Chapter V: Results

Results

The problem was that the writer’s work setting had state of the art technology that was not being used by the teachers or the students. Based on an analysis of successful programs described in the literature, the writer developed a multiple-level training program to enable teachers to overcome technophobia and to become comfortable in using the available technology. Ongoing training for teachers was conducted by facilitators they trusted and with whom they felt at ease. Teachers met for training in small groups by teams and departments to enable them to brainstorm ways to integrate the technology into curricular areas and interdisciplinary units. A select group of students was trained to assist teachers in using the technology successfully.

Several goals were projected for this practicum. At the conclusion of the practicum, students and teachers will use the available technologies throughout the curriculum. Students and teachers will recognize technology as an educational tool to enhance instruction, and they will embrace its use. The available technology will be infused into the curriculum.

The following outcomes were projected for this practicum:

1. An analysis of the photocopying time logs (see Appendix B) completed in the first month of the practicum and
those completed in the last month of the practicum will indicate that the percentage of time the office clerk spends on photocopying materials for teachers out of the total hours she spends photocopying materials for the staff will decrease by at least 40%.

This outcome was not met.

The writer calculated that during the first month of the practicum, the office clerk responsible for photocopying materials for the staff, spent 92% of her time photocopying material for teachers out of the total time she spent photocopying materials. The materials being photocopied for the teachers were worksheets, labs, reading selections, and assignments. The materials being photocopied for the administration and support staff were staff announcements and memos, parent letters, and the school newsletter.

The writer calculated that during the last month of the practicum, the office clerk spent 83% of her time photocopying material for teachers out of the total time she spent photocopying materials. The types of materials being photocopied were the same as those being photocopied in the first month of the practicum for both the teachers, administration, and support staff.

Although the time spent photocopying materials for the teachers decreased by 9%, a decrease of 40% reduction in time spent photocopying materials was expected if the teachers were using the available technology more. Several teachers began to use technology much more than other teachers. The
writer suggests that training on the integration of technology into the curriculum continue to be provided to the teachers next year. The writer suspects the time spent photocopying materials for teachers will continually decrease as the training and acceptance of technology continues.

2. An examination of the media center's Bibliofile system will show that 60 out of the 68 teachers will check out at least one type of the hardware and one software item by the conclusion of the practicum.

This outcome was met.

The writer, with the assistance of the media specialist, reviewed the media center's Bibliofile system to determine the numbers of teachers who checked out hardware and software. The media specialist examined the Bibliofile records from the prior school year. These indicated that only 15 teachers out of the 62 teachers employed last year checked out at least one type of hardware and one software item. Sixty-two out of the 68 teachers checked out at least one type of hardware and one software item by the conclusion of the practicum.

There are several possible reasons for the increase in the numbers of teachers checking out the available technology. Additional teachers were hired. More hardware and software were acquired since the previous year. Teachers had more time to explore the available technology because less time was being spent on becoming acclimated to the new school. Teachers became aware of the technology that was
available for check out in the media center and were encouraged during training workshops to examine it.

3. An analysis of a roster checklist of teachers (see Appendix C) using their file folders on the server will show that at least 60 out of the 68 teachers will use their folders at least once by the conclusion of the practicum.

This outcome was not met.

The writer had intended to establish a folder for each teacher on the server enabling them to store retrievable lesson plans, grades, memos, and other personal information in a central location that was backed up daily. The Education Technology Services (ETS) department would not allow the writer to perform this task because of security breach concerns. The Windows NT network system is new in the school system, and the technicians at ETS are very cautious in permitting new uses of the Windows NT servers. They are concerned that unauthorized persons could breach the security and tamper with confidential files and records. The writer intends to pursue the establishment of teacher folders on the server during the next school year.

4. A review of a roster checklist of students (see Appendix D) will indicate that 70% of 1,632 students will use their file folders at least once by the conclusion of the practicum.

This outcome was not met.

The writer intended to create folders for each of the 1,632 students on the Windows NT server. This could not be
accomplished because of the reasons outlined in Outcome 4. Consequently, none of the students could use folders on the server. The writer will continue to pursue the establishment of student folders on the server during the next school year.

5. A review of a teacher roster checklist (see Appendix C) of teachers who submit projects on floppy disks will indicate that 60 out of the 68 teachers will successfully complete one project using each of these software applications: (a) WebWhacker; (b) ClarisWorks (wordprocessing, draw, and slideshow; database and merging; charts and spreadsheet); (c) HyperStudio; and (d) PowerPoint by the conclusion of the practicum.

This outcome was met.

The results of this outcome exceeded the writer's expectations. One hundred percent of the 68 teachers completed and submitted on floppy disks, projects demonstrating the use of each of these software applications: (a) WebWhacker; (b) ClarisWorks (wordprocessing, draw, and slideshow; database and merging; charts and spreadsheet); (c) HyperStudio; and (d) PowerPoint by the conclusion of the practicum.

Professionals claim that not only must adequate time be provided for training, but also for practice (Bockisch & Redfearn, 1995; Carter, 1996; Lovely, 1997; McKenzie, 1991). The results of this outcome support this contention. Teachers did produce projects using the software and hardware they learned to use when they were give the time to complete them
during the workshop. An effective workshop must provide time for instruction and ample time for practice.

6. An analysis of a teacher roster checklist (see Appendix C) of teachers who submit application lesson plans will indicate that 60 out of the 68 teachers will submit copies of lesson plans indicating the use of each of these applications: WebWhacker, ClarisWorks (wordprocessing, database, and spreadsheet), HyperStudio, and PowerPoint at least one time in their curriculum by the conclusion of the practicum.

   This outcome was not met.

   Only 28 teachers out of 68 submitted lesson plans indicating the use of the software applications: WebWhacker, ClarisWorks (wordprocessing, database, and spreadsheet), HyperStudio, and PowerPoint at least one time in their curriculum by the conclusion of the practicum. The teachers expressed lack of preparation time as the reason for not submitting the lesson plans. If more time could have been provided during the workshops, the teachers could have prepared and submitted the lesson plans while in the workshop. This would have permitted assistance from the facilitator or other peers if needed. The writer also should have sent out more reminder notices.

7. An examination of a teacher roster checklist (see Appendix C) of teachers who complete projects using peripherals will indicate that 60 out of the 68 teachers will successfully complete at least one project using each of
these types of peripherals: (a), laser disc player, (b) scanner, (c) digital camera, and (d) LCD projector or panel by the conclusion of the practicum.

This outcome was met.

Sixty-eight teachers out of the 68 teachers completed a project using each peripheral taught on early release and planning days. The reason for the success of this outcome can again be attributed to adequate time being provided to the teachers to complete the projects during the workshops. When the writer asked the teachers informally which workshops they enjoyed the most, the workshop on peripherals was voiced most often. They admitted that they were not aware of several of the types of equipment and they did not know how they could be used. They expressed that they felt comfortable being able to practice using the hardware under the direction and assistance of the facilitator.

8. A review of a teacher roster checklist (see Appendix C) of teachers who complete the peripheral lesson plans will show that 60 out of the 68 teachers will submit copies of lesson plans indicating the use of each of these peripherals: (a) laser disc player, (b) scanner, (c) digital camera, and (d) LCD projector or panel at least one time by the conclusion of the practicum.

This outcome was not met.

Only 23 teachers out of the 68 submitted lesson plans indicating the use of each peripheral. Although the teachers found the workshop on peripherals to be the most interesting
and valuable, they did not complete the follow-up assignment requiring the creation of lesson plans incorporating the use of the peripherals. The writer questioned several teachers informally why they did not submit the lesson plans indicating the use of the peripherals. Inadequate time for preparation was again the answer given most often. If time had been provided to create the lesson plans during the workshop, all of the teachers questioned said they would have completed them.

9. An analysis of a teacher roster checklist (see Appendix C) for teachers who scheduled their classes to use the computer lab rooms will indicate that 50 out of the 68 teachers will use one of the computer lab rooms at least once by the conclusion of the practicum.

This outcome was not met.

Thirty-three teachers out of the 68 teachers used one of the computer labs at least once by the conclusion of the practicum. Beginning with the second quarter, the administration added an elective computer class that met during fourth period in the large computer lab, preventing teachers with fourth hour classes from using it. Many teachers complained to administration that if they could not take all of their classes into the lab, then they would not make the effort to use it.

The writer, as a teacher, empathized with them, knowing the difficulty this presented when planning lessons. A teacher expending the extra time necessary to integrate the
use of the computer lab into the lesson wants to be able to implement that lesson with all of her classes, not just four out of the five. All fourth period classes were not able to take advantage of the computer lab for the remainder of the year. Consequently, many teachers decided not to use the computer lab for the remainder of the year.

10. An analysis of a teacher roster checklist (see Appendix C) for Internet lesson plans will show that 60 out of the 68 teachers will submit at least one lesson plan indicating that they have located and implemented an Internet classroom project by the conclusion of the practicum.

This outcome was not met.

Only 8 out of the 68 teachers submitted a lesson plan indicating that they have located and implemented an Internet classroom project by the conclusion of the practicum. Commencing with second quarter and continuing for the remainder of the year, an elective computer class met in the large computer lab room preventing teachers from using the large computer lab room during fourth period as explained in Outcome 9 above. Consequently, teachers decided not to use the computer lab room for instruction and Internet access.

Administration assigned the writer to teach an eighth grade science class during fifth period commencing second semester. This affected the amount of time the writer had available to perform her technology responsibilities. Thus, time was not available to complete the network process in all the classrooms. The writer networked approximately half of
the rooms to have Internet and Intranet access. Since 8 out of
the 68 teachers float into other teachers' classrooms to
teach, this prevented more than half of the teachers from
being able to assign students to work on the Internet in
their classrooms.

The teachers had no reason to create lesson plans
involving the use of the Internet if they did not have access
to the Internet. Once again, however, the teachers questioned
about this issue, said they would have developed lesson plans
in the workshop if time had been allotted for this task.

11. An examination of a teacher roster checklist (see
Appendix C) for probeware will show that 8 out of the 11
science teachers will successfully complete at least one lab
using a pH probe and at least one lab using a temperature
probe by the conclusion of the practicum.

This outcome was not met.

The writer could not purchase probeware the first half
of the year because of lack of funds. When money from the
state technology grant became available during the second
half of the year, the vendor bid had expired. The school
district's science department did not approve a probeware
vendor before the conclusion of the practicum. Therefore, the
writer could not train the science teachers in the use of
this technology. Next year probeware will be ordered and the
writer will train the science teachers in the application of
this technology.
12. A review of a teacher roster checklist (see Appendix C) for probeware lesson plans will indicate that 8 out of the 11 science teachers will submit a copy of lesson plans indicating the use of a pH probe at least one time and a temperature probe at least one time by the conclusion of the practicum.

This outcome was not met.

The teachers could not submit lesson plans indicating the use of probeware because the school district’s science department did not approve a vendor before the conclusion of the practicum.

13. An analysis of a teacher roster checklist (see Appendix C) for e-mail will show that 60 out of 68 teachers will respond by e-mail to an e-mail message sent to them by the technology coordinator.

This outcome was met.

Out of the 68 teachers, 61 responded by e-mail to an e-mail message sent to them by the technology coordinator. The writer sent this e-mail using the Microsoft Exchange Mail program via the Intranet. The teachers expressed regret that this technology was not available sooner and that it was not more accessible. Those teachers who were in classrooms not networked yet, had to access their mail from computers in classrooms that were networked making it inconvenient to retrieve and send mail. Use of the Intranet e-mail system allowed the teachers to communicate with other teachers within the school system during school hours.
In addition, teachers also used e-mail via popmail from their homes accessing it from their laptops. They enjoyed the ease of using their laptops to communicate with teachers from the school after school hours and from schools throughout the world. The writer continually overheard conversations among the teachers about e-mail correspondences.

14. A comparative analysis of the total scores on the technology attitudinal questionnaires (see Appendixes E and F) will indicate that 60 out of the 68 teachers earn a higher score at the end of the practicum than the one earned in the beginning.

This outcome was met.

Sixty-one teachers out of the 68 teachers earned a higher score in the last month of the practicum from the one earned in the first month on the Technology Attitudinal Questionnaire as shown in Table 1. The last column of the table represents the increase or decrease in scores earned by the teachers on the questionnaire at the conclusion of the practicum. A decrease in scores is shown for seven teachers. Sixty-one out of the 68 teachers had an increase in scores. The higher scores at the conclusion of the practicum for 61 teachers indicate that these teachers felt more positive and comfortable about the use of technology. Writers (Thornburg, 1991; Donoho, 1994; McQuarrie and Iwamoto, 1990) have documented that teachers with positive attitudes toward technology are those that integrate its use into their curriculum. Holtzberg (1998) states, "For technology
integration to be successful at the school level, never underestimate the power of enthusiasm" (p. 37). If teacher training on the integration of technology into the curriculum is continually offered, the writer believes that scores on the Technology Attitudinal Questionnaire administered to teachers at the end of the next school year will indicate further improvement.

Table 1

Initial and Ending Scores Earned on the Technology Attitudinal Questionnaire

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**Note.** Possible scores on the Technology Questionnaire Attitudinal (see Appendix E) range from a -24 to a +24

15. A review of a student roster checklist (see Appendix D) for a **HyperStudio** presentation will indicate that 70% of the 1,632 students will complete at least one individual or group presentation using **HyperStudio** by the conclusion of the practicum.

This outcome was not met. None of the students completed and submitted a **HyperStudio** presentation. Research has shown that teachers, as human beings, fear change (Tally and Grimaldi, 1995; Thornburg, 1991; Dell Computer Corporation, 1993; Donoho, 1994; Rosen & Weil, 1995; Bulkeley, 1988). This fear was
evident when the writer asked the science teachers to incorporate into the Invent America! Curriculum, assignments requiring the students to produce a HyperStudio presentation.

The science teachers expressed to the writer a lack of confidence in using the program. The teachers felt one training session was not enough time to learn the program well enough to teach it to their students. This outcome confirms studies done by several researchers on inadequate time allotment for technology training resulting in teachers not arriving at comfort zones with the technology (Siegel, 1995; Rosen and Weil, 1995; Harrington-Lueker, 1996). Consequently, none of the science teachers consented in requiring their students to produce a HyperStudio presentation.

16. An examination of a student roster checklist (see Appendix D) for a report done using the ClarisWorks wordprocessing component will reveal that 70% of the 1,632 students will prepare at least one written report using ClarisWorks as part of an interdisciplinary unit by the conclusion of the practicum.

This outcome was not met.

Only 21% of the 1,632 students submitted a report as part of an interdisciplinary unit using the ClarisWorks word processing component. The majority of the language arts teachers reacted to a request by the writer to require students to use ClarisWorks to do their major research paper in a similar manner as the science teachers. They expressed a
lack of confidence in their expertise with the program and attributed this to inadequate time to practice using it.

A few of the teachers had had previous experience with ClarisWorks and did initiate its use as a requirement for their students. They took their classes to the computer lab room for a week to do research using the Internet and then to write the report. Thus, although only 21% of the 1,632 students submitted their reports using ClarisWorks, the writer credits this as a positive outcome and a stepping stone to the possibility of more extensive usage in the upcoming years.

Discussion

Although only 5 out of the 16 projected outcomes were met, many positive accomplishments were achieved. Given the many obstacles, the writer is encouraged by the results of the practicum.

The writer observed that some of the teachers preferred to teach the way they always had because they feared change. They continued to use textbooks and lectures regardless of the technology that was available. Researchers advocate the necessity of technology leadership in achieving teacher usage and application of technology. The researchers claim that the infusion of technology will fail if the administrators do not have a technological vision and do not have sufficient skills in using the technology (Dempsey, 1997; Harrington-Lueker, 1996; Kearsley & Lynch, 1994; Ritchie, 1996; Williams, 1993). Administration will need to take a more active role in
encouraging teachers to integrate technology into the curriculum. The administration has already begun this process. They have made a commitment to the teachers that they will not schedule courses using the computer labs in the future.

An unexpected outcome that transpired because of the training program the writer initiated was her appointment as the zone's technology trainer and representative. The writer is now responsible for coordinating all technology training in all the schools, elementary through high school, within her zone. Additionally, because of the leadership role she undertook, she has also been appointed the peer teacher liaison of the school for the next year. This position places the school's beginning teacher program under her direction. The writer has also been appointed to the Technology Standards Ad Hoc Committee by the superintendent.

In reflection, the writer realizes her expectations were too high. Most of the outcomes showed positive results, but did not meet the measurement criteria. The writer is confident that if training is continued and is ongoing as recommended in the literature (Fulton, 1996; Lovely, 1997; Mckenzie, 1991; Siegel, 1995), the practicum goals will be met in upcoming years.

The writer came across in her readings, a memorable analogy. Guhlin (1997) stated that "Technology integration is similar to a tidal wave, growing silently in strength, then falling with an unstoppable roar upon those who paid no
attention or showed little interest" (p, 26). The most promising indicator of this response is the overwhelming number of teachers who earned a higher score on the technology attitudinal questionnaires at the end of this practicum.

The most rewarding aspect of this practicum was observing a few teachers who displayed severe technophobia at the initiation of this practicum who began to implement technology as a tool in their curriculum by its conclusion. The writer believes that their excitement over the successes they experienced will be contagious among those teachers still exhibiting technophobic behaviors.

**Recommendations**

Based on the writer's experiences implementing this practicum, six recommendations seem appropriate.

1. When establishing a training program, adequate practice time following the instructional component of the workshop must be incorporated. The workshop should be structured to allow adequate time for instruction, practice, and completion of expected projects and lesson plans. Outcome 6 and Outcome 8 were not met because the teachers expressed that there was not enough time to complete them in the workshop. They also stated that they did not have the time to complete them independently following the workshop.

2. Before establishing outcome criteria, be sure that all equipment, supplies, and materials are accessible and functioning. If the writer had tested the use of WebWhacker
in the computer lab room prior to the workshop on this application, the writer would have avoided embarrassment, the facilitator would have had time to prepare a workshop on the Internet, and time would not have been lost during the first session the workshop was presented.

3. Administrators need to attend the training sessions also. If this is not possible, after school or Saturday workshops for administrators should be established. The writer believes that if administrators are exposed to the same training the teachers are receiving and if administrators become more involved with technology, they will have a better understanding of the frustrations and challenges the teachers encounter. Consequently, they will become supportive of initiatives to integrate technology into the curriculum. The writer believes that if they are more aware of the logistics of teachers using computer labs, they will be more willing to support the computer lab being accessible to teachers all periods of the day.

4. An after-school program to train students to (a) troubleshoot technology-related problems (b) use software applications and hardware, and (c) install software should be established to assist teachers. This program was so successful and so well received by the teachers that the writer believes it must be incorporated into any program established to train teachers. The students can assist teachers often in a more timely manner than if teachers had to submit help forms to the technology coordinator and
schedule a time for assistance. Additionally, they are more readily available to help their peers in their classrooms in using hardware and software applications. The students involved in a program similar to STEP develop leadership skills and become better prepared to meet the challenges of future career opportunities.

5. An adjunct of the after-school student technology program should be initiated whereby students can sign up for an elective class with the technology coordinator. This class should be offered during several periods so that during the day, the students are able to assist the teachers and the technology coordinator. These students could also be trained to maintain the school's web page and update it daily. This would provide more time to train the students so that they become more proficient in troubleshooting and assisting their teachers and peers.

6. Not all of the outcomes were met, but the writer believes that if a similar training program is continued in the next school year, more of the outcomes will be met. A great beginning was achieved because of the implementation of this practicum. The teachers have a more positive attitude toward technology and therefore, have less trepidation about using it. They are now more receptive to further training. If this worksite is to become the model school for the county demonstrating the successful integration of technology into the curriculum, then training of the teachers must continue. The writer will need to continue to locate articles, ideas
and projects for teachers that relate to the environment and incorporate technology. If teachers are constantly made aware of how technology can enhance the delivery of an environmental awareness curriculum, then the writer believes they will make more of an effort to incorporate it into their instruction. Consequently the vision and mission statements developed by the shareholders of the school will be achieved.

**Dissemination**

The writer will present an overview of this practicum at the Nova Southeastern Summer Institute.

Several of the technicians at ETS as well as zone technology council members have expressed an interest in this practicum. The writer will send them copies of the final report.

The administration and faculty at the writer's school have been actively following the progression of the writer’s practicum experiences. The writer plans to summarize the results in a staff meeting and to provide copies of the report in the media center for check out.