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Making Connections with Technology: Longitudinal Analysis of the Impact of Hand Held Computers on Student Reading Achievement

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Abstract

The current study uses linear mixed-model analyses to examine the influence of a technology-infused curriculum on middle school students' reading achievement. The major findings suggest a growth in the amount of time and the ways teachers and students use technology, especially hand held computers. More importantly, the variability in technology use across classrooms is slowly changing – more teachers are using technology more often and for a variety of purposes. The use of Palm handhelds has increased both in the number of teachers as well as the numbers of lessons where handhelds are integrated. Students surveyed report that they find the Palm easy to use, though only about half report using the computers for activities beyond teacher directed activities and the majority do not believe their performance is improved by the Palm.

In terms of student achievement over five waves of testing, the strongest relationships racial differences in student reading achievement over two years as well as differences between testing cycles. The model presented here is a promising first step in describing replicable, quantifiable relationships on a large scale between technology use and student achievement.

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Purpose

The promise of computing and digital technologies for K-12 classrooms has been investigated and pursued passionately by practitioners, researchers, and theorists alike. Educators have examined the variables contributing, intervening and enhancing the effects of technology on learning and achievement. The current study uses linear mixed-model analyses to examine the influence of a technology-infused curriculum on middle school students' reading achievement.

Theoretical Framework

The relationships affecting student achievement are naturally complex. System issues (like access, planning and vision), teacher issues (like skill, pedagogy, and comfort level), and the interaction of these with technologies themselves have been considered as key agents in complex models of change (Hunger, Bagley, & Bagley, 1993; Mehlinger, 1997; Tetreault, 1998; Odom & Griffin, 1999).

Claims of the effects of these technologies touch learners in many ways: attitudes, thinking, collaborative skills, and most importantly, in this age of heightened accountability pressures, standardized tests scores across skill and content areas (Hill, 1993; Means & Olsen, 1997; Wenglinsky, 1998; Rampp & Guffey, 1998; Honey, Culp, & Carrigg, 1999; Mann, Shakeshaft, Becker, & Kottkamp, 1999; Schacter & Fagnano, 1999). The excitement of these claims is amplified by studies suggesting that minority students and students at-risk due to poverty or learning problems are not excluded from these gains when sound projects are implemented (Kozma & Croninger, 1992; Diggs,

1997; Alfaro, 1999; Thornton & Wongbundhit, 2002). Access to technologies is the key to opening the benefits to these students – access to files, telecommunications, and interactive services to bridge the real inequities that exist (Center for Science, Mathematics, and Engineering Education, 1995; Means and Olson, 1997).

The mere access of the technology, however, does not guarantee academic benefits for all students. Regardless of the student population being served, the implementation issues are the same—effectively utilizing available technology tools to enhance student productivity, support collaboration or engage students in real-life, authentic learning experiences.

The mediating factors influencing the role of technology in learner achievement have been a primary focus of researcher attention. The idea that technology's influence does not occur in a vacuum but rather is inextricably linked to instructional practice as informed many models for "best practices" in the effective integration of technology (Harel & Papert, 1990; Means et al., 1993; Tetreault, 1998; Schacter & Fagnano, 1999; Krajcik, Marx, Blumenfeld, Soloway, Fishman, 2000; Sherry, Billig, Jesse, & Watson-Acosta, 2001)

What do researchers and theorists tell us are the key factors in the transformative use of technology? One important component is conceptualizing the technology based reform in the context of the system being transformed. Change is a process that takes time and the fluidity may not be consistent across different agents in the system. Many projects have recognized the key role of teachers as an important change agent, especially in the integration of technology into daily instruction (Cradler & Cradler, 2000). Access

to a sound infrastructure, both human and technological, is also considered a key prerequisite to sustained reform (Cradler & Beuthel, 2001).

Ideas on how to best frame technology-rich instructional activities in ways that maximize positive outcomes have been steadily evolving. (Schacter, 1999; Wang, Laffey, & Poole, 2001). Practitioners have worked hard to translate these theories of technology integration practices into effective training and teacher preparation models (Means & Olson, 1997; Sparks, 1997; Sparks & Hirsh, 1997; Middleton & Murray, 1999; Mills, 1999; Sparks, 1999; Killion, 2000; Christensen, Griffin, & Knezek, 2001; Shibley, 2001; Thornton & Wongbundhit, 2002; Zhao, Pugh, Sheldon, & Byers, 2002). Specifically, teachers need to know how to use and have access to the additional resources as well as to the application they have selected; an awareness of and access to timely technical guidance; to use technology applications that are consistent with their own teaching practice and pedagogy, the social dynamics of the school, the school culture (collaborative or individualistic), and the curricular goals of the school and district; and colleagues who will support and mentor them through the implementation of their innovative efforts. Teachers need time to design and receive feedback on complex new units. They need to observe others and work collaboratively to reshape curriculum aligned to content standards. And of course, they need improved technical skills. Schools and districts need a thoughtful vision and clear plans for all these effective implementation elements to come together (Breithaupt, 2000). Some have even suggested that healthy change is progressive rather than revolutionary. School environments need to include healthy human infrastructure and functional and convenient technical infrastructure (Zhao, Pugh, Sheldon, & Byers, 2002).

The current research applies these ideas of technology rich curriculum applications in a large Midwestern suburban school district. "Connections" – between and among students, school staff, parents, and community partners – are critical factors for any student's success. The school district has identified through data analysis three subgroups of students for whom connections through technology integration can benefit their achievement in language arts, reading, and math. Support for the targeted subgroups seeks to open avenues to these students that will benefit entire families. This report focuses on the aspect of the project that targets students from one middle school in the district who lack proficiency in language arts and/or math. In that sense, it attempts to encompass the crucial design-based research tenets described by Fishman, Marx, Blumenfeld & Krajcik (2004) through its focus on an entire school district and reform with all teachers in the school.

While the project measures integration of all types of technology by teachers, there is a specific focus on the use of handheld technology (Palm) by the 7th and 8th grade teachers and students. The model focuses on appropriate preparation of teachers to implement technology through face-to-face training as well as on-going technology support in their classrooms. Teacher training using technology began in summer 2003. Systematic integration of technology into classroom lessons began in January 2004. Targeted use of hand held technology by seventh and eighth grade teachers and students began in fall 2004. Technology implementation is tracked throughout the project to enable a clear understanding of the relationships between different technologies, different ways of using these technologies by students and teachers, and student outcomes. Finally, using mixed model analyses, the relationships between students' achievement for

different student populations are explored. Future directions to examine relationships between achievement and teacher, technology, and instructional practices are recommended.

Methods

Participants

Forty-two seventh and eighth grade teachers participated in technology training in 2003-2004 and 2004-2005 academic years. Student achievement data represent 775 total; students participating for one year (7^{th} and 9^{th} graders) as well as students participating two years (8^{th} graders). Student Palm surveys were completed by 254 students in 7^{th} and 8^{th} grades (n_7=164, n_8=90).

Data Analysis

Descriptive statistics are used to analyze teacher preparedness and technology implementation. A multi-level model of change is applied to STAR reading data (NCE scores) over five testing periods (September 2003, January 2004, May 2004, September 2004, and May 2005). In addition to STAR data, students' race (coded as white or non-white), students' grade level, Terra Nova Cognitive Skills Inventory score, and month of test are considered.

This model allows for the intercept and slopes for each student to be considered random and correlated over the testing periods. Estimates of fixed effects, random effects and variance parameters were produced using restricted maximum likelihood (REML). Tests of the significance of fixed effects used the Wald statistic. Decisions about improvement in tested models were made by examining the tables of information criteria,

specifically -2Restricted Log Likelihood, Akaikes information criteria (AIC) and Bayesian information criteria (BIC).

Data Sources

STAR

STAR reading is a computer-adaptive, norm-referenced reading test. Reliability coefficients for grades 7-9 (generic, alternate forms, split half) range from .82-.90. Concurrent validity coefficients for STAR correlated with Iowa Tests of Basic Skills in 1998-1999 for all forms range from .61 - .87 for grades 7-9.

Terra Nova Cognitive Skills Test

The Terra Nova Cognitive Skills (InView) test is a standardized measure of intelligence. It was standardized concurrently with the new edition of Terra Nova in the spring of 2000. The test measures students' thinking and reasoning skills by assessing performance on several cognitive tasks.

Technology Implementation Logs

Online logs completed weekly by 7th and 8th grade teachers. Logs outline type of technology as well as specific technology uses and instructional goals

Training Quality Surveys

Online surveys are completed after training sessions by all participating teachers

Teacher Technology Skill Surveys

Online self-report surveys of teacher competency using hand held computers and software.

Student Palm Survey

Online surveys are completed by students in the spring semester reporting experience using the Palm for the year.

Results

Teacher Preparedness

Teacher satisfaction with training quality is measured across nine indicators. Feedback from teachers indicates a high level of satisfaction with the training quality with the exception of the amount of time allocated for activities, with 20% of teachers indicating there is not adequate time for each training segment. Narrative feedback indicates that teachers appreciate the time to learn in small groups and like the applied nature of the trainings.

Teachers indicated their skill level (unfamiliar, beginner, confident, can teach others) on twelve different aspects of using hand held computers (see *Figure 1*). Results of the technology survey indicate that teachers feel they are confident in their skills with general operating features of the Palm. However, there is clear room for growth in their skill level with applications and advanced features. The majority of teachers report that they are unfamiliar or beginners using iKWL, Palm Reader and applications like Print Boy, Converter, iKWL, Inspiration, Quizzler, and Due Yesterday (see *Figure 2*).

Technology Implementation-General

Word processors and browsers stand out as the dominant software types used by students (as reported by teachers) in the lessons logged at the beginning of the 2004-2005 year while word processing and Accelerated Math and Reading (listed as Other) account for about half of the software use by students in the spring. Levels of use of hand held

computers are the highest in the spring as well. Length of technology use is much more variable in the fall while twenty to twenty-five percent of spring lessons report up to 30 minutes, one-two hours, and two hours of student technology use.

Software Use

In the Spring 2004, lessons described by teachers indicate mostly the use of word processors and browsers (see *Figure 3*). This pattern continues in the Fall 2004 implementation logs. In Spring 2005, the pattern shifts slightly with still about 1/3 of the lessons logged including word processing, but slightly higher proportions of spreadsheet and presentation software use and lower proportions of internet browser use (see*Figure 4* and *Figure 5*).

In Spring 2004, word processing, PLATO, and internet browsers are the most dominant software types in lessons logged by teachers (see *Figure 6*). In Fall 2004, word processors and browsers stand out as the dominant software types used by students in the lessons logged (see *Figure 7*). Finally, in Spring 2005, word processing and other (Accelerated Math and Reading) account for about half of the software use by students (*Figure 8*).

Technology Time

For teacher technology use, lessons logged in Spring 2004 indicate that about half of the lessons required teacher technology use of about one or about two hours (26% and 29%, respectively; see *Figure 9*). Almost 20% of the lessons in Spring 2004 required only 0-30 minutes. In Fall 2004, 30% of the lessons logged show teacher weekly technology use at five or more hours (see *Figure 10*). The remaining lessons are about equally distributed across the different times. Finally, in Spring 2005, one-third of the

lessons indicate five or more hours of teacher technology time and almost 30% indicate about two hours of technology time (see *Figure 11*).

Length of technology use by students in Spring 2004, Fall 2004, and Spring 2005 show mixed results. For Spring 2004, almost two thirds of the lessons logged report about one and two hours of student weekly technology use (see *Figure 12*). For Fall 2004, weekly technology use is highly variable. About equal proportions of lessons report about one hour, about two hours, about three hours, five hours or more as well as none (*Figure 13*). For Spring 2005, about a quarter of about equal proportions (just under 20%) of lessons show about one and about two hours of student technology use per week (see). For Spring 2005, more lessons logged show 0-30 minutes of weekly technology use than previous semesters (about 20%; see *Figure 14*). About one quarter of the lessons show about two hours of weekly technology use. Finally, the percent of lessons logged that report no technology use remains relatively constant at about 13%.

Purposes of Technology Use

In Fall 2004 and Spring 2005, teachers logged the purposes of technology use for themselves (chosen from a list of possible purposes; see *Figure 15* and *Figure 16*). Teachers' use of technology in the lessons represents a balance across the different purposes presented, with creating instructional materials listed most frequently.

In Fall 2004 and Spring 2005, teachers also logged the purposes of technology use for the students and (chosen from a list of possible purposes; see *Figure 17* and *Figure 18*). Teachers consistently report many of the purposes for their lessons; no clear patterns of use are evident, except that no teachers report students publishing their work on the web.

Barriers to Technology Implementation

Teachers selected barriers to the effective implementation of the lessons for Fall 2004 and Spring 2005 (see *Figure 19* and *Figure 20*). The most frequently cited barrier is time for both semesters. For Fall 2004, teachers equally identified student engagement, student technology knowledge, and technology reliability as barriers. In Spring 2005, technology access is a prominent barrier with student engagement and technology knowledge proportionally less.

Technology Implementation – Palm

Use of the Palm handhelds increased in the second year (2004-2005) of the grant, both in the numbers of teachers using the hardware and in the numbers of lessons implemented (see Table 1).

In surveys of 7th and 8th grade students whose teachers had implemented lessons with the Palm (n=254), some trends are evident. First, students largely find the Palm easy to use (see *Figure 21*). For about half of these students, the Palms were used about two to three or more days per week for about one to two periods per day. About half of the surveyed students report that the use went beyond teacher-directed activities (see *Figure 22* and *Figure 23*). Around half of the students in each grade (50% for 7th grade; 60% for 8th grade) report that Palm activities go beyond teacher-directed activities (see *Figure 24*). However, most students do not believe that their performance on tasks are improved by using the Palm (66% for 7th graders; 76% for 8th graders; see *Figure 25*).

Student Achievement and Technology Use

Data from six tested models are presented (see Table 2). Because Models 5, and 6 produce essentially the same information criteria, the simpler model (Model 6) is selected.

The adopted model includes estimates for race, month of testing, and scores on the Cognitive Skills Index (as a covariate). Plots of residuals with predicted values indicate the model is tenable. Tests of fixed effects show all of these variables are significant at $p<.05$ (see *Table 3*), indicating that the covariates of test month and CSI as well as the factor for race significantly explain the variation in students' scores. Parameter estimates (see *Table 4*) indicate that white students score about seven points higher than non-white students at each testing interval. Pairwise Bonferroni tests of these differences are significant at $p<.00001$ (see *Table 5* and *Table 6*).

In *Figure 26,* these differences are clear across all testing periods. It is important to note that the interaction of race and testing periods is not significant, indicating that white and non-white students are not increasing at different rates. Although scores for May 2004 show a decline for non-white students and an increase for white students, the differences between slopes for white and non-white students over time is not significant in this model.

Educational Importance

In terms of preparing teachers to integrate technology into language arts instruction, specifically the effective use of hand held computers, teachers report high levels of satisfaction with training activities. Self-reports of their technology proficiency

indicate that teachers are confident with their hardware skills but report room for growth in using software correctly and effectively.

Implementation log data suggest that throughout the grant period there has been a growth in the amount of time and the ways teachers use technology, especially in the increase in hand held computers use with students. More importantly, the variability in technology use across teachers is slowly changing – more teachers are using technology more often and for a variety of purposes supported by the grant training.

The use of Palm handhelds has increased both in the number of teachers as well as the numbers of lessons where handhelds are integrated. Students surveyed report that they find the Palm easy to use, though only about half report using the computers for activities beyond teacher directed activities and the majority do not believe their performance is improved by the Palm.

In terms of student achievement over five waves of testing, the relationships that are strongest in these data show racial differences in student reading achievement over the two year period as well as differences between testing cycles. White students are scoring higher than non-white students by about seven points (although their rate of change is not significantly different). There are no significant grade level differences in change, indicating that the increased exposure to grant activities for eighth graders has not translated into clear gains in reading scores. The ninth graders in this analysis experienced about one semester of technology integration; the eighth graders have participated in three semesters of grant activities, and the seventh graders have participated in two semesters of technology-infused curriculum.

The model presented here is a promising first step in describing replicable, quantifiable relationships on a large scale between technology use and student achievement. Future analyses will extend this exploration of student differences in important ways. First, as the current wave of seventh graders completes a second full year of the grant, grade level differences should emerge if the curriculum is causing discernible differences in student achievement. Improving missing data issues for technology implementation will allow more clear examinations of the relationship between technology integration variability and student outcomes. Finally, more complete information about these relationships will provide the district with clearer evidence for programmatic decisions. Overall, this work demonstrates a promising path to understanding technology as an agent of change at the middle school level.

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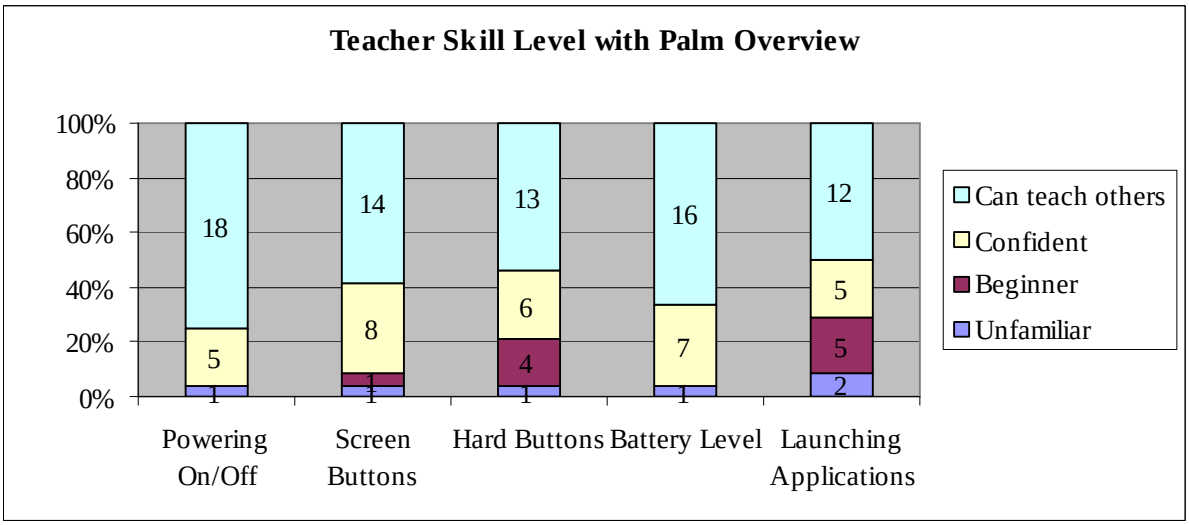
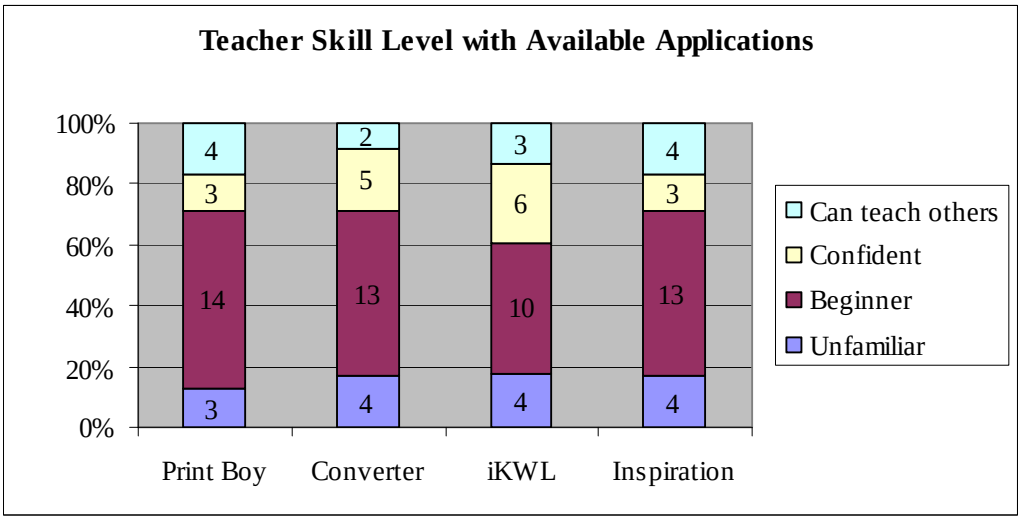
Figure 1. Teacher skill with hand held computers



Note: n=24

Figure 2. Teacher skill with hand held applications



Note: n=24 (n_{iKWL}=23)

Figure 3. Teacher Software Use Spring 2003 – 2004

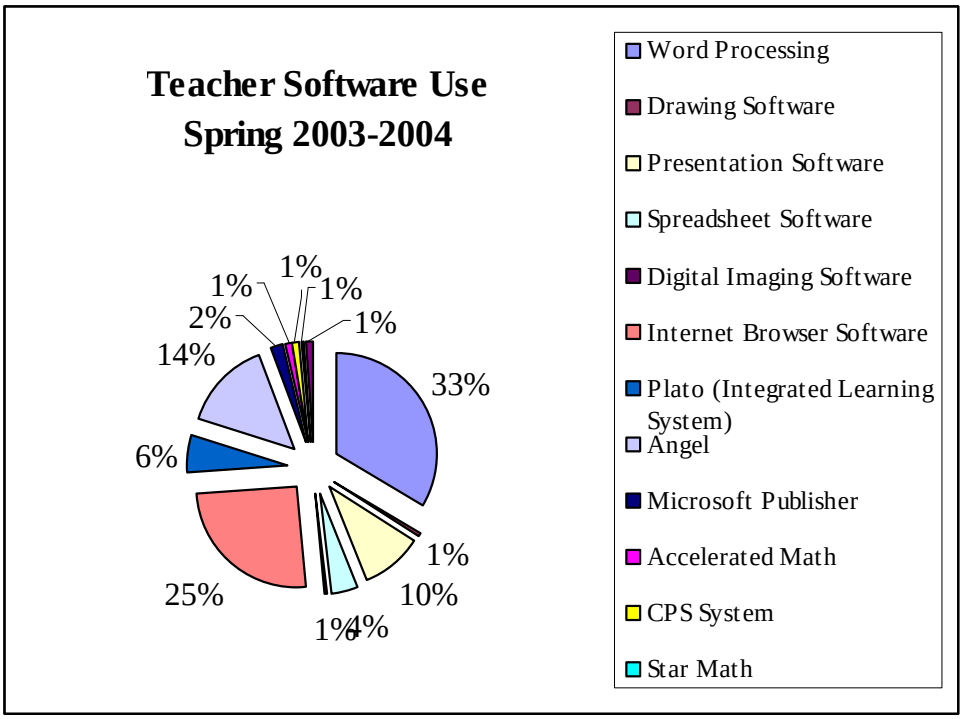


Figure 4. Teacher Software Use Fall 2004-2005

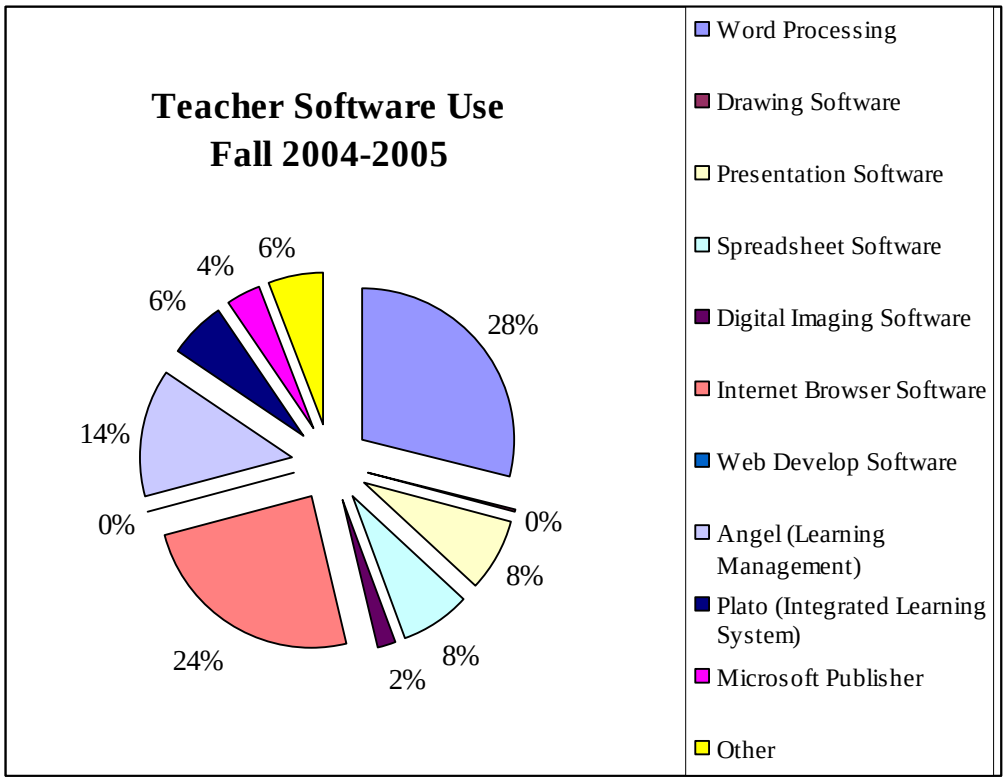


Figure 5. Teacher Software Use Spring 2004-2005

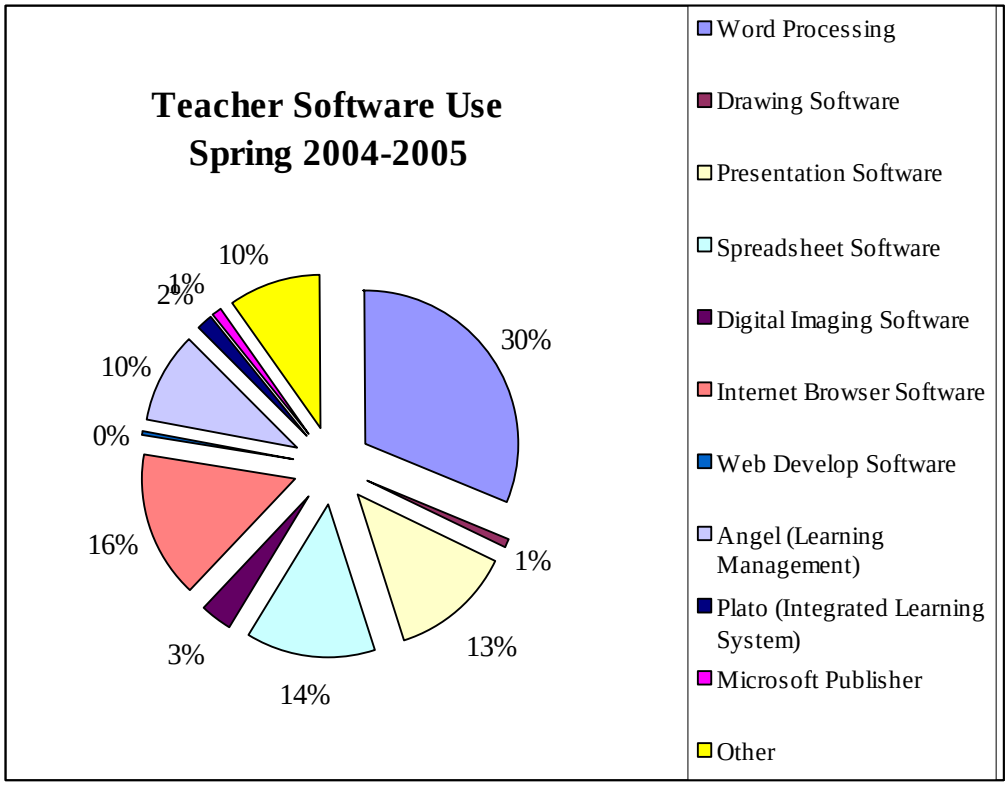


Figure 6. Student Software Use Spring 2003-2004

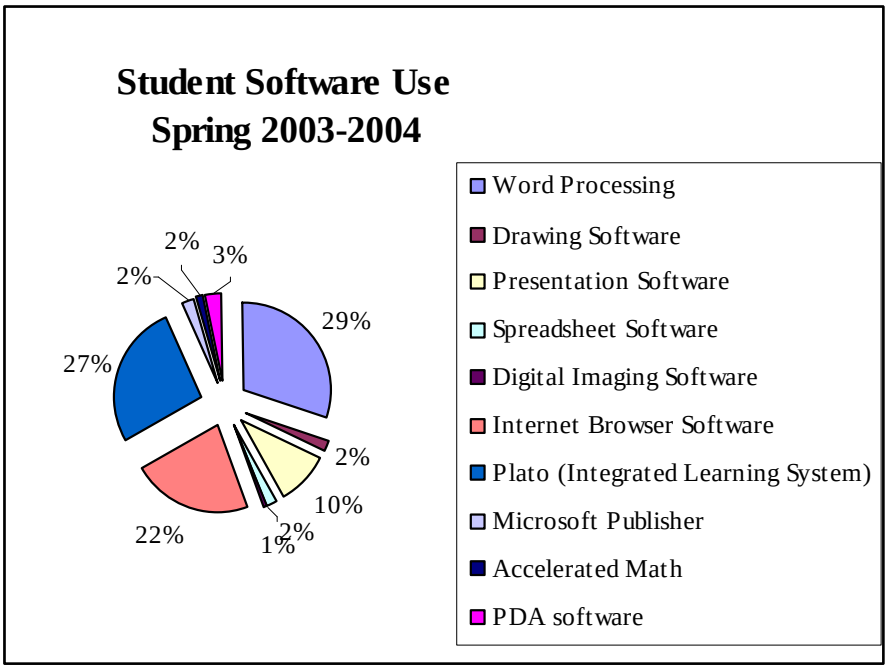


Figure 7. Student Software Use Fall 2004-2005

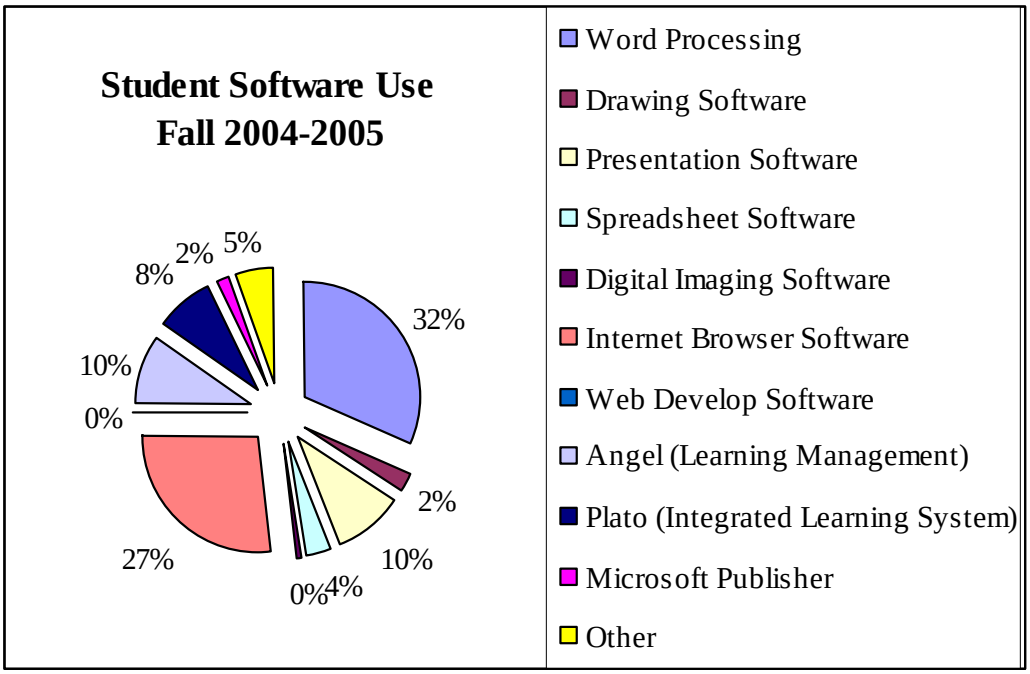


Figure 8. Student Software Use Spring 2004-2005

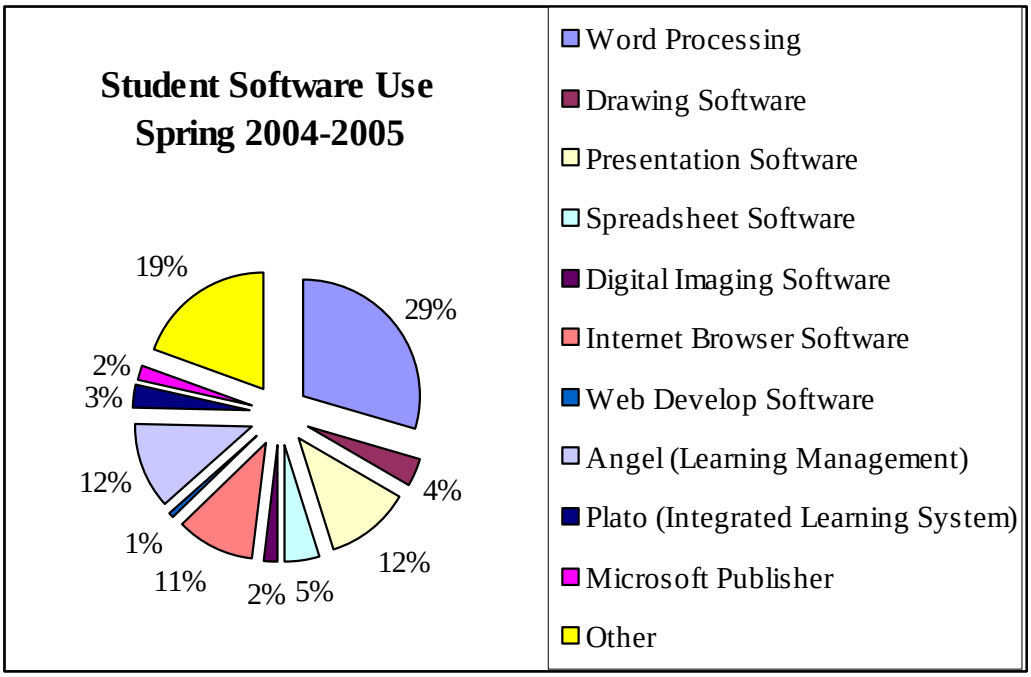


Figure 9. Teacher Technology Time Spring 2003-2004

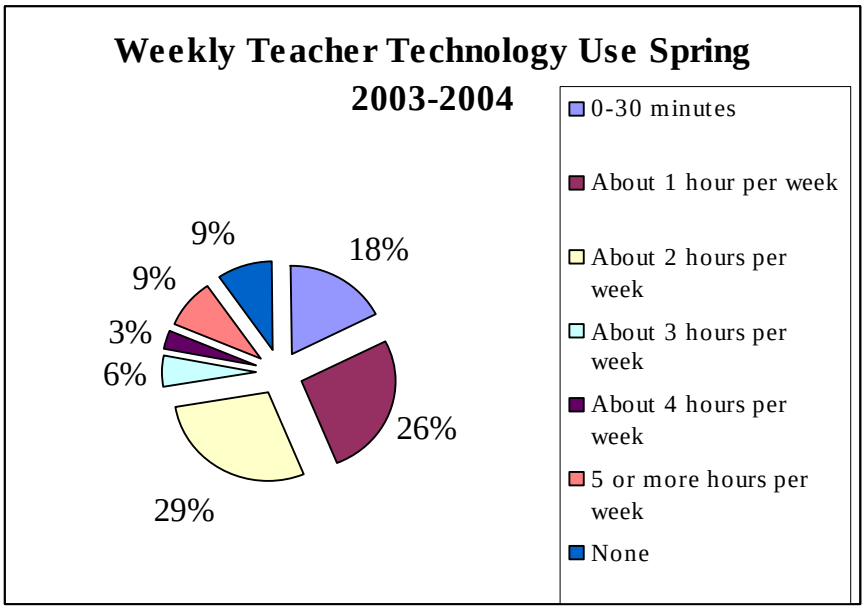


Figure 10. Teacher Technology Time Fall 2004-2005

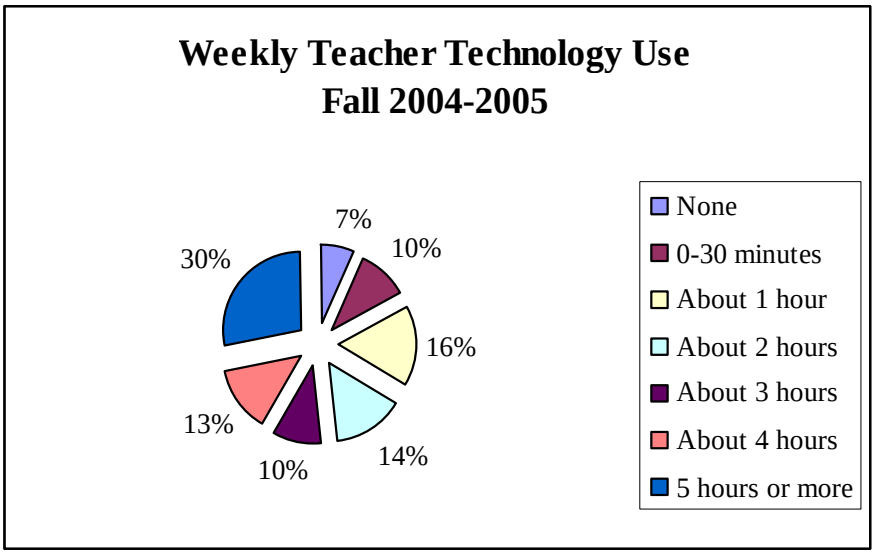


Figure 11. Teacher Technology Time Spring 2004-2005

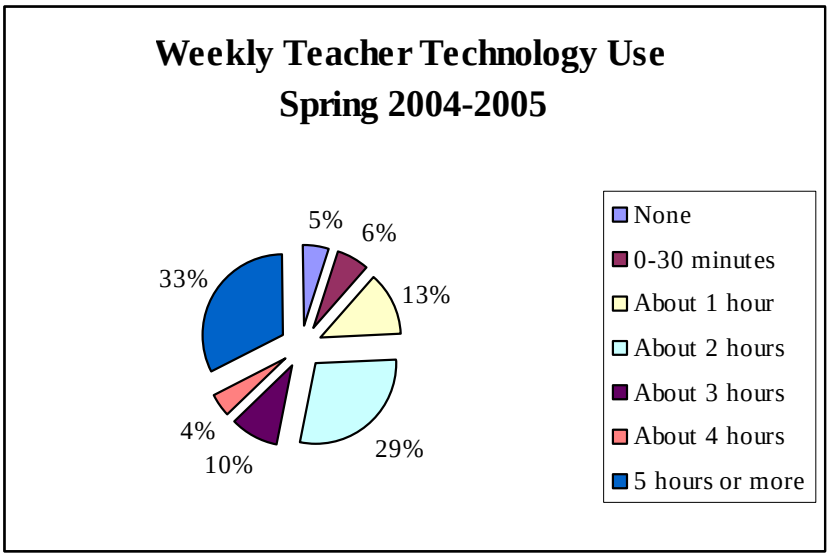


Figure 12. Student Technology Time Spring 2003-2004

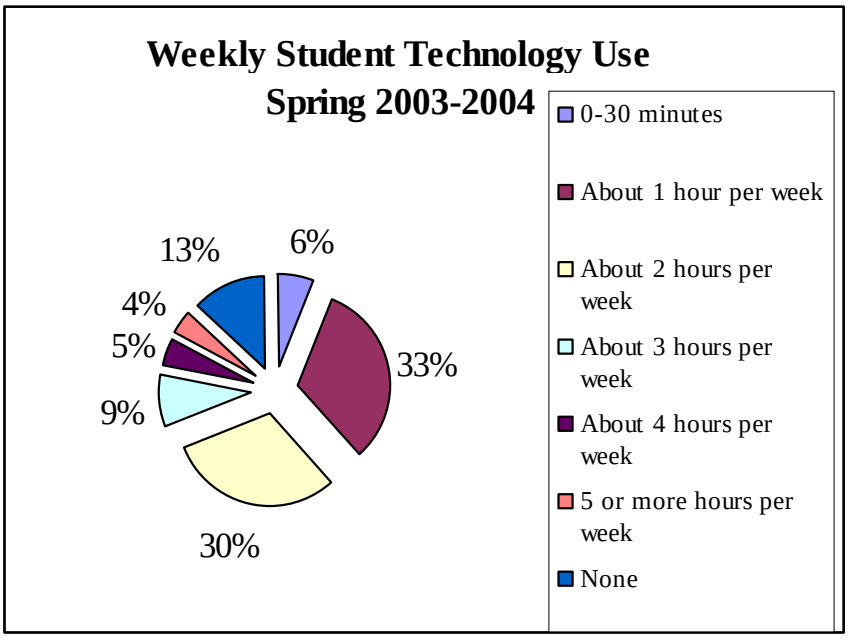


Figure 13. Student Technology Time Fall 2004-2005

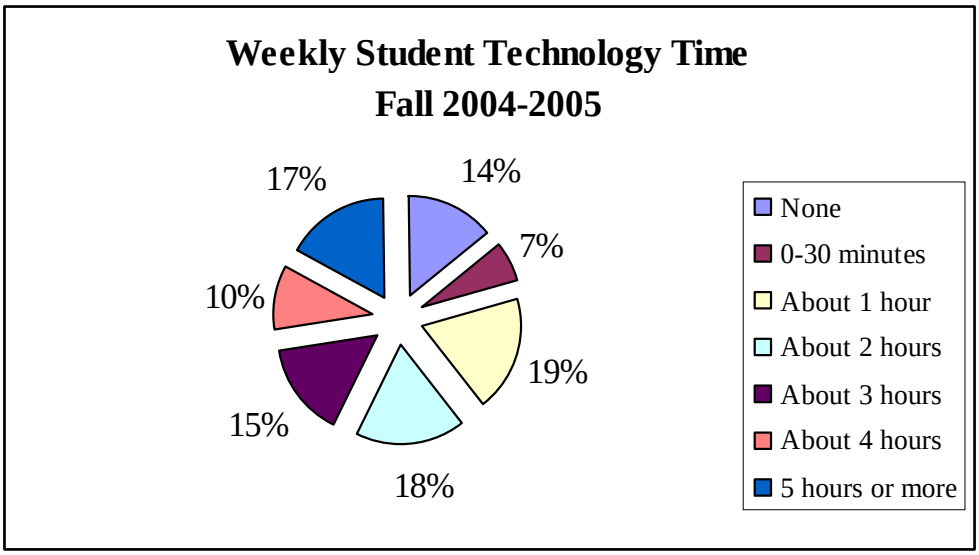


Figure 14. Student Technology Time Spring 2004-2005

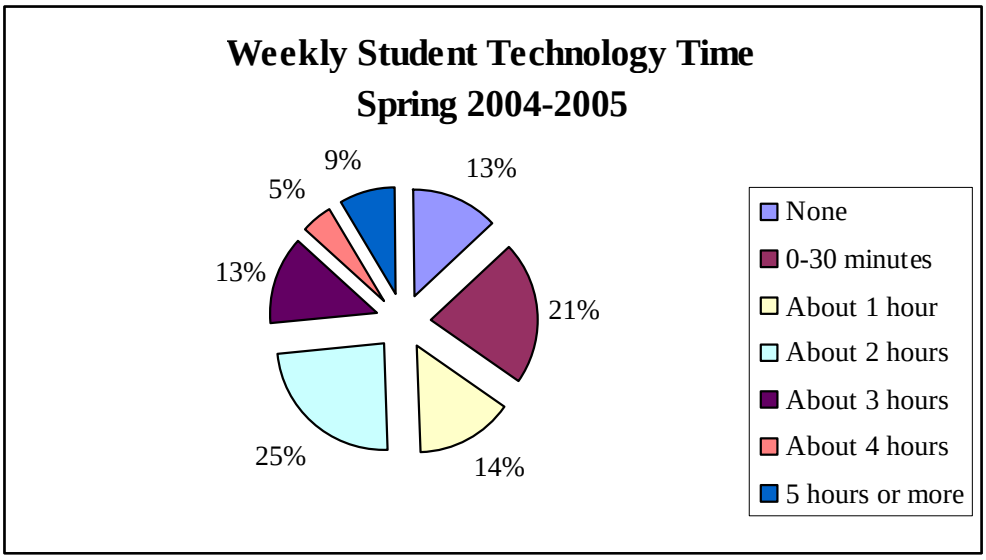


Figure 15. Technology Purposes for Teachers – Fall 2004-2005

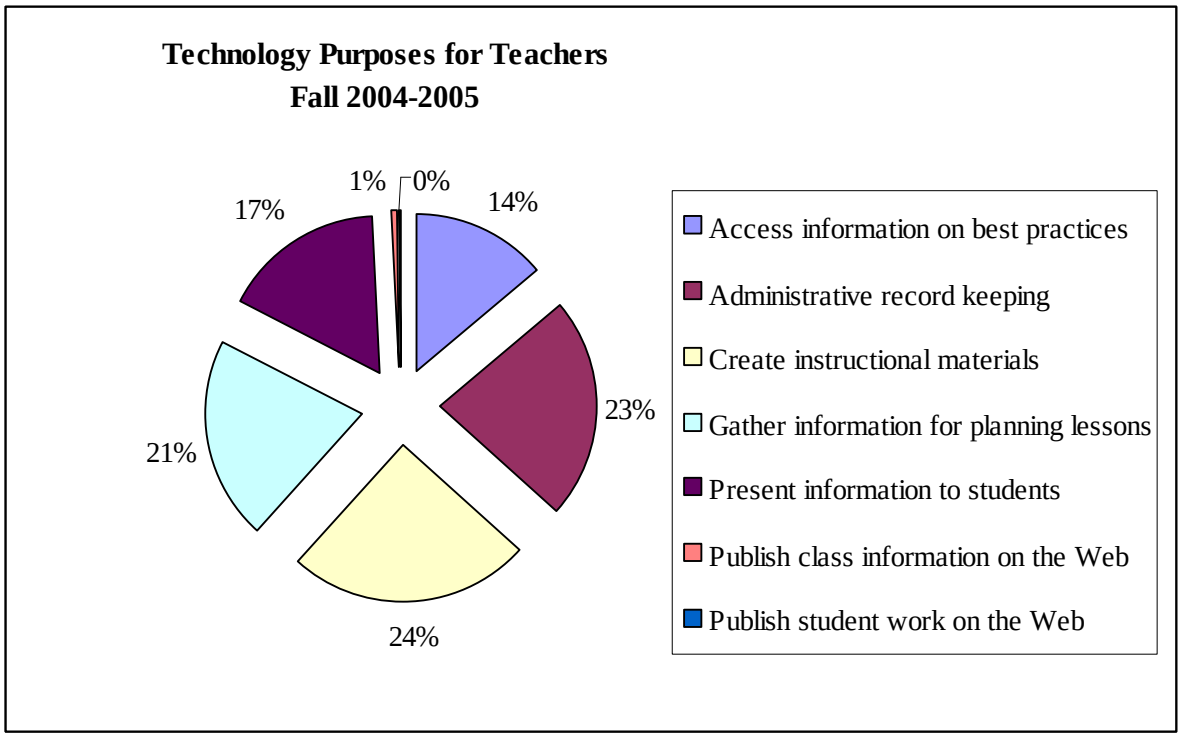


Figure 16. Technology Purposes for Teacher Spring 2004-2005

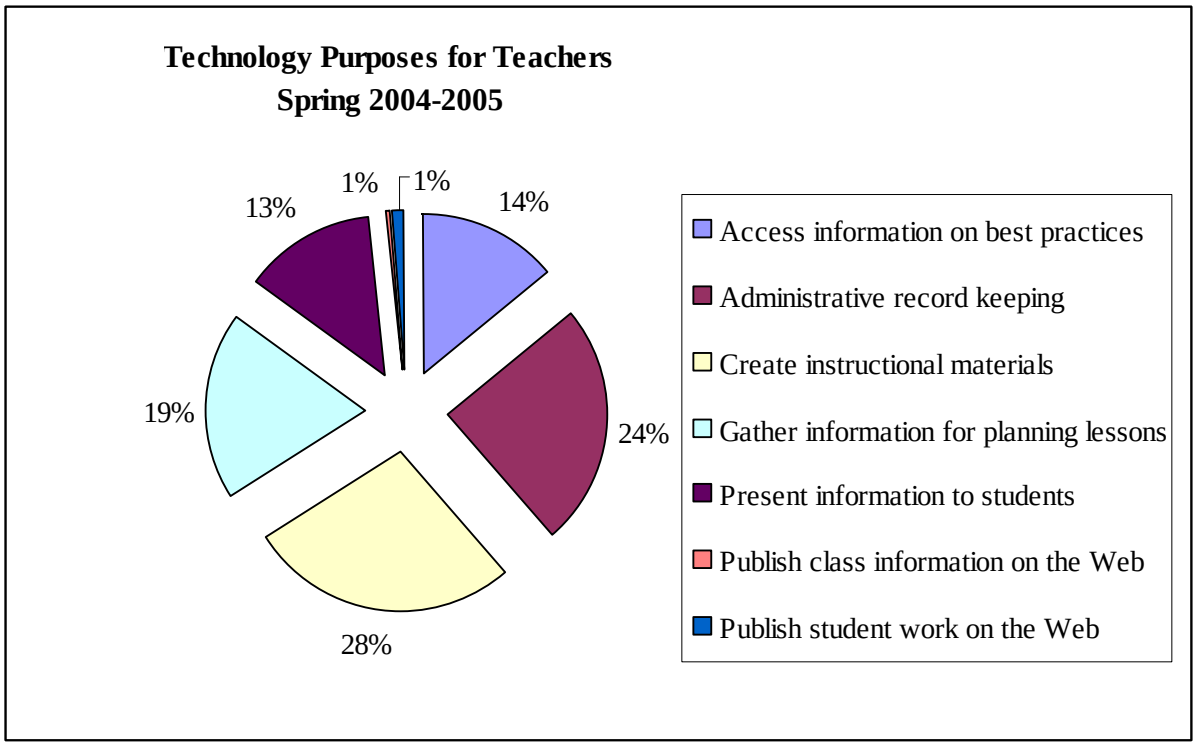


Figure 17. Technology Purposes for Students Fall 2004-2005

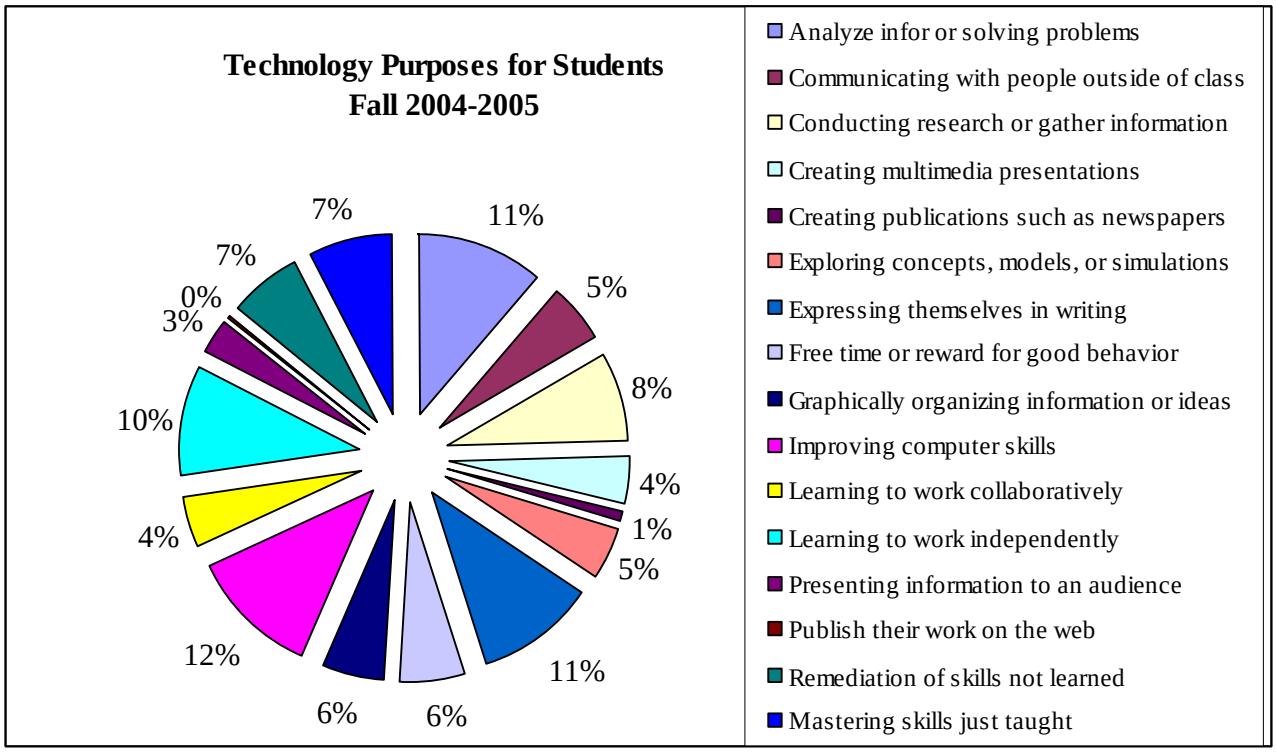


Figure 18. Technology Purposes for Students Spring 2004-2005

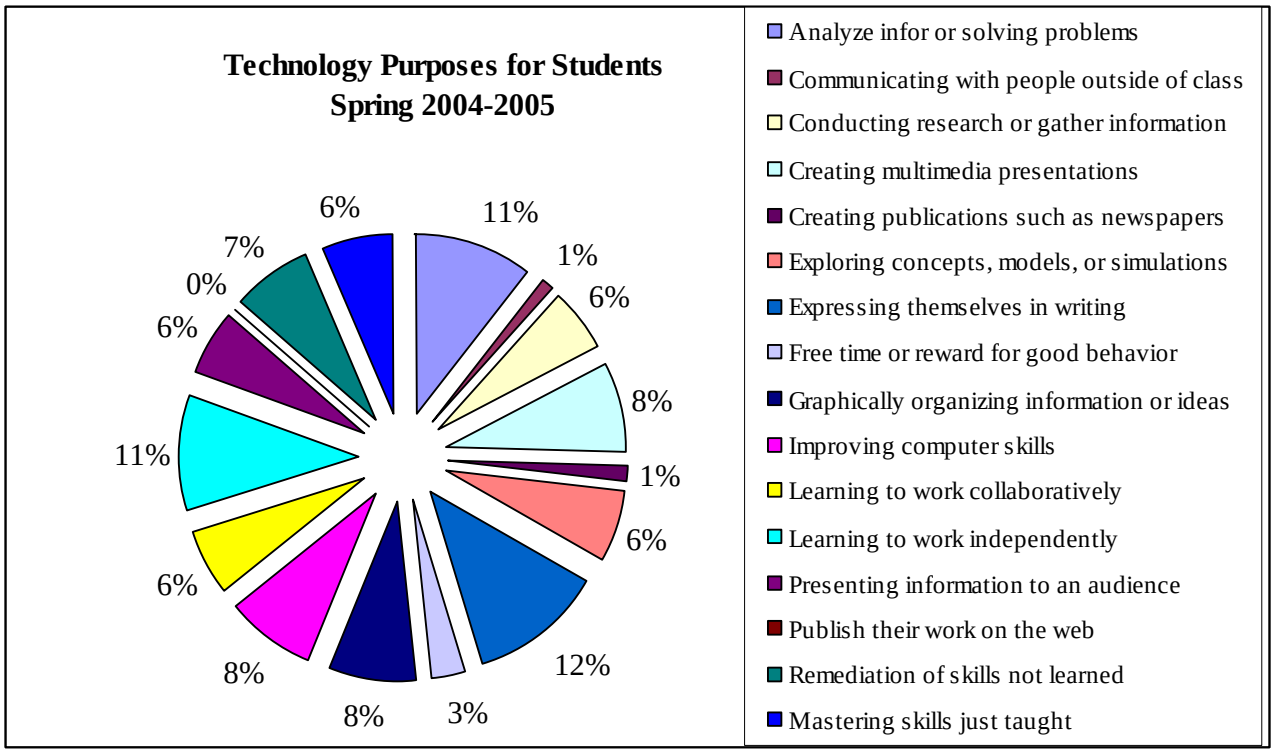


Figure 19. Barriers to Effective Implementation Fall 2004-2005

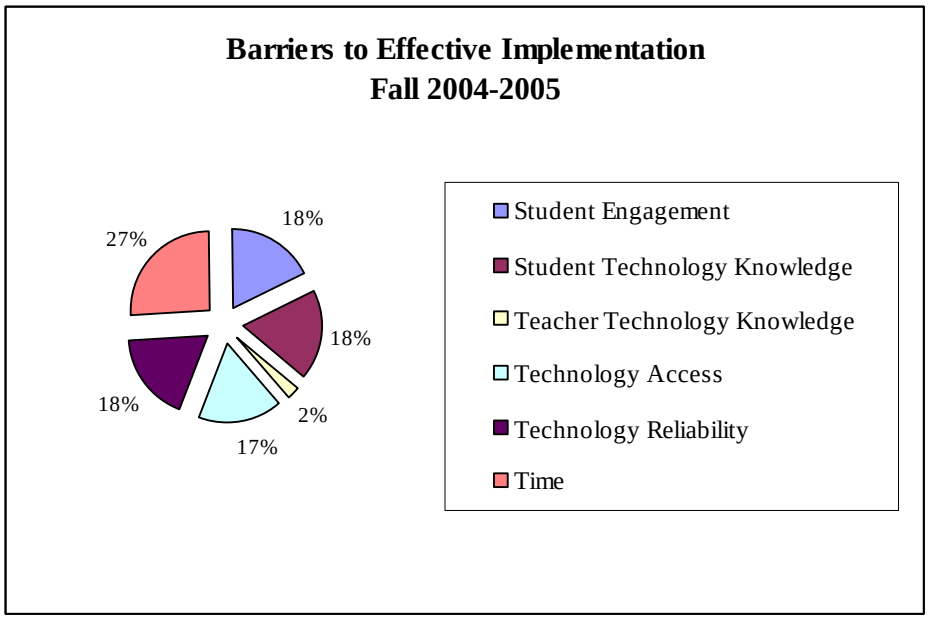


Figure 20. Barriers to Effective Implementation Spring 2004-2005

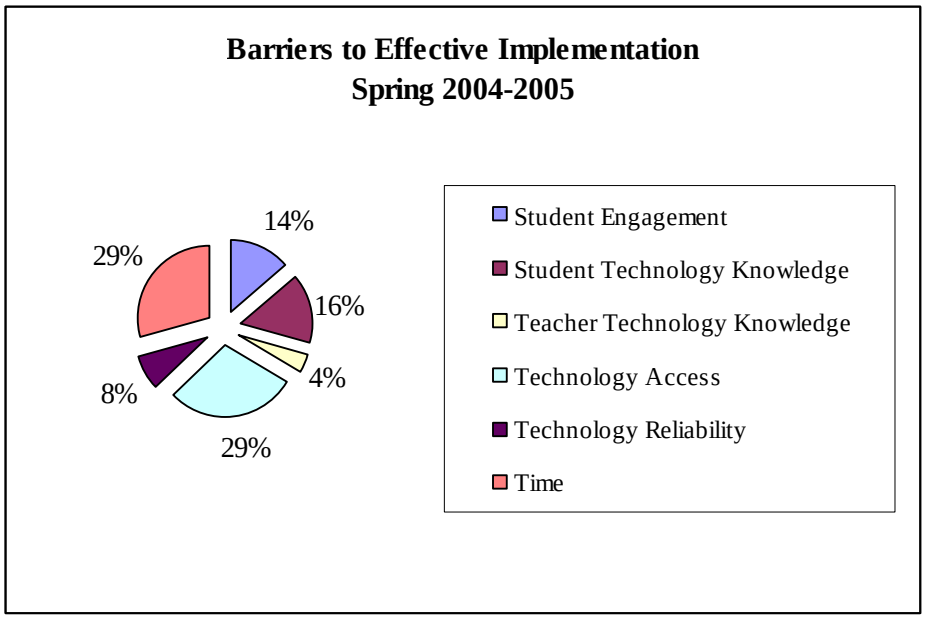
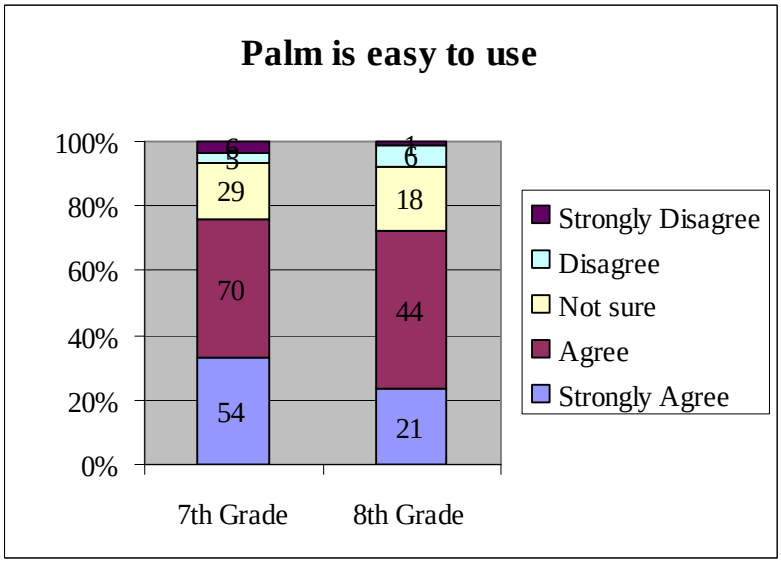
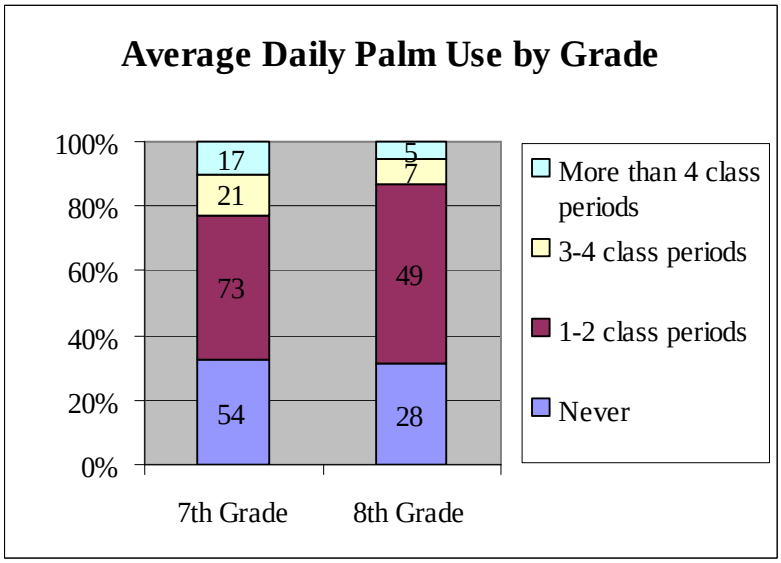


Figure 21. Student report 2004-2005: Palm ease of use



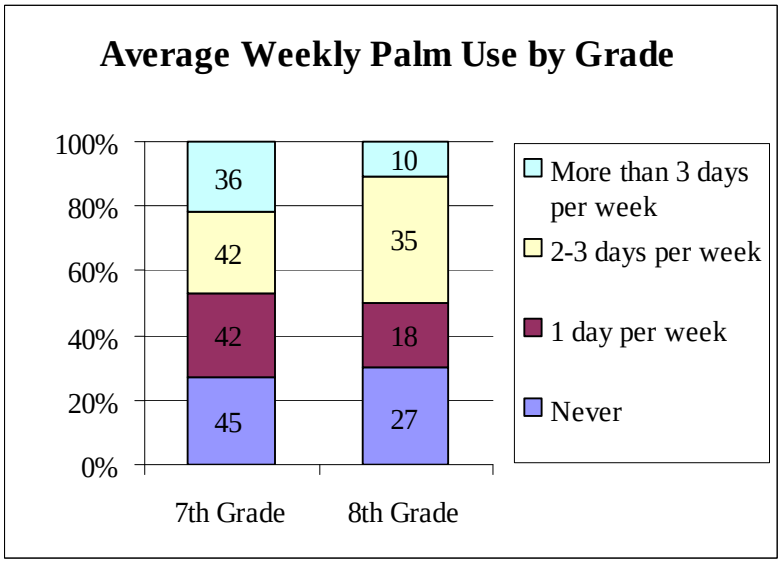
Note: n_7=165, n_8=90

Figure 22. Student report 2004-2005: Daily Palm use



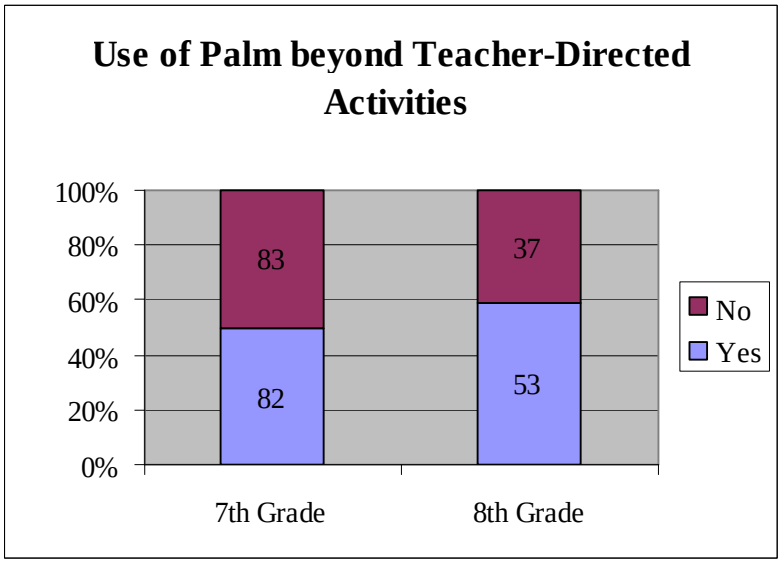
Note: n_7=165, n_8=89

Figure 23. Student report 2004-2005: Weekly Palm use



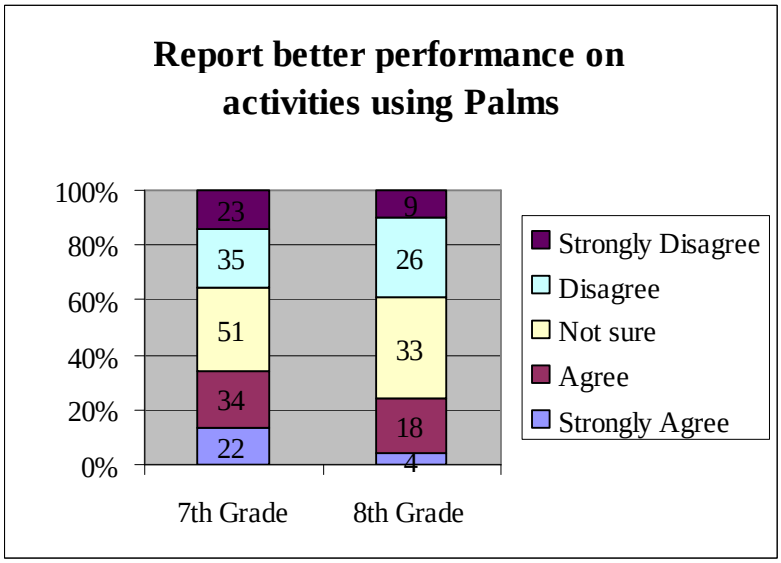
Note: n_7=165, n_8=90

Figure 24. Student report 2004-2005: Palm beyond teacher-directed activities



Note: n_7=165, n_8=89

Figure 25. Student report 2004-2005: Better performance on Palm



Note: n_7=165, n_8=90

Table 1. Changes in teacher Palm use 2003-2005

Year	N Teachers	N Total Lessons
2003-2004	8	16
2004-2005	16	46

Table 2. Model summary: STAR change

Model Summary*		-2LL	AIC	BIC
1	Race, Gender, Grade, Test Month	14098.24	14106.24	14128.07
2	Race, Test Month, Race*Grade, Gender*Grade	13071.04	13079.04	13100.57
3	Race, Test Month, Race*Test Month, Grade*Test Month	14112.78	14120.78	14142.61
4	Race, Test Month, Grade*Test Month, Cognitive Skills Index (CSI)	13073.91	13081.91	13103.44
5	Race, Test Month, CSI, CSI*Race	13071.96	13079.96	13101.49
6	Race, Test Month, CSI	13071.05	13079.05	13100.59

*Covariance Structure: Unstructured for all models

Table 3. Tests of fixed effects for STAR data

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	577.4378	100.2897	7.1E-22
Race Code	1	526.4262	18.61698	1.91E-05
Test Month	1	369.33	4.061445	0.044597
Cognitive Skills Index	1	532.4479	42.49452	1.65E-10

[a]Dependent Variable: STAR NCE Score.

Table 4. Estimates of Fixed Effects for STAR Data

Estimates of Fixed Effects[b]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	20.0780587	2.509262	573.559	8.001578	6.84E-15	15.14959	25.00652
[Race Code=White]	6.89142481	1.597182	526.4262	4.314739	1.91E-05	3.753791	10.02906
[Race Code=Non-White]	0[a]	0	.	.	.	.	.
Test Month	0.083619092	0.041492	369.33	2.015303	0.044597	0.002029	0.165209
Cognitive Skills Index	0.162262972	0.024892	532.4479	6.518782	1.65E-10	0.113365	0.211161

[a]This parameter is set to zero because it is redundant.

[b]Dependent Variable: STAR NCE Score.

Table 5. Estimated marginal means for race

Estimated Marginal Means[b]

Code for race	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
White	42.24315444[a]	0.889188	530.7541	40.49639	43.98991
Non-White	35.35172963[a]	1.324955	525.308	32.74887	37.95459

[a]Covariates appearing in the model are evaluated at the following values: Month of testing = 10.4406, Cognitive Skills Inventory = 88.75.

[b]Dependent Variable: STAR NCE Score.

Table 6. Univariate tests of pairwise comparison for race

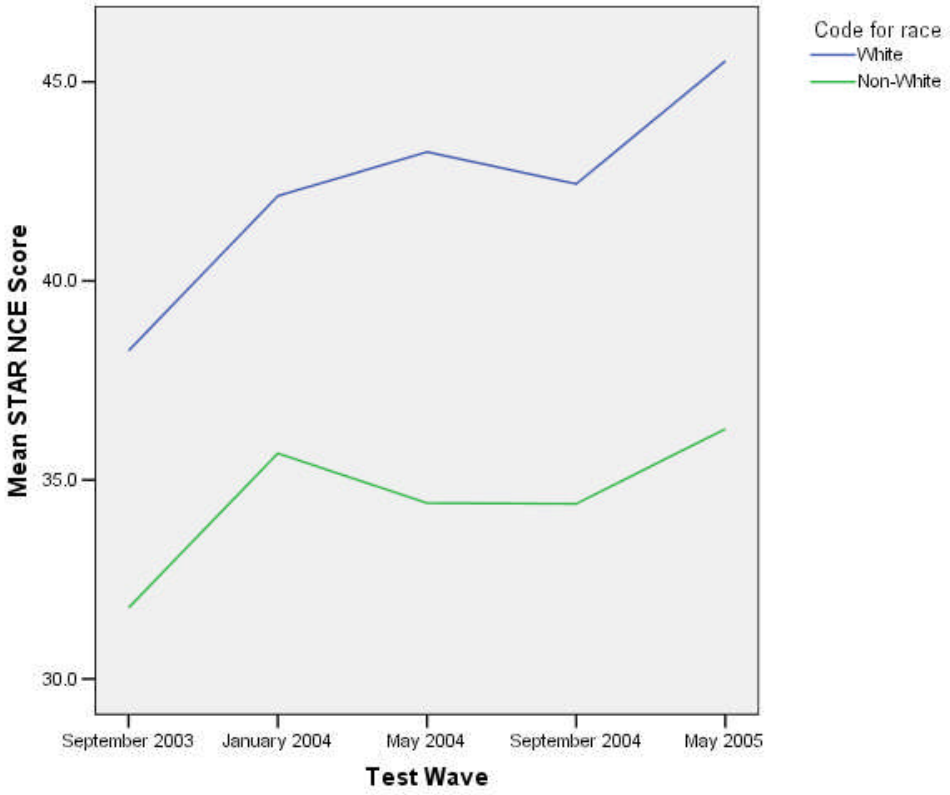
Univariate Tests(a)

Numerator df	Denominator df	F	Sig.
1	526.4262454	18.61698	1.91E-05

The F tests the effect of Code for race. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

[a]Dependent Variable: STAR NCE Score.

Figure 26. Change in STAR NCE scores for white and non-white students



Appendix

Instruments

Wayne Township Ed Tech Grant

Weekly Implementation Log

Section 1. Please describe your lesson.

Dates:

1. Lesson Content Area (Check all that apply)

- ☐ **A.** Math
- ☐ **B.** Social Studies
- ☐ **C.** Science
- ☐ **D.** English/Language Arts
- ☐ **E.** Technology Skills
- ☐ **F.** Other (please describe)

2. Average Technology Use During Lesson (For the Week)	**None**	**0-30 minutes**	**About 1 Hour**	**About 2 Hours**	**About 3 Hours**	**About 4 Hours**	**5 Hours or More**
Student	○	○	○	○	○	○	○
Teacher	○	○	○	○	○	○	○

3. Please describe software technologies used during this lesson.

Software Technologies (CHECK ALL THAT APPLY)	**Who used this technology? (CHECK ALL THAT APPLY)**	
a. ☐ Word Processing (e.g., Appleworks, Microsoft Word)	a. ☐ Student	☐ Teacher
b. ☐ Drawing (e.g., Kid Pix, PrintShop)	b. ☐ Student	☐ Teacher
c. ☐ Presentation Software (e.g., PowerPoint)	c. ☐ Student	☐ Teacher
d. ☐ Spreadsheet (e.g., Excel)	d. ☐ Student	☐ Teacher
e. ☐ Digital Imaging Software (e.g., Photoshop)	e. ☐ Student	☐ Teacher
f. ☐ Internet Browser (e.g., Internet Explorer, Netscape)	f. ☐ Student	☐ Teacher
g. ☐ Web development software (e.g., Frontpage, Dreamweaver)	g. ☐ Student	☐ Teacher

h. ☐	Angel	h. ☐ Student	☐ Teacher
i. ☐	Integrated Learning System (e.g., Plato)	i. ☐ Student	☐ Teacher
j. ☐	Supplemental Textbook Publisher Software	j. ☐ Student	☐ Teacher
k. ☐	Other software (please describe):	k. ☐ Student	☐ Teacher

4. Please describe hardware technologies used during this lesson.

Hardware Technologies (CHECK ALL THAT APPLY)		**Who used this technology? (CHECK ALL THAT APPLY)**	
a. ☐	Computer (desk or laptop)	a. ☐ Student	☐ Teacher
b. ☐	Digital Camera (video or still)	b. ☐ Student	☐ Teacher
c. ☐	Printer	c. ☐ Student	☐ Teacher
d. ☐	Palm Pilot	d. ☐ Student	☐ Teacher
e. ☐	Computer Projector	e. ☐ Student	☐ Teacher
f. ☐	Scanner	f. ☐ Student	☐ Teacher
g. ☐	CPS	g. ☐ Student	☐ Teacher
h. ☐	Other hardware (please describe)	h. ☐ Student	☐ Teacher

5. Please describe the primary lesson objectives. (CHECK ALL THAT APPLY)

- ☐ Analyzing or organizing information
- ☐ Assessment
- ☐ Build new skills
- ☐ Comprehension of new content
- ☐ Practice/expand existing skill set
- ☐ Research / gathering information
- ☐ Review previously learned content
- ☐ Other (please describe):

6. Please describe the primary purposes of the technology use *for you, the instructor*. (CHECK ALL THAT APPLY)

- [ ] Access information research on best practices
- [ ] Administrative record-keeping
- [ ] Create instructional materials
- [ ] Gather information for planning lessons
- [ ] Present information to students
- [ ] Publish class information on the Web
- [ ] Publish student work on the Web
- [ ] Other (please describe):

7. Please describe the primary purposes of the technology use *for the students*. (CHECK ALL THAT APPLY)

- [ ] Analyzing information or solving problems
- [ ] Communicating with people outside the classroom
- [ ] Conducting research or gathering information
- [ ] Creating multimedia presentations
- [ ] Creating publications such as newspapers
- [ ] Exploring concepts, models, or simulations
- [ ] Expressing themselves in writing
- [ ] Free time or reward for good behavior
- [ ] Graphically organizing information or ideas
- [ ] Improving computer skills
- [ ] Learning to work collaboratively
- [ ] Learning to work independently
- [ ] Presenting information to an audience
- [ ] Publish their work on the Web
- [ ] Remediation of skills not learned
- [ ] Mastering skills just taught
- [ ] Other (please describe):

Section 2: Please think about your actual implementation of this lesson as you respond to the following statements.

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
1. I received adequate technology resources for the implementation of this lesson	○	○	○	○	○
Instructional or support skills needed:					
2. Installation of required hardware and/or software was completed satisfactorily for implementation of the lesson.	○	○	○	○	○
3. The length of the implementation was exactly the same as planned.	○	○	○	○	○

Comments:

	90-100% (Full)	75-89% (Most)	50-74% (More than Half)	25-49% (Some)	Below 25% (Low)
4. Generally speaking, how fully did you implement the lesson?	○	○	○	○	○

Comments:

5. Were there any barriers to effective implementation of the lesson in your classroom?

- ☐ Difficulty level of lesson content
- ☐ Student engagement level in instructional activities
- ☐ Student Knowledge of how to use technology
- ☐ Teacher Knowledge of how to use technology
- ☐ Technology access
- ☐ Technology reliability
- ☐ Time constraints
- ☐ Other (please describe):

6. How did the timing of the lesson fit with other classroom or school activities? Were there any conflicts?

- ○ Yes
- ○ No

Comments:

Section 3: Please think about the individual elements of your lessons as you respond to the following statements.

1. Please describe how you have used the concepts from your training in your lessons.

- ☐ Used familiar technology in a new way
- ☐ Used new hardware
- ☐ Used new software

- [ ] Used more technology
- [ ] Used technology to explore an ill-defined problem
- [ ] Other (please describe):

Comments:

	Very Effective	Somewhat Effective	Not at all effective
2. Rate the effectiveness of your lessons in terms of your content area goals.	○	○	○
3. Rate the effectiveness of your lessons in terms of your technology integration goals.	○	○	○

4. How will you revise your use of technology in these lessons for the next implementation?

- [ ] Change content of lessons
- [ ] Change time allotted for activities
- [ ] Add new technology activities
- [ ] Change one or more technology activities
- [ ] Eliminate one or more technology activities
- [ ] Improve skill with technology
- [ ] Other (please describe):

Comments:

5. Do you have any other comments or suggestions related to your implementation?

Submit

Thank you for your feedback! Please contact Dr. Elizabeth Oyer at eoyer@evalsolutions.com or (317)582-1925 if you have any questions!

Training Evaluation

Please complete all of the items below as honestly as possible. Your responses are completely confidential.

Please reflect on your experience in the training session you have just attended. Please think about the overall quality of the training as you respond to the following statements.

1. The training met my expectations.

- **A.** Strongly agree
- **B.** Agree
- **C.** Not sure
- **D.** Disagree
- **E.** Strongly disagree

2. I will be able to apply the knowledge I learned.

- **A.** Strongly agree
- **B.** Agree
- **C.** Not sure
- **D.** Disagree
- **E.** Strongly disagree

3. The training objectives for this topic were clearly identified and followed .

- **A.** Strongly agree
- **B.** Agree
- **C.** Not sure
- **D.** Disagree
- **E.** Strongly disagree

4. The training content was organized and easy to follow.

- **A.** Strongly agree

- **B.** Agree
- **C.** Not sure
- **D.** Disagree
- **E.** Strongly disagree

5. The materials distributed were pertinent and useful.

- **A.** Strongly agree
- **B.** Agree
- **C.** Not sure
- **D.** Disagree
- **E.** Strongly disagree

6. The presenters were knowledgeable.

- **A.** Strongly agree
- **B.** Agree
- **C.** Not sure
- **D.** Disagree
- **E.** Strongly disagree

7. The quality of the instruction was good.

- **A.** Strongly agree
- **B.** Agree
- **C.** Not sure
- **D.** Disagree
- **E.** Strongly disagree

8. Adequate time was provided for each segment of the training.

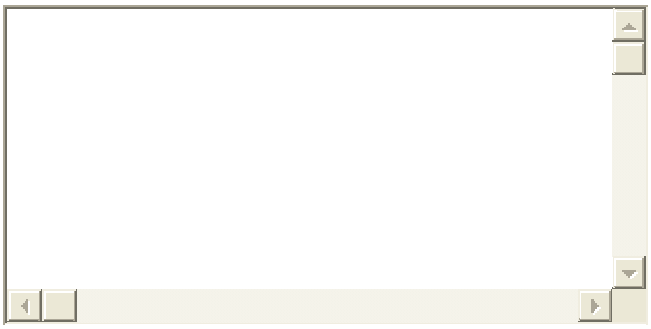
- **A.** Strongly agree
- **B.** Agree
- **C.** Not sure
- **D.** Disagree

- **E.** Strongly disagree

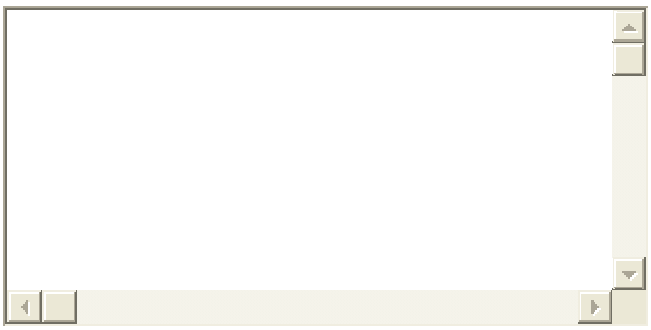
9. The training activities and assignments were valuable.

- **A.** Strongly agree
- **B.** Agree
- **C.** Not sure
- **D.** Disagree
- **E.** Strongly disagree
- **F.** Does not apply to me

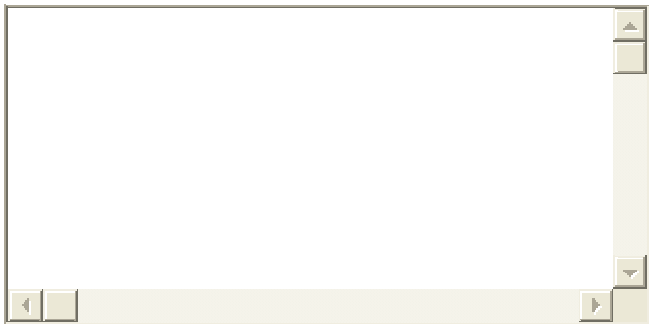
10. Which of the training activities were the most useful to you?



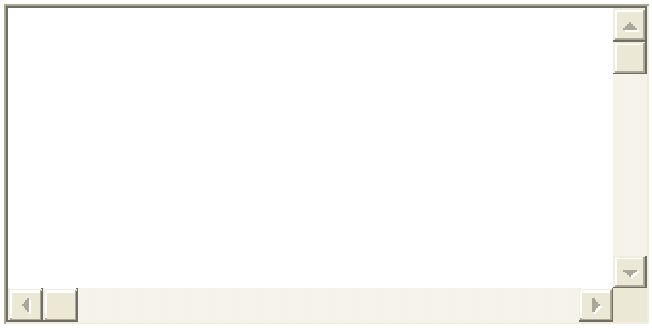
11. Which of the training activities were the least useful to you?



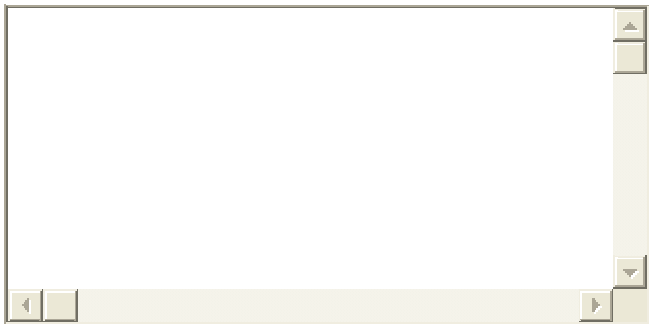
12. What is the single best aspect of this training for you?



13. What would you like to see changed in this training?



14. Do you have any other comments or suggestions?



Submit

Thank you for your feedback! Please contact Dr. Elizabeth Oyer at eoyer@evalsolutions.com or (317)582-1925 if you have any questions!

Palm Training

Directions: It is important to reflect on your personal development of skills that are part of this Palm training. Please consider your knowledge and ability to implement the following skills right now.

	Unfamiliar	Beginner	Confident	Capable of teaching others this skill
A. Palm Orientation				
1. Powering on/off	○	○	○	○
2. Screen buttons	○	○	○	○
3. Hard buttons	○	○	○	○
4. Battery level	○	○	○	○
5. Launching Applications	○	○	○	○
B. Resetting the Palm				
1. Soft	○	○	○	○
2. Warm	○	○	○	○
3. Hard	○	○	○	○
C. Using the Keyboard				
1. Keyboard Application	○	○	○	○
2. Insertion	○	○	○	○
3. Removal	○	○	○	○
D. Beaming				
1. Documents	○	○	○	○
2. Applications	○	○	○	○
E. Classroom Management				
1. Assigning/Distributing Palms	○	○	○	○
2. Beaming Trees	○	○	○	○

3. Storage				
4. Charging				
F. Available Applications				
1. Print Boy				
2. Converter				
3. iKWL				
4. Inspiration				
G. Documents to Go				
1. Creating a new document				
2. Moving document from Palm to PC (syncing)				
3. Moving document from PC to Palm (syncing)				
4. Beaming documents				
5. Using Spell Check				
6. Changing fonts				
7. Inserting tables				
8. Changing line spacing				
9. Using bullets and numbering				
H. Quizzler				
1. Creating a new quiz				
2. Importing quiz from Memo Pad				
3. Running a quiz				
4. Quiz options				
I. Due Yesterday				
1. Creating a class				
2. Adding assignments				
3. Beaming class/assignments				

4. Setting a grading scale				
5. Assigning a grade to an assignment				
6. Viewing the report card				
J. Palm Reader				
1. Opening an ebook				
2. Navigating through an ebook				
K. Inspiration				
1. Starting a new file				
2. Opening a template				
3. Printing a file				
4. Creating symbols				
5. Formatting symbols				
6. Linking symbols				
7. Using Rapid Fire				
8. Switching to Outline View				
9. Transferring Docs To Go				
L. Print Boy				
1. Printing Documents to Go Files (i.e., Word To Go, Sheet To Go)				
2. Connecting the printer adapter				
Submit				

Wayne Township Ed Tech Project
Student Palm Survey

Please complete all of the items below as honestly as possible. Your responses are completely confidential.

What grade are you in school?

- **A.** 7th
- **B.** 8th

Please reflect on your experience using your Palm this year as you respond to the following statements.

1. On average, how often did you use the Palm in your classes?

- **A.** Never
- **B.** 1 day per week
- **C.** 2-3 days per week
- **D.** More than 3 days per week

2. I think the Palm is easy to use.

- **A.** Strongly agree
- **B.** Agree
- **C.** Not sure
- **D.** Disagree
- **E.** Strongly disagree

3. I performed better on activities when I used the Palm.

- **A.** Strongly agree
- **B.** Agree
- **C.** Not sure
- **D.** Disagree
- **E.** Strongly disagree

4. Did you use the Palm on any activities that your teacher did not specifically ask you to use it?

- **A.** Yes
- **B.** No

5. On average, how often did you use your Palm in class each day?

- **A.** Never
- **B.** 1-2 class periods
- **C.** 3-4 class periods
- **D.** More than 4 class periods

6. On average, how often did you use your Palm in class each week?

- **A.** Never
- **B.** 1 day per week
- **C.** 2-3 days per week
- **D.** More than 3 days per week

7. Please indicate all the activities for which you used your Palm (check all that apply):

- Calendar (e.g., keeping class schedule, assignment due dates, personal use)
- Address book (e.g., contact information, phone numbers)
- To Do List (keeping a list of things you need to do)
- Word Processing (using Memo Pad or Docs to Go for writing activities)
- Spreadsheet (using Sheets to Go - Excel)
- Inspiration (graphic organizer activities)
- Quizzler (tests or quizzes for review or a grade)
- Due Yesterday (tracking your grades and assignments)
- Reference (e.g., Chem Table, Palm Reader, Noah Lite)

8. Please comment on the condition of the Palm you used.

- **A.** My Palm worked fine all year. When I turned it in it was in perfect condition.
- **B.** My Palm was in good condition but there was some cosmetic damage to it when I turned it in.

- **C.** My Palm was in poor condition when I turned it in. It is probably not reusable.
- **D.** I lost my Palm.
- **E.** Someone stole my Palm.

9. In which subject area did you find the Palm to be the *most* useful?

- **A.** English/Language Arts
- **B.** Math
- **C.** Science
- **D.** Social Studies
- **E.** Other (please describe):

10. What was the best aspect of using your Palm this year?

11. What would you change about the way you used your Palm this year?

Thank you for your feedback! Please contact Dr. Elizabeth Oyer at eoyer@evalsolutions.com or (317)582-1925 if you have any questions!