supported and nurtured from the instructional technology leadership.
- * Educators with greater than 25 hours of technology-related training experienced a higher percentage of participants at LoTi Levels 3 and above; conversely, those respondents with less than 25 hours of technology-related training experienced a higher percentage of participants at LoTi Levels 0-2.
- * The data revealed that 88% of the educators who participated in this study used computers daily or several times a day compared to 33% for student daily use.



LoTi Findings

<p>Participants at LoTi Level 0 There is no visible evidence of computer access or instructional use of computers in the classroom.</p>	<p>16% (5,074 participants)</p>
<p>Participants at LoTi Level 1 Available classroom computer(s) are used primarily for teacher productivity (e.g., email, word processing, grading programs).</p>	<p>19% (6,252 participants)</p>
<p>Participants at LoTi Level 2 Student technology projects (e.g., designing web pages, research via the internet, creating multimedia presentations) focus on the content under investigation.</p>	<p>29% (9,556 participants)</p>
<p>Participants at LoTi Level 3 Tool-based applications (e.g., graphing, concept-mapping) are primarily used by students for analyzing data, making inferences, and drawing conclusions.</p>	<p>14% (4,406 participants)</p>
<p>Participants at LoTi Level 4a The use of outside resources and/or interventions aid the teacher in developing challenging learning experiences using available classroom computers.</p>	<p>13% (4,275 participants)</p>
<p>Participants at LoTi Level 4b (Target Technology Level) Teachers can readily design learning experiences with no outside assistance that empower students to identify and solve authentic problems using technology.</p>	<p>7% (2,177 participants)</p>
<p>Participants at LoTi Level 5 Teachers actively elicit technology from outside entities to expand student experiences directed at problem-solving, issues resolution, and student action.</p>	<p>2% (660 participants)</p>
<p>Participants at LoTi Level 6 Computers provide a seamless and almost transparent medium for information queries, problem-solving, and/or product development.</p>	<p>0% (160 participants)</p>
<p>Participants indicating they HAVE access to computers for instructional purposes</p>	<p>100% (32,560 participants)</p>



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