PT3 Evaluation Report:

Spring 2001 Student Survey Results

Presented to

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Introduction

Evaluators administered a 5-page survey to students at the end of Spring semester, 2001, to gauge the effectiveness of technology integration into the elementary education curriculum. This report complements previous reports on Tech TA and instructors' perspectives of the PT3 program by showing the effect of their effort on students. In particular, evaluation questions addressed by the data analysis include:

1) What are students' self-perceptions of technology skill as related to their future roles as teachers? Do students majoring in different areas have differential skills?
2) What is students' perception of their learning of tools that fit into the four categories of the conceptual framework?
3) Are faculty modeling technology use in ways which will be useful to students in their future as teachers? What is the quality of that modeling? To what degree did students learn technologies in their field placements?
4) What do students think is going well/badly?

Presented below are the methods by which the data were elicited and compiled, the results of the survey as relevant to the four questions above, and recommendations for future action. The project directors should review these suggestions and make (or not) any changes they believe are warranted. This report becomes part of the evaluation record.

Method

101 students were surveyed at the end of the 2001 spring semester from the following courses: EDUC 4311 (N=41; most of these were also enrolled in ProSem II); EDUC 4321 (N=24); EDUC 4411 (N=26); Master's Plus (N=20).

Survey questions derive from:

1) Review of the conceptual framework outlined in the original proposal with its four broad categories of functions of technology in education (communication, enhance daily instruction, efficiency tools, improved learning);
2) Review of the program goals as stated in the proposal: faculty will model uses of technology which students will later use themselves in their own teaching; students will have a deep understanding of "how, why, and when" to use information technology in elementary education; and
3) Themes which emerged from a focus group interview with teacher preparation students representing two cohorts in which students were asked open-ended questions about their experiences with information technology in their education courses.

Groups of questions sought students' perceptions of their skills; value, benefits, and problems of instructional technologies for elementary education; technology use observed in practica; adequacy of instruction of various functions of technology in the teacher preparation program; source of learning about various tools; and open-ended questions about what is going well and what could be improved in regard to technology integration. A copy of the survey is appended.

Responses for each question group are presented below for all classes grouped together and by individual class. Mean scores are reported. Missing values are not included. The data presented are all self-report. They can be taken as representative of student skill level only if one assumes that students have a good sense of what they do know relative to what is possible to know. More likely, these reports represent some level of student confidence that they are receiving different types of instruction. Differences between courses are sometimes telling. For example, students of 4311 usually have lower estimated skill, understanding, etc., than students of 4321 or 4411 (with statistically significant difference).

Results

1. What are students' self-perceptions of technology skill as related to their future roles as teachers? Do students majoring in different areas have differential skills?

Students' Self-Reported Computer Skills

As shown in Table 1 below, most students agree that their computing skills are adequate for personal needs. Fewer, however, agree that their skills are adequate for their professional teaching goals. If a "3" choice on the Likert scale is interpreted as "neither agree nor disagree," only students in 4411 can be said to agree with certainty. For all other classes, there may be at least three reasons why the mean score falls into the "3" range: students may be only slightly sure that they have the required skills; students may be somewhat unsure what those skills should be; or students may simply be indicating uncertainty about the skills needed in the particular placement they will eventually have as a teacher. The fact that students in 4411 were more likely to agree or agree strongly suggests that the instruction they have received by this point in the curriculum has made them feel relatively confident that they both know what skills they will need and that they are prepared. Undergraduates in 4411 are more likely to agree on both questions than Masters Plus students. Whether this is because the undergraduates know less about what they will need or actually believe they have more skill is unclear.

Table 1: Perception of Basic Computing Skills for Personal and Professional Activities*

Question	Combined	4311	4321	4411	MA+
My basic computing skills are adequate for my personal needs	4.03	4.15	3.83	4.39	3.63
My basic computing skills are adequate for my professional teaching goals	3.54	3.34	3.46	4.15	3.30

*Scale: 1 = Strongly Disagree, 5 = Strongly Agree

On the average, students are very confident in their word processing, web browsing, and web searching skills. Also, they are fairly confident of their ability to evaluate materials they find on the web. They are less confident of their ability to use presentation software, spreadsheets, digital imaging technology, web page development, and ability to evaluate educational software packages. Except for web-related tools, self-perceived skill is greater in 4411 than in 4311 or 4321, suggesting that students in 4411 have picked up additional skill, as planned in the matrix prepared at the beginning of the year. Masters Plus students self-rate lower than 4411 students in all categories, though these differences are not statistically significant.

Table 2: Perception of Skill in Various Technologies*

Technology	Combined	4311	4321	4411	MA+
Web page development.	2.74	2.76	2.79	2.80	2.50
Online discussion tools.	4.34	4.51	4.13	4.58	3.95
Presentation software.	**2.65**	2.49	2.13	3.38	2.60
Word processing software.	4.74	4.71	4.65	5.00	4.60

Technology	Combined	4311	4321	4411	MA+
Evaluation of educational software.	3.09	**2.43**	**2.5**	**4.15**	3.80
WWW browsers.	4.48	4.54	4.25	4.62	4.45
Web-based search engines.	4.44	4.54	4.25	4.46	4.40
Evaluation of web materials.	3.96	4.05	3.67	4.08	3.95
Digital imaging technology.	**2.2**	2.10	1.83	2.81	2.10
Spreadsheet.	**2.73**	2.61	2.21	3.46	2.55

Differences in Perception of Skills Across Colleges, Level

We tested differences across schools and colleges as well as Masters Pus to explore whether students in different degree programs perceived that they had differential preparation. If so, instructors would have a better sense of which students were more likely to need or ask for special help. Three main differences emerged.

1) Students majoring in Social Sciences feel they have significantly less skill using a web browser than students majoring in Natural Sciences or Masters Plus ($p < .01$; equal variances not assumed).
2) Students in Natural Sciences are less confident than students in Social Sciences or Humanities that their computer skills are adequate for personal needs ($p < .01$; equal variances not assumed). However, there are no significant differences among these groups when comparing computer skills for professional needs.
3) Masters Plus students have less confidence than Social Science majors in their skill in online discussion ($p < .01$).

2. What are students' perceptions of their learning of tools which fit into the four categories of the conceptual framework? (Do students believe the instruction is valuable? Do they feel they have a deep understanding of the problems and benefits associated with instructional technology for elementary education? Do they feel the instruction they receive is adequate?)

Value of Various Tools

To understand whether students were learning about various tools in ways that would help them to become better teachers, they were asked their perception of the value of various tools. Students reported their perceptions of the value of knowing software packages, use of the World Wide Web (web), and word processing skills as more valuable than other tools, each averaging more than 4.0 on a five point scale from "not important" to "important." With one exception, all other technologies were rated over 3.0, which suggests that students see some value in using them for elementary education. 4311 students rated online discussion for children's learning at 2.49. *This cohort may need to be introduced to how/why this would be valuable. Rec -- include later.*

Table 3: Student Ratings of Technologies' Value*

Technology	Combined	4311	4321	4411	MA+
How to create web pages.	3.61	3.41	3.63	3.58	3.90
Online discussion for teacher professional development.	3.30	2.83	3.58	3.50	3.65
Online discussion for children's learning.	3.10	**2.49**	3.33	3.54	3.45
PowerPoint or other presentation software.	3.40	3.22	3.79	3.54	3.00
Software packages for group instruction.	**4.07**	3.92	**4.5**	**4.08**	3.80
Software packages for independent student learning.	**4.11**	**4.08**	**4.38**	**4.27**	3.65
Student use of WWW for research.	**4.55**	**4.39**	**4.65**	**4.58**	**4.75**

Technology	Combined	4311	4321	4411	MA+
Educational Web sites for teaching particular concepts.	**4.46**	**4.27**	**4.5**	**4.58**	**4.70**
WWW for finding teaching resources.	**4.70**	**4.59**	**4.63**	**4.85**	**4.85**
Digital imaging.	3.45	3.24	3.58	3.39	3.70
Word processing software.	**4.61**	**4.47**	**4.83**	**4.58**	**4.60**

*Scale: 1 = not important, 5 = important

In an attempt to probe students' understanding about the educational costs and benefits of using various tools, we asked students to indicate how well they understood the benefits and problems associated with them. We asked about "problems" because, based on the premise that people learn from surveys (wrongly or rightly), we did not want to imply to students that there are only benefits associated with technology use. Questions covered examples in each of the four instructional categories of technology in the conceptual framework. Some of these were broken down into more concrete categories to help students visualize the tools we were asking about. For example, "as a tool to link children with others inside and outside the classroom" is more concrete than "a communication tool."

The scale ranged from "no understanding" to "deep understanding"; means for each question and course are presented in tables 4a-4h below. Students claimed at least some understanding of the benefits. Although students say they are aware of benefits, they claim a lower awareness of problems that may be associated with use. Most "benefits" ratings averaged between 3.4 and 4.2, while most "problem" ratings averaged between 2.7 and 3.2.

We also asked students to agree or disagree with statements that various technologies in these categories had been sufficiently addressed in their courses. The results are also shown in Tables 4a-4F. On a scale ranging from "disagree strongly" to "agree strongly," with the exception of MA+, most scores for this category were below 3.0, suggesting that students perhaps perceive there is more to know and that it was not covered in their classes. The MA+ group ranked coverage for several instructional uses of technology over 3, indicating that more students agreed than disagreed. Perhaps lessons could be learned from how this group approached some of these areas. All classes could more sufficiently address technology as a resource for non-instructional tasks, as a resource to assess children's learning, and as a resource to address social, legal, and ethical issues.

4a.

		Overall	4311	4321	4411	MA +
For elementary students' learning	Benefits	3.82	3.61	4.13	3.96	3.70
	Problems	3.21	2.95	3.17	3.38	3.50
	Sufficiently addressed	3.00	2.73	3.21	2.96	3.30

		Overall	4311	4321	4411	MA +
As a resource for instructional planning	Benefits	4.05	3.80	4.08	4.27	4.20
	Problems	3.01	2.78	3.04	3.15	3.15
	Sufficiently addressed	2.98	2.66	3.17	2.96	3.45

4c.

		Overall	4311	4321	4411	MA +
As a resource for professional development	Benefits	3.94	3.80	3.83	4.19	4.00
	Problems	3.01	2.90	2.96	3.08	3.10
	Sufficiently addressed	3.26	3.22	3.04	3.24	3.65

4d.

		Overall	4311	4321	4411	MA +
As a resource for non-instructional tasks	Benefits	3.64	3.59	3.54	3.88	3.55
	Problems	2.96	2.90	2.96	2.96	3.00
	Sufficiently addressed	**2.42**	**2.15**	**2.42**	**2.72**	**2.60**

4e.

		Overall	4311	4321	4411	MA +
As a tool to support children's group work	Benefits	3.39	3.20	3.50	3.42	3.55
	Problems	2.96	2.70	3.13	3.15	2.95
	Sufficiently addressed	2.83	2.56	2.79	2.84	3.40

4f.

		Overall	4311	4321	4411	MA +
As a tool to link children with others inside and outside of the classroom	Benefits	3.79	3.61	4.00	3.77	4.00
	Problems	3.03	2.75	3.29	3.08	3.10
	Sufficiently addressed	2.95	2.54	3.13	3.24	3.25

4g.

		Overall	4311	4321	4411	MA +
As a resource to assess children's learning	Benefits	3.37	3.22	3.38	3.50	3.45
	Problems	3.00	2.80	3.13	3.04	3.10
	Sufficiently addressed	**2.36**	**1.98**	**2.38**	**2.72**	**2.65**

4h.

		Overall	4311	4321	4411	MA +
As a resource to address social, legal, and ethical issues	Benefits	3.15	3.05	3.38	3.31	2.85
	Problems	2.87	2.73	2.92	2.96	2.90
	Sufficiently addressed	**2.41**	**2.12**	**2.88**	**2.52**	**2.35**

Scale: no understanding – deep understanding; sufficient/insufficient

3. What is the source of instruction of different tools? Are faculty modeling technology use in ways which will be useful to students in their future as teachers? What is the quality of that modeling?

An issue in the capacity building year was whether faculty were learning and modeling technology uses or whether Tech TAs were doing the teaching. In addition, focus group data suggests that for at least some tools, practicum teachers were providing the instruction rather than CU faculty. To check for source of instruction as well as to test the claim that students were learning certain tools from practicum teachers, we asked where students learned about the various tools they were asked to use over the semester. The results are below in Tables 5a-5g. Based on these results, it appears that the instructors in most classes were successful in leading technology activities. When reading the results, note that the instruction of various tools was planned to occur in different courses, so "have not learned" is a perfectly reasonable response for many tools. Students were about as likely to have learned web page creation from instructors as from TAs. Students are learning much less from their field placements than they are from their course work.

		4311	4321	4411	MA+

Use of the Web for Student Research	Instructor	14 of 41	**17 of 24**	**13 of 26**	**14 of 20**
	TA	12 of 41	9 of 24	4 of 26	5 of 20
	Field Placement	3 of 41	3 of 24	3 of 26	1 of 20
	Workshop	6 of 31	7 of 24	3 of 26	3 of 20
	Have not learned	4 of 41	0 of 24	0 of 26	0 of 20
	Other	15 of 41	6 of 24	8 of 26	4 of 20

		4311	4321	4411	MA+
How to create Web Pages	Instructor	6 of 41	**17 of 24**	14 of 26	12 of 20
	TA	**23 of 41**	**17 of 24**	11 of 26	9 of 20
	Field Placement	4 of 41	0 of 24	0 of 26	0 of 20
	Workshop	**19 of 41**	8 of 24	10 of 26	12 of 20
	Have not learned	1 of 41	1 of 24	2 of 26	0 of 20
	Other	7 of 41	3 of 24	3 of 26	2 of 20

		4311	4321	4411	MA+
Use of online discussion to improve teaching	Instructor	**27 of 41**	**20 of 24**	**19 of 26**	**19 of 20**
	TA	2 of 41	10 of 24	6 of 26	3 of 20
	Field Placement	4 of 41	0 of 24	1 of 26	0 of 20
	Workshop	4 of 41	2 of 24	3 of 26	1 of 20
	Have not learned	7 of 41	0 of 24	1 of 26	0 of 20
	Other	3 of 41	1 of 24	2 of 26	1 of 20

		4311	4321	4411	MA+
Use of presentation software	Instructor	3 of 41	4 of 24	8 of 26	4 of 20
	TA	1 of 41	1 of 24	7 of 26	1 of 20
	Field Placement	0 of 41	0 of 24	0 of 26	0 of 20
	Workshop	0 of 41	0 of 24	6 of 26	3 of 20
	Have not learned	**25 of 41**	**14 of 24**	**1 of 26**	7 of 20
	Other	14 of 41	6 of 24	10 of 26	6 of 20

		4311	4321	4411	MA+
Use of software for independent student learning	Instructor	4 of 41	**10 of 24**	9 of 26	**15 of 20**
	TA	1 of 41	3 of 24	1 of 26	2 of 20
	Field Placement	5 of 41	2 of 24	7 of 26	4 of 20
	Workshop	0 of 41	0 of 24	2 of 26	2 of 20
	Have not learned	**24 of 41**	9 of 24	1 of 26	1 of 20
	Other	7 of 41	3 of 24	5 of 26	2 of 20
	Software Review Center	1 of 41	0 of 24	**8 of 26**	3 of 20

		4311	4321	4411	MA+
Use of software for group instruction	Instructor	4 of 41	**17 of 24**	**11 of 26**	**19 of 20**
	TA	0 of 41	4 of 24	5 of 26	2 of 20
	Field Placement	1 of 41	1 of 24	2 of 26	1 of 20
	Workshop	0 of 41	0 of 24	0 of 26	2 of 20
	Have not learned	**30 of 41**	6 of 24	3 of 26	0 of 20
	Other	6 of 41	0 of 24	4 of 26	1 of 20
	Software Review Center	0 of 41	0 of 24	5 of 26	4 of 20

		4311	4321	4411	MA+
Use of the Web to find instructional resources	Instructor	**16 of 41**	**15 of 24**	**14 of 26**	**15 of 20**
	TA	**14 of 41**	8 of 24	7 of 26	3 of 20
	Field Placement	2 of 41	2 of 24	3 of 26	1 of 20
	Workshop	9 of 41	2 of 24	3 of 26	6 of 20
	Have not learned	1 of 41	2 of 24	1 of 26	1 of 20
	Other	**15 of 41**	6 of 24	8 of 26	5 of 20
	Software Review Center	0 of 41	0 of 24	4 of 26	0 of 20

		4311	4321	4411	MA+
Use of the Web sites to teach particular concepts	Instructor	17 of 41	**20 of 24**	**16 of 26**	**12 of 20**
	TA	**12 of 41**	6 of 24	7 of 26	2 of 20
	Field Placement	1 of 41	1 of 24	1 of 26	2 of 20
	Workshop	6 of 41	1 of 24	1 of 26	2 of 20
	Have not learned	10 of 41	4 of 24	3 of 26	2 of 20
	Other	**10 of 41**	1 of 24	6 of 26	6 of 20

		4311	4321	4411	MA+
Use of digital imaging technology	Instructor	2 of 41	2 of 24	1 of 26	3 of 20
	TA	**2 of 41**	4 of 24	5 of 26	0 of 20
	Field Placement	1 of 41	0 of 24	3 of 26	0 of 20
	Workshop	0 of 41	0 of 24	3 of 26	0 of 20
	Have not learned	**30 of 41**	**15 of 24**	8 of 26	**14 of 20**
	Other	8 of 41	3 of 24	8 of 26	4 of 20

4. What do students think is going well/badly?

We asked students what they thought their courses were doing well and how they could be improved in terms of educational technology. We also asked what else they would like to tell us. The analytical method employed best fits into content analysis. First, we researchers read through the data several times, labeling them and establishing a classification scheme according to emergent patterns. In an iterative process, relevant data were coded according to category. Themes that emerged include instructor modeling, support, student skill level, technology integration v. taught separately, meaningfulness of

technology instruction, workshops, and tools. Example comments and tables showing the frequencies of positive, negative, and no comment relevant to each theme are presented below. For the most part, comments in any area were few; where comments were many in each course, the number is in bold in each table.

Faculty modeling. The ability of instructors to model technology use emerged from comments such as the following: "Be more organized! Understand where you are going and what you're doing before teaching it"; "Have TA's or teachers know what they are teaching! When they don't it gets extremely confusing"; "Classes are often condescending and taught by people who have very limited knowledge themselves."

Support. Support issues included the students' ability to do assignments because of access to TAs, equipment, and materials or resources. They wrote, "TAs do an excellent job helping students in any way that they can and they are very knowledgeable." "The TAs are the only reason I was able to successfully complete my assignments. They are a great addition." "The lab needs to be more accessible, TAs need to be more accessible as well." "Better handouts – need to include all steps." "More handouts to refer back to."

Student skill level. Some students referred to their expertise or inadequate skill with technology and requested that students to be grouped or supported accordingly. Examples were "Group students by ability (some of us have years of technology experience – others none)." "Put us in more homogeneous groups in instruction." "Split classes into remedial computer people such as me and those who know most of it."

Technology integration and separation. Some students complained about the lack of integration of technology into their courses: "Make it more a part of the course. One or two workshops are not going to make me remember." "Don't treat it (technology) like an added piece that must be dealt with, but that we really don't have time for." "Technology is thrown into the curriculum in a confusing, disorganized way." "If instructors are really committed I'd like it if all instructors tried to integrate technology, not just make it an extra!" At the same time, however, many students feel that there should be a separate course on technology or more time devoted to technology activities during class time. They said things like "Have a separate course for technology only. Instructors don't seem to know much about technology and it is wrong to think that many students can learn how to do web design after one 2 hour session of teaching web design." "Provide more class time for technology instruction." "Have it be more gradual and devote a class to it if it is so important." "More class time to work on it, either make it it's own class or give class time not our time to do it. We already have so much to do we don't get credit for." "Make it part of the regular classroom stuff!"

Meaningfulness of technology instruction. Several students felt that the technology instruction that they received was not meaningful to them. "[SOE could improve] by actually addressing how to use tools within the classroom as opposed to just 'how to use tools', by making technology more of an integral and useful part of program rather than worthless extra work for courses." "Don't do things at the beginning of the year but instead incorporate it when it is applicable to us." "More tech assignments geared towards what I could actually use while teaching." "How is technology useful in terms of teaching kids where to go?" "Don't make us do useless projects. Who is ever going to look at our Mexican-American web site? It would be better if everyone could come up with his or her own idea for a page."

Many students commented on the workshops that were offered. "It is too hard to plan when we need to be there when workshops are held outside of class time." "Providing workshops was a helpful way to teach new ideas/concepts." "Need better workshops, more workshops, perhaps more consistently, not just once." "We shouldn't have to find extra time for the workshops."

Tools. As with all the other categories, some students were critical and some appreciative. Some students did not like some of the technology they were being introduced to. "Educate us in something that will be useful for when we start teaching, not stuff that is common sense, i.e. how to find a web page." "Stop pretending that mundane web assignments give us the skills to be web designers." Other students wanted more exposure to more tools. "Show technology that will help me perform as a teacher, i.e. Outlook, PDA's, grading, rubric software, Excel, better listing of web resources, use of IBM and Mac, use more powerful web creation tools like Adobe/Macromedia – especially if I am to create a web portfolio." "More instruction with presentation software, visual imaging, using computers for assessment." Many students, however, were grateful for the opportunity to be exposed/introduced to technology. "They are teaching us how to use AlphaSmarts, PowerPoint, web design, Inspiration … overall I feel I will use all of these types of technology as a teacher (and otherwise)." "I appreciate the knowledge I've gained in regards to web page templates and evaluating educational software."

Instructor modeling	4311	4321	4411	MA+
No comment	37 of 41	0 of 24	21 of 26	18 of 20
Not satisfied	4 of 41	3 of 24	5 of 26	2 of 20
Satisfied	0 of 41	0 of 24	0 of 26	0 of 20

Support	4311	4321	4411	MA+
No comment	23 of 41	18 of 24	20 of 26	15 of 20
Not satisfied	3 of 41	4 of 24	5 of 26	3 of 20
Satisfied	**15 of 41**	2 of 24	1 of 26	2of 20

Student Skill	4311	4321	4411	MA+
No comment	33 of 41	22 of 24	25 of 26	18 of 20
Inadequate	6 of 41	1 of 24	1 of 26	0 of 20
Over adequate	2 of 41	1 0f 24	0 of 26	2 of 20

Technology as an add-on	4311	4321	4411	MA+
No comment	32 of 41	16 of 24	18 of 26	14 of 20
Inadequate	**9 of 41**	**7 of 24**	**8 of 26**	4 of 20
Over adequate	0 of 41	1 0f 24	0 of 26	2 of 20

Separate / More class time	4311	4321	4411	MA+
No comment	17 of 41	13 of 24	14 of 26	19 of 20
Separate class	**16 of 41**	**9 of 24**	**7 of 26**	1 of 20
More class time	**8 of 41**	2 0f 24	**5 of 26**	0 of 20

Meaningful instruction	4311	4321	4411	MA+
No comment	27 of 41	18 of 24	19 of 26	0 of 20
Not satisfied	**14 of 41**	4 of 24	6 of 26	**10 of 20**
Satisfied	0 of 41	2 0f 24	1 of 26	0 of 20

Workshops	4311	4321	4411	MA+
No comment	35 of 41	18 of 24	21 of 26	15 of 20
Not satisfied	6 of 41	3 of 24	3 of 26	5 of 20
Satisfied	0 of 41	3 0f 24	2 of 26	0 of 20

Appreciation of tools	4311	4321	4411	MA+
No comment	18 of 41	13 of 24	14 of 26	7 of 20
Not satisfied	5 of 41	0 of 24	4 of 26	0 of 20
Satisfied	**18 of 41**	**11 0f 24**	8 of 26	**13 of 20**

Want more tools	4311	4321	4411	MA+
No comment	38 of 41	20 of 24	25 of 26	17 of 20
Want more	3 of 41	4 of 24	1 of 26	3 of 20

Conclusions – both surveys

Students and instructors seem to be acquiring technology skills.

Some ISTE and PT3 goals have been sufficiently addressed, some have not. Overall student averages suggest that technology has been sufficiently addressed as a resource for professional development (3.26), moderately sufficiently addressed as a resource for elementary students' learning (3.00), as a resource for instructional planning (2.98), as a tool to link children with others inside and outside of the classroom (2.95), and as a tool to support children's group work (2.83). Student survey means suggest technology has not been sufficiently addressed as a resource for non-instructional tasks (2.42), as a resource to assess children's learning (2.36), and as a resource to address social, legal, and ethical issues (2.41). Instructor responses corroborate that assessing children's learning has not been sufficiently addressed (2.41) and social, legal, and ethical issues not strongly addressed (2.82). Instructors did feel that technology as a resource for non-instructional tasks was sufficiently addressed (3.42). Most Tech TA's did not respond to these questions.

Support emerged as an salient theme. Many students liked having Tech TA support, especially 4311. Instructors would have like to have Tech TAs more available before, during, and after class. Students and instructors both responded they would have liked easier access to equipment and support materials to practice. Many students responded that they would like more in-class support, not having outside of class workshops.

The relationship between the skills being introduced well and the Standards not being sufficiently addressed could be related to the students who questioned the meaningfulness of technology assignments. For example, all students participated in online discussion, yet many did not feel they understood its value for children's learning. Perhaps when given, technology assignments were not always explicitly discussed in terms of teaching and learning.

Pre and post surveys of instructors knowledge and beliefs would be beneficial to measure gains. Instructors appear to have skill with technology and to have led many class activities. However, gains

could not be measured. Also, Tech TAs still led many activities. It would be nice to see how this changes over the course of the grant.