Technology Action Research Plan

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Section I

Introduction

Wireless networking has positively changed how technology is implemented in the classroom (Beasley, Dobda, & Chen, 2005). Through their research, Davis, Carbonaro, Kendal and Beauchamp observed that:

> Bringing the technology [mobile computer lab] into the classroom was no more invasive than putting another textbook on the desk, because it blended seamlessly into the environment. Exploiting the flexibility of wireless technology, instructors found it easier to implement a collaborative student-centered classroom compared with using a conventional computer lab. This is a result of the classroom becoming more of a community in which all members could interact more effectively (2003, Impact on Learning section, para. 2).

Beasley, Dobda and Chen site lack of space for additional computer labs, demand that exceeds current lab space, and increased flexibility of current classroom use as reasons to investigate mobile computer labs (2005).

Due to lack of available computer lab space, Fire Prairie Middle School, the fifth and sixth grade building of the Fort Osage School District, purchased a mobile computer lab of 15 netbook computers to allow teachers and students increased access to the internet and Microsoft Office applications. The lab was purchased at the beginning of the 2010-2011 school year and was ready for student use in October 2010.

Area of Focus Statement

The purpose of this study is to determine how the mobile lab at Fire Prairie influenced student learning during the first year of implementation and if the need for an additional lab exists. This study will also seek to determine why the lab was not used by more than 25% of the teachers in the building and what training opportunities may be necessary to encourage them to use the lab in the future.

Research Questions

1. How did the netbook lab at Fire Prairie Middle School influence student learning during the first year of use?
2. How did the netbook lab at Fire Prairie Middle School influence students' perceptions of their learning during the first year of use?
3. How often was the lab used during the first year it was available and what professional development opportunities are necessary to encourage more use of the lab in the future?

Related Literature

Wireless technology is not new and much of the initial literature pertaining to wireless access was written between 2001 and 2007. Despite this, the implementation of wireless technology was new to Fire Prairie Middle School in the 2010-2011 school year. The available literature offers many suggestions to the staff of Fire Prairie as they investigate the advantages of a mobile lab. While some of the literature points out potential shortcomings or problems inherent with wireless and mobile technology, the literature recommends the implementation of mobile labs in classroom settings.

Daly (2005), Grignano (2007), and Hoffman (2007) contributed to the literature in the form of technical suggestions for setting up wireless technology and keeping it secure and operational. Their suggestions are not focused on any specific level of education. Gay, Martin, and Hembrook (2001), Gercek and Saleem (2005), and McKimmy (2005) focused their research at the college level. Their findings can be adapted to K-12 settings, but not all of the conclusions directly transfer to a fifth and sixth grade building. Tomel, Huth, and Ravenstahl (2001), Weathers (2001), and Styron and Disher (2003), focused their research at the K-12 level and include information on implementing wireless technology into the classroom. Studies by Davies, Carbonaro, Kendal and Beauchamp (2003), Walery (2004), and Beasley, Dobda, and Chen (2005) also focused on K-12 implementation of wireless labs and represent the most useful sources for this research project. Particularly useful are suggestions for integrating the mobile lab into various content areas using web tools and applications along with software installed on the computers for concept mapping, word processing, and presentations.

Based on the findings of these studies, the benefits of wireless labs in the classroom are worth the research and professional development necessary for successful implementation. This research project will examine how Fire Prairie Middle School has used the mobile lab and what steps are needed to encourage more faculty members to use it to enhance the learning that is taking place in the classrooms of Fire Prairie Middle School.

Description of the Intervention or Innovation

I will seek to determine how effectively the lab was used through an online survey of teachers and students, teacher interviews, and the wireless lab reservation calendar. The

teacher survey will be given to all teachers in the building. The student survey will be given to students on teams that have used the mobile lab; this survey will seek to determine student perceptions concerning the use of the mobile lab in the classroom and how it influenced their learning. The teacher survey, interviews, and lab reservation calendar will be used to determine how often the lab was used and in which classrooms and grade levels it was used. Teacher interviews will be used to determine the effectiveness of the mobile lab in the classroom. The interview will contain questions pertaining to specific activities and how the mobile lab was used to enhance learning. The interview will also allow teachers who did not use the lab an opportunity to explain why they did not use the lab and what support they would need to use it in the future. I, with the help of the building technology committee and administration, will analyze the data from these collection instruments and make decisions concerning the purchase of an additional lab, and training opportunities necessary to encourage more faculty members to use the mobile lab in the future.

Section II

Overview of Data Collection Strategies

I will use a teacher survey and interview, a student survey, and the reservation calendar for the lab to collect data in an effort to answer my research questions. The teacher interview and survey will ask questions that pertain to the use of the lab, what activities were completed with the lab, and how it influenced learning. The interview will also contain questions seeking to determine the level of integration by asking if new activities were completed with the mobile lab, or if teachers had used the mobile lab in lessons they had previously taught in the computer lab. For teachers who did not use the lab, the interview addresses my third research

question and seeks to determine what support is necessary to encourage those teachers to use the lab in the future. The interview is valid because the questions focus on perceptions of how the lab impacted student learning in comparison to the computer lab or without computers, or the reasons why teachers did not use the lab. Administrator permission will be obtained before faculty are surveyed or interviewed, and responses will be reported to the technology committee anonymously. To enhance reliability, the interview questions will be asked as written in the same order for each participant.

The student survey will seek to determine students' perceptions of their learning while using the mobile lab. Validity will be addressed by focusing the questions on specific activities they completed with the lab and how they perceived their success and attitudes while completing the activity. Parental permission will be obtained before administering the survey and all responses will be anonymous. The focus on student learning while using the lab during specific activities will foster relevance of the instrument.

Data Sources

- Teacher Survey – The teacher survey, given to all faculty members, will determine who used the lab during this school year and teachers' basic perceptions of the lab.
- Lab Reservation Calendar – The reservation calendar will be used to determine who used the lab and how often they used it.
- Teacher Interview – The interview will contain questions seeking more specific answers than the survey from both teachers who used the lab and those who did not.

- Student Survey –The survey will be given to students who used the lab and will focus on student perceptions of their own learning during specific activities that were discussed by teachers during the teacher interview.

Data Analysis Plans

I plan to begin analyzing the data by comparing the reservation calendar with the teacher survey results to determine how often the lab was used and who was using it. From these results, I will select a sample of faculty members who used the lab and who did not use the lab to participate in the teacher interview. I will compare the interview results with the survey results and look for relationships between how the lab was implemented in classrooms and what impact it had on teacher perceptions of student learning. Through identifying and charting themes that reoccur in the survey and interview, I hope to better understand how the lab was used and why it was not used by others. I will base the questions of the student survey on activities discussed in the teacher interview; the student survey will be tailored to focus on activities that were completed using the lab by that team of students. This will allow me to compare the perceptions of students and teachers during the same activity. After identifying and charting reoccurring themes present in the teacher interview and student survey, I will create a concept map to visually represent student and teacher perceptions. Using the concept maps and charts created in the analysis phase will help the building technology committee and me answer the research questions posed by this study and begin the process of recommending action to the building administration.

Section III

1. The other people besides me involved in this study will be the building principal, the technology committee, of which I am a member, and the two computer teachers in the building. After granting permission to conduct the study, the building principal will help set up interview times and facilitate the online surveys. If the members of the technology committee agree to participate in this study, they will see the results of the study and work with me to analyze the data. With the building principal, the committee and I will plan for any professional development opportunities that will encourage more use of the lab in the future. The two computer teachers will assist in administering the student survey during their classes.
2. Administrative permission would be necessary to begin the study. I will also seek help from members of the building technology committee for assistance in analyzing and interpreting the data, and developing recommended actions. Based on the advice of the administrator, I would seek parent permission before administering the student survey. I would also need to confirm that the computer teachers were willing to administer the student survey during their class.
3. Timeline for collecting, analyzing, and interpreting data:

    - Weeks 1 – 4 – Collect Data
    - Weeks 5 - 6 – Analyze Data
    - Weeks 7 – 8 – Interpret Data

4. Timeline for developing our recommended actions:

    - Weeks 9 – 10 – Develop Recommended Actions

5. The overall strategy for implementing any recommended actions resulting from this project would include:
    - Designing professional development opportunities with the building administration and technology committee.
    - Offering support from technology committee members for individual teachers wishing to implement the lab in the future.
    - Planning professional development to provide additional training later in the school year if required.
    - Following up with teachers who have implemented the lab for the first time and offering support from a technology committee member.
    - Finding or making time in the building schedule and school calendar to offer the professional development opportunities designed by the technology committee.
6. Ongoing monitoring would consist of informal conversations with teachers as they implement the lab into their classrooms. The mobile lab reservation calendar will also be used to see who is using the lab. Technology committee members could ask additional questions of these teachers and offer support for future opportunities to use the lab. Another teacher survey will be administered a year after this initial study is conducted to determine how attitudes and usage of the lab has changed. These results could be analyzed and a plan of continued support could be made for the following year.

References

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Appendices

Appendix A: Literature Matrix

Author/s	Year	Variables Considered in the Study						
		Reasons for Implementation	Set-up	Comparison to dedicated computer labs	Using wireless access to support learning	Practical suggestions for teachers	Implemented in K12 settings	Implemented in college settings
Tomel, Huth, & Ravenstahl	2001	X		X	X		X	
Gay, Martin & Hembrooke	2001	X			X			X
Weathers	2001	X		X	X	X	X	
Styron & Disher	2003	X			X	X	X	
Davies, Carbonaro, Kendal & Beauchamp	2003	X	X	X	X	X	X	X
Walery	2004	X		X	X	X	X	
Gercek & Saleem	2005	X	X	X	X	X		X
Beasley, Dobda & Chen	2005	X	X	X	X	X	X	X
McKimmy	2005	X	X	X	X	X		X
Daly	2005		X	X		X		
Grignano	2007		X			X		
Hoffman	2007		X				X	

Appendix B: Data Collection Matrix

Research Questions	Data Source		
	1	2	3
1. How did the netbook lab at Fire Prairie Middle School influence student learning during the year of use?	Teacher Survey	Teacher Interview	Student Survey
2. How did the netbook lab at Fire Prairie Middle School influence students' perceptions of their learning during the first year of use?	Student Survey	The teacher interview will ask questions dealing with teacher observations of student attitudes. (Questions 5 and 6 Appendix D)	
3. How often was the lab used during the first year it was available and what professional development opportunities are necessary to encourage more use of the lab in the future?	Teacher Survey	Teacher Interview	Lab Reservation Calendar

Appendix C: Data Analysis Matrix

Data Collection Technique	Data Analysis Strategy		
	1	2	3
1. Teacher Survey	Identify and chart themes, and compare these themes with those found in the teacher interview	Develop a concept map that combines and compares data from the teacher survey and interview	Analyze each survey looking for reasons why faculty members chose to use the lab or not
2. Teacher Interview	Analyze each interview looking for examples of implementation of the lab and reasons why it was not used by some teachers	Identify and chart themes, and compare these themes with those found in the teacher survey	Develop a concept map that combines and compares data from the teacher interview and survey
3. Student Survey	Identify and chart themes, and compare the perceptions found in the teacher Interviews with the perceptions of students when working with the same activity	Develop a concept map that compares student and teacher perceptions of the same activity	Analyze each survey looking for cause and effect relationships that influenced students' perceptions of their learning with the mobile lab
4. Lab Reservation Calendar	Compare with teacher survey to determine which teachers used the lab and understood the process of reserving the lab		

Appendix D: Instrument

This instrument is a survey that will be conducted with a sample of faculty from Fire Prairie Middle School. This sample will include teachers who have used the wireless lab and those who have not used the lab this year. (Optional probes are given under the main questions.)

Introduction Script: This interview focuses on the mobile computer lab at Fire Prairie and how it has been used this year. All answers will be compiled and aggregated, and reported to the technology committee and the administration anonymously. Please answer the questions honestly so that the technology committee can help the faculty further implement the mobile lab in its second year of use. If you prefer not to answer a question, please indicate this and we will move to the next question. You may choose to end the interview at any time. Thank you for taking the time to help the technology committee understand how the mobile lab has been used this year and how we can help you with this technology in the future.

For teachers who have used the lab:

1. Describe the activities or lessons in your classroom that involved the mobile lab this year that you have previously completed in the computer lab or library computer lab.
    a. Tell me about a specific lesson that you have previously used in the computer lab that you modified for the mobile lab this year.

2. Did these activities have more impact on student learning with the mobile lab in your classroom or in the computer lab? What evidence did you see to support your answer?
    a. Where did this activity have the greatest impact on student learning? Why?

3. Explain the activities or lessons in your classroom involving the mobile lab this year that you have not previously completed in the computer lab or library.
    a. Tell me about a specific activity that you created this year that implemented the mobile lab.

4. Would you have completed these activities or lessons in the computer lab this year if the mobile lab was not available? Why or why not?
    a. Why did you not create this lesson using the computer lab?

5. What was your students' reaction to using the netbook lab? What comments did they make as they completed a lesson? What attitudes did you observe?
    a. Tell me about your students' participation and attitudes as they used the mobile lab.

6. Please compare student attitudes and their level of achievement when using the lab to previous years when you taught the same lesson or concept without the mobile lab.

a. What differences, if any, did you see in your students' attitudes and level of achievement when you compare a lesson with and without the mobile lab?

7. In comparing your experience with the computer lab and mobile lab, which do you think has had a greater overall impact on student learning? What evidence have you seen to support your opinion?
    a. In your experience, which computer lab (fixed or mobile) has had the greatest impact on student learning?
    b. Give me a specific example that supports this opinion.

8. What limitations did you find with the netbooks as you integrated them into your classroom?

9. What strengths did you find with the mobile lab as you integrated it into your classroom?

10. Please describe an activity that you attempted to use with the mobile lab that did not work. How would you do this differently in the future?
    a. Tell me about a specific lesson or activity that did not work well with the mobile lab.
    b. In hindsight, what would have done differently to make this successful?

11. Please describe an activity you considered implementing the mobile lab into, but chose not to. Why did you decide not to use the mobile lab in this case?
    a. Tell me about a lesson you considered for use with the mobile lab, but then changed your mind. Why did you change your mind?

12. What activities do you plan to implement the mobile lab into next year? What resources will be necessary to successfully use the mobile lab in these activities?
    a. How do you plan to use the mobile lab next year?
    b. What support or resources will help you continue to use the lab next year?

13. Do you have any other comments or questions about the mobile lab?

For teachers who did not use the lab:

1. What factors prevented or discouraged you from using the mobile lab this year?

2. What support or training would be necessary for you to use the lab next year?

3. Describe a lesson or activity that you completed this year that you would consider implementing the mobile lab into next year. How could the mobile lab enhance student learning during these activities?
    a. Can you think of any lessons or activities that you taught this year that could be completed with the mobile lab in the future? What are these activities and how could the mobile lab enhance student learning while completing them?

4. Please describe an activity you considered implementing the mobile lab into, but chose not to. Why did you decide not to use the mobile lab in this case?
    a. Tell me about a lesson you considered for use with the mobile lab, but then changed your mind. Why did you change your mind?

5. What support or training would help you implement this lesson?

6. What activities have you completed in the computer lab or library computer lab in the past?

7. Would you consider completing these same lessons or activities (from #6) with the mobile lab in the future? Why or why not?

8. Do you have any other comments or questions about the mobile lab?

Ending Script: Thank you again for taking the time to participate in this interview. The technology committee and I hope that the information gained in this study will benefit you and the faculty of Fire Prairie through meeting any needs that are discovered through our research.