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AUTHOR White, Evelyn; Gary, Todd
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ABSTRACT

A graduate course that challenged classroom teachers to make a meaningful connection between the research literature and effective classroom teaching strategies was designed and analyzed. The Tennessee State University course, Advanced Science in the Elementary School, is a team-taught doctoral level course for teachers trained in a hands-on science reform project to develop higher quality science teaching and student learning. During the fall semester of 1998, 12 teachers enrolled in this course located and critiqued research articles that support effective teaching strategies such as cooperative groups, inquiry, and the learning cycle. Then these participants wrote papers that described how the findings connected with the project and their classroom teaching. In this course, inquiry-based lesson plans were also prepared, science curricular materials were evaluated, and science activities were synthesized to align with state and national guidelines. One semester after taking the course, the teachers were asked how they applied the research findings in their classes and in leadership roles in the project. Their work, videotapes of the presentations, and followup responses were analyzed. Results suggest that once teachers see a connection between research and the classroom, the research becomes of value to them. Schools should provide professional development opportunities that encourage teachers to explore the value of research to their profession. Appendixes contain information on the course, the titles of research papers, and the postcourse survey. (SLD)

1999 Mid-South Educational Research Association

Does Research Matter to the Classroom Teacher?

Presented by:

Evelyn White, Ed.D.
Associate Dean, College of Education
Science Education Specialist
Tennessee State University
3500 John Merriot Blvd.
Nashville, 37209

Phone: (615) 963-5089
e-mail: ewhite@picare.tnstate.edu

Todd Gary, Ph.D.
Molecular Biologist & Research Project Director
Center of Excellence: Basic Skills
Tennessee State University
330 10th Ave. N. Suite J
Nashville, TN 37203

(615) 963-7219
tgary@coe.tsuniv.edu

Table of Contents

I. Abstract

Does research matter to the classroom teacher?

Evelyn White and Todd Gary,
Tennessee State University

Does research matter to the classroom teacher? This fundamental question should concern those of us involved in educational research. Our concern, led us to design and analyze a graduate course at Tennessee State University which challenged classroom teachers to make a meaningful connection between the research literature and effective classroom teaching strategies.

This course, Advanced Science in the Elementary School (EDCI 683), is a team taught doctoral level course designed for teachers trained in a NSF-funded K - 6 hands-on science reform project to develop higher quality science teaching and student learning. This goal is achieved by engaging teachers in leadership roles in this project and involving them in actively learning and applying current developments in science education to this project and in their classroom. During the fall semester of 1998 twelve teachers enrolled in this course located and critiqued research articles which support effective teaching strategies such as cooperative groups, inquiry, and the learning cycle. Then these teachers wrote papers which described how findings from these articles connected with this project and their classroom teaching. Each teacher presented her findings to the class. Also in this course, inquiry based lesson plans were prepared, science curricular materials were evaluated and science activities were synthesized to align with state and national guidelines. One semester after taking the course, these teachers were contacted and surveyed to determine how they applied the research findings in their classrooms and in leadership roles in the project. The teachers' work, videotapes of the presentations and follow up responses were analyzed to determine the extent to which they made the connection between theory and practice.

Our results suggest that once teachers see a connection between research and their classroom, the research becomes of value to them. School systems should provide professional development opportunities which encourage teachers to explore the value of research to their profession.

II. Setting the Stage: A gap exist between research in education and the classroom.

Several reasons:

Research Side

- Research is not always relevant to a classroom teacher
- Funding and publications drive research
- Amount of Research published is immense
- Type and method utilized

Practice Side

Policy makers decisions

- not trained to separate good from bad research
- can implement policy without a research basis
- their decisions affect teachers

Classroom teacher

- few have good and consistent exposure to relevant research literature
- few posses the skills and time it takes to locate, examine and apply research to their classroom
- attitude towards research

According to the National Science Education Standards

-Research Should Matter to the Classroom Teacher-

"Teachers require the opportunity to study and engage in research on science teaching and learning, and to share with collogues what they have learned." (Page 56)

Other Reasons:

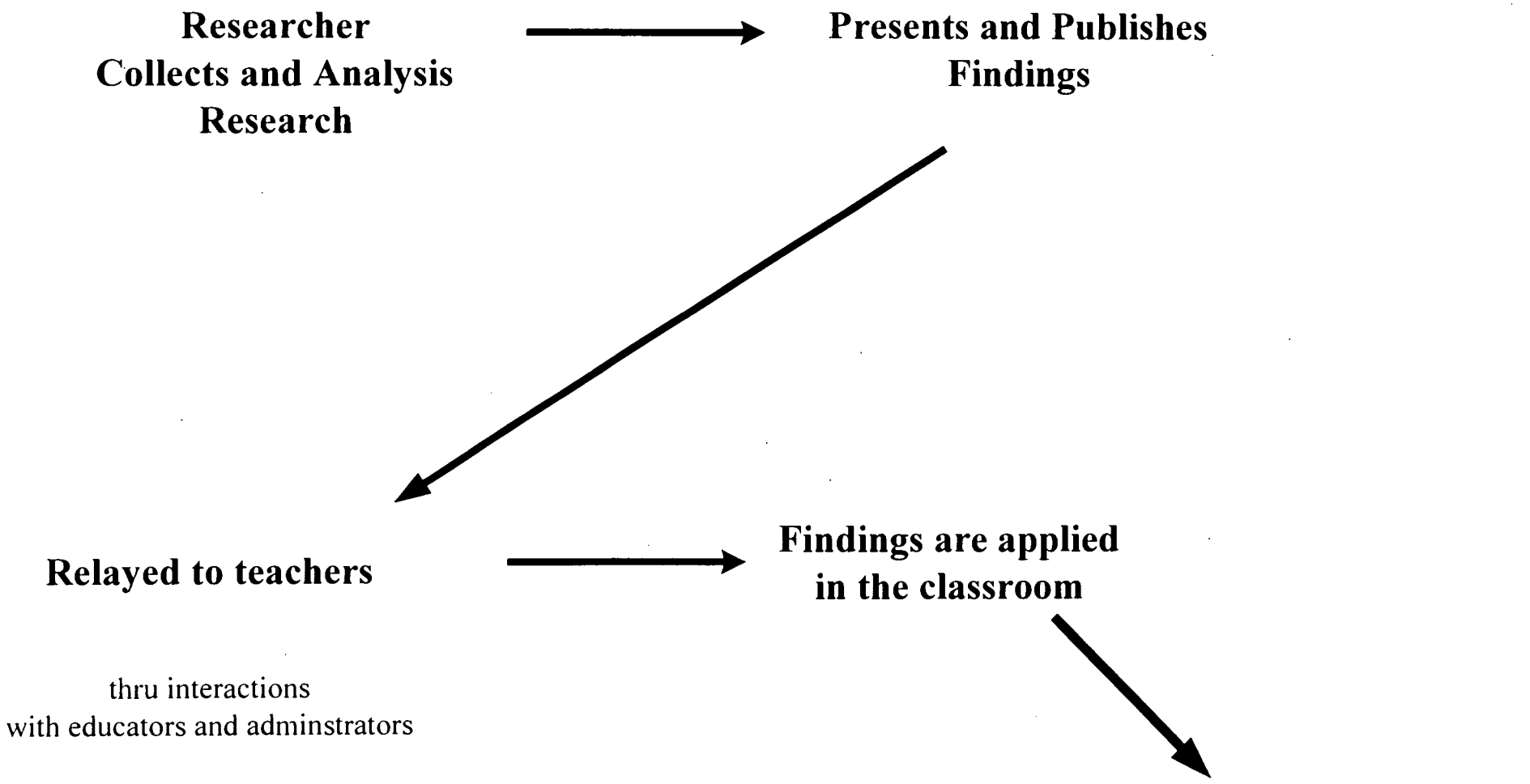
- Education is a changing and evolving field
- Teachers need to keep current as professionals
- Teachers can become the sources of their own growth as well as supporters of the growth of others

How bad is the Problem or Gap?

"There is such a chasm that separates research from the field. My colleagues don't have a clue what's being done in the research field." (Classroom teacher)

The Chronicles of higher education, August 6, 1999 The failure of Education Research. Why don't scholars play a large role in school reform. A17-A18.

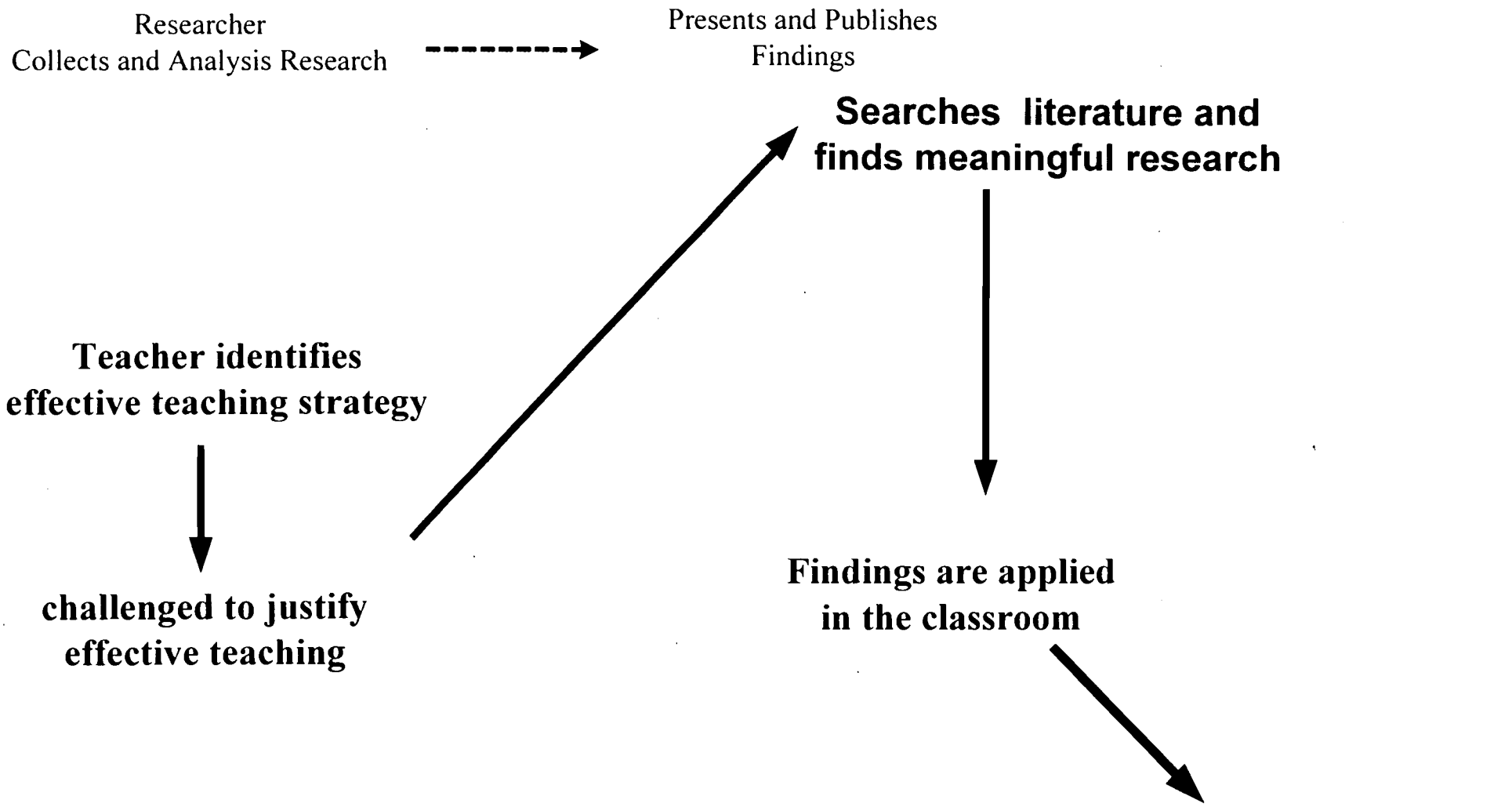
Current Model



Are there any Solution?

- Professional Development
- Courses designed to incorporate relevant research

Model used to design Graduate Course EDCI 683 at TSU



III. Designed a Graduate Course at TSU to address this concern

- One goal of this course was to challenge teachers to make a meaningful connection between the research literature and effective classroom teaching strategies.
- This presentation will focus on our analysis this course

Information on the Course and Students

- 12 teachers
- Women in 40's with 15 years teaching experience in a leadership role in a K-6 hands on science reform project.
- Course was a semester long

Eight assignments including a research paper

TSU - NSF Hands On Science Project or Schools for Tomorrow Project

- **NSF-funded Systemic Reform project in Science Education in Middle Tennessee**
- **Converting from a text, lecture-based to a hands-on inquiry-based program**
- **Involves 128 K-6 schools in 4 counties (Each counties has 1 school district)**
- **Involves over 3,000 K-6 teachers and 80,000 students**

Teacher Leadership

6 Teachers-in-Residence **(full time)**

128 School Facilitators (1 per school) **(+ 5 PD Day/ year)**

Teachers **~ 3,000** **(100 hrs PD over 5 years)**

PD = Professional Development which focuses on Hands-on Inquiry-based Science Education (Pedagogy, Content, and system wide change).

IV. Results gathered in 3 Different Areas

A. Teacher's prior knowledge about research

B. Teachers found research to be meaningful

C. Evidence for classroom application

Prior Knowledge

1. Precourse interviews
2. First assignment:
   Identify effective teaching strategies (in science)

Increased Understanding

1. Analyzed research papers
2. Surveys
3. Videotaped presentation
4. Course evaluations

Application to the Classroom

1. Post-course surveys
2. Post-course interviews
3. Videotaped presentation
4. Course evaluations

V. Results: A. Teacher's Prior Knowledge

1. **Teachers were resistant to write research papers.**

2. **Teachers can identify effective teacher strategies but not the research basis.**

Initial Resistance

- Most teachers did not want to do a research paper.
  Only 1 expressed an interest.

- Primarily too much work, not sure if worth their time, not sure what instructors wanted.

"Too much work."
"Too formal. What is APA?"
"Prefer to meet and discuss with other teachers."
"How many pages? How many references do we need?"
"I don't have time!!"

Teachers could identify effective teacher strategies, but not the research basis.

"What are effective teaching strategies in science education?"

1. The Learning Cycle
2. Cooperative Learning
3. Habits of the Mind
4. Authentic Assessment
5. Portfolios
6. KWL Strategy
7. Journal Writing
8. Process Skills
9. Inquiry-based learning
10. Constructivism

Note: These topics are important to both teachers and researchers

How were Teachers Aware of these Topics?

Personal Experience "They work in my classroom"
From Peers "They work in other teacher's classroom"
From Professional Development "These strategies were presented at the Hands-on Science Institutes."

V. Results: B. Teachers found Meaningful Research

1. Research Papers
2. Surveys: End of course and post-course
3. Videotapes of their presentations
4. Post-course Interviews

Topics Selected for Research Papers

Student Learning	Assessment	Pedagogy
Bloom's Taxonomy	Portfolio Assessment	Constructivism
Habits of the Mind	Authentic Assessment	Cooperative Learning
Gender Bias	Performace-Based Assessment	Less is More
	Concept Mapping	Inquiry-Based Instruction
		Race-Base

Some Examples of Titles*

Inquiry Based Learning: What is it and why do we need it?

Authentic Assessment: Do we really want to go there?

Still Blooming After All These Years: Is Bloom's Taxonomy outdated?

Is Performance-Based Assessment a Sound Way to Assess Students in Hands-on Science Programs?

Is Less Really More: Will teaching fewer topics with greater depth improve student learning in science?

*All titles are listed in the appendix.

V. Results: B. Teachers found Meaningful Research

2. Post-course surveys (10 of 12 returned)

100% Considered research paper most relevant assignment (see appendix)

How?

"The research paper was beneficial to me. It forced me to do research and compile it. I often want to know more but find that there is limited time."

"It changed the way I teach!!"

3. Videotape of Classroom Presentations

A. Example: VH (Kindergarten Teacher)
Describe what she has learned about Constructivism

Describes historical content.

Defines schemata and student understanding
Teachers must challenge the existing schemata of students.
Planning to implement this.

First time she has heard "Teachers must change from a sage on the stage to a guide on the side".

V. Results: C. Evidence for Classroom Application

1. Videotapes of their presentations

2. Post-course surveys and interviews

Conclusion:

1. **If teachers see research as having meaning in the classroom they will embrace it.**
2. **A New Model for designing a course to bridge the gap between research and practice.**

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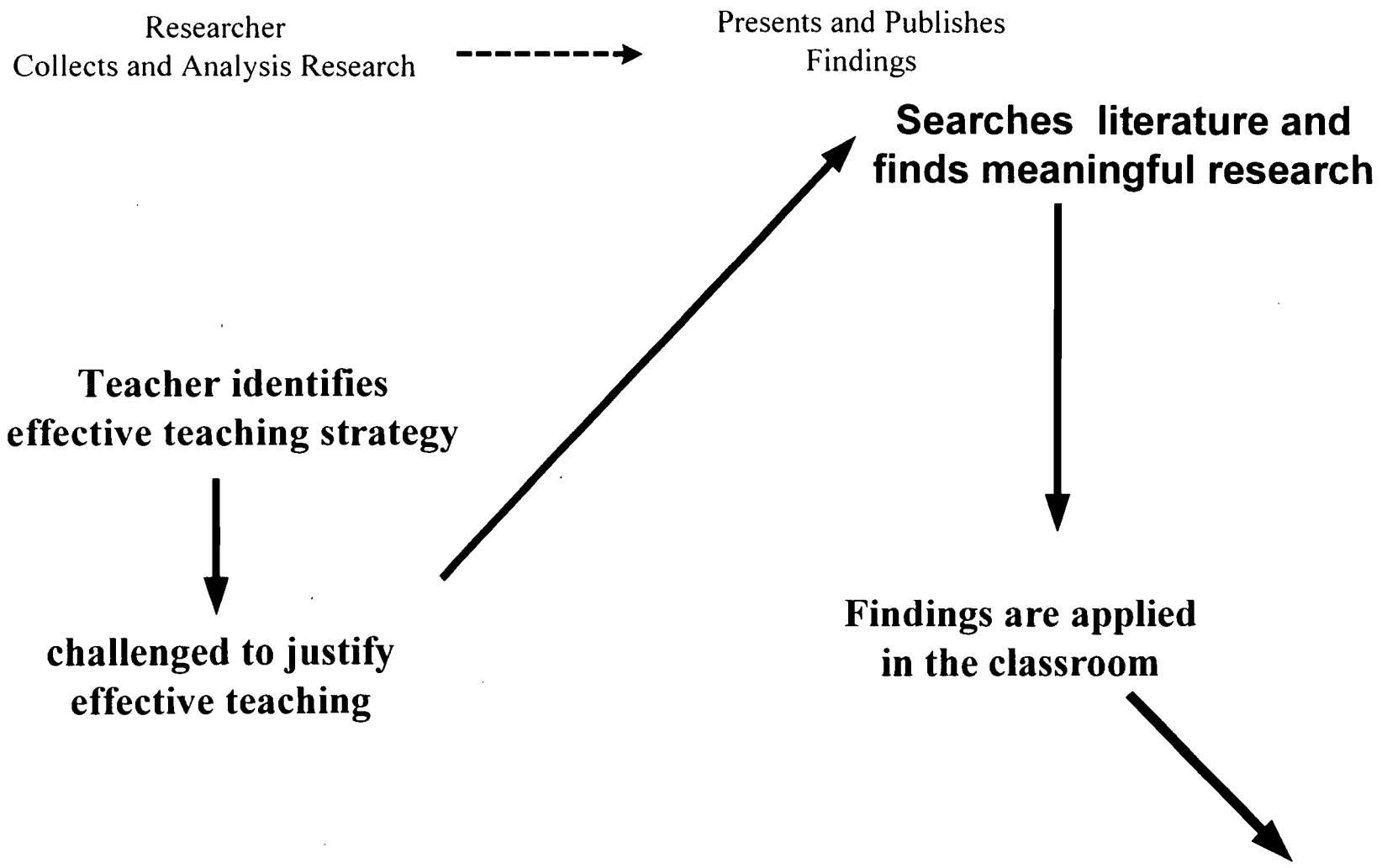
Model used to design Graduate Course EDCI 683 at TSU



Appendix

Appendix A: Information on EDCI 683

Appendix B: Title of Research Papers

Appendix B. Post-Course Survey

Information of EDCI 683:
Advanced Science in the Elementary School

What is EDCI 683?

- A graduate course for teachers in leadership roles in the NSF hands on science program
- 3 graduate credit hours (doctoral level)

What are the Goals of this course:

To strengthen the leadership of NSF project by providing an opportunity for teachers

- to grow professionally and receive graduate credit
- to examine the research literature upon which effective teaching strategies are built
- to pursue a educational topic in-depth
- to analyze and critique the NSF project

Syllabus for EDCI 683

Introduction	
Class #1	Science Content and Pedagogy
Class #2	Understanding How Learning Occurs
	Analyzing computer software for elementary science courses
Class #3	Understanding and Applying Research to the Classroom

Assignments:

1 & 2. Take home Exams

Mid-term and Final (Each with 4 - 5 questions and 2 - 3 weeks to complete)

Sample Question: Based on your knowledge, experience and feedback from other teachers, make several suggestions or recommendations which will improve the TSU-NSF hands on science program and its changes for sustainability.

3. Research Paper

An 8 - 10 page paper examining a science education or teaching strategy topic such as cooperative groups, inquiry, and the learning cycle.

4. Classroom application assignment

Applying knowledge gained in the course to the classroom.

Textbook: Elser, E.K. & Elser, M.K. (1996) Teaching Elementary Science (7th ed) New York: Wadsworth Publishing Company.

Research Papers

Teacher	Research Paper
LB	Inquiry Based Learning: What is it and why do we need it?
LG	Is Less Really More: Will teaching fewer topics with greater depth improve student learning in science?
KG	Gender bias and its impact on teachers in the classroom.
PH	Is Performance-Based Assessment a Sound Way to Assess Students in Hands-on Science Programs?
MH	Still Blooming After All These Years: Is Bloom's Taxonomy outdated?
VH	Constructivism.
BJ	Is there race-bias in science education?
DP	Can Portfolio Assessment be Successful in a Primary Classroom?
TP	Utilizing Concept Maps in Science Education.
RS	Are Two Heads Better than One: Cooperative Learning: Why and how it works.
JT	Habits of the Mind.
PZ	Authentic Assessment: Do we really want to go there?

Post-course Survey for EDCI: 683
Advance Science in Elementary School

Please rate each of the following class assignments from 1 to 6 using the following scale:

4 = Very beneficial to you and your classroom teaching
3 = Beneficial and relevant to the course and classroom teaching
2 = A class assignment which had little benefit to classroom teaching
1 = Busy work and not relevant

Course Assignment	Circle the appropriate number			
Technology in the Classroom	1 (1)	2 (1)	3 (6)	4 (2)
Harry Wong Simulation	1 (0)	2 (3)	3 (4)	4 (1)
Lesson Plan	1 (7)	2 (1)	3 (1)	4 (0)
Evaluating Science Textbook	1 (2)	2 (4)	3 (3)	4 (0)
Sharing Resource Files	1 (1)	2 (0)	3 (3)	4 (5)
Edible Science Project	1 (1)	2 (1)	3 (3)	4 (5)
Mid-term and Final Exam	1 (0)	2 (4)	3 (6)	4 (0)
Research Paper	1 (0)	2 (0)	3 (4)	4 (6)
Overall EDCI 683 Course	1 (0)	2 (2)	3 (6)	4 (2)

1. Should a course like this be offered to classroom teachers? 9 yes 1 no
Why or Why not?

- Science education is experiencing so many changes. Some teachers need to be retrained and for some attitudes towards science education need to be changed.
- Classroom teachers will benefit from additional information about science and its teaching.
- It would give new science teachers time saving information and more experienced teachers can acquire new ideas and resources.
- This course could inspire teachers to broaden their scope of knowledge.
- Teachers can benefit from learning more about teaching science.

2. What did you Like most about this course?
(100%) Meeting with other teachers and sharing ideas. "Being with other teachers who love science, love teaching science & are committed to improving science education."

3. **How can this course be improved?**

- More focus on personal research
- More sharing of research and progress
- Make it more of a research course

4. **If you found the research paper beneficial, please comment on how it benefited you as a teacher.**

- We go to pick a topic that was meaningful to us.

- The research paper was beneficial to me. It "forced me to do research and compile it. I often want to know more but find that there is limited time.

- It introduced me to facts and information and stimulated my thinking and reasoning skills. It forced me to make judgements about concepts based on learning from the research. It exercised my skills involved in communicating both written and verbal. The process of research has never been something that I look forward to. The formality of it is a nuisance to me, but I have always know that I experience the most growth when I become involved with a project that involves research. This relates to the students that I teach also. They will experience more growth in learning if they are totally invested in the process.

- Allowed me to research topic I have been interested in and see history and data supporting theories.

- There were several articles that I read that enlightened me on my subject.

- I found out more about my selected topic.

- Basically it reaffirmed some things that I was already aware of. It also gave me justification for some of the changes I have made in the way I teach.

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Organization/Address: Tennessee State University, 330 10th Ave. N. Suite J, Nashville, TN 37203	Telephone: (615) 963-7219 / FAX: (615) 963-7214
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