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Students' Experiences of Mathematics Learning in Technology Integrated Classrooms

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Technology is used as a mind tool that "can support the deep reflective thinking that is necessary for meaningful learning" (Jonassen & Carr, 2000). However, little is known on what specific features of integrated technology systems contribute significantly to mathematics thinking process to facilitate learning from learner's perspectives. The purpose of this study was to explore the student experiences of using integrated technology system to learn mathematics in two elementary schools. The results indicated that the feature of learning by playing encouraged student self-exploration. The diverse communication channels interacted with students in a much more direct and private manner. The repeated instruction and immediate assessment promoted students' autonomy, encouraged student engagement and nurtured self-directed learning.

Key words: Riverdeep, Odyssey, computer assistant learning, mathematics instruction, student learning experience

INTRODUCTION

Technology is essential in teaching and learning and it influences the way mathematics is taught (Stahl, Koschmann, & Suthers, 2006). When technological tools are available, students can focus on decision making, reflection, reasoning and problem solving (NCTM, 2000). Research on the NCTM standards suggests focusing on the conditions under which these tools can be optimally enhanced in the classroom (Kramarski & Zeichner, 2001). Many efforts have been made to explore alternative ways of teaching mathematics by creating curricula and didactic material that incorporate new tools, pedagogical approaches, and models or methods, which engage learners in a more pleasant mathematical learning process (Kulik, 2002). Through the use of technologies in the classrooms, there is promising evidence of a relationship among computer-supported learning activities, positive attitudes towards mathematics, improvement in mathematical learning, and student performance (Rosas et al., 2003; Loez-Morteo, & Lopez, 2007). Kulik (2002) reported that most evaluation studies suggest that student benefit from

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integrated learning systems in mathematics instructional technology. As noted by Jonassen and Carr (2000), technology is used as a mind tool that "can support the deep reflective thinking that is necessary for meaningful learning."

Technologies are tools for supporting and amplifying human activity particularly learning and mathematics way of thinking. Technologies shape the way people act and think (Jonassen, Hernandez-Serrano, & Choi, 2000). Jonassen and Reeves (1996) emphasized that when technology is used to enhance the cognitive powers of learners during their thinking, problem-solving, and learning, they become cognitive tools. However, little is known on how technology supported learning activities and integrated technology systems facilitate learning process and reflective thinking in mathematics learning. Instructional technology developers and teachers have ideas of how technology supported learning activities and integrated technology systems should work in the classrooms, but students learning experience is an essential aspect that requires careful study. Questions such as "what student experiences have been in using technology tools to support their thinking process for meaningful mathematics learning?" and "Which features of computer-supported learning activities and integrated technology system facilitate student learning?" are particularly prevalent. To understand students learning experiences in using technology will illuminate insider's perspective, and provide important indicators for researchers, instructional system developers, classroom teachers to understand, design, modify, and implement effective technology learning activities and tools to promote positive attitude and maximum mathematics achievement. The purpose of this study was to answer the two questions from elementary student perspectives and learning experiences during their participation of a statewide technology integration initiative- the "Enhance Education Through Technology" (EETT) project.

PRELIMINARY EVALUATION REULTS OF THE STATE EETT PARTICIPATION

The No Child Left Behind Act seeks to promote strong use of technology for learning through federal commitments to the integration of technology throughout all educational programs. Through these commitments, the Act seeks to promote:

1. improved student academic achievement through the use of technology in schools;
2. student technology literacy by the end of eighth grade; and
3. effective integration of technology with teacher training and curriculum development to establish successful research-based, instructional methods.

To address these commitments and goals, the department of Education and the School Net Commission in a Midwestern state jointly created the Enhancing Education Through Technology (EETT) project. Through No Child Left Behind, the state is allocated education technology funds that are awarded to schools. Schools are funded according to a funding formula, based on low socioeconomic status and school demographics. The program has been implemented since 2003. Participating schools were awarded funding on a yearly base for up to two years. In 2006-2007 School Year, seventy-five (75) schools were awarded funding through the state EETT program. For 2006- 2007 participating schools, Compass learning and Plato learning were selected as the approved venders. Each tool falls within the "family" of technology solutions that could be used to build a Learning Management System. Each school is doing something slightly different with the solution sets available from the vendors and with the vendor-provided tools clearly the centerpiece of the local projects. Each local project was asked to propose how it would use EETT funding to help eligible students in grades K-8 meet or exceed state academic content standards in mathematics and reading.

As part of the program evaluation to determine the effectiveness of the state funded technology initiative, standardized achievement test (OAT) reading and mathematics scores were used as an indicator to measure student academic achievement as the results of participating in the EETT project. In addition, student technology use and technology literacy skills were also assessed through student self-reported measures and teachers feedback to determine the impact of EETT participation on technology use and the improvement of student technology literacy skills. Student technology literacy skills were defined by the three areas of Technology Content Standards:

1. Technology for productivity application-demonstrate operation of basic computer and multimedia technology tools;
2. Communication application-use technology tools to interact with others, or to learn;
3. Information Literacy-identify, access, and evaluate information to generate a finished product.

The preliminary results of the EETT program evaluation indicated that on average, there was a significant improvement of student academic achievement in mathematics and reading measured by OAT state standardized test for grades 3 – 8. As OAT only assesses grades 3-8 student achievements, no direct measurement was available to assess student academic achievement in grade k-2. The analysis results indicated that on average, student OAT reading scores increased positively in 3rd, 4th, 5th, and 8th grade. Student OAT mathematics scores increased positively in every grade level except the 5th grade. Particularly, the percentage of student mathematics performance at or above proficient level increased by 19.01, 7.10, 4.75, 3.22 and 2.42 respectively at the different grade levels. Table 1 presented the academic growth for the 75 EETT participating schools in reading and mathematics. Specifically, the analysis focused on the average percentage change of students at or above the designated proficiency level required by the State academic content standards at each grade level.

Table 1: Achievement Gain in % at or Above Proficiency Level for the 75 EETT Schools

Grade	*Reading 06-07 %*	*Reading 05-06%*	*Average Gain%*	*Math 06-07%*	*Math 05-06%*	*Average Gain%*
3rd grade	52.04	49.72	**2.32**	63.44	44.43	**19.01**
4th Grade	50.93	50.25	**0.68**	46.82	39.72	**7.10**
5th Grade	51.08	44.91	**6.17**	26.24	32.13	-5.89
6th Grade	46.59	53.54	-6.95	40.94	36.19	**4.75**
7th Grade	42.42	45.23	-2.81	34.25	31.03	**3.22**
8th Grade	50.42	45.23	**5.19**	32.58	30.16	**2.42**

* Positive gain with average percentage at or above state proficiency level is in bold

Further, students who reported using integrated technology system more often also indicated a more positive attitude to learning mathematics. It requires much sophisticated research design to determine the causation of student mathematics growth and the schools' participation of the EETT project, but the preliminary data did provide a prelude to explore what happened in the process of the EETT implementation in the classrooms, and what the learning experiences were for these students? The purpose of this study was to describe student experiences of learning mathematics in the technology integrated classrooms in two urban elementary schools.

RESEARCH QUESTIONS

Based on the preliminary findings from the EETT program evaluation, the researchers in this research intended to explore student experiences of using integrated technology system to enhance mathematics thinking and learning in two elementary schools. The research questions that guided this study were:

1. How is mathematics learning processed when students use integrated technology system?
2. What features do students feel facilitated learning mathematics when using integrated technology system?

METHOD

PARTICIPANTS

Participants were 55 students in two technology integrated classrooms selected from two EETT participating schools. The two technology integrated classrooms were treated as independent units for a case study approach, while individual students learning experiences were collected and analyzed from both emic and etic perspectives for cross case comparison (Gall, Gall & Borg, 2005). Student characteristics and social economic background were similar in the selected two research sites. Participants included in the study were 55 third grade students, and two teachers in two technology integrated classrooms in two urban schools funded by the State EETT initiative. Of the 55 students, more than half (35) were African American students, and the rest were White. The students came to the technology integrated classroom to learn reading, social studies, science and mathematics two or three times every week during regular school time. The two teachers in the classrooms were assigned to work with these students to use computer assisted learning software to learn the third grade curriculum besides student regular classroom instruction. Most often, students came to the technology integrated classrooms to work on a project or review what was learned in the regular classrooms on a school day.

DESCRIPTION OF THE TWO EETT PARTICIPATING SCHOOLS

The two EETT participation schools were located in two large metropolitan school districts. Both schools received funding from the State Department of Education in 2006 and 2007 respectively due to the social economic status of the student population and school resources.

School A was located in the east side of a metropolitan area in the northeastern part of the state, one of the poorest regions in the nation. The student population was about 300 with grade levels ranging from K to 8. Over 95 % of the students received free lunch. The school received EETT funding from the State for two years in 2006 and 2007 to implement Compass Learning-Odyssey to enhance technology use, and technology integration in professional development and research-based curriculum practice. The 2007 school report card indicated that there was a 21.9 % increase of the OAT score at or above proficiency level in mathematics for the third grade students in comparison to

2006. Students also reported a significant increase in using integrated technology system in learning mathematics in their schools.

School B was a metropolitan school in the southern part of the state. The student population is about 500 with grade levels ranging from K to 8. The school received EETT funding from the State for one year - 2007 SY to implement Destination Success (Riverdeep math and reading) to enhance technology use, and technology integration in professional development and research-based curriculum practice. The 2007 school report card indicated that there was a 32.7 % increase for the OAT score at or above proficiency level in mathematics for the third grade students in comparison to 2006. Students also reported a significant increase in using integrated technology system in learning mathematics in their schools.

DESIGN

This study applied typical case study method to select the cases to accumulate data addressing the two research questions (Gall, Gall & Borg, 2005). Students in two technology integrated classrooms were selected for in depth analysis to learn the experiences of the students in two of the EETT participating schools. The purpose of selecting the two third grade classrooms in two different schools was for cross case comparison and validation of student learning experiences. Based on the preliminary evaluation results, the students in both schools demonstrated the strongest mathematics achievement growth in the state school report card system in comparison with mathematics achievement in previous years before the EETT participation.

In order to capture how students interact in computer assisted learning system, classroom observations were conducted twice in the fall 2006 and spring 2007. An observation protocol was developed by the evaluation team. The protocol was piloted early in the fall 2006 in another research site with some modification to reflect the dynamics in the classrooms. Two domain areas were the foci for the development of classroom observation protocol 1) instruction and technology integration and 2) student aspiration in learning and technology application. The protocol is included in Appendix A.

Focus group interviews were particularly designed to investigate the reflection process when student engaged in mathematic thinking interacting with technology. Focus group interview questions included both open ended questions and close ended questions. The purpose of open ended questions was to provide an opportunity for students and instructors to describe their learning experiences and reflective thinking process when using computer assisted learning system. The close ended questions were to learn specifically from students about their cognitive thinking process, and their interaction with learning tools when learning mathematics in the technology integrated classrooms. The close ended questions were designed to address questions such as: Which features in the system helped learning more than the others? How the system specifically addressed their learning needs? Focus groups interviews were conducted twice in the fall 2006 and spring 2007 during the EETT program implementation. Focus group interview questions were also included in Appendix A.

The data was analyzed through thematic coding and selective coding process separately (Gall, Gall & Borg, 2005). The results of student experiences were cross compared by schools and student characteristics. The observation and focus group interview data were also triangulated with the themes derived from the three researchers. The initial results of classroom observation and the coding system were discussed with instructors and school administrators in the two research sites for member checking purpose.

PROCEDURES

Two researchers visited the school twice in the Fall 2006 and Spring 2007 as part of the EETT project evaluation data collection effort. In School A, a computer lab was observed when 25 students in a 3rd grade class were using the lab for mathematics learning, while similarly, a 3rd grade class of 30 students was using the lab for mathematics learning was observed by the same researchers in School B. During the site visits, a formal focus group interviews were also conducted with the same group of students and classroom teacher in the computer lab after the class twice, one in the Fall 2006 and the other in the Spring 2007. The focus group interviews lasted about 45 minutes in both sessions and were facilitated by the same researchers with a few open ended questions regarding their learning experiences in the computer assisted learning activities and learning management systems (Odyssey in School A and Riverdeep in School B). The interview was recorded and transcribed later by a professional qualitative researcher. The transcripts were read by three separate independent researchers in the team with separate coding themes. Then the themes were compared, merged, and selected to allow students experiences and technology integration features to emerge.

FINDINGS

Students of the two metropolitan schools used Odyssey and Riverdeep as supplementary learning tools to obtain extra help outside of the mathematics classrooms. The teachers working with students in the computer lab were not necessarily mathematics teachers, but acted as the technology liaison in the school. Besides mathematics, the students also used the two learning management systems for reading, social studies and science as extra curriculum activities outside of the regular classroom instruction. Students from different classrooms came to the computer lab after they completed the regular classroom activities and worked on targeted academic interests facilitated by the computer assisted learning tools and the teacher guidance in the computer labs.

The observation indicated that 95% of the students got onto and began computer usage for a task fairly well. The teacher in the classroom had fairly clear expectations for students, and students navigated their own way through programs, and were able to complete assignments within the allotted time frame. The learning environment was collaborative and encouraging, even though discipline was an issue occasionally.

Students in both schools indicated a greater use and interest in mathematics learning and feel the computer learning system facilitated their thinking in learning mathematics. Particularly, students in both schools indicated a greater use and interest in learning mathematics. The features of the computer assisted learning activities facilitated and aroused a greater interest in learning mathematics than in the other subject areas. The unique feature of these learning activities captured student needs for mathematics learning can be categorized in the following aspects from what was observed in the computer supported classrooms and responses of the students during the focus group interviews.

LEARNING BY PLAYING AND SELF-EXPLORATION

Students' interest and motivation in learning mathematics in the computer assisted learning system were reflected in quotes. "I like to use the computer to do math". "I learn math better by using the computer". The features of these learning tools are more fun, colorful and interactive to increase student attention and interest in learning. The following excerpts presented a few snapshots of students learning experiences and positive attitudes towards learning mathematics in computer assisted learning system:

1. "It's like a game. It is more fun than using a textbook. It's like a teaching game, school games."
2. "It's colorful. It's a cool game and you learn and catch up in a fun way."
3. "When I'm using a computer, I kind of like press the key buttons and then when I get on the internet, when it shows me pictures and it tells me, it asks me what is in the picture, what is familiar to me just think about it, I just look at the picture again, and then I learn more when I look at the pictures and stuff."
4. "We play on it and learn it at the same time."

Students obviously felt that the computer assisted learning activities had closer connection to their world. The interactive interface of the learning system captured the unique characteristics of young children and their learning interests. The multiple sources imbedded in the learning system helped students to learn in fun environment with opportunities to apply mathematical concepts and construct meanings that connect to their own world. The enthusiasm and the level of student engagement demonstrated by these students in learning mathematics with the technology integrated activities were stimulating and powerful.

MULTIPLE AND PRIVATE COMMUNICATION CHANNELS

A unique feature of the two learning systems was the diverse knowledge presentations. A wide range of audio and video media presentations were designed in the learning systems to function as the major communication methods for learners in a private platform to facilitate the understanding and needs of the diverse learners of young children. The students shared with the researchers their level of comfort and relaxation when interacting with computer assisted learning system in the following:

1. "Sometimes on Curious George he tells you when you messed up and they give you directions. The directions are easy to understand."
2. "The computer helps you concentrate more and sometimes the teachers are keeping on doing things over and over and sometimes people be talking while the teacher be saying stuff."
3. "—so let's say like if you wanted to get an answer you go on the internet to that and then it's going to say two times something (two times or three times something)."
4. "The first time you do it, it's hard but when you get to know it more it's easy."
5. "You can remember what the problem is by looking at the pictures."
6. "You can look at the picture and you can understand what it's asking better because you're not just reading it."

These positive experiences described by students revealed the importance of developing multiple communication methods to reach students with diverse learning needs on complicated and abstract mathematical concepts. To be supported by computer assisted learning system, students were working on a brand new learning platform. When students asked questions, submitted resolutions, or explored alternative answers, they did not have to wait to be called, and they did not have to worry about how other students in the classrooms might respond if their answers were wrong, or not the same as the others. In the learning process, students found the interactive features of the learning tools opened up a much more private communication channel beyond the merely two-way interaction between students and teachers in a traditional classroom. Students felt very comfortable and easy to communicate and interact most frequently with their favorite “body” rather than their “teachers”. The feedback and direction was simultaneous and open to many options and solutions with plenty of room for students to engage in experimenting, making mistakes, and figuring things out in their own pace without being pressured by the comparison of how “others are doing”.

REPEATED INSTRUCTION AND IMMEDIATE ASSESSMENT TO NURTURE SELF-DIRECTED LEARNING

The learning tools incorporated direction, repeated instruction, along with immediate feedbacks to encourage students to self assesses their learning outcomes and areas for improvement. It captured the individualized needs of students in a private manner and provided learning goals and directions for improvement repeatedly and very promptly. The direction students got were personalized and linked to previous work or progress. Students did not have to wait for the next period to get the results of their quizzes. These additional features integrated in the learning system provided much more powerful facilitation to students to “try harder” than the students experienced in regular classroom settings where technology is not available.

1. “I like doing the math in the computer. I like math subject because in multiplication, in division, there are additions, subtraction and all of that, then when I go on the multiplication it makes it hard and then when I get it wrong, it says sorry that is incorrect. But, I get better and then when I do it again, I get it right.”
2. “Whenever I get the answers wrong, I go back then I know the answer right.”
3. “I kind of tried harder because I knew I could get it right after I figure it out myself several times.”
4. “It kind of like having your own teacher. Um computers let you practice, it tells you if you get it wrong instead of like if you’re waiting for your teacher and your teacher is helping with somebody else and on the computer they actually help you because all you got to do is just press the help button and they actually help you.”
5. “You can take practice test. You can click on the envelope, and you can see other people’s stuff. And what they said.”

In summary, the qualitative analysis of student mathematics learning experience indicated three unique features of computer assisted learning system as powerful learning tools to promote students interest, motivation and aspiration to learn mathematics. The three unique features that facilitate mathematics learning process and explain the positive experiences are 1) the computer assisted learning environment connect with students by games and other age appropriate, fun, and interactive features to incorporate learning by playing and relating to children’s real world; 2) multiple and private channels of communication are integrated in the system to provide extensive opportunities for self-exploration, trying out, making mistakes, and correct misconnects about mathematics content; 3) repeated instruction and immediate feedback animated by popular characters stimulate curiosity, nurture self-directed learning, and help students develop sense of ownership and responsibility for their own learning. The findings from the perspectives of students in the two 3rd grade classrooms illuminate a powerful potential of integrating computer assisted learning system to improve instructional design and technology implementation to promote mathematics learning.

DISCUSSION

The experiences of the two classes of 3rd grade students using technology to learn mathematics provided hope and insight of how technology integrated learning activities can be powerful stimuli to facilitate mathematics learning process and reflective thinking. Technology and its analog tools amplified our nature capacities and can help lighten the learning burden for these young children. These technologically integrated learning activities also created opportunities for extended understanding in mathematics. It assisted teachers in creating a supportive, affective environment in the classroom. The interactive game features of computer programs and exploratory quality of the internet motivated students to explore and to connect learning to their own lives. The untiring, non-judgmental nature of the activities make it ideal tool to help students feel sufficiently secure to make and correct their own errors without embarrassment or anxiety. Most importantly, the computer assisted learning activities provided positive learning experiences that rewarded and encouraged self-regulation and meta-cognition so important for academic achievement.

The key of successful application of technology in learning is not so much how the "information" itself is presented, but the degree to which students are motivated to exploit the environment in order to achieve their personal learning goals (Mihalica & Milea, 2007). The student learning experiences in this study suggested that unique features designed in the learning system provided a new platform for seamless transition of media presentation, information sharing, self-exploration, and knowledge negotiation in the target mathematics thinking process. The dynamics of multiple channels of communication to a greater degree nurtured the negotiation of knowledge and stimulated self-directed learning. Glazer (2004) explained that communication tools, either synchronous or asynchronous, enable students to learn anytime and anywhere. Synchronous communication tools enable students to request help from a teacher or peer without waiting a long time for a response. While, asynchronous communication tools are valuable when a student would like to reflect on and describe a solution in detail to share with teachers or peers. First of all, the interactive nature of these learning tools is age appropriate and increased the learning interests for the young students. The learning tools made the learning process playful and fun. As Warner concluded (2006), technology educators have a long history of providing students with opportunities to experience the joy of learning and the joy of involvement with technology. Students demonstrated obvious aspiration to purposeful learning and they wanted to practice more and try harder on the computer. Researchers have suggested that technology creates a way to bring authentic problems into the classroom (Bransford, Brown, & Cocking, 2000), so technology is viewed as an integral part of teaching and learning to improve both the effectiveness of instructional strategies and student motivation (Hsieh, Cho, Liu & Schallert, 2008). Secondly, the step by step self learning features provided simultaneous feedback and directions to assess students learning in private manner. The immediate and specific feedback students received in various formats repeatedly on the computer screen by student favorite characters in their daily life connected mathematics concepts and content to their real world. Further, these features also served as the function of correcting or highlighting students' error, making students more aware of their own misconceptions in non-threatening manner. This feedback served as a model for students to learn how to write notations accurately using numbers and words, explaining concepts by using mathematical terminology. Students may have learned the terminology while using such as virtual manipulative and then use it accurately in their own written explanations on the assessment, which are so vital for enhancing student reflective thinking in learning mathematics. Thirdly, students had a sense of autonomy of what to learn and when to learn in a private learning environment to self explore in an individualized pace. The interactive nature of these learning tools also allowed for accommodations and differentiation of the different ability levels of the learners. The students did not feel they were behind, or need to catch up with the rest of the class. They were on their own to control their own learning with the computer screen accompanies by their favorite characters and friends.

The experience of students learning mathematics with Odyssey and Riverdeep in the two schools has practical implications in the technology enhanced classrooms. It shed lights on the development, modification, and implementation of integrated technology system to better meet the needs of students and teachers in enhancing mathematics learning. Four critical points of mathematics learning suggested by Kazemi and Stipek (2001) needs to be considered in implementing a technology integrated classroom or developing a mathematics learning system: a) an explanation consist of a mathematical argument, not simply a mathematical description, b) mathematical thinking involves understanding relations among multiple strategies, c) errors provides opportunities to reconceptualize a problem, explore contradictions in solutions, and pursue alternative strategies, and d) collaborate work involves individual accountability and reaching consensus through mathematical argumentation. Reflective thinking process for k-8 grades students for learning mathematics should be conceptualized in such socio-mathematical norms. The student perceptions of their learning experiences in the technology assisted learning system in the study highlighted the potential power to design technology assisted learning activities for self-exploration in each of the mathematics learning points.

The cognitive constructivist view of learning believes that an active self-regulated, goal-directed, and reflective learner constructs personal knowledge through discovery and exploration in a responsive learning environment. This constructivist environment can be activated by interactive technologies that can adaptively and intelligently respond to for-the-moment learning needs. A learning environment is a system that consists of interrelated components that jointly affect learning in interaction with relevant individual and cultural differences (Salomon, 1991). This approach emphasizes the need to construct learning environments that engage students in meaningful and purposeful activities. Thus, the content of cognition (what is known) and what the process of cognition (how it is known) cannot be separated from the context. Consequently, technology assisted learning system has a powerful role to act as a major tool to create adequate learning environments where enhanced situated cognition takes place. In the process of developing, designing, and implementing computer supported activities and integrated technology systems these guidelines need to be considered to meet student needs and reflect student learning experiences. Technology creates “new opportunities for curriculum and instruction by bringing real-world problems into the classroom for students to explore and solve” (Brandford, Brown, & Cocking, 2000). The experience of student mathematics learning using Riverdeep and Odyssey in this study echoed the power of such learning opportunities.

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APPENDIX A

Site Visit Protocols for EETT Evaluation Project
Site Name_______________________
Date___________

1. Classroom Observation:

A. ***Learning Integration***

1. Where are computers/resources located?

☐ In-Class ☐ Computer Lab ☐ Both

How are they arranged? Are there enough for all students? How do students tend to sit?

Comments:

Technology application tool:

☐ Blackboard ☐ SchoolNet ☐ Plato ☐ Compass Learning
☐ Other_______________________

2. How well are students able to get onto and begin computer usage for a task (specific task)?
3. How well do students navigate their own way through a specific program (application tool)?
4. Are students doing the work they have been assigned? Do teachers have clear expectations for students? Do they covertly/overtly have additional programs/games running simultaneously?
5. Do students seem to be able to complete assignments within the allotted time frame? Describe the quality of student work.
6. How often do students ask instructors for help? Do students ask peers for help additionally or instead of instructors? Is the learning environment is collaborative and encouraging?
7. How well does the instructor integrate technology skills and application in teaching?

B. ***Affective domain and technology aspiration*:**

1. Do students appear to generally be happy, bored, frustrated, distracted, entertained, etc. during their computer usage?
2. Do teachers demonstrate enthusiasm in integrating technology in teaching?

2. Focus Group Interview Questions:

Group Composition:

A. ***Learning Integration*:**

1. (Teachers) Please share your experience of technology integration and professional development?
2. (Students) Can you tell me something about your computer use in class or school work?
3. How does it work in your class or school to use a computer? (Are there set times for computer/computer lab use each day/week?)
4. What would you like to have that the school has not provided yet?

B. ***Technology Aspiration*:**

1. (Students) Do you enjoy the available programs? Why?
2. (Students) Do you look forward to computer time at school and would you like more or less of it?
3. (Teachers/Students) How much do you feel the use of these programs has helped?
4. (Teachers) Do you feel technology has improved your teaching capabilities and made your job easier and/or more successful?
5. (Teachers) Which programs/subjects do you prefer to use? Why? How often do you use them?
6. (Teachers) What, if anything, do you feel would help you to use the technology for the sake of student learning more efficiently?
7. (Teachers/Students) Is there anything else anyone would like to share?