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# Technology Empowered Transitions: Curriculum, Teachers' Practices, and . . . Change?

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## Introduction

Meet Joshua (pseudonym), a ninth grade student attending a rural community school in a rural state. Joshua is the oldest of three children living at home with his parents in an impoverished neighborhood. Neither his father (a Native American), nor his mother (of Anglo descent) have completed the 12<sup>th</sup> grade. Both parents hold minimum wage jobs, thus the daily tasks of putting food on the table and taking care of their children occupies their energies. Due to their lack of educational experiences, Joshua's parents have little understanding of what they can do to help their child complete high school and attend college.

Joshua's school counselor has over 200 students to oversee. Joshua has no vision about the high school he will enter, let alone college. No one has articulated it for him. He is passive in school, with low self-expectations. Now that he has completed middle school, his parents are talking to him about getting a job and helping the family. Slowly, the societal expectation of completing high school and going to college diminishes in Joshua's day to day reality. While his teachers see his lack of commitment, they are faced with other students in similar situations. Because of lack of professional development training, teachers do not make the appropriate connections within the curriculum to help Joshua and his classmates become successful in school and move on to college. Joshua is unprepared for the rigorous curriculum needed to prepare for college. This fact combined with the lack of support from home for the needed rigorous high school program, Joshua may just slide by in school or worse yet, drop out.

Joshua's story is representative of the at-risk student population who were served by the *Technology Empowered Transitions: From High School to Higher Education* grant. This grant obtained in March 2003 from a state Department of Education was designed to help high schools with high poverty populations in the state adjust their curriculums so teachers could instruct to both state and ACT objectives. When combined with the other state initiatives, students in this state have school curriculums that better prepare them for higher education.

The following objectives were identified for the *Technology Empowered Transitions* (TET) project:

1. School personnel will implement a revised appropriate curriculum(s) based upon the results of the EXPLORE and PLAN portions of ACT's Educational Planning and Assessment System.
2. School personnel will identify problems classroom teachers experience when implementing curriculum changes, and explain how these problems were overcome.
3. School personnel will identify and document changes in student learning based on the implemented curriculum changes.
4. School personnel will identify exemplars of "best practices" associated with the implementation of curriculum changes.

It was hypothesized by the researchers that once those objectives were met, target schools would have a curriculum enabling students to become more successful in school.

## Grant Implementation

TET was designed to help secondary schools with high poverty populations improve instruction for their students by helping teachers learn to align their curriculums with ACT and state objectives. Fourteen school curriculum lead teachers from eight rural school districts with high poverty populations were involved in graduate study designed to accomplish the stated program objectives. Instruction for the curriculum lead teachers, provided by university professors - knowledgeable in the areas of curriculum design and alignment, state and ACT objectives, and the state approach to NCLB requirements - was designed to occur in three different settings: traditional classrooms, on-line instruction, and the use of interactive educational television (IETV). Using a "turn key" organizational management plan, curriculum lead teachers then instructed their faculty using multimedia programs and equipment (laptop computer, LCD projector, Polycom 128 and 32" television, 2 mobile carts) purchased through this grant. School districts were required to provide internet connections for the teachers to use. In addition, curriculum lead teachers were able to contact other participants and

university faculty, as well as participate in on-line sessions using this same program equipment.

Now that more than a year has passed since the completion of TET, researchers are interested in the lasting effects brought about by this grant. In particular, researchers are interested in the grant participant's perceptions regarding the effectiveness of the TET grant in promoting student learning, curriculum alignment with ACT and state standards, and on teachers' comfort levels with technology in the classroom.

### Literature Review

Fullan (2001) indicates that the study of educational change "is less than half a century old" (p. 4). Fullan along with Hord, Rutherford, Huling-Austin and Hall (1987) agree that the study of educational change did not begin until the late 1950's when large scale educational reform efforts in response to Sputnik began in the United States. Unfortunately many of the earlier reform efforts met with little success (Fullan 2001; Goodlad 1971; Hoban 2002; Hord, Rutherford, Huling-Austin & Hall 1987) because schools lacked the capacity to implement the desired reforms. Thus for change to be successful, the process needs to be understood and implemented.

Bennis, Benne and Chin (1976), Hord, Rutherford, Huling-Austin and Hall (1987), and Fullan (2001) all state that change is a process. A synthesis of these works indicates that change occurs through the following four step process:

- Awareness
- Understanding
- Implementation
- Institutionalization.

The initial step in the change process is *awareness*. Administrators often tell teachers that curriculum alignment is both needed and important. Unfortunately little information or professional development is provided so that teachers become comfortable and competent with the process and reasoning behind the alignment initiative. This is where TET graduate course work began in the change process. Participating lead teachers completed a Summer I 2003 reading and discussion session consisting of a series of articles about the pros and cons of aligning curriculum with state and national standards (Adler 1982; Brooks & Brooks 1999; Burner & Greenlee 2002; Hurwitz & Hurwitz, 2000; Hoover 2002; Kerr 1999; Madaus 1999; Melnick & Gable 1989; Romberg & Price, 1999; Strong, Silver & Perini 2001). These sessions were conducted by one of the principal investigators.

During the Summer II 2003 session, participating curriculum lead teachers learned about the curriculum alignment process and how to comply with NCLB requirements. This instruction came from four university professors acting as mentors during the participants' course

of study. At the completion of the Summer II session, participants became so familiar with the needs and process involved in curriculum alignment that they were able to explain the conceptual and specific elements of these proposed changes to others. So upon completion of Summer II session the second step in the change process, *understanding*, occurred.

The third step in the change process is *implementation*. This part of the change process was begun during the Fall 2003 semester when participating lead teachers began the task of aligning their curriculums with the ACT and state objectives. This is a crucial step in the change process because, "If the instruction and classroom assessments are not aligned with the standards around which these large-scale assessments are constructed, then a student could perform very well in the classroom and then fail the high stakes assessment" (McGehee & Griffith, 2001, p. 142). To help begin the curriculum alignment process school wide, participating lead teachers created a multimedia presentation concerning the curriculum alignment process and presented this information to their public school faculty during one of their fall in-service days. The aligned curriculums and multimedia presentations were turned into the principal investigators at the end of the grant in December 2003.

The last stage in the change process is *institutionalization*. Institutionalization will occur when both faculty and administration continually update and apply curriculum alignment with ACT and state objectives. Further, as new and pre-service teachers become members of the learning community, they are taught the process of curriculum alignment by school faculty and administration. Thus we look at the perceptions of participating lead teachers to see how far along they and the schools are in the implementation and institutionalization of this change process.

### Methodology

To investigate the effectiveness of the TET grant, the researchers utilized a survey to gather the needed data. The instrument created for this study was comprised of two sections: a group of 11, 5-point Likert scale items and a group of 4 open-ended questions. The Likert scale items were constructed to elicit data about student learning, curriculum alignment, and teacher learning. The open-ended items served two purposes: to provide an opportunity for participants to provide more in-depth responses than Likert scale items, and to provide affirmation or disaffirmation of the Likert scale data.

### Data Analysis

Data from Likert scale items were analyzed using chi-square (Goodness of Fit) analysis using a .01 significance level. Chi-square analysis allowed the researchers to compare observed and expected frequencies (Ary, Jacobs,

Razavieh, & Sorensen 2006). Gall, Gall and Borg (2003) recommend that "when the expected frequency in any cell is less than five, a Yate's correction or the Fisher exact test needs to be applied" (p.315). To compensate for this need, the researchers collapsed data from Likert scale items from 5 levels to 3 levels prior to analysis.

Constant comparative analysis was used to code data from the open-ended items. The researchers sought to identify categories of meaning relevant to the purposes of this study. As categories emerged, the researchers also attempted to determine whether or not open-ended data affirmed or disaffirmed findings from the Likert scale data.

### Participants

The population in this study was the 14 public school curriculum lead teachers who participated in the TET grant. Surveys were mailed during the spring of 2005. Of the 14 surveys sent to TET grant participants, 11 were returned. Participants had a range of 3 to 22 years and included two elementary teachers, three middle school teachers, and six high school teachers. Six of the 11 participants held master's degrees.

### Findings

The purpose of this study was to examine the effectiveness of the TET grant in promoting student learning, curriculum alignment of course content with ACT and state standards, and teacher comfort with technology use in the classroom. Data for this study came from participants' responses to a survey consisting of 11 five-point Likert scale items and 4 open-ended items. Findings are organized according to the three areas of purpose of the study: student learner, curriculum alignment, and teacher comfort with technology.

#### Student Learning

Of the 11 Likert-scaled items, two addressed the area of student learning. Item 1 asked participants if TET assisted them to become more "aware of student academic needs" in their classrooms. Item 4 sought to determine if student learning increased as a result of TET. The mean response for each of these items was fairly high. The mean for item 1 was 4.0 and the mean for item 4 was 3.91. More importantly, results of chi-square analysis indicate statistical significance at the .01 level.

Data from the open-ended items suggested that participants believed that the TET grant was effective in assisting them to increase student learning. Two themes emerged from this data. First, TET participants believed that student engagement in lessons increased when they incorporated skills learned during TET into their classroom teaching. The second theme indicated TET participants were better able to address students' various learning styles.

One participant wrote, "the technology provided by the grant allows the students to see and hear the curriculum in a variety of methods which enhances learning." Another participant stated that, as a result of TET, there is "little wasted time thus better equipping the students." Perhaps the most detailed statement about student engagement was offered by a middle school language arts teacher:

For learning to take place, students must be able to make connections and see relationship in the material they are given to learn and the application of this material in test situations. Technology Empowered Transitions provided me with a wonderful motivation for seeing new avenues for accomplishing my goals in the classroom . . .

A high school science teacher wrote, "Students today are becoming more and more technology minded" and that through the use of technology students "comprehend more quickly and stay [more] focused on the classroom learning as a whole."

In addition to increased student engagement, the data suggested that TET helped teachers be more aware of students' learning styles. One middle school math teacher wrote that as a result of TET, "I have changed my teaching methods to address learning styles as a result of a discussion I had with a fellow student in TET." A high school math teacher stated that the "technology provided by the grant allows the students to see and hear the curriculum in a variety of methods which enhances learning."

#### Curriculum Alignment

Four items were constructed to elicit data that would allow the researchers to address whether or not participants viewed the TET grant as an effective tool for assisting them with curriculum alignment. Item 2 asked participants if TET was effective in assisting them to learn "how and why it is important" to align their curriculum with state and ACT standards. Item 3 inquired whether or not TET helped participants to overcome problems in the process of aligning curriculum with state and ACT standards. Participants were asked if their colleagues were receptive to what they had learned during TET about curriculum alignment in item 5. Item 6 sought information about the extent to which TET participants worked with other teachers to align their curriculums with state and ACT standards. Chi-square analysis did not reveal any statistically significant results.

Data that emerged from open-ended items indicated TET participants believed that participation in the grant assisted them in aligning their curriculum with state and ACT standards. One participant asserted, "The professors used for the Technology Empowered Transitions grant were all helpful during the time I was aligning my curriculum. Any

problems encountered were overcome with their help." Another participant remarked, "Throughout the year my students were presented with a curriculum focused on state standards. The narrowing of material along with the technology... helped me to better prepare my students for state testing.

### Teacher Comfort with Technology

The final area investigated by the researchers was teacher comfort with technology in the classroom. Item 8 asked participants if TET assisted them to become more comfortable using technology in their classrooms. Item 9 required participants to indicate if they were still using the technology learned in TET in their classrooms. Item 10 took a wider view and asked participants if their schools were still using equipment and materials provided by the TET grant. No statistically significant results were found.

In the open-ended items, TET participants expressed the belief that they become more comfortable with technology in the classroom as a result of the TET grant. A kindergarten teacher stated that she learned, "to use computers more comfortably" and supported the importance of this learning because in kindergarten, computers "are the only technology we use." A high school mathematics teacher stated, "I feel more confident in the context of my teaching. I'm excited about the use of new technology in my classroom." Other respondents believed that their increased comfort level with technology helped their colleagues to become more comfortable with technology as well. A middle school math teacher wrote, "A co-worker came to me for help in presenting a lesson using technology. Without having gone through training in TET, I would not have likely been much help." A high school math teacher believed that part of the value of TET was "seeing my colleague who is a relatively new teacher use the technology provided by this grant. She has able to present her curriculum in a variety of methods and facilitate the learning process."

### Conclusions

The purpose of this study was to examine the effectiveness of the TET grant from the perspective of its participants. The researchers chose to focus their inquiry on three areas: student learning, curriculum alignment, and teacher comfort levels with technology. Results of this study indicated that participants believed the TET grant was effective in assisting them to enhance student learning in their classrooms, to more completely align their curriculums with state and ACT standards, and to become more comfortable with using technology in their classrooms.

Of particular importance were the results of the chi-square analysis of the Likert scale data. This analysis indicated that the participants' responses to the items addressing student learning were statistically significant.

While the analysis of the Likert scale data concerning curriculum alignment and teacher comfort with technology could have been purely by chance, the responses concerning student learning were not. Participants in this study firmly believed that students in their classrooms were learning more as a result of changes they made to their practices based on their participation in the TET grant.

From this study, the researchers concluded that if public school instruction is to be relevant for 21st century students, teachers' practices must include current technology. Equally important, teachers need opportunities to learn how to integrate existing as well as emerging technologies in their classrooms. Administrators have the responsibility of helping to provide those learning opportunities. These opportunities could and should include providing time to attend training events, creating situations in which teachers could observe colleagues skilled with technology in the classroom, and giving constructive feedback about technology usage following classroom observations in the context of supervision and evaluation.

As existing technologies are refined and new technologies continue to emerge, research into the applications and uses of technology by teachers in the classroom needs to continue. Implementation of new technologies presents challenges to teachers on multiple levels. Schlechty (1997) identified three different types of change:

1. **procedural change:** an alternation in the order in which events occur.
2. **technological change:** a change in the tools used to complete a task as the result of technological advances such as using a computer instead of a typewriter.
3. **systemic change:** a modification in the nature of the job being done. Systemic change involves changes in beliefs, values, rules, relationships, and orientation.

Teachers and administrators need to view the integration of technology in the classroom as *systemic* as well as *technological* change. How teachers change their belief systems about instruction in order to accept the integration of technology into their practices is an area ripe for further study.

The results of this study suggest the work done during the TET grant did assist teachers to more fully integrate technology into their practices. The perception of participants that their work during the TET grant helped to enhance student learning was statistically significant. What was not answered in this study was *why* teachers believed strongly that student learning was enhanced. Perhaps this is an additional avenue for further research.

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