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The ITEST Learning Resource Center's Online Evaluation Database: Examples from the Collection

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The National Science Foundation-funded ITEST Learning Resource Center at EDC has developed an online database of instruments for ITEST project level evaluators and researchers to use as they develop measures for their projects. This article details the purpose and development of that database and highlights three instruments from it that represent the kind of evaluation tools archived there. Although the ITEST online evaluation instrument database is not publicly accessible, it represents an innovative way to collect, analyze and share evaluation instruments for use by a specific community of practice. The instruments shared in this article are available for public use, with appropriate citation, and represent the quality and aims of tools and instruments housed in the database.

Keywords: Database, Teacher professional, development, Secondary school, Digital library collection,

For those who evaluate or conduct research on technology integration and innovative Science, Technology, Engineering and Mathematics (STEM) educational programs, finding appropriate, valid and reliable measures of student skills and understanding and teachers' needs can be a challenge. To help address this challenge, the National Science Foundation-funded ITEST Learning Resource Center has developed an online database of instruments for ITEST project level evaluators and researchers to use as they develop measures for their projects. This article details the purpose and development of that database and highlights three instruments in it that represent the kind of evaluation tools archived there. Although the ITEST online evaluation instrument database is not publicly accessible, it represents an innovative way to collect, analyze and share evaluation instruments for use by a specific community of practice. The instruments shared in this article are available for public use, with appropriate citation, and represent the quality and aims of tools and instruments housed in the database. We will first describe the ITEST program and the role of the ITEST Learning Resource center, then detail the purpose and development of the online database, and end by sharing three examples of instruments

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from that database that measure student technology skill level, content understanding and teachers' technology needs.

ABOUT ITEST

The National Science Foundation (NSF) established the Information Technology Experiences for Students and Teachers (ITEST) program in direct response to the looming shortage of information technology workers in the United States. The ITEST program is designed to address this shortage by increasing opportunities for students and teachers to learn about, experience, and use information technologies within the context of science, technology, engineering, and mathematics (STEM), including Information Technology (IT) courses. The ITEST program goals include increased and maintained student interest in IT through the creation of effective student education programs in both school and non-school settings.

ITEST projects take two forms: youth-based projects offer exciting, hands-on STEM and IT experiences for students in out-of-school settings, and comprehensive projects provide professional development to teachers so that they can better use IT in their STEM and IT classes. The ITEST program started in 2003, and has funded four cohorts to date, totaling 76 projects. ITEST projects are in 36 states and approximately half of the projects are youth-based and half comprehensive projects. The ITEST program also funds a National Learning Resource Center to support, synthesize and disseminate the learning from the program to a wider audience.

The National ITEST Learning Resource Center at Education Development Center (EDC) collaborates with ITEST Projects across the United States to achieve program goals, weave together promising practices and leverage their combined achievements into new knowledge. Activities of the Learning Resource Center (LRC) include: annual all-project meetings, called the ITEST Annual Summit; dissemination of promising practices and cutting edge research; and ongoing technical assistance targeted at content areas such as skills and standards, recruitment and retention of teachers and students, and technical issues such as working with specific types of technology in the classroom. The Learning Resource Center also leads a national research study focused on understanding the factors that contribute to teacher change, the development of student interest and skills and program models. The ITEST LRC collaborates with ITEST projects to design local and regional research studies, gather and analyze data, and report and disseminate findings. Findings from these studies inform and guide formal and informal educators in planning, implementing and evaluating IT-enriched STEM initiatives.

ITEST RESEARCH APPROACH

The ITEST LRC approach to designing and implementing the ITEST national research agenda is rooted in the principles of collaborative inquiry. Using an adaptation of Lawrenz and Huffman's (2003) multi-site participatory evaluation model, the LRC works with ITEST projects and their evaluators to develop a multi-site, coordinated research program to answer questions of interest to the ITEST community and the field. Through this process, the LRC generates research questions that will inform project practice and development; build on project evaluations and data collection to inform the generation of research areas and questions; leverage local evaluation data collection and analysis to form the base of the larger inquiry; and highlight issues of Equity and Access, and Informal and Formal Learning.

ITEST collaborative research activities have included documentation and dissemination of compiled project level evaluation approaches and findings; the formation of thematic working groups to investigate research questions; online evaluation peer exchanges; evaluation technical assistance events, such as conference calls presenting strategies for writing strong reports; development and dissemination of literature reviews; and the collection, compilation and analysis of ITEST project evaluation instruments.

Through the online evaluation peer exchange and other calls for submission of evaluation instruments, the ITEST LRC collected and categorized more than 90 instruments—42 student instruments and 49 teacher instruments—that measure aspects of ITEST program outcomes such as classroom implementation of IT; pedagogical practice in science and technology; IT skills and proficiencies; attitudes about technology; technology access; technology use; technology confidence; and technology integration.

These instruments are housed in a searchable online database, accessible to the ITEST program community through the ITEST Learning Resource Center website. Built using digital library technology, users can search the database with key words that represent the programmatic outcomes included in the instruments. For example, a user could search for teacher instruments that measure technology integration and technology access. This search would yield 60 instruments. A search for student instruments that measure technology skills and proficiency yields 74 instruments. Now, obviously, these numbers are higher than the numbers of instruments referred to above; bugs in the database software cause it to turn up duplicates when searching, so users need to be cautious and look to make sure the instruments it finds are relevant. Overall, this searchable database serves the purpose of offering ITEST project evaluators a resource for instrument development. In the instrument development descriptions below, note that more than one of the evaluators featured in this article consulted other ITEST project evaluators for advice on instrument development. This electronic resource supports the growing network of ITEST principal investigators and evaluators.

BACKGROUND

Students and teachers participating in ITEST programs learn to apply advanced technologies to inquiry and problem-based learning situations. Therefore, when evaluating program effectiveness, ITEST principal investigators and evaluators need instruments which measure a variety of program factors, such as STEM content knowledge, attitudes, and technology access. The tools described in this article include a drawing-based authentic assessment of students' archaeology knowledge, a survey of students' self-reported technical proficiency, and a survey of teachers' perceived needs for technology integration.

A key point of interest to ITEST projects is whether their participants are able to go beyond the regurgitation of memorized facts and apply STEM skills and knowledge to new situations. Fox-Turnbull (2006) argues that students' technological proficiency can only be measured accurately through authentic assessment. Authentic assessment tasks are process-oriented challenges that reflect the competency in question, represent real-life scenarios that are encountered by experts in the field, and give students the opportunity to emulate experts' thinking processes (Hsu 1999; Gulikers, Bastiaens, & Kirschner 2004). Gulikers, Bastiaens, & Kirschner add that perception of authenticity is subjective, and that the experience level of students must be considered. Several ITEST projects use authentic assessments; this article presents a drawing-based archeology content assessment from Museum Tech Academy.

ITEST projects also use instruments in combination to measure content and technology proficiency. For example, Technology at the Crossroads combines student responses to the survey questions presented in this article with a performance-based authentic assessment. Lawrenz and Huffman (2006, p30) advocate for a mixed methods approach, noting that "appreciation and use of a variety of techniques is a reflection of the STEM disciplines themselves and permits comprehensive insight into STEM education evaluation."

Finally, although student outcomes are often the end focus of evaluation plans, teachers cannot be left out of the equation. Teacher knowledge is important to assessment process because teachers' level of technology knowledge and skill affects the feedback teachers are able to give to students (Fox-Turnbull 2006). Furthermore, when discussing evaluation of technology-based lessons, Weston (2004) stresses that lesson implementation is as important as lesson content, and teachers' abilities to implement a lesson in their classrooms is tied directly to their technology knowledge, access, and attitudes. ITEST projects gather information about teachers in many ways; the DAMSALS 2 Snapshot Survey is one example.

METHOD

For this article, we wanted to present ITEST evaluation instruments that:

- Represent common measurement goals of ITEST projects
- Provide examples of a student-focused instrument and a teacher-focused instrument
- Are broad enough so that they could potentially be adapted for the evaluation of technology-based instruction in programs outside of ITEST

After selecting several possibilities from the database, we contacted the principal investigators and evaluators of the projects whose instruments we chose. We asked them for permission to publish the instruments as a part of an article about the ITEST Instrument Database. We also asked for their collaboration on the article in the form of telephone interviews. During the interviews, we asked them to describe the development and use of the instrument and its findings. Interviews lasted approximately one hour each. The instrument- and project-specific portions of this article are based on the telephone interviews and subsequent editing suggestions of the evaluators and PIs.

INSTRUMENTS

In this section, we offer three examples of instruments from the ITEST online evaluation instrument database. In addition to the instruments, we describe the project, give a narrative overview of the instrument and discuss instrument development, administration and use of findings. We conclude each instrument's section with recommendations from the instrument developers for those interested in using the included instruments.

TECHNOLOGY AT THE CROSSROADS

Project description. Technology at the Crossroads is a youth-based ITEST project that engages middle school youth (with particular emphasis on girls) in environmental research in Boston through the use of Geographic Information Systems (GIS) and Geographic Positioning Systems (GPS). The program consists of a three-week summer camp and an after school component during the academic year. The program is joint venture of the Girls Get Connected Collaborative and Simmons College, with Dr. Deborah Muscella as the Principal Investigator. Goodman Research Group, Inc. (GRG) conducts formative, process and outcome evaluation of the project; Dr. Karen Peterman of GRG leads this effort. Boston area organizations with after school programs take part, and each after school program team includes one teacher, one undergraduate student and one high school student. These teams are trained in the use of the technologies and the IT curriculum and work with youth, local scientists and GIS specialists. Over three years, this project will reach a total of 125 middle school youth and employ six high school students, six undergraduate students and six teachers.

Instrument overview. The skills and confidence-related survey questions presented here are one portion of a longer instrument, the Technology at the Crossroads Mid-Year Follow-Up Survey (See Figure 1). The full instrument asks about other aspects of the Technology at the Crossroads program, including science experiments and the young people's career aspirations. Questions five through eight are explored in this article because of their technology focus and potential applicability to other technology-rich learning environments.

All four survey questions are meant to be asked in a pencil and paper format and yield student self-reported data. Question five checks whether young people have previous experience with the different technologies they encounter during Summer Camp. Question six asks students to select technologies they have used during the after school component of Technology at the Crossroads, and question seven asks whether they have used any of the technologies on their own, outside of the program. Question eight asks students to rank their levels of confidence in performing seven different technology-based tasks using a five point scale that ranges from "I cannot perform this skill," to "I can perform this skill very well and could teach it to a friend right now."

Instrument development. Technology at the Crossroads is a Cohort 2 ITEST project, which means that the project began during the second year of NSF's ITEST program. Many ITEST projects seek to measure the technology skill levels of their program participants, and their confidence in those skills. The Technology at the Crossroads team was able to talk with more experienced ITEST projects at the ITEST annual meeting and see some of those projects' existing evaluation instruments.

In program evaluation plans, Goodman Research Group generally covers the following categories: behavioral data, process data, attitude data, and knowledge data. To assess program participants' technology exposure, the evaluator and principal investigator created questions five through seven to reflect the technologies used in the program. For question eight, they based the scale on those used in other ITEST instruments (adapting the language slightly for their middle school audience) and chose technology tasks that were integral to the Technology at the Crossroads program. The scale used in question eight is often used by ITEST projects that focus on teacher professional development. It also has particular meaning for Technology at the Crossroads students during the academic year because many students return to Summer Camp as mentors and teach these skills to their peers.

Instrument administration. These survey questions are asked twice during the year: midway through the academic year (February/March) and at the end of the year after students have experienced the after school component. The program participants who take the survey are students in the middle grades. The survey questions were asked during the 2005 and 2006 program years.

RECOMMENDATIONS

The Technology at the Crossroads team uses results from these survey questions, separately and in combination with other evaluation tools, to inform the program's operation. For example, the survey indicated that a number of students were participating in various program activities as onlookers only, never manipulating the technology (e.g.

PDAs, GIS on handheld computers) themselves. When considering these data, the Principal Investigator and evaluator realized that the emphasis on students working in teams to solve problems led the students to develop different kinds of expertise, which left some students not learning the skills needed to use the handheld GPS units and the PDAs for ArcPad. Now, the Technology at the Crossroads program includes an explicit requirement that teachers ensure that all students use the technology over the course of an activity.

Survey responses also highlight technology access issues. Students do not use the GIS software and other technologies used in the Summer Camp and the after school program elsewhere, either at school or at home. The project now lends the GPS units to the schools and has installed the Arc Explorer Java Edition for Education in the schools so that students have year-round access.

To get a picture of participants' technology progress, the students' survey responses are combined with data from "embedded assessments"—hands-on, performance-based assessments that the Technology at the Crossroads team has developed to test students' proficiency. For example, students play a game in which they hide something and use GPS to note the location and provide instructions to another group to search. Observers record behavioral data and use a talk-aloud methodology to elicit the participants' thoughts during the game. Students' performance during game is matched to their self-assessments. The project team use these data to see how comfortable the young people are with the GPS and whether participants are overestimating or underestimating their own proficiency.

Lastly, both the evaluator and Principal Investigator strongly feel that when measuring young people's skill and confidence with technology, the ability to track things over time is crucial. The survey questions presented here are helpful indicators by themselves, but the most useful findings come from combining the survey questions with other assessment data and tracking the students' progress longitudinally. These combined data allow the project to measure both students' confidence and competence in using the GIS and GPS technology.

MUSEUM TECH ACADEMY

Project Description. The Museum Tech Academy (MTA) provides an inquiry-based, two year program in archaeology, natural sciences, and information technology for low-income Springfield, Illinois students in grades 7 through 12. The program engages students in the full process of scientific research from problem formulation to the presentation of results in a variety of media in an after school program that students attend twice a week. Saturday field trips during the academic year and summer field experiences with the Center for American Archeology introduce students to rich content and career paths in the sciences and technology. Students can explore areas of interest in information technology, natural sciences, and archaeology, and related career and college options. Each student engages in 436 contact hours and participates in all three phases of the project: A first-year after school program that introduces them to archaeology and natural sciences (geology, botany, zoology) and information technology. This is followed by a summer field experience in archaeology and the natural sciences. In the second year, students participate in an after school program with follow-up research in archaeology and/or natural sciences and integration of appropriate technology. Dr. Bonnie Styles and Beth Shea of the Illinois State Museum and Mary Pirkl of the Center for American Archeology are the principal investigators, while Carey Tisdal, of Tisdal Consulting, is the project's external evaluator.

Instrument overview. Museum Tech Academy's Drawing Method was developed because traditional pre- and post-experience assessment questions were not sufficient to show whether students understood the connection between the process of archaeology field work (a hands-on, authentic work experience excavating a Middle Woodland site) and developing knowledge about the people who lived there The evaluator found that the students treated the program's pre/post assessments like school tests, trying to hide any gaps in their knowledge. The students could define archaeological terms, but the evaluator had difficulty determining students' levels of understanding—particularly when they were beginning to make connections between evidence and ideas—from their memorized definitions (see Appendix A).

MTA's Drawing Method seeks to highlight students' actual understandings and misconceptions and includes the following steps:

1. Drawings: Students draw pictures showing the lives of the people who lived at the site being excavated. (For the drawing prompt and method details, please see Appendix B)
2. Interviews: After drawing their pictures, the students explain their work in brief interviews with the evaluator. The interviews are recorded and transcribed.
3. Analysis: The evaluator codes the pictures and interview transcriptions together for indicators of students' understanding of the connection between archaeological evidence and archaeologists' vision of what life was like for the people who once lived at the site.

Instrument development. The Drawing Method described in this article is grounded in child psychology. Drawing is considered an indicator of children's understanding and priorities; they make choices about the content of their drawings and the ways in which they portray that content (Van Tillburg, 1987; Evans & Reilly, 1996; Kuhn, 2003; Tisdal, 2005).

When crafting and delivering the drawing prompt, the evaluator took care not to include extraneous descriptive words which might influence the students. For example, the prompt asks what life was like for "someone" who lived at the site, rather than what life was like for the Native Americans who lived there. The evaluator wished the students to draw pictures of the life they associated with the excavation site, not to draw pictures of the life they associated with the term "Native American."

*Instrument administration. T*he Drawing Method was initially piloted with 16 program participants during Museum Tech Academy's first year. With the program's second cohort of students, the method is being used as an entry/exit protocol. Forty students completed the exercise in fall 2006, and those who remain with the program will complete new drawings in May of 2007.

The recorded student interviews with the evaluator are brief—two to three minutes long. As additional written documentation, students are asked to write 1-2 sentences describing their drawings on the backs of the papers.

The evaluator follows a naturalistic process when coding, allowing the coding categories to arise from the students' drawings and interview comments. In addition, she consulted the principal investigator and a professor of educational psychology for feedback and input into the coding scheme. This method is appropriate for Museum Tech Academy's purposes because it surfaces students' misconceptions and because the program's goal is to deepen the students' understanding the process of science. In other words, although the Drawing Method assesses content knowledge, the drawings do not serve as exams.

RECOMMENDATIONS

The students' drawings provided insight into several areas of their archaeological understanding. The Museum Tech Academy team could see what kinds of tools, dwellings, and food students envisioned when they thought about the lives of the people who once lived there. Details like this allowed the team to assess the accuracy of the mental pictures the students were building. From the drawings, it was clear whether students thought that early people at the site grew squash (accurate) or tomatoes and corn (inaccurate). The drawings also indicated whether the students understood the importance of environmental features such as forests or rivers or the concept that bows and arrows were technologies that the people who inhabited the settlement did not have at the time.

The drawings and interviews highlighted abstract ideas such as community cooperation, work roles, and leadership. The drawings also yielded clues about the students' levels of metacognition—whether they could explain and analyze their choices (how they knew what they knew and why it was accurate). Lastly, in coordination with the drawings, the interviews uncovered students' sources of information; they students cited the excavation, school, books, television, and museum staff all as sources for their drawings, while other details they imagined, and some they "just knew."

The teaching team used the findings to supplement program lessons and address student misconceptions. Further, the Drawing Method has also been incorporated into museum programs for the student participants. The museum director (who is an archaeologist and a principal investigator for the project) now reminds the students of the pictures they drew and then introduces the exhibits in the Museum's Native American hall as her "pictures." She then elaborates and explains how the archaeological evidence supports the exhibits.

After using the Drawing Method with two groups of students, the evaluator has several logistical and conceptual recommendations:

- One important question to ask when planning an evaluation is whether the method resonates with the learning environment. Using drawings as an evaluation tool works particularly well in museum and field environments, where traditional school tests are out of place.
- Eliciting verbal descriptions of students' work in addition to collecting the drawings is crucial when using a method of this kind.
- Use standard 8.5" x 11" paper so that the drawings are easy to scan.
- Make it fun. Provide colored pens, and assure them that they should draw their pictures however they need to in order to answer the prompt. To the students, it is an opportunity to show off their artwork and share their thoughts, not a test-taking situation.
- A note about coding: if a naturalistic approach is not appropriate (because students' drawings are expected to demonstrate understanding of specific concepts, for example) then an alternative approach could be to code the drawings and interviews using set concepts from a content outline or teaching objectives. Another option could be to assess the drawings using a rubric that is developed from program goals.

This Drawing Method is only one piece of a larger mixed-methods evaluation plan. While the findings from the Drawing Method can be useful on their own, multiple sources of evaluation data (including staff observations and participant entry interviews) can best inform project decisions.

DAMSALS 2

Project description. The Delta Agriculture Middle School Applied Life Science (DAMSALS 2) project provides professional development for 72 science teachers who in turn will provide staff-supported IT instruction for 180 students. These students are in grades 7–12 from rural schools in the Mississippi Delta region of northeast Louisiana. The project uses an integrated science approach to deliver agriculture-related concepts. DAMSALS 2 conducts a three-week summer institute for middle school teachers and also offers a one week-long science and technology summer camp for students attending the rural school systems where participants teach.

Patty Watts of the University of Louisiana-Monroe is the project's Principal Investigator, while Theresa Overall, Dr. Gerald Knezek, and Dr. Rhonda Christensen of the Institute for the Integration of Technology Into Teaching and Learning at the University of North Texas serve as the project's external evaluation team.

Instrument overview. The original DAMSALS 2 evaluation plan did not include use of a Technology Needs Assessment for participating teachers. However, one of NSF's expectations for the ITEST program is that it produce cross-project findings. The first cohort of funded ITEST projects identified teachers' attitudes, beliefs, and perceptions about technology as an area of informal STEM education to which the group could contribute. The DAMSALS 2 Technology Needs Assessment Snapshot Survey was created to gather some of these data.

The Technology Needs Assessment (See Figure 3) is a survey that asks teachers what they need to integrate technology into their classroom activities. The teachers rank 12 items on a five point scale that ranges from "Less Urgent" to "More Urgent." The items include both technology needs (Internet access, software, tech support) and technology integration needs (training, time to adapt the curriculum).

Instrument development. Once teachers' attitudes, beliefs, and perceptions about technology were identified as an area of interest, the evaluation team looked for existing validated instruments. Also, building on several years of experience with Technology Innovation Challenge Grant Evaluation and the PT3: Preparing Tomorrow's Teachers to Teach Technology program, they narrowed the interest area to an instrument that would help identify perceived needs that teachers felt as they approached using technology in the classroom.

To create the Technology Needs Assessment now used by the DAMSALS 2 ITEST project, the evaluation team adapted a longer Snapshot Survey which was developed by Dr. Cathleen Norris of the University of North Texas and Dr. Eliot Soloway of the University of Michigan. The original instrument measures teachers' beliefs about technology in addition to teachers' perceived needs for technology integration. Drs. Norris and Soloway created the Snapshot Survey over the course of two years by keeping track of questions which arose during teacher professional development sessions and teacher conferences. They added a Likert scale and gave the survey to teachers, asking the teachers to suggest more survey questions and making iterative changes to the instrument until it became stable. The DAMSALS 2 evaluation team used the original Snapshot Survey (see Appendix C) with projects prior to their involvement with the ITEST program. Adapting the instrument for the ITEST project involved modifying the language and shortening the survey. In the DAMSALS2 ITEST project, the technologies being used are not limited to computers, which were the sole focus of the original survey items. DAMSALS 2 teachers gain computer skills, but they also learn to use data loggers and GPS. The evaluator and the principal investigators modified Snapshot Survey items so that they were not computer specific.

Instrument administration. During the first year of using the instrument with DAMSALS 2 teachers, the teachers took the survey three weeks after their first training, one week after leading technology-based lessons at the student summer camp, and at the end of the academic year the following spring. In second year, the timeline was altered slightly: teachers took the survey at the beginning of their summer institute training, 3 weeks after the training's end, and again in spring. With this altered timeline, the Technology Needs Assessment could be used as a pre/post survey.

RECOMMENDATIONS

The DAMSALS 2 evaluation team appreciates the Technology Needs Assessment as a tool for teachers because it is quick, it focuses on perceived technology needs rather than pressuring teachers to rate their own technology skills, and it produces reliable results. Using the DAMSALS 2 Technology Needs Assessment with teachers has highlighted the cycles that teachers go through with respect to technology integration in the classroom.

The project found that in the beginning, equipment issues are paramount. If the hardware does not work or the Internet access is unreliable, they cannot move forward. Once the equipment issues are taken care of, teachers face the question of how to effectively incorporate the technology into teaching and learning. They need resources, models, and training at this stage. After initial training, their needs shift again to tech support and logistics—how to get a particular data logger to work with their classroom computer, for example.

The Technology Needs Assessment findings also have informed DAMSALS 2 at the local project level. The teachers' responses to the survey led the project team to ask more specific questions about skills needed and to then incorporate those activities into next summer. In DAMSALS 2 second summer, for example, they added more computer trainings, instruction on using Blackboard, and lessons on creating email attachments.

TheDAMSALS 2 evaluation team has the following recommendations for the instrument's use:

1. The teachers' feelings of urgency over the different items can be used as absolute measure, but the tool is best used as a pre/post assessment so you can measure change over time.
2. When using the instrument as a pre/post assessment, watching how the teachers' rank order of the items changes can be meaningful for formative evaluation of a professional development program
3. The original Snapshot Survey is longer because it includes questions about teachers' beliefs about technology in addition to their perceived needs. In our experience, teachers' beliefs about technology are surprisingly consistent—regardless of their own technology access or skill level, teachers are positive about the potential benefits of technology integration in classrooms. Therefore, belief questions in the Snapshot Survey are useful only if you have a group whom you suspect does not have positive beliefs about technology. Generally, the needs questions are most useful because teachers' needs change over time with access and training.

CONCLUSIONS

The instruments presented here represent the kind of instruments housed in the ITEST Online Evaluation Database, an online repository for instruments that measure outcomes such as classroom implementation of IT; pedagogical practice in science and technology; IT skills and proficiencies; attitudes about technology; technology access; technology use; technology confidence; and technology integration. This database serves as a resource for ITEST project principal investigators and evaluators, helping them to develop new evaluation tools for their projects without reinventing the wheel, so to speak, and that are in line with current research. The instruments shared in this article are publicly available with proper citation and recognition of the developers. By presenting these instruments and information about the ITEST Learning Resource Center and its Online Evaluation Database, we hope to share the learnings from the ITEST program with others interested in technology integration and innovative programs to increase interest and engagement with technology.

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APPENDIX A

TECHNOLOGY AT THE CROSSROADS MID-YEAR FOLLOW-UP SURVEY

Technology at the Crossroads Mid-Year Follow-Up Survey.________________________

1. Name ______________________
2. Tree House ____________________

3. If you were describing the Technology at the Crossroads Summer Camp to a friend, what one or two sentences would you use to tell them what the Summer Camp was about?

4. Please write one to two sentences to describe the project that you are working on with your Technology at the Crossroads group this year?

5. Last summer as part of Summer Camp, you had the chance to use different kinds of computer programs and other technology. For each item below, please indicate whether you used it for the *first time* during the Summer Camp or whether you had used it before.

	Used for First Time at Summer Camp	Had Used Before Summer Camp
GPS	❒	❒
GIS software	❒	❒
PDAs	❒	❒
Map Web sites (mapquest, googlemaps)	❒	❒
WebCT	❒	❒
PowerPoint	❒	❒
Clip Art	❒	❒
Digital cameras	❒	❒
HTML programming language	❒	❒

6. Which of these have you used as part of your Technology at the Crossroads meetings this school year? (Check all that apply.)

❒ GPS ❒ WebCT
❒ GIS software ❒ PDAs
❒ PowerPoint ❒ Digital camera
❒ Clip Art ❒ html programming language
❒ Map Web sites (mapquest, googlemaps, etc.)
❒ Other; please describe _________________________

7. Which of these have you used on your own since finishing the Summer Camp? (Check all that apply.)

❒ GPS ❒ WebCT
❒ GIS software ❒ PDAs
❒ PowerPoint ❒ Digital camera
❒ Clip Art ❒ html programming language
❒ Map Web sites (mapquest, googlemaps, etc.)

8. Please describe how skilled you are *now* with each of the following technologies that you learned about during the Summer Camp.

	I cannot perform this skill	I can perform this skill but only with assistance	I can perform this skill well enough for my own personal use	I can perform this skill pretty well, and could teach it to a friend if I had time to review	I can perform this skill very well and could teach it to a friend right now
Using GPS to program a waypoint	❒	❒	❒	❒	❒
Using GPS to find a location	❒	❒	❒	❒	❒
Using ArcPad GIS software of the PDA	❒	❒	❒	❒	❒
Using the PDA to perform other functions	❒	❒	❒	❒	❒
Using GIS to create layers on a map	❒	❒	❒	❒	❒
Using html language to create a Web page	❒	❒	❒	❒	❒
Creating a PowerPoint presentation	❒	❒	❒	❒	❒

9. Last summer as part of Summer Camp, you had the chance to do a number of different science labs. Which of these labs would you recommend the staff keep for next year's Summer Camp?

❒ Orange extract lab
❒ Paper chromatography lab
❒ Muddy River Ecosystem lab
❒ Tree DNA lab

As you know, the experiments listed above are the same ones that Professors Chow and Gurney do with their college students. They have asked their college students to share what they think about the labs and they want to know what you think too. They have asked that you share your ideas with them about the two labs listed below.

For the Muddy River Ecosystem lab, you did field experiments at the Muddy River. You collected water samples, did water tests, collected soil samples, and collected some plant and bug samples.

10. Please describe what you remember about *how you tested the water* from the Muddy River.
11. What did you learn about the river's water quality?
12. What did you learn by looking at the samples under the microscope when you returned to the lab?

For the Paper Chromatography lab, you did an experiment in which you separated the pigments of vegetable leaves.

13. Please describe what you remember about *how you separated the pigment* from the leaves.

14. What substance did you use to separate the color pigments?

15. What did this experiment tell you about the leaves?

16. During the Summer Camp you also learned a lot about different trees in the Boston area. Which of the following trees do you think you could identify if you were walking down the street?

Red Maple	❒ Yes	❒ No	❒ Maybe
Green Ash	❒ Yes	❒ No	❒ Maybe
Paper Birch	❒ Yes	❒ No	❒ Maybe
American Linden	❒ Yes	❒ No	❒ Maybe
Ginkgo	❒ Yes	❒ No	❒ Maybe

17. When was *the last time* that you were walking around the city and identified a tree that you learned about at Summer Camp (either in your head or by pointing it out to somebody else)? The last time I did this was:
❒ over the summer.
❒ in September or October.
❒ in November or December.
❒ within the last month.
❒ within the last week.
❒ I have not done this since Summer Camp ended.

18. How strongly do you agree or disagree with each of the following statements about science?

	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
I like science.	❒	❒	❒	❒	❒
I enjoy learning science.	❒	❒	❒	❒	❒
Science is boring.	❒	❒	❒	❒	❒
I am good in science.	❒	❒	❒	❒	❒
I enjoy learning about technology.	❒	❒	❒	❒	❒
I like using new technology.	❒	❒	❒	❒	❒
I am good at using technology.	❒	❒	❒	❒	❒
Learning about technology is boring.	❒	❒	❒	❒	❒

19. What is the one job you want to have the most when you grow up?

20. Now that you have taken a technology course, which of the following do you think you might like to use in a future job? (Check all that apply)

❒ GPS
❒ GIS software
❒ PowerPoint
❒ Clip Art
❒ Map Web sites (mapquest, googlemaps, etc.)
❒ WebCT
❒ PDAs
❒ Digital camera
❒ html programming language

APPENDIX B
MUSEUM TECH ACADEMY DRAWING METHOD.

Purpose: to explore how students synthesize and connect the archaeological processes they participate in with ideas about the people who once lived at the site.

Prompt: The students are asked to draw a picture portraying "What was life like for someone who lived at the site you've been excavating."

Further Instructions: They are told they can label their drawings, and to write a short description of what they draw. When students ask questions about the assignment (e.g. “can we draw people as stick-figures?” they are encouraged to make their drawings however they choose.

Materials: Standard 8.5” X 11” paper and a variety of colored pens and pencils.

Drawing Time: 15-20 minutes

Interviews: When participants finish their pictures, they take turns explaining their pictures to an evaluator. These interviews are tape recorded and later transcribed.

Coding: The drawings and interviews are coded for concepts together in pairs.

APPENDIX C
SNAPSHOT SURVEY

Technology Needs Assessment

ID# ________________ Date ______________________

Snapshot Survey **What, if anything, do you need to make technology an integral part of your curricular activities?** **Mark the level of urgency for each item.**		**Less Urgent**			**More Urgent**	
1.	Need more time to learn to use computers and the Internet.	☐	☐	☐	☐	☐
2.	Need more time to change the curriculum to better incorporate technology.	☐	☐	☐	☐	☐
3.	Need more training with technology.	☐	☐	☐	☐	☐
4.	Need more training with curriculum and pedagogy that integrate technology.	☐	☐	☐	☐	☐
5.	Need access to more technology for my students.	☐	☐	☐	☐	☐
6.	Need more access to the Internet.	☐	☐	☐	☐	☐
7.	Need more software that is curricular-based.	☐	☐	☐	☐	☐
8.	Need more technical support to keep the technology working.	☐	☐	☐	☐	☐
9.	Need more resources that illustrate how to integrate technology into the curriculum.	☐	☐	☐	☐	☐
10.	Need to be able to try out technology-enhanced curriculum units in my classroom several times before I am comfortable with them.	☐	☐	☐	☐	☐
11.	Need more opportunities to work with colleagues to become more proficient using technology-enhanced curriculum units.	☐	☐	☐	☐	☐
12.	Need more compelling reasons why I should incorporate technology into the classroom.	☐	☐	☐	☐	☐
		Less Urgent			More Urgent	

Original Snapshot Survey items developed by and used with the permission of Dr. Cathleen Norris, University of North Texas, and Dr. Elliot Soloway, University of Michigan, and the Texas Center for Education Technology.

Timeline: Post Three Week Teacher Training & Post One Week Student Camp & Post 2004-2005 Academic Year

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1

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