

UPDATE AND VALIDATION OF A TEACHERS' ATTITUDE TOWARD  
EDUCATION RESEARCH SCALE

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Nancy Holincheck  
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Committee:

Gary R. Galluzzo Chair

Philip M. Earley

Arundhati Kirtika

Gary R. Galluzzo Program Director

Michael R. Quinn Dean, College of Education and Human  
Development

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George Mason University  
Fairfax, VA

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A dissertation submitted in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy at George Mason University

by

Nancy Holincheck  
Master of Science  
George Mason University, 2003  
Bachelor of Science  
The College of William and Mary, 1997

Director: Gary Galluzzo, Professor  
College of Education and Human Development

Spring Semester 2012  
George Mason University  
Fairfax, VA

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## **ABSTRACT**

### **UPDATE AND VALIDATION OF A TEACHERS' ATTITUDES TOWARD EDUCATION RESEARCH SCALE**

Nancy Holincheck, Ph.D.

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Dissertation Director: Dr. Gary Galluzzo

One of the challenges associated with education becoming an evidence-based practice is teachers' attitude toward education research. Little is known about why teachers may not look to research to solve instructional problems, but it is likely linked to teachers' attitudes toward education research. The purpose of this dissertation was to update and validate a scale to measure teachers' attitudes toward education research. The updated scale was administered to a group of classroom teachers in a large suburban school district (n=474). An exploratory factor analysis found three factors, accounting for 51.5% of the total variance in the final scale. The factors underlying teachers' attitudes toward education research are personal interest in conducting education research, value of education research, and usefulness of research skills to teachers. Significant differences in the attitude scores were found when examined for teachers' educational background, types and quality of professional development the teachers have experienced, their

exposure to and use of teacher research, and the sources of education research findings that teachers can use in the classroom.

## CHAPTER ONE: INTRODUCTION

It appears that comparatively little of what is written and thought about by scholars and policy makers actually has any appreciable impact on classrooms (Davis, 2007, p. 569).

The No Child Left Behind Act of 2001 (No Child Left Behind [NCLB], 2002) requires that practices grounded in “scientifically-based research” be used in schools. In addition to stating “practices shall be based on the most current research,” (p.2, sec. 1111.d.1) the law further mandates the use of strategies, methods, and professional development based on “scientifically based research” to address school improvement, strengthening the core academic subjects, and improving educational opportunities for low achieving students. The law does not explicitly state how school administrators and teachers are to choose and interpret education research, except to say that the methods chosen should have proven effective in addressing the issues to which they are being applied.

Teachers learn about education research in multiple ways, including teacher education programs (Cochran-Smith & Lytle, 1999), professional development (Duffy & Kear, 2007), and their own professional reading (Littman & Stodolsky, 1998). It is reasonable to consider that teachers’ understanding and acceptance of practices grounded in research depends on the teachers’ beliefs and attitudes about education research. Although teachers’ use of the scientifically-based findings from education research has

been mandated by the government, teachers' attitudes toward education research are not known. As Richardson (1996) noted, teachers' attitudes influence their behavior, thus it is important to be able to measure teachers' attitudes toward education research so that policymakers and researchers can find better venues for sharing their results with practitioners. The purpose of this study was to update an existing but dated and unvalidated scale, the Attitudes Toward Education Research Scale (ATERS), (Isakson and Ellsworth, 1979) and to validate the updated scale to measure teachers' attitudes toward education research. Additional goals included an analysis of selected demographic factors related to teachers' attitudes toward education research and an examination of how teachers learn about research-based practices for classroom use.

### **Rationale**

The research to practice gap in education has been discussed within education research and policy circles for many years (Davis, 2007; Kaestle, 1993), with the focus of the discussion on the apparent lack of connection between education researchers and classroom practitioners. In 2002 the What Works Clearinghouse (WWC) was created for educators, researchers and policy makers in order to facilitate sharing the results of scientifically based studies (see <http://ies.ed.gov/ncee/wwc>). The WWC's goal is to provide information to educators to help them make evidence-based decisions. The WWC provides a format for sharing and disseminating research findings, but its standards have been called in to question by some researchers (Slavin, 2008). Additionally, the extent of the use of the WWC by classroom teachers is not known.

Davis (2007) and Kaestle (1993) have each theorized why teachers do not appear to value education research findings, but it is not clear empirically that in fact teachers do not value education research. The research that has been conducted on teachers' use of research findings includes studies of teachers' professional reading (Myrick, 1990; Littman & Stodolsky, 1998) and a handful of studies where preservice teachers' attitudes toward research were explored (Isakson & Ellsworth, 1979, Papanastasiou, 2005; Short & Szabo, 1974). None of these studies focused on current practicing teachers' attitudes toward education research. If policy makers want teachers to use research-based practices, and if academicians believe the research to practice gap is a problem within education research, then practicing teachers' attitudes toward education research should be explored in more depth to understand where the leverage points are in the use of research findings to improve teaching and learning. This study made an effort to do so by updating and validating the ATERS developed by Isaksen and Ellsworth (1979).

### **Purpose of the Study**

The purpose of this study was to update and validate a scale that measures teachers' attitudes toward education research. This study was guided by the following research questions:

- 1) Is the revised ATERS a reliable and valid measure of teachers' attitudes toward education research?
- 2) What factors comprise teachers' attitudes toward education research?
- 3) Is there a difference in teachers' attitudes toward education research that can be explained by the grade level they teach, the subject they teach, their gender, their

- years of teaching experience, their educational background or the teachers' previous experience with teacher research?
- 4) Is there a difference in teachers' attitudes toward education research that can be explained by the teachers' exposure to education research and their sources of education research findings?
  - 5) Are there differences in teachers' reading habits of professional literature that can be explained by the grade level they teach, the subject they teach, their gender, their years of teaching experience, their educational background or the teachers' previous experience with teacher research?

### **Definition of Terms**

*Education research* is a term referring to research conducted within the field of education, including teaching, learning, school environments, etc. As a more general term, it includes university research and teacher research and quantitative, qualitative, and mixed research methods.

*Teacher research* or action research is the use of research methods by teachers to examine the teachers' own classroom or school.

*Attitude* is defined as a disposition to respond favorably or unfavorably to an object, person, institution or event (Ajzen, 2005).

*Attitude* toward education research is defined as a disposition to respond favorably or unfavorably to education research as a construct.

*Professional development course* is a time-intensive course offered to teachers to help them acquire knowledge or skills. These courses generally provide 30-40 hours of

instructional time, either during one week or over many weekly meetings. Provided by the school district as an alternative to a university course, teachers must elect to enroll in professional development courses, and frequently earn re-certification credits from these courses.

An *inservice course* is a short course offered to teacher to help them learn about a particular program or skill. Inservice courses generally provide fewer than 5 hours of instructional time. Teachers are often required to attend inservice courses on non-instructional contract time.

### **Organization of the Study**

This study involved the updating and validation of an existing scale, the ATERS (Isakson and Ellsworth, 1979), to measure current practicing teachers' attitudes toward education research. The original scale required updating due to the population with which it would be used in this study, i.e. practicing rather than preservice teachers, and because some original items were no longer relevant due to changes in research accessibility since the original scale was created over thirty years ago. Following scale construction and data collection, a factor analysis was completed in the data analysis stage of the study to extract the factors from the data that may explain why teachers hold the attitudes they hold.

### **Significance**

Despite the emphasis on teachers using research-based teaching methods, the limited research extant suggests that teachers rarely use education research findings when they make instructional decisions (Hiebert, Gallimore & Stigler, 2002). Fishbein and

Azjen's (1978) theory of reasoned action tied teachers' action and lack of action to their attitudes, and this theory is a useful lens for examining teachers' use of education research findings. Teachers' attitudes toward education research may be related to teachers' use (and lack of use) of education research findings in their teaching. Teachers' attitudes toward education research are not well understood, and much of the research related to teachers' attitudes toward education research is qualitative and dated. In this era of accountability and ease of information accessibility it will be useful to learn more about teachers' attitudes toward education research today.

A validation study of a scale to measure teachers' attitudes toward education research will contribute to understanding the research to practice gap in education. The analysis of the factors that contribute to teachers' attitudes toward education research will allow for greater understanding of why teachers do or do not use education research findings in making instructional decisions. Additional analyses of demographic variables and how they relate to teachers' attitudes toward education research may help researchers to investigate further the research to practice gap.

## **CHAPTER 2: REVIEW OF THE LITERATURE**

The purpose of this research study was to update and validate a scale to measure teachers' attitudes toward education research. An additional goal of this study was to explore how teachers learn about research-based practices for classroom use. To that end, this chapter will briefly review the history of research on attitudes generally, and teachers' attitudes, specifically. The second part of this review will examine the literature related to teachers' beliefs about and attitudes toward education research, as well as teachers' professional reading habits and how teachers use education research findings in their teaching.

### **Attitudes**

Research on attitudes began in the 1920's and 1930's when Louis Thurstone and Rensis Likert pioneered the measurement of attitudes using written tests with large sets of questions (Krosnick, Judd & Wittenbrink, 2005). Throughout the 20th century attitude research evolved in the fields of psychology, sociology and education. Education researchers particularly focused on attitude research from the 1950's to the 1970's, as they sought to discover the characteristics and attitudes of teachers that predicted teacher behavior in the classroom (Richardson, 1996). In 1975, Fishbein and Azjen (1975) described their theory of reasoned action, which distinguished between attitudes, beliefs, intentions, and actions. Prior to this time many researchers had grouped attitudes and

beliefs together. For example, Rokeach (1968) defined attitude as an organization of several beliefs focused on a specific object. Fishbein and Azjen's departure from what had been the accepted usage of attitudes marked a change in research methods, as a focus on teachers' beliefs replaced that of teachers' attitudes. As Richardson (1996) noted, during this time period a paradigm shift in research methods was occurring, which may have also contributed to the greater emphasis on teacher beliefs and the relative de-emphasis on teacher attitudes.

The theory of reasoned action is a useful theory for understanding how teachers' attitudes and beliefs about education research may relate to their use of research findings in classroom teaching. The distinction between attitudes, beliefs, intentions and actions are a key part of this theory. Fishbein and Azjen (1975) stated that what had previously been called "attitude" is made up of three components: affective, cognitive and conative; or attitudes, beliefs and actions. The affective component is attitude, encompassing a person's emotions toward an object, person, issue or event. The cognitive component contains a person's knowledge, opinions, thoughts and beliefs about an object, person, issue or event. The conative component refers to a person's behavioral intentions and actions toward an object, which Fishbein and Azjen further distinguished into behavioral intentions toward an object, and behaviors toward an object (1975). The theory of reasoned action suggests that people's beliefs determine their attitudes toward an object, and to a lesser extent people's attitudes influence their beliefs. In turn, people's attitudes influence their behavioral intentions, which influence their behaviors. A person's

behaviors and actions may then influence their beliefs. Figure 1, below, is a graphical representation of this theory (Fishbein & Azjen, 1975).

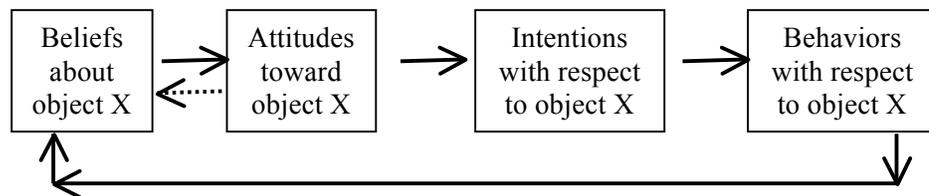


Figure 1: The theory of reasoned action.

Fishbein and Azjen's theory of reasoned action suggests that teachers' behavioral intentions are influenced by their attitudes and their beliefs in general and can be explored empirically with regard to education research. Although policy makers encourage school systems and teachers to use research-based practices in schools, Hiebert, Gallimore & Stigler, (2002) assert that teachers do not routinely use education research findings to advise their practice or to deal with problems in their classroom. The theory of reasoned action suggests that examining teachers' attitudes toward education research may help in further understanding teachers' behavioral intentions and actions related to education research toward the use of research findings to improve their practices.

Azjen and Fishbein's (1975) theory of reasoned action suggests that attitude refers to a person's feelings toward and evaluation of some object, person, issue or event. In this research study the object toward which attitude is directed is education research.

## **Attitudes and Beliefs**

Since Fishbein and Azjen (1975) first made the distinction between attitudes and beliefs, teachers' attitudes and teachers' beliefs have been considered separate areas of research. Richardson noted "whereas teacher attitudes are still examined from time to time, beliefs have taken over as a major construct of interest in studying teachers' ways of thinking and classroom practices." (1996, p. 102). Similar to the way that attitude research evolved and was then broken into separate constructs of attitude, beliefs and behavioral intentions, so too has the construct of belief been developed and contrasted with knowledge. The construct of belief appears to have a knowledge dimension that is based on the perception of objective fact. Pajares (1992) suggests that there is some consensus that beliefs are based on evaluation and judgment, but knowledge is based on objective fact.

Rokeach (1968, as referenced in Pajares, 1992) called beliefs about constructs attitudes. Pajares (1992) notes that teachers' attitudes about education have generally been referred to as teachers' beliefs, demonstrating the blurred line between beliefs and attitudes. He cautions that beliefs, attitudes and values must be understood in terms of their connections to each other and to other beliefs in the system, not as beliefs detached from and unconnected to a broader belief system. Pajares refers to attitudes as "belief substructures," rather than distinguishing between attitudes and beliefs completely.

For the purpose of this study, attitudes toward education research are defined as a person's feelings toward and evaluation of education research. Although the theory of reasoned action draws a distinction between beliefs and attitudes, the difference between

these two constructs is not always made clear in other research literature. Educational psychologists have defined beliefs in many different ways, including attitudes, values, opinions and conceptions (Pajares, 1992). At this point in the literature, separating the constructs of beliefs and attitudes is less important than the research goal of measuring teachers' attitudes regarding the role of education research in improving their practice, but it should be noted that this distinction is not yet resolved.

In order to explore teachers' attitudes toward education research it is important to define education research. The next sections of this chapter focus on education research, with additional emphasis on teacher research and scientifically based research.

### **Education Research**

Education research is the rigorous and systematic investigation into many different aspects of education, including teaching, learning, school environments, teacher education and the dynamics of a classroom. Positivistic education research involves hypothesis testing and tends to quantitative research methods, and naturalistic research tends to focus on qualitative research methods (Morrison, 2009). The contributions of education research include adding to the body of knowledge on a topic, replicating knowledge and adding different perspectives on a topic to the body of knowledge. Research is also important because of its ability to suggest improvements to practice (Creswell, 2002). As a more general term, education research includes university based research and school based teacher research.

## **Teacher Research**

Teacher research has been offered as one way to close the research to practice gap. Cochran-Smith and Lytle (1990) define it as “systematic and intentional inquiry carried out by teachers.” (p. 2) Teacher research is distinguished from traditional education research by its practice by classroom teachers who seek to examine their own teaching, and the participants are typically students in the teachers’ own class. In contrast, university-based researchers have historically conducted traditional education research in a variety of settings, and frequently with students who are not known by the researcher.

Cochran-Smith and Lytle (1999) note that teacher research is frequently taught in teacher education programs, and is also used by teams of teachers in some professional development schools as part of their data analysis. Although not all teacher researchers do so, the findings of prior education research studies are typically used in the development of studies conducted by teacher researchers. The teacher researchers then gather and analyze data collected in their classrooms. The literature suggests that teacher researchers change their beliefs and their behaviors as a result of engaging in teacher research (Bilgili, 2005; Ritchie, 2006). Teachers who have conducted teacher research also report becoming better consumers of research (Sivadge, 2005) and teachers who had engaged in action research also tended to be more positive about research (Williams & Coles, 2007).

There are a number of studies that indicate that teacher research helps teachers change their classroom practice. In his dissertation, Bilgili (2005) conducted a four day

action research training session with a group of teachers and then followed up with four of the teachers as they were involved in the action research process. The teachers who participated in Bilgili's study found that they became more focused on student learning, more accountable to themselves for what they said they would accomplish, and more reflective on their practice. The teachers stated that the action research process helped them become better teachers. Bilgili declared that his research confirmed that action research contributes to the knowledge base of teaching, improves individual practice, changes their teaching, and helps teachers become more reflective.

In a similar study, Sivadge (2005) conducted a qualitative study of nine elementary teachers engaged in teacher research in a professional development program. In this dissertation study, the author used observations and interviews to assess the teachers' beliefs about changes that occurred as a result of their involvement in teacher research. The teachers perceived changes in their behaviors, and changes in student learning. They reported becoming more deliberate practitioners, suggesting that teacher research made them more reflective and more attentive to data and to the needs of students. The teachers also reported that they became better consumers of research and improved communication with parents. Sivadge also reported that student learning became more goal-oriented and directed by the students.

Although Bilgili (2005) and Sivadge (2005) examined a small group of teacher researchers, Ritchie (2006) studied a group of 99 teacher researchers from around the nation. Ritchie conducted a mixed-methods analysis of teachers engaged in teacher research for her dissertation, which focused on how to sustain the use of teacher research.

Ritchie's data collection included surveys, interviews and document analysis of teachers' action research reports. The 99 teacher researchers who completed the survey and 7 teachers who participated in interviews were all members of teacher research networks, either at the local, national or international level. The survey results indicated that 87% of the respondents felt that teacher research helped them to improve their practice, and 80% reported that teacher research had a positive impact on student achievement. Ritchie found that prolonged engagement in teacher research led teachers to develop dispositions such as critical reflection, a questioning stance, and a desire to improve teaching and learning. The teacher researchers in Ritchie's study were members of a teacher research network, which may have contributed to the teachers' feelings of the positive impact of teacher research.

Teacher research has the potential to make a difference in teachers' attitudes toward education research as well as in teachers' practices within the classroom. Sivadge (2005), Bilgili (2005) and Ritchie (2006) all found that teachers reported a change in their classroom practice that impacted student learning. All of these studies examined teacher researchers who had support of some kind, such as a school or community teacher research network. The network support may have been a contributing factor in these studies.

Teacher research can use both qualitative and quantitative research methods, depending on the question being investigated (Morrison, 2007). In contrast, scientifically based research is almost exclusively quantitative in nature.

## **Scientifically Based Research**

Although the term “scientifically-based research” has appeared in education literature previously, the term was brought into popular use after the passing of the No Child Left Behind Act in 2001 (No Child Left Behind [NCLB], 2002). NCLB requires that practices grounded in “scientifically-based research” be used in schools and states that scientifically based research should be rigorous, systematic, and objective, and use experimental or quasi-experimental designs. The law further states a preference for random-assignment experiments, or other experimental designs that contain a control group. This directive was significant in that education research studies that incorporate random-assignments are rare and usually small-scale (Slavin, 2002). In the law, randomized experiments are preferred over other types of research because the causal effectiveness of programs or interventions can be directly inferred from randomized experiments (Eisenhart & Towne, 2003). Other types of research, including qualitative and correlational research, provide information about relationships between variables, but do not allow for cause-and-effect statements to be made, thereby reducing the reliability of research studies of these types for policy-makers seeking to recommend programs or methods within education.

To facilitate in the dissemination of scientifically based education research, the U.S. Department of Education funded the What Works Clearinghouse (WWC) for educators, researchers and policy makers (see <http://ies.ed.gov/ncee/wwc>). The WWC was created to provide a format for sharing and disseminating evaluations of educational programs and teaching methods. Originally it only featured randomized experiments, but

since its creation it has expanded to include other types of research (Slavin, 2008), such as studies with non-randomized but matched groups. However, consistent with the law, only randomized experiments meet the WWC's highest standard of "Meets Evidence Standards" (What Works Clearinghouse, 2008).

Although NCLB mandates the use of scientifically based research findings in the instructional decisions made by teachers, teachers' attitudes toward education research are not well understood. The WWC's standards for education research reflect that of the U.S. Department of Education, that randomized experiments are the "gold standard" for education research. What teachers believe about education research, including both randomized experiments and studies that use other research methods, is likely to impact how teachers use research findings.

### **Teachers' Beliefs, Attitudes, and Perceptions of Education Research**

Teachers' beliefs about education research and their attitudes toward education research are often discussed separately in the literature, but the distinction between beliefs and attitudes is not a clear one. As Pajares (1992) noted, separating beliefs and attitudes into separate constructs is not as important as measuring attitude in order to understand something better. Research on teachers' beliefs about education research indicates that teachers find education research to be irrelevant (Miretsky, 2007), too theoretical (Gore & Gitlin, 2004), and too easily manipulated by researchers (Boardman, Arguelles, Vaughn, Hughes, and Klingner, 2005). These studies of teachers' beliefs are largely qualitative in nature, and tend to focus on what teachers found wrong with education research. In general, these researchers were trying to understand why the

research to practice gap exists in education, or why teachers apparently use little of the findings of education research to inform their classroom practice. The development of a scale examining teachers' attitudes toward education research will allow for a quantitative analysis of teachers' attitudes toward education research. The analysis of this scale may allow for better understanding the research to practice gap in education from the perspective of the eventual "end users".

In a questionnaire and interview study of 85 preservice teachers and 147 practicing teachers in Australia and the U.S., Gore and Gitlin (2004) examined how preservice and practicing teachers have different views about education research. They found that 82% of final year preservice teachers felt that education research sometimes addressed their concerns about teaching, yet only 8% of practicing teachers reported similar feelings. The gap between the preservice and practicing teachers' perceptions about research suggests that teachers' beliefs about research change dramatically after completing their licensure program and gaining real-world experience with teaching. Specifically, the teachers in the study reported wanting education research to give them practical applications, and did not value the theoretical aspect of academic research. The teachers suggested that academicians live in an ivory tower and that education researchers would benefit from spending more time in the schools in order to better understand the classroom and the students. The teachers harbored some resentment toward academicians who have little classroom experience and real-world knowledge, yet plenty of ideas about how teachers should teach. Gore and Gitlin highlighted an important problem in education research—the teachers in their study believed that

researchers have lost touch with schools and teachers. The researchers suggested that this is a result of the academic culture, which encourages researchers to publish in peer-reviewed journals for other researchers and discourages or even punishes researchers who write for an audience of teachers.

In a separate study using pre- and post- questionnaires and follow-up interviews, Gitlin, Barlow, Burbank, Kauchak, and Stevens (1999) compared preservice elementary (n=17) and secondary (n=8) teachers' perceptions of education research as they proceeded through their teacher licensure programs. These two groups of teachers took all of their courses together. The elementary program emphasized becoming critical consumers of education research and the secondary program focused on the use of action research. Initially the two groups noted the same limitations to the usefulness of research in teaching: it is inaccessible, subjective, and too time-consuming to use. At the end of their programs the elementary preservice teachers focused more on the inaccessibility of research and secondary preservice teachers focused more on time as the limiting factor for applying the findings from research in their teaching. Gitlin, et al. noted that in the interviews several preservice teachers referenced that the teachers they work with in schools do not use or refer to research, and that this lack of support for research in the schools is a part of why the participants did not perceive education research as useful, thereby suggesting the powerful influence of the world of practice on preservice teachers' development in ways the program cannot control.

Miretsky (2007) conducted an interview study with ten elementary teachers and five high school teachers in the Chicago area. The teachers were all recommended by

colleagues to participate in the study because they were believed to have useful opinions about education research. The teachers spoke of the lack of relevance of academic research, particularly when the research was presented in professional development workshops. The participants also spoke of the usefulness of teacher research and their frustration over the lack of respect that teacher research receives from school administrators and university-based researchers. The teachers felt that school administrators were looking for research that provided quick fixes, and that teacher research did not fill this need for administrators. The teachers also felt that academic researchers don't respect teachers or value their input, and that university-based researchers should spend more time in schools in order to understand how teachers use theory and to give them some context. Miretsky notes that many teachers are exposed to research mainly through professional development, and points to teacher research as a method to involve teachers more directly in education research.

In another interview study, Joram (2007) compared the beliefs about education research among three groups: preservice teachers, practicing teachers, and teacher education professors. The participants read and responded to two vignettes that were designed to tap into participants' beliefs about education research. Joram found that teachers referenced the importance of context and the non-generalizability of classroom research far more than professors. Only one of the seven (14%) professors referenced this idea, yet three of the seven (43%) preservice teachers and seven of nine (78%) practicing teachers referenced it, stating that every child learns differently and every classroom is distinct. Joram also found that three of seven (43%) professors reported

believing that general principles can be discovered in education research, yet one of seven (14%) preservice teachers and one of nine (11%) practicing teachers shared this belief. When asked if they would use research to consider changing their practice, one of the seven (14%) preservice teachers, three of the nine (33%) practicing teachers and four of the seven (57%) education professors responded that they would. In addition, four of the nine (44%) practicing teachers said that they would only use research findings if they confirmed what they already believed. Overall, Joram concluded that education professors find greater value in education research than either preservice or practicing teachers. Both groups of teachers seem less convinced of the ability of education research to inform practice than did professors.

In a focus group study of elementary special education teachers' views of research-based practices and professional development, Boardman, et al. (2005) found that teachers are skeptical of the validity of research presented in professional development because they felt that researchers could make the data show whatever they want it to show. The 49 special education teachers who participated in the study generally felt that the research they saw did not apply to their students, as most of the research they saw in professional development workshops was conducted on general education students. The participants reported that mostly no research was used to justify their instructional practices. The authors of this study suggest that teachers need a method of evaluating the credibility of research for it to carry greater meaning for them.

Zeuli and Tiezzi (1993) investigated teachers' views on education research with an interview study of 13 teachers. Their participants included five teacher collaborators

who had previously spent at least one year working with education researchers on research projects related to teaching and learning in public schools, and eight teachers with little prior experience with research. The thirteen participants were each given three vignettes to read. The first vignette described a teacher who found research to be irrelevant and impractical, the second described a teacher who found education research is useful for providing strategies and techniques, and the third vignette advocated for research as a helpful source of insights, ideas and theories, but stated that education research doesn't give answers or make decisions for teachers. The participants in the study were asked which vignette aligned most closely with their beliefs. Zeuli and Tiezzi found that only 2 of the 13 (15%) participants most closely identified with the first vignette, 6 of the 13 participants, (46%) chose the second vignette, and 5 of the 13 participants, (38%) chose the third vignette as matching their beliefs about research. On the surface, that 38% of participants' demonstrated interest in theories appears to conflict with the previously cited studies that indicate teachers do not like the theoretical aspect of academic research (Gore & Gitlin, 2004), but as Zeuli and Tiezzi note, the five teachers who appreciated education research for its theoretical aspects were the five teachers with previous experience working on education research projects. All eight of the teachers who were new to education research either stated that research is irrelevant and impractical, or only useful if it has directly practical applications. Zeuli and Tiezzi's study is not generalizable due to the small sample size, but it suggests that teachers who have little prior experience with education research would align themselves with vignettes one or two, as those teachers in this study did.

In a study from the United Kingdom, Williams and Coles (2007) used an information literacy perspective to examine how teachers there read research. Using surveys, focus groups and individual interviews they looked at attitudes toward, access to, and confidence in finding and using education research. They distributed surveys to 3000 teachers and to 500 head teachers. The response rate to the surveys was low, with only 312 teacher surveys returned (10.9%) and 78 head teacher surveys returned (15.6%), so the findings must be treated cautiously. It may be that only people who had experience with education research responded. Williams and Coles found that teachers currently taking part in research were more positive about research (80.6% positive,  $p < .001$ ), and that teachers who had engaged in action research also tended to be more positive about research (66.4% positive,  $p < .001$ ). The researchers found that teachers aged 20-30 (61.2% positive,  $p = .032$ ) and women ( $p = .038$ ) tended to be more positive about research.

In summary, the research related to teachers' beliefs about education research suggests that most teachers find education research to be irrelevant (Miretsky, 2007), inaccessible (Burbank, Kauchak & Steven, 1999) and too statistical (Boardman, et al., 2005). However, teachers who have been involved with university research or teacher research view research findings as a helpful source of ideas and theories (Zeuli & Tiezzi, 1993) and are more positive about education research than teachers who have no prior experience with research (Williams & Coles, 2007). It is possible that teachers' beliefs about (and thus their attitudes toward) education research may be related to their experiences with education research.

Although this study does not seek to draw a distinct line between teacher beliefs and teacher attitudes, many of the studies discussed do make this distinction. Both qualitative and quantitative methods have been used to examine teacher beliefs, but teacher attitudes have been studied almost exclusively with quantitative methods. This may be explained by the timing of the evolution of belief studies from attitude studies; which occurred during a paradigm shift in research methodologies in education research. Or it may be a result of the difference between the cognitive measure of beliefs and the affective measure of attitudes.

A number of researchers have studied teachers' attitudes toward research, with varying results (Johnson, 1966; Short & Szabo, 1974; Napier, 1979; Isakson & Ellsworth, 1979; Benton & Jerrolds, 1984; Papanastasiou, 2005). A number of these studies produced scales to measure teachers' attitudes toward research, but these scales are either outdated or not appropriate for the target population for this current dissertation.

In 1966 Margaret Johnson investigated the lag between publication of research findings and classroom implementation. She created a scale to measure teachers' attitudes toward education research and administered it to 270 teachers. She also collected demographic information and gave teachers a ten question true/false assessment of then-current general research findings. She found that male teachers had significantly more favorable attitudes toward research than female teachers ( $p < .01$ ), and that teachers who had previous experience with research were more favorable towards research than teachers with no previous research experience ( $p < .001$ ). Johnson also found that teachers' who reported reading professional literature had significantly higher attitude

scores than those who did not read. (The significance value for this relationship was not reported.) Johnson did not find any statistically significant difference in attitudes toward education research based on differences in time spent teaching (measured by whether teachers were trained before or after World War II), whether teachers taught at the primary or secondary level, or whether the teachers held some special responsibility in the school.

Short and Szabo (1974) investigated the relationship between teachers' attitudes toward education research and teachers' knowledge of research. Short developed the two instruments used in the study for his earlier dissertation. The Short Knowledge of Education Research Test (SKERT) had K-R 20 reliability estimates ranging from 0.61 to 0.73 for various administrations of the test. The second instrument, Teachers' Attitudes Toward Education Research Instrument, had a split-half reliability coefficient of 0.94. Short and Szabo collected knowledge and attitudinal measures and demographic data from 204 secondary school teachers. The researchers found that social studies teachers scored statistically significantly lower on attitude toward education research than math, English, science and other subject area teachers ( $p < .05$ ), and that mathematics teachers scored statistically significantly higher on knowledge of education research than social studies, English and other teachers ( $p < .05$ ). Although they expected to find a correlation, Short and Szabo did not find a statistically significant correlation between teachers' attitudes toward education research and teachers' knowledge of education research ( $r = .06$ ). The researchers suggested that the instruments might better be used as

pre- and post- measures to measure changes in knowledge and attitude as a result of an education research course.

Napier (1979) examined gains in knowledge of and attitude toward education research with 26 preservice social studies teachers enrolled in a research course. Two different attitude measures were given at the beginning and end of the ten week course, and the knowledge measure was given only at the end of the course. The two attitude measures used were constructed for the study and included the Attitude Toward Education Research (ATER), in which students agreed or disagreed with a series of questions about education research, and the Attitude of Concept-Education Research (ACER), in which students chose between a series of contrasting pairs of adjectives to describe education research. The pretest reliability for the ATER was .91 and for the ACER was .93. The posttest reliability for the ATER was 0.85 and for the ACER was .95. The knowledge measure, which was also the final exam for the course, measured students' knowledge of the research concepts taught in the class. The knowledge measure had a Spearman-Brown coefficient of reliability of .84. Napier found a statistically significant decrease in attitude toward education research score on the ATER ( $t=4.05$ ,  $df=25$ ,  $p<.001$ ), and a non-significant decrease in attitude score on the ACER ( $t=1.91$ ,  $df=25$ ,  $p<.067$ ). Napier found no statistically significant correlation among the knowledge score and pretest or posttest attitude scores. Napier concluded that the context of the class and heavy workload of the students may have impacted their attitudes toward education research, and that the small sample size may have resulted in measurement errors. The study does not demonstrate any conclusive relationship between knowledge

of education research and attitude toward education research, but does suggest that context, in this case a rigorous education research course, can have powerful effects on attitudes toward education research. These studies all suggest that teachers' attitudes toward education research may be related to a variety of factors, including a broadly unexamined array of demographic variables and their knowledge about education research.

### **Attitudes Toward Education Research Scales**

Another instrument to measure teachers' attitudes toward education research was created and used in a study by Isakson and Ellsworth (1979). The Attitudes Toward Education Research Scale (ATERS) was developed and used to facilitate course improvement in a preservice teacher education program. The ATERS is a 50 item ordinal scale in which students rated the degree to which they agreed or disagreed with statements about education research. The internal consistency reliability was found from the original sample of 236 graduate and undergraduate students and was estimated at 0.92 using coefficient alpha. The researchers found that the ATERS could capture pre-post differences in a course. The students who had completed an education research course demonstrated significantly more positive attitudes than students who were just beginning the course ( $t=1.802$ ,  $df=111$ ,  $p<.05$ ). The ATERS was used with a different group of students in an education research course as a pre and post assessment and the researchers found that the mean score was significantly higher for students after completing the course ( $t=9.82$ ,  $df=30$ ,  $p<.05$ ). Isakson and Ellsworth concluded that the instrument could be a useful tool for assessing preservice teachers' attitudes toward education

research, and suggested that the tool could be used to facilitate improvement of education research courses. The researchers did not investigate the use of ATERS with practicing teachers.

Benton and Jerrolds (1984) used the ATERS in their investigation of the relationships between attitudes toward education research and achievement in an education research course, reading attitudes, grade point averages (GPA), and scores on the National Teacher Examination (NTE). The participants included 80 teachers who were graduate students enrolled in an education research course. The researchers also used a 26-item attitude toward reading scale that measured the students' attitudes toward school related reading, recreational reading and general reading. Achievement was measured using two multiple choice examinations created by the course instructors. The researchers found moderately low and statistically significant correlations between ATERS scores and graduate GPA ( $r=.42$ ,  $p<.01$ ), between ATERS score and course achievement ( $r=.37$ ,  $p<.01$ ) and between ATERS score and reading attitude ( $r=.31$ ,  $p<.01$ ). Benton and Jerrold's research indicates that the teachers in their sample who excelled in graduate education courses had more positive attitudes toward education research, and that teachers who were more positive toward reading were also more positive toward education research. Although this study did not collect data on what teachers read, the link between attitudes toward reading and toward education research suggest that there may be a more general link between what teachers choose to read and their attitudes toward education research.

Papanastasiou (2005) developed and used the Attitudes Toward Research (ATR) scale to measure teachers' attitudes toward research. This scale was developed for use with preservice teachers enrolled in an undergraduate education research course. The questions on the scale are not specific to education research, but are related to research in general. The researcher validated the instrument with a sample of 226 preservice elementary teachers, and found a reliability coefficient of 0.948. Papanastasiou extracted five factors, listed in order of strength: 1) research usefulness in the profession; 2) research anxiety; 3) positive attitudes toward research; 4) life relevancy; and 5) research difficulty. The five factors accounted for 66.25% of the total variance. The research found statistically significant correlations among the five factors, with correlation coefficients varying between 0.287 and 0.697. The greatest correlations were between factors 1 and 4 ( $r=0.697$ ), between factors 1 and 3 ( $r=0.671$ ) and between factors 2 and 3 ( $r=0.587$ ). In order to extend the analysis, Papanastasiou used a multidimensional scaling analysis to map the five factor model onto a two-dimensional configuration. The resulting analysis suggested that the factors of research usefulness (factors 1 and 4) were generally grouped together. Teachers' sense of research difficulty (factor 5) and research anxiety (factor 2) were unrelated to the degree of usefulness that teachers' found for research (factors 1 and 4). Papanastasiou suggested that teachers may find education research to be useful, but may also find it to be difficult or have high anxiety towards research. These results suggest that teachers' attitudes toward education research may come out of several contributing factors. From a methodological perspective, the technique used by Papanastasiou in analyzing the ATR scale would be useful in

analyzing results from a revised version of the ATERS, developed by Isakson & Ellsworth (1979).

The research on teachers' attitudes toward education research dates back forty years, yet after searching the Education Full Text and ERIC databases it was found that the research conducted on the problem is scant and findings from these studies remain inconclusive. Several different scales have been developed to measure teachers' attitudes toward education research, but most of these were applied on a small scale in order to assess the impact of teacher education courses (Isakson & Ellsworth, 1979) or to better understand the students enrolled in particular teacher education programs (Benton & Jerrolds, 1984; Napier, 1979). Some of the studies also suggest that there are demographic factors that may explain differences in teachers' attitudes toward research. Although the majority of the studies in this category were conducted with preservice teachers and not with practicing teachers, the attitude scales are likely to be useful with a population of classroom teachers, but that remains an empirical question. Papanastasiou's (2005) ATR scale seems useful, but is not specific to education research. An update and validation of Isakson and Ellsworth's (1979) ATERS scale may be the most useful scale for further research with practicing teachers. A factor analysis of revised ATERS may allow for explaining a greater percentage of the variance in teachers' attitudes toward education research than that achieved by Papanastasiou's scale.

### **Teachers' Professional Reading**

The literature suggests that most teachers engage in professional reading, but the publications that most teachers choose to read are not research journals (Littman &

Stodolsky, 1998). Several factors appear to be related to whether teachers read professional literature. Myrick (1990) found that education level, age and gender were related to elementary teachers' professional reading. Littman and Stodolsky found that subject area, education level, gender and membership in professional organizations were all related to secondary teachers' reading of research. The degree to which teachers apply education research findings in their teaching has not been well explored in the literature, but was touched on by both Myrick's and Littman and Stodolsky's studies.

Teachers' professional reading was the subject of Myrick's (1990) study of elementary teachers. The author sent a mail survey to administrators, asking them to have their teachers fill out the survey about their professional reading and how they applied the material they read to the classroom. Myrick had a 51.8% return rate, with 650 participants responding. Myrick found that most teachers reported reading the elementary teacher journal *Instructor*. Only 15% of respondents reported that they never read the journal. Of the 85% of teachers that did read *Instructor*, greater than 47% of the respondents reported reading it regularly. Other professional literature that the majority of teachers reported reading included *NEA NOW* and *Learning*. When asked how they used what they read, 78% of teachers reported that they used the literature to make some or great changes to their teaching of reading and language arts and general teaching techniques. Some or great changes to math teaching were reported by 75% of the teachers. Only 31% of teachers reported using their professional reading to make changes in testing. Myrick also analyzed general professional reading habits and found that female teachers reported reading more than male teachers ( $t=2.77$ ,  $p<.01$ ), teachers

with master's degrees read more than teachers with bachelor's degrees ( $t=-4.02$ ,  $p< .01$ ) and teachers aged 50-59 read more than teachers aged 30-39 ( $F=3.68$ ,  $p< .01$ ). This study indicates some interesting differences within groups of teachers, and also suggests that the majority of elementary teachers in this sample read professional literature and use it in their teaching. It should be noted that the journals listed by teachers were not education research journals and are not peer-reviewed journals. Rather, they are teacher publications in which the majority of articles are written by other teachers.

Littman and Stodolsky (1998) investigated the professional reading of high school teachers. The researchers analyzed survey data from 666 high school teachers (282 English, 113 math, 68 science and 203 social studies teachers) that was collected from 39 United States high schools. The survey was mostly multiple choice and Likert-type scale, with one open-ended question that asked teachers to name up to four professional journals that they read on a regular basis. Littman and Stodolsky found that 55% of their sample reported reading at least one professional journal. They found that belonging to a subject-matter organization was an important factor, as 73% of teachers in subject-matter organizations reported reading professional journals compared to 35% of non-members. The researchers found that 36% of social studies teachers reported reading professional literature, significantly less than math (52%), science (62%) and English (60%) teachers ( $F(3,662)=6.36$ ,  $p< .01$ ). The survey distinguished between reading professional literature and content-specific background literature, such as textbooks, novels or historical accounts. The researchers found that social studies teachers reported spending more time reading background literature in order to prepare for teaching than other

subject area teachers. ANOVA results indicated that the mean of 4.6 hours per week that social studies teachers reported spending was significantly greater than the 3.8 hours spent by English teachers, 3.1 hours by science teachers and 1.6 hours per week reported by math teachers,  $F(3, 659) = 24.25, p < .001$ . These differences in professional reading among high school teachers based on content area suggest that other differences in teacher research may be related to content area.

Littman and Stodolsky (1998) also found that the literature read most frequently by high school teachers were subject matter journals. The *English Journal* was most popular with English teachers, listed by 85% of English teachers who reported reading literature. The *Mathematics Teacher* was listed by 90% of math teachers who reported reading, Science and social studies teachers' reading was not as pervasive, as only 36% of science teachers listed *The Science Teacher* and 43% of social studies teachers listed *Social Education*. The science and social studies teachers were more likely to list subject-specific journals or content-related journals, such as *Scientific American*, or chemistry or history journals.

In addition to questions about reading, Littman and Stodolsky (1998) also asked teachers whether they were aware of current reforms in their fields, and if they had altered instruction according to reforms. They found that teachers who reported reading professional literature were more likely to report that they were aware of current reforms ( $\chi^2=53.96, p < .001$ ), and also more likely to alter instruction according to reforms ( $\chi^2=48.93, p < .001$ ). Littman and Stodolsky concluded that subject subcultures are

important for understanding teachers' professional reading, and that these findings may also relate to how teachers alter instruction based on reform movements in their subject.

Beyond the subject area differences, Littman and Stodolsky (1998) also found that females read more than males ( $\chi^2=5.15$ ,  $p < .05$ ). The researchers also found that teachers with a master's degree were more likely to report reading literature than teachers with a bachelor's degree ( $\chi^2=11.68$ ,  $p < .001$ ), but when examined by subject area this difference was only significant for science and English teachers. The study does not attempt to explain most of the subject area differences, but there are intriguing possible reasons for the disparity in teachers' professional reading and use of research. It is possible that certain subject areas attract people with a greater interest in research, or it may be that teacher education programs that divide teachers into their subject areas unwittingly pass on biases for or against education research.

The results from the quantitative studies conducted by Miretsky (1990) and Littman and Stodolsky (1998) indicate that there are a number of factors related to teachers' professional reading and use of research findings. Additional factors that were not explored by the researchers may include teacher involvement in teacher research, as well as the teacher education program, school support and personal attitudes toward research, as presented earlier in this chapter.

In a qualitative study of 47 teachers randomly selected from the teaching population in Israel, Shkedi (1998) used survey and case study methods to investigate what teachers read and teachers' perceptions about academic research in education. Approximately two-thirds of the teachers taught in elementary schools and one-third

taught at secondary schools. Shkedi reported that “most if not all of the teachers read some sort of literature from time to time” (p. 566). Based upon the data, Shkedi classified the professional literature read by teachers into seven groups: (1) practical education literature; (2) didactic literature; (3) general pedagogic literature; (4) case literature; (5) subject-matter literature; (6) general education literature; and (7) research literature. The researcher reported that most of the participants felt alienated by education research literature, and only three of the 47 participants (6%) reported regularly reading research literature.

When Shkedi (1998) asked the teachers for their motivation in reading professional literature, most teachers reported that they read for course requirements, but also reported reading to expand professional knowledge, to address professional problems that arise, or at the request of their principal. The reasons the teachers gave for not reading literature were that it is irrelevant and unavailable, and because of lack of time, lack of trust in studies, and lack of understanding. In discussing how they react to research that clashes with their beliefs, approximately 60% of teachers stated that they reject it. Only one teacher said that she accepted the research findings over her own beliefs, and the rest of the teachers said they tried to be open to other views, particularly if the study gave clear qualitative evidence that explained the findings in the context of a classroom. Shkedi also asked teachers what constitutes research. The teachers viewed research as quantitative, theory-based, and generalizable. Shkedi noted that only two teachers (4%) mentioned teacher research as a form of education research, but also stated

that the dominant research approach offered to future teachers in Israel is positivistic. It is likely that most teachers in Shkedi's study were unfamiliar with teacher research.

The studies of teachers' reading of professional literature suggest that although they frequently read in their field, teachers rarely read education research articles (Shkedi, 1998). Instead, teachers' more common source of education research findings is a professional development program or course (Duffy & Kear, 2007). These studies on teachers' professional reading are somewhat dated, and particularly the advent of the Internet age that allows for far easier access to education journals and other professional literature than that which existed even ten years ago. It is likely that teachers' reading of professional literature has been influenced by these changes in accessibility and availability of education research.

Whether teachers choose to change their classroom practices as a result of learning about education research findings is related to teachers' attitudes toward education research. A scale measuring teachers' attitudes toward education research allows for the research-to-practice gap that exists in education to be broken down and examined. Part of this analysis will include the examination of the factors related to teachers' attitudes toward education research.

### **Scale Development & Validation**

In order to develop and validate the updated Teachers Attitudes Toward Education Research Scale, a two-stage process was followed, each stage containing multiple steps. The initial stage was considered the development stage, followed by the validation and factor analysis stage.

**Development stage.** The first task in developing a scale is to generate a pool of possible questions and to evaluate these questions for the degree to which they reflect the scale's purpose, the appropriate amount of redundancy, and general construction (DeVellis, 2003). Salant and Dillman (1994) recommend the use of a series of a scaling technique to improve the measurement of attitudes and beliefs.

This item pool was then examined by a panel of experts in the field of study. The function of the experts is to ensure the content validity of the questions, the clarity and conciseness of the questions and to provide additional ideas for items that should be part of the initial scale (DeVellis, 2003). The panel of experts worked with the researcher to develop an initial scale. The final step in the development stage was to administer the initial scale to the development sample.

**Validation and factor analysis stage.** The goal in the second stage of the validation process was to determine which questions from the initial scale should be eliminated and which should remain in the final version of the scale. Azjen (2005) suggests that the final scale should consist of a smaller set of items than the initial scale, and that these items should have passed the criteria of internal consistency and heterogeneity. Internally consistent items are strongly correlated with the total score on the scale, and thus are representative of the domain being measured. The criterion of heterogeneity is met by only keeping items that have relatively low correlations among themselves, as items with too strong a correlation with each other do not explore different aspects of the domain being measured (Azjen, 2005).

The refinement of the initial scale can also depend on the exploratory factor analysis conducted by the researcher. The factor analysis at this stage helped the researcher to identify patterns of relationships between items on the scale. A more complete description of the methods in this study is presented in Chapter 3.

### **Proposed Factors**

The original analysis of the Attitudes Toward Education Research Scale (ATERS) did not involve a factor analysis, but this present study included a modification of the original ATERS and a factor analysis on the results from the revised scale. An evaluation of the research findings discussed earlier in this chapter allowed for factors to be theorized. The five factors that were hypothesized to be related to teachers' attitudes toward education research include teachers' experience with research, relevance of findings to teaching, practicality of application, school support of the use of education research findings and accessibility of research. These factors and the supporting research are discussed below and summarized in table 1.

**Experience with research.** The first theorized factor was teachers' prior experience with education research. This factor is related to teacher participation in research studies, either as a participant or a researcher, including both formal university research and teacher research. Teachers' interest in participating in and contributing to education research is likely to be related to their attitude towards education research. Previous studies found that teachers who had collaborated with university researchers held more positive beliefs about education research (Zeuli & Tiezzi, 1993) and also found

that teachers themselves pointed to teacher research as a way to engage teachers' interest in education research (Miretsky, 2007).

**Relevance of research findings.** The second theorized factor was teachers' perception of the relevance of research findings. Teachers are often exposed to research studies through short inservice programs, but many teachers reported that this research was rarely relevant to their teaching (Miretsky, 2007). Teachers also disclosed that the context of some research studies made the findings irrelevant to the teachers (Joram, 2007).

**Practicality of application of findings.** The third factor that was theorized to influence teachers' attitudes toward education research was teachers' perception of the practicality of education research findings. In previous studies teachers reported that findings needed to be practical, so that it could help teachers be as effective in the classroom as possible (Gitlin, et al., 1999). Teachers were not always convinced that the findings of education research could be applied in a practical manner (Joram, 2007), but teachers expressed a wish for research to give them practical applications (Gore & Gitlin, 2004).

**School support for use of research findings.** Prior research seems to suggest that administrative and peer support for research influences teachers' attitudes. Preservice teachers who had completed internships in school reported that they would probably not seek out education research findings because they did not observe practicing teachers using research findings for their teaching (Gitlin, et al., 1999).

**Accessibility of research.** Teachers’ perceptions of the availability and accessibility of education research findings was hypothesized to be related to teachers’ attitudes toward education research (Shkedi, 1998). This concept encompasses both physical and conceptual accessibility. In order to stay current on research findings related to their field, teachers must know how and where to find research reports or summaries of research findings, but they must also be able to read and interpret the findings (Carnine, 1997). Previous research found that both preservice and practicing teachers gave research inaccessibility as a reason for not using research findings in their teaching (Gitlin, et al., 1999).

Table 1

*Proposed Factors and the Supporting Research*

Factor	Supporting Research
Experience with research	Shkedi, 1998 Zeuli & Tiezzi, 1993
Relevance of research findings to one’s teaching	Gitlin, et al., 1999 Joram, 2007 Miretsky, 2007
Practicality of application of research findings	Gitlin, et al., 1999 Gore & Gitlin, 2004
School support of use of research findings	Gitlin, et al., 1999
Accessibility of research to teachers	Carnine, 1997 Gitlin, et al., 1999 Shkedi, 1998

## Summary

Isakson and Ellsworth's (1979) Attitude Toward Educational Research Scale was originally used with preservice teachers enrolled in an education research class. However, this scale has not been used for almost thirty years. It contained outdated items and required updated items. Modification of the scale as part of a scale construction cycle was advised. Randy Ellsworth was contacted by the author of this dissertation and he gave permission for the use of the scale in this manner (personal communication, March 13, 2008). In addition, the original use of the scale was in a university class, and its usefulness in determining practicing teachers' attitudes toward education research is not known. However, it is likely that many of the issues that relate to preservice teachers' attitudes toward education research are similar to those related to practicing teachers. For this reason the original ATERS will be used as part of the item pool for the creation of a new scale, along with additional items constructed from the theorized factors.

Item analysis and exploratory factor analysis was used to determine the validity of the resulting and revised scale for this use. Additional data was collected to explore how teachers learn of education research findings, how they use these findings in the classroom, and whether this is related to teachers' attitudes toward education research.

With the advent of NCLB and its expectation that education practice can be improved through better research that is scientifically-based, there follows a more specific expectation that teachers will use the research for improving instructional practice. One of the gaps between research and practice is whether teachers perceive

research as helpful to their teaching. This chapter has argued that barriers have been located in previous research, but that most of the studies are either dated or have not looked at practicing teachers. This study sought to develop a new instrument that captures and explains teachers' attitudes toward research in this era of accountability.

## CHAPTER 3: METHODS

The main purpose of this research study was to modify and validate a scale to measure teachers' attitudes toward education research. An additional goal of this study was to examine teachers' attitudes toward education research and how teachers learn about research-based practices for classroom use. The scale validation was a multi-stage process using both quantitative and qualitative methods that have been established within the literature (Azjen, 2005; DeVellis, 2003; Dillman, 2007). Additional statistical analysis of the scale data and the demographic survey completed by participants occurred following the initial validation stage of the study.

The research to practice gap that exists within the field of education is a problem for education policy-makers and education researchers. It is assumed by many education researchers that their research findings "trickle down" into the classroom, to be used by teachers as needed (Gitlin, Burbank & Kauchak, 2005). However, Hiebert, Gallimore and Stigler (2002) found that teachers rarely use education research findings to advise their classroom behavior or aid in educational decision making. Although previous qualitative research has examined teachers' beliefs about education research, there is no current quantitative study examining teachers' attitudes toward this construct. A scale was developed and used in 1979 by Isakson and Ellsworth, but updating of this scale and more advanced analysis of data collected with the modified scale was required. This

chapter describes the methods used in the modification and validation of the scale, subsequent factor analysis of the modified scale and the data analysis methods used to analyze the scale data.

### **Research Questions**

This study is guided by the following research questions:

- 1) Is the revised ATERS a reliable and valid measure of teachers' attitudes toward education research?
- 2) What factors comprise teachers' attitudes toward education research?
- 3) Is there a difference in teachers' attitudes toward education research that can be explained by the grade level they teach, the subject they teach, their gender, their years of teaching experience, their educational background or the teachers' previous experience with teacher research?
- 4) Is there a difference in teachers' attitudes toward education research based on the teachers' exposure to education research and their sources of education research findings?
- 5) Are there differences in teachers' reading habits of professional literature that can be explained by the grade level they teach, the subject they teach, their gender, their years of teaching experience, their educational background or the teachers' previous experience with teacher research?

### **Participants**

The validation of the revised ATERS required the use of two groups of participants. The first group was the panel of experts (n=5) who evaluated and helped

modify the existing ATERS items and helped construct additional items to address the hypothesized factors. The second group of participants (n=474) completed the modified scale and demographic survey, allowing for the validation and factor analysis of the modified scale.

### **Development of the Instrument**

Modification and validation of the existing “Attitudes Toward Educational Research Scale (ATERS) (Isakson & Ellsworth, 1979) followed similar steps that would be followed in the development and validation of a new attitude scale (Azjen, 2005; DeVellis, 2003). These steps include: 1) item construction; 2) review of items by a panel of experts; 3) initial validation study 4) analysis of pilot stage data; and 5) modification of scale.

Initial development of an attitude scale typically involves the construction of a large number of attitude items (DeVellis, 2003). This study is unique in that an existing scale that had previously been validated (Isakson & Ellsworth, 1979) was updated and modified. For this reason the initial item pool included fifty items on the ATERS (see Appendix A), as well as additional items constructed by the researcher and by the panel of experts in the panel review process.

The ATERS scale required updating for multiple reasons. It was first developed to be used with preservice teachers enrolled in education research or educational psychology courses. For the original sample (n=236) internal consistency reliability was estimated at 0.92 using coefficient alpha (Isakson & Ellsworth, 1979). The scale was developed to be used before and after a course on education research to assess the effect

of the course. In this proposed study the new version of the ATERS was to be used with current teachers who are not necessarily involved in any university-based education coursework. Some of the items on the original ATERS were deemed irrelevant by the panel of experts examining the study, and additional questions were needed to update the scale and to address the new population with which the revised ATERS was be used.

An additional reason for adding items to the revised ATERS was to include items that may be relevant to the hypothesized factors. The original development and testing of the ATERS did not include a factor analysis. This study sought to examine the factors that affect teachers' attitudes toward education research, thus additional items were needed on the ATERS. The results from the panel of experts are discussed in greater depth in chapter 4, and the revised ATERS is included in Appendix B.

The demographic survey that all participants completed is included in Appendix D. The purpose of the survey was to collect personal information including gender, grade taught, subject taught, teaching experience, level of education, preservice teacher education program, and questions about their exposure to education research and participation in teacher research. Previous research in this field suggested that these variables might be related to teachers' attitudes toward education research (Myrick, 1990; Littman and Stodolsky, 1998)

After initial item construction, the panel of experts reviewed the original items on the ATERS and the additional questions constructed. The panel of experts was asked to evaluate each item for how relevant it was to measuring teachers' attitudes toward education research and to evaluate the items for clarity and conciseness (DeVellis, 2003).

The experts examined and modified the items as needed, and help to establish content validity for the revised ATERS.

## **Procedures**

**Data collection.** The revised ATERS and the demographic survey were administered electronically (via the internet). All teachers at two high schools, three middle schools and six elementary schools in the same area of a large suburban school district in a mid-Atlantic state were recruited via email. All teachers were sent an initial email notifying them of the upcoming study. Three days after the initial email, a second email was sent with a link to the survey. Six days after the survey was opened a postcard with a piece of candy attached was placed in each teacher's school mailbox in order to encourage response to the survey. A final reminder email was sent two days before the survey was closed. Participants completed the scale and survey online and submitted their responses anonymously. Participants were able to then enter a drawing for a \$50 gift certificate to an online retailer.

**Data analysis.** The data were analyzed in multiple phases. Following the completion of data collection the scale items were analyzed in a number of different ways. Following Azjen's (2005) guidance on ensuring internal consistency, the correlation of each item with the total score on the scale was examined, with an eye toward eliminating items that were not representative of teachers' attitudes toward education research. Azjen's criterion of heterogeneity was met by examining items that are strongly correlated with each other for evidence that they are measuring different aspects of the domain being measured, teachers' attitudes toward education research.

Item means and variances were also examined, to ensure that each item is discriminating among the respondents ( DeVellis, 2003).

In addition to examining the items for internal consistency, heterogeneity and appropriate means and variances, an exploratory factor analysis was also completed to attempt to examine the latent variables in the measure of teachers' attitudes toward education research. An exploratory factor analysis was used to identify the major identifiable factors. Both the eigenvalue rule and the scree test were considered for use in determining the appropriate number of factors to extract (DeVellis, 2003). Orthogonal rotation was used to aid in interpreting the factors, which assumes that the theorized factors will not be strongly correlated with each other (DeVellis, 2003). It was hypothesized that the following five factors would be present in the revised ATERS: teachers' experience with research, relevance of findings to teaching, practicality of application, school support of the use of education research findings and accessibility of research.

An additional measure of the scale quality was the calculation of the reliability coefficient, alpha. Statistical software was used to calculate the coefficient alpha for the full scale and for the k-1 versions (each version of the scale with one question removed.) This provided an additional method for removing unnecessary items from the scale (DeVellis, 2003).

Once the revised ATERS was completed, analysis of the demographic data was possible. SPSS was used to run independent samples t-tests and analysis of variance (ANOVA) tests to examine differences in ATERS scores based on demographic

characteristics and based on responses to the teacher research questions on the survey.

Table 2 indicates how each of the research questions was addressed in data analysis.

Table 2

*Summary of Data Collection and Data Analysis Strategies*

Question	Data collection strategy	Data analysis Strategy
Is the revised ATERS a reliable and valid measure of teachers' attitudes toward education research?	Scale	Inter-item Correlations, Exploratory Factor Analysis
What factors contribute to teachers' attitudes toward education research?	Scale	Scree test, Exploratory Factor Analysis
Is there a difference in teachers' attitudes toward research that can be explained by the grade level they teach, the subject they teach, their gender, their years of teaching experience, their educational background or the teachers' previous experience with teacher research?	Scale & Survey	Statistical analysis: t-tests, ANOVA, on gender, subject, education, years experience, etc.
Is there a difference in teachers' attitudes toward research that can be explained by the teachers' exposure to education research and their sources of education research findings?	Scale & Survey	Statistical analysis: t-tests, ANOVA, on sources of research.
Are there differences in reading habits of professional literature between teachers based on the grade level they teach, the subject they teach, their gender, their years of teaching experience, their educational background or the teachers' previous experience with teacher research?	Survey	Statistical analysis: Cross-tabulation analysis on demographic data

## **Summary**

The modification and validation of an updated Attitudes Toward Education Research Scale was the main focus of this study and involved work with a panel of experts (n=5) and a group of K-12 public school teachers (n=474). Following the initial validation of the scale, additional demographic data was analyzed to examine how attitudes toward education research vary between and within different groups of teachers. Understanding teachers' attitudes toward education research and how these attitudes vary among teachers may allow for staff development and education programs for teachers that are adapted to the interests and beliefs of teachers. Extracting the factors from the scale will allow for further analysis of teachers' attitudes toward education research, and help education researchers to understand the research to practice gap that currently exists.

The participants who were eliminated as outliers were similar to the whole sample in terms of demographics and sources of education research findings.

## **CHAPTER 4: RESULTS**

The questions that directed this research study were:

- 1) Is the revised ATERS a reliable and valid measure of teachers' attitudes toward education research?
- 2) What factors comprise teachers' attitudes toward education research?
- 3) Is there a difference in teachers' attitudes toward education research that can be explained by the grade level they teach, the subject they teach, their gender, their years of teaching experience, their educational background or the teachers' previous experience with teacher research?
- 4) Is there a difference in teachers' attitudes toward education research that can be explained by the teachers' exposure to education research and their sources of education research findings?
- 5) Are there differences in teachers' reading habits of professional literature that can be explained by the grade level they teach, the subject they teach, their gender, their years of teaching experience, their educational background or the teachers' previous experience with teacher research?

In order to address research question 1, the revision of the ATERS scale and the initial analysis of the correlations between items were examined. The steps of the research study that directly relate to this research question included the session with the

panel of experts, the implementation of data collection and the initial analysis of the items and the ATERS score. Research question 2 was addressed through a factor analysis of the scale results, which resulted in a shortened version of the ATERS scale. Participants' scores on the reduced scale were analyzed with the demographic data collected from the participants. These analyses include t-tests and ANOVA tests, allowing for research questions 3 and 4 to be addressed, as well as cross-tabulations to further address the demographic characteristics in research question 5. The revised ATERS can be found in Appendix B.

### **Scale Development Process**

**Panel of Experts.** The initial steps in scale validation involved generating a pool of questions from which the scale was created (DeVellis, 2003). The initial pool of questions for this study contained the original 50 items of the ATERS scale. A panel of experts reviewed these items and an additional five items were written by the researcher and the panel of experts in order to more fully address the theorized factors, which are described below.

The panel of experts consisted of five teachers who had both experience and interest in education research. Two of the teachers were currently teaching high school, one was a middle school teacher, and another was an elementary school teacher. The fifth expert on the panel was an adjunct professor at a nearby university and had formerly taught at the high school level.

The average age of the members of the panel was 39.8 years. All members of the panel were female. Three of the members had earned master's degrees in education, one

had earned a Ph.D. in education, and one was enrolled in coursework for her master's degree in education. Prior to sitting the panel, the members had varying experiences with education research. The middle and high school teachers all conducted action research projects for a graduate level class, the elementary teacher conducted teacher research within her school's professional learning community, and the adjunct professor had engaged in formal education research at the university level. The elementary teacher on the panel was a Nationally Board Certified Teacher. Members of the panel of experts were paid for the time they contributed to the panel.

The panel of experts first discussed the theorized factors that were found through the review of the literature. The panel constructed a diagram on a whiteboard to draw connections between the factors and discuss the meaning of each factor. The panel elected to review the factors again after reviewing and classifying the items from the original ATERS.

The panel of experts reviewed the fifty items for face validity and content validity. Five of the items from the original scale were eliminated. These items were eliminated for two reasons, including outdated research references (i.e. "The Education Index") and the changed population for the revised scale. The original scale had been used with students in a teacher education program, but the revised scale was to be used with practicing teachers. The panel of experts felt that references to teacher education faculty would be confusing to the practicing teachers who would be completing the revised scale. The panel edited the remaining 45 items from the original scale in order to eliminate confusing language. One item from the original scale was deemed "double-

barreled” and was split into two items. Four additional items were constructed in order to address missing elements of the factors.

**Survey Response Rate.** The original sample size (teachers who were asked to participate in the study) was 964, and there were 474 respondents to the survey, yielding a 49% response rate. The combined length of the scale and survey was 65 questions. Most respondents completed the scale in 15-20 minutes, but this may have been more time than some teachers could spare, or the number of questions may have deterred potential respondents. The results from the demographic survey indicate that there was no response bias based on gender, grade level taught, or teaching experience. These characteristics of the 474 respondents to the survey are very similar to the original sample of 964 teachers, and to the general teaching population in the school district. For example, the original sample of 964 teachers consisted of 42% elementary teachers, 22% middle school teachers and 36% high school teachers. The grade level breakdown of the 474 participants was identical to the sample of 964 teachers.

Some response bias in this study is possible because teachers with a master’s degree as their highest degree were likely over-represented in this study. Although nationally approximately 57% of teachers have earned a master’s degree as their highest degree (National Center for Education Information, 2011), the average for the school district in which this study was conducted is 62%. The respondents to the survey were a better-educated group than both the national average and the school district average, with 70% of teachers reporting a master’s degree as their highest degree earned. It is possible

that teachers with master's degrees are more interested in education research, and thus more likely to complete a survey about it.

Additional response bias is possible based on teachers' path to licensure. The participants in this study indicated that only 46% of the sample earned licensure through an undergraduate education program, compared to the national average of 65% (National Center for Education Information, 2011). Forty-two percent (42%) of the teachers in the sample reported earning certification through a graduate education program, compared to the national average of 18%. These differences might be explained by the high rate of master's degrees in the sample. A difference that is less easy to explain is that only 6% of the teachers in the sample reported that they earned licensure through an alternative teacher certification program, a number far below the 16% national average. As some alternative programs are administered through a local university's graduate school of education, it is likely that some respondents indicated earning licensure through a graduate program. It is also possible that teachers who earned teacher licensure through an alternative certification program were less likely to complete the survey.

**Scale and survey participants.** The teachers (n=474) who completed the 50-item modified ATERS-M and demographic survey were K-12 teachers in a large suburban school district. Participants in the study taught at elementary (n=196), middle (n=105) and high schools (n=173). The majority of the participants were female (78%, n=372) and 20% were male (n=96) and the remainder (n=6) did not report their gender. Participants' teaching experience, grade levels taught, highest level of education and path to teacher licensure are provided in Table 3.

Table 3

*Demographic Characteristics of Sample*

	n	%
<b>Gender</b>		
Male	96	20
Female	372	78
No response	6	1
<b>Grade level taught</b>		
Preschool	9	2
Lower Elementary	108	23
Upper Elementary	79	79
Middle School	105	105
High School	171	171
No response	2	0
<b>Subject Teaching</b>		
Secondary English	46	11
Secondary math	40	9
Secondary Social Studies	35	8
Secondary Science	50	11
Other: Electives, PE, Life skills, LD, ESOL	103	23
Elementary: Multiple subjects	166	38
No response	11	2
<b>Teaching Experience</b>		
1-3 years	48	10
4-6 years	79	17
7-10 years	96	20
11-20 years	156	33
21 or more years	92	19
No response	3	1
<b>Highest level of education</b>		
Bachelor's degree	43	9
Bachelor's degree + additional hours	88	19
Master's degree	194	41
Master's degree + additional hours	139	29
Doctorate or other advanced degree	6	1
No response	4	1
<b>Field of highest degree</b>		
Education	341	72

Non-education, related to subject teaching	86	18
Non-education, subject not related to subject teaching	16	3
No response	32	7
<hr/>		
Path to licensure		
Undergraduate teacher education program	219	46
Graduate-level teacher education program	200	42
Alternative teacher certification program	27	6
Provisional license	7	1
Other	7	1
No response	14	3

**Participants' exposure to education research.** Participants were asked a series of questions about how teachers learn about education research findings. These methods include: through graduate education classes; professional development courses; engagement in teacher research; school inservice education opportunities; other people (including administrators and teachers), and professional reading. Table 4 provides the number of responses to each question by the participants. Each of these questions is discussed in greater depth in the discussion of research questions 3 and 4.

Table 4

*Participants Exposure to Education Research*

	<i>n</i>	%
<hr/>		
Enrolled in graduate education class in previous 3 years		
Yes	256	57
No	189	42
No response	6	1
<hr/>		
Level of research use in graduate education class		
None	28	6
Rarely	39	9

Occasionally	89	20
Frequently	123	27
No response	172	38
Enrolled in professional development course in previous 3 years		
Yes	374	83
No	69	15
No response	8	2
Level of research use in professional development course		
None	56	12
Rarely	116	26
Occasionally	158	35
Frequently	51	11
No response	70	16
Ever participated in teacher research		
Yes	187	42
No	258	57
No response	6	1
Frequency of participation in teacher research		
Rarely	146	65
Occasionally	63	28
Frequently	17	8
No response	225	50
Heard of/used What Works Clearinghouse		
Never heard of it	381	85
Heard of it but never used it	45	10
Heard of it and used it	19	4
No response	6	1
Learned about education research findings at an inservice		
Yes	297	66
No	154	34
Learned about education research findings from an administrator		
Yes	165	37
No	286	63
Learned about education research findings from another teacher		
Yes	166	37
No	285	63
Learned about education research findings from either reading of education journals & books or subject-specific journals & books		
	227	50
	224	50

Yes		
No		
Learned about education research findings from reading education journals & books		
Yes	180	40
No	271	60
Learned about education research findings from reading subject-specific journals & books		
Yes	127	28
No	324	72

### **Reliability and Validity of the ATERS**

The first research question related to the reliability and validity of the ATERS for measuring teachers' attitudes toward education research. This question was addressed using statistical analyses of the scale items and the scale as a whole. Following the administration of the survey, statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS, version 18). The initial analysis of the scale included an outlier test, item-scale correlations to identify which items relate most strongly to teachers' attitudes toward education research, and an exploratory factor analysis in order to determine how many factors were in the instrument. Internal consistency of the scale was measured by calculating Cronbach's coefficient alpha. Additional statistical analyses of the total attitude score as it related to the demographic variables were conducted to examine the relationship between the demographic variables and the measures of teachers' attitudes toward education research.

Prior to conducting item analysis, a Mahalanobis distance test for outliers was conducted. Twenty-four outliers were identified and were eliminated from the data sample. The participants who were eliminated as outliers were similar to the whole

sample in terms of demographics and sources of education research findings, but the outliers had a lower mean score on the modified ATERS than the remaining sample and included one participant who started but did not complete the scale. Analysis of the modified ATERS resulted in a Cronbach's coefficient alpha of 0.95. DeVellis (2003) recommends shortening the scale in the event that the alpha value is much more than 0.90, and advises dropping items with an inter-item correlation well below the average for the scale. An item-scale correlation was run in SPSS in order to determine which items did not contribute to the overall score. A total of nine items were found with correlation coefficients less than 0.40, resulting in the reduction of these items. For example, item 2 "Education books and articles should be well documented with relevant research findings," had a correlation coefficient of 0.29, indicating that participant's response to this item was not meaningfully linked to their overall score on the scale, so it was eliminated. Also eliminated were items 3, 19, 26, 29, 30, 31, 45, 47. Of the remaining 41 items, the highest correlation coefficient was 0.73. The modified ATERS is included in Appendix B.

The remaining 41 items of the modified ATERS were used in an exploratory factor analysis. A principle components analysis (PCA) method was used, and cases were excluded pairwise. Initially a scree plot was created using SPSS, which indicated the presence of three or four factors. It was believed that the factors would likely correlate with each other, so a direct oblique minimum (oblimin) rotation of the factors was used. Bartlett's Test for Sphericity was conducted to determine if factoring was appropriate. The results of Bartlett's Test for Sphericity were significant, ( $\chi^2$  (820) =

7405.71,  $p < .001$ ), suggesting that the use of a factor analysis is appropriate because the strength of the relationship among variables is strong. A Kaiser-Meyer-Olkin (KMO) test was used as a measure of sampling adequacy. The KMO value (KMO=0.96) exceeded 0.60, indicating that factoring of the data is appropriate.

Following analysis of Bartlett's Test for Sphericity and the KMO test, the resulting structure matrix was analyzed. Items that did not give a factor loading value higher than 0.50 were eliminated, as were items that cross-loaded high (values greater than .40 on more than one factor). The resulting scale retained 19 items and is referred to as ATERS-19. These items and their means, standard deviations and communalities are listed in table 4. The factor loadings of the items on ATERS-19 are provided in Table 5.

The reduced scale, ATERS-19, had a Cronbach's coefficient alpha of 0.91. Although DeVellis (2003) recommends reduction of a scale with a Cronbach alpha score higher than 0.90, the 19 items in the reduced scale were retained in order to strengthen the factor subscale Cronbach alpha scores.

Table 5

*Means, Standard Deviations and Communalities for 19 items on ATERS-19*

<i>Item</i>	<i>M</i>	<i>SD</i>	<i>Communality</i>
42. There should be more opportunities for teachers to be involved in education research.	3.5	.75	.66
25. I would like to carry out some research in my own classroom.	3.0	.99	.63
28. I would prefer to work for a principal who does NOT have a commitment to doing research in his school.*	3.3	.84	.56

7. I have no desire to become involved in education research in the schools.*	3.4	1.03	.56
43. Teaching can be a more rewarding and interesting profession when the teacher is a participant in education research.	3.3	.83	.60
50. I would like to share research findings with my teaching colleagues.	3.4	.88	.57
46. The money spent by federal, state, and local governments to support education research is not justified by what the research has revealed about education.	3.1	.85	.43
5. Education research has revealed important information about the teaching-learning process.	4.0	.72	.46
15. Education researchers are at the forefront of interesting new developments in education.	3.2	.84	.52
24. Most innovations in education would not have occurred without the efforts of education researchers.	3.4	.91	.40
20. The methods used in education research represent a logical way to obtain information about a problem in education.	3.4	.66	.43
7. Education researchers can make data show whatever they want.*	2.7	.92	.32
40. Education research has revealed important information about student learning.	3.9	.63	.52
32. I feel that education researchers have discovered information that would be important in my teaching, if I know about it.	3.6	.71	.54
33. Being able to read a research article critically is a valuable skill for teachers to acquire.	3.8	.78	.57
17. When preparing a new subject area for students, a teacher does not need to read the research articles available on that subject.*	3.4	.89	.44
16. Teachers do not need to receive training in education research.*	3.5	.83	.56
18. An understanding of the methods used by education researchers can help teachers take a more systematic approach to solving education problems.	3.6	.73	.49
34. Practice in developing research hypotheses can be useful to the teacher in coming up with possible solutions to problems faced in the classroom.	3.5	.82	.54

*\*Item negatively scored*

### **Teachers' Attitudes toward Education Research**

The second research question addressed the factors that comprise teachers' attitudes toward education research. A factor analysis found three factors, allowing for 19 items from the modified scale to be retained. The three factors found through an exploratory factor analysis accounted for 51.5% of the total variance in the final scale, which had an overall Cronbach's coefficient of 0.91. Each factor had a Cronbach's coefficient of 0.70 or higher, fulfilling the requirements of DeVellis (2003). The factors that underlie teachers' attitudes toward education research include: 1) participation in research; 2) the value of education research and 3) the usefulness of research methods.

Table 6

*Means, Standard Deviations and Correlations of Factor Subscales*

<i>Item</i>	<i>M</i>	<i>SD</i>	<i>Correlations</i>		
			<i>F1</i>	<i>F2</i>	<i>F3</i>
Factor 1: Participation in research	3.3	.69	--	.535	.505
Factor 2: Value of research	3.4	.50	.535	--	.416
Factor 3: Usefulness of skills	3.6	.58	.505	.416	--

These results must be interpreted cautiously, as the results of an exploratory factor analysis are neither definitive nor predictive without further testing of the scale.

The first factor, participation in research, is composed of six items that related to teacher involvement in education research. The possible scores on the factor 2 subscale ranged from 6 to 30. These items and their factor loadings are provided in Table 7.

Table 7

*Structure Matrix Item Loadings for Factor 1: Participation in Research*

<i>Item</i>	<i>F1</i>	<i>F2</i>	<i>F3</i>
42: There should be more opportunities for teachers to be involved in education research.	<b>.82</b>	.04	-.06
25: I would like to carry out some research in my own classroom.	<b>.82</b>	-.10	.05
28: I would prefer to work for a principal who does NOT have a commitment to doing research in his school.	<b>.75</b>	.04	-.04
7: I have no desire to become involved in education research in the schools.	<b>.74</b>	-.03	.05
43: Teaching can be a more rewarding and interesting profession when the teacher is a participant in education research.	<b>.71</b>	.06	.06
50: I would like to share research findings with my teaching colleagues.	<b>.59</b>	.14	.14

Some of the items that make up factor 1 generally refer to teachers as participants in or their involvement in education research and other items more specifically reference carrying out their own research in their schools. The item in this factor that teachers responded to most positively was item 42, “there should be more opportunities for teachers to be involved in education research.” This item had a mean score of 3.50 and a

standard deviation of .75, and a factor loading of .818, the highest of any item on the scale. The factor one subscale had a Cronbach's coefficient of 0.86.

The second factor, value of education research, is composed of eight items related to the teachers' attitudes about how education research contributes to education. The possible scores on the factor 2 subscale ranged from 8 to 40. These items and their factor loadings are provided in Table 8.

Table 8

*Structure Matrix Item Loadings for Factor 2: Value of Education Research*

<i>Item</i>	<i>F1</i>	<i>F2</i>	<i>F3</i>
46: The money spent by federal, state, and local governments to support education research is not justified by what the research has revealed about education.	.01	<b>.69</b>	-.11
5: Education research has revealed important information about the teaching-learning process.	.01	<b>.64</b>	.07
15: Education researchers are at the forefront of interesting new developments in education.	.06	<b>.64</b>	.10
24: Most innovations in education would not have occurred without the efforts of education researchers.	.17	<b>.59</b>	-.17
20: The methods used in education research represent a logical way to obtain information about a problem in education.	-.09	<b>.59</b>	.21
37: Education researchers can make data show whatever they want.	-.01	<b>.58</b>	-.03
40: Education research has revealed important information about student learning.	.06	<b>.56</b>	.22
32: I feel that education researchers have discovered information that would be important in my teaching, if I know about it.	.10	<b>.54</b>	.24

Four of the items in factor 2 reference how education research reveals important information, including item 5, “education research has revealed important information about the teaching-learning process.” This item garnered the most positive response of any item on ATERS-19, with a mean value of 3.95 and a standard deviation of .72. Other items that contribute to this factor focus on the innovative developments that result from education research and the reliability of the methods used in education research. Item 37, “education researchers can make data show whatever they want”, was one of several negatively scored items on the scale, but the only item with a mean score that fell on the negative side of the scale (less than 3). The mean on this question (after negative scoring) was 2.7 with a standard deviation of .92. This suggests that survey respondents generally agreed that data can be used to show whatever education researchers want. A less positive statement than the others, this item also relates to the value that participants place on education research. The factor 2 subscale had a Cronbach’s coefficient of 0.80.

The third factor is made up of five items that relate to the usefulness of education research skills. The possible scores on the factor 3 subscale ranged from 5 to 25. These items and their factor loadings are provided in Table 9.

Table 9

*Structure Matrix Item Loadings for Factor 3: Usefulness of Research Skills*

<i>Item</i>	<i>F1</i>	<i>F2</i>	<i>F3</i>
33: Being able to read a research article critically is a valuable skill for teachers to acquire.	.04	.10	<b>.69</b>
17: When preparing a new subject area for students, a teacher	.05	-.14	<b>.68</b>

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does not need to read the research articles available on that subject.			
16: Teachers do not need to receive training in education research.	.05	.09	<b>.68</b>
18: An understanding of the methods used by education researchers can help teachers take a more systematic approach to solving education problems.	.02	.20	<b>.58</b>
34: Practice in developing research hypotheses can be useful to the teacher in coming up with possible solutions to problems faced in the classroom.	.22	.07	<b>.56</b>

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These skills include reading research articles, using research articles to advise teaching, and using research methods to solve classroom and education problems. The item in factor 3 that respondents responded most positively to was item 33, “being able to read a research article critically is a valuable skill for teachers to acquire.” This item had a mean score of 3.78 and a standard deviation of .78. The factor 3 subscale had a Cronbach’s coefficient of 0.77.

The items within each factor generally cross-loaded quite low, as shown in Table 5. As expected, the three factors were correlated with each other. The inter-item correlations for the three factors are provided in Table 6.

In summary, the three factors found from the factor analysis of the data were participation in education research, value of education research and usefulness of education research skills. The range of scores on the factor subscales are: factor 1: 6-30; factor 2: 8-40; factor 3: 5-25. These factors should be interpreted cautiously as they were found from an exploratory factor analysis. Additional research, including a confirmatory factor analysis of a new sample of data, is recommended.

The first two research questions related to the validation and factor analysis of the ATERS-19, but research questions 3, 4 and 5 examine the characteristics of teachers and how they relate to teachers' attitudes toward education research and their reading of education research. A crosstabs analysis in SPSS was used to create contingency tables. To address research question 5, contingency tables, the  $\chi^2$  statistic and either the phi coefficient,  $\phi_c$ , (for 2 x 2 contingency tables) or Cramer's V (for all other tables) were used to determine if there were significant relationships between the variables. In order to cohesively examine these questions, the findings from research question 5 are included as appropriate below.

### **Results for Selected Demographic Characteristics**

The third research question related to the differences in teachers' attitudes toward education research based on grade level taught, subject taught, gender, years of experience, educational background and teachers' experience with teacher research. In order to address this question, independent sample t-tests and analysis of variance (ANOVA) tests were used to compare the participants in the study. The dependent variables in both tests were the ATERS-19 score and the factor subscores. Analysis of the ATERS-19 and the three factors identified through an exploratory factor analysis must be treated cautiously, as a confirmatory factor analysis is needed to further validate this scale and the factors.

**Grade level.** Grade level taught revealed differences in enrollment in professional development courses. Significantly more secondary teachers took professional development courses than elementary teachers, with 22.3% of secondary teachers

reporting enrollment during the previous three years compared to 6.5% of elementary teachers,  $\chi^2(1, N = 442) = 20.45, p < .001, \phi_c = .22$ .

An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for elementary and secondary teachers. There was a significant difference in the scores for elementary teachers ( $M = 66.1, SD = 9.20$ ) and secondary teachers ( $M = 63.80, SD = 9.80$ ); ( $t(400) = 2.43, p = .02$ ). This suggests that elementary teachers have significantly higher (more positive) attitude scores than secondary teachers. There was a similarly significant difference in scores for the factor 1 and factor 2 subscales, as reported in data Table 10. There was not a significant difference in their scores on the factor 3 subscale for elementary and secondary teachers.

Table 10

*Teachers' Attitudes by Grade Level Taught*

<i>Grade level teaching</i>	<i>Elementary</i>		<i>Secondary</i>		<i>t</i>	<i>p</i>
	<i>(n=189)</i>		<i>(n=259)</i>			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	66.1	9.2	63.8	9.8	2.43	.016
Factor 1: Participation in research	20.4	3.9	19.5	4.2	2.32	.021
Factor 2: Value of research	27.9	3.8	26.7	4.1	3.14	.002
Factor 3: Usefulness of skills	17.8	2.7	17.7	3.0	0.43	.668

**Subject taught.** An analysis of variance (ANOVA) test was used to compare the ATERS-19 and the factor subscale scores on subject taught. The groups were secondary math, secondary English, secondary social studies, secondary science, elementary all

subjects and electives and physical education. There was not a statistically significant difference between groups for ATERS-19 ( $F(5, 389)= 1.26, p= .28$ ), factor 1 ( $F(5,416)= 0.900, p= .48$ ), factor 2 ( $F(5, 411)= 1.841, p= .10$ ), nor factor 3 ( $F(5, 416)= .902, p= .48$ ) as determined by one-way ANOVA. These results are provided in Table 11.

Table 11

*Teachers' Attitudes by Subject Taught*

<i>Subject taught</i>	<i>Secon Engl</i> <i>n=42</i>	<i>Secon math</i> <i>n=37</i>	<i>Secon social studies</i> <i>n=30</i>	<i>Secon sci</i> <i>n=48</i>	<i>PE &amp; elective courses</i> <i>n=89</i>	<i>Elem. all subjects</i> <i>n=149</i>	F	$\eta_p^2$	p
ATERS-19	65.0 (9.9)	61.7 (11.6)	63.9 (10.2)	64.3 (9.5)	65.6 (9.1)	64.9 (9.6)	1.26	.016	.279
Factor 1: Participation in research	19.9 (4.4)	18.9 (4.5)	20.1 (4.2)	19.3 (4.3)	20.0 (4.0)	20.3 (3.9)	0.90	.011	.481
Factor 2: Value of research skills	27.1 (3.3)	25.7 (5.0)	26.5 (4.3)	27.2 (4.4)	27.4 (3.7)	27.7 (3.8)	1.84	.022	.104
Factor 3: Usefulness of research skills	18.2 3.0	17.0 3.3	17.6 (2.6)	18.2 (2.9)	17.8 (3.1)	17.8 (2.7)	0.92	.011	.480

*Note: Secon=Secondary; Engl=English; Sci=Science; PE = Physical education; Elem=Elementary*

**Gender.** The data revealed differences in enrollment in professional development courses and in grade level taught by the gender of the teachers. Male teachers took professional development classes more than female teachers, with 29% of males

reporting enrollment during the previous three years compared to 12% of female teachers,  $\chi^2(1, N = 439) = 15.35, p < .001, \phi_c = .19$ . Male teachers in the study were more likely to be teaching at the secondary level than at the elementary level, with 11% of males teaching at the elementary level and 89% of males teaching at the secondary level,  $\chi^2(1, N = 444) = 43.94, p < .001, \phi_c = .32$ .

An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for male and female teachers (Table 12). There was not a statistically significant difference in the scores for female and male teachers on the ATERS-19 ( $t(396) = -1.75, p = .08$ ), nor on the factor 1 subscale ( $t(425) = -1.03, p = .31$ ), the factor 2 subscale ( $t(109) = -1.69, p = 0.09$ ) or the factor 3 subscale ( $t(423) = -0.86, p = .39$ ).

Table 12

*Teachers' Attitudes by Gender*

<i>Gender</i>	<i>Female (n=356)</i>		<i>Male (n=90)</i>		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	65.2	9.3	63.1	10.9	1.75	.081
Factor 1: Participation in research	20.0	4.0	19.5	4.5	1.03	.305
Factor 2: Value of research	27.4	3.7	26.4	4.8	1.69	.094
Factor 3: Usefulness of skills	17.8	2.9	17.5	3.1	0.86	.393

**Teaching Experience.** An analysis of variance (ANOVA) test was used to compare the ATERS-19 and the factor subscale scores on years of experience. As shown in data table (new one), participants were grouped into the following categories: 1) 1-3

years; 2) 4-6 years; 3) 7-10 years; 4) 11-20 years; and 5) more than 20 years. There was not a statistically significant difference between groups for ATERS-19 ( $F(4, 395)=2.31$ ,  $p=.06$ ), factor 1 ( $F(4, 424)=1.66$ ,  $p=.16$ ), factor 2 ( $F(4, 422)=1.63$ ,  $p=.17$ ), nor factor 3 ( $F(4, 422)=2.14$ ,  $p=.08$ ) as determined by a one-way ANOVA (Table 13).

Table 13

*Teachers' Attitudes by Years of Experience*

<i>Years of Experience</i>	<i>1-3 years (n=40)</i>	<i>4-6 years (n=68)</i>	<i>7-10 years (n=83)</i>	<i>11-20 years (n=130)</i>	<i>21+ years (n=79)</i>	<i>F</i>	<i><math>\eta_p^2</math></i>	<i>p</i>
ATERS-19	66.9 (8.1)	67.3 (8.1)	64.0 (9.8)	63.8 (10.5)	64.0 (9.6)	2.31	.023	.057
Factor 1: Participation in research	20.5 (3.5)	20.8 (3.4)	19.4 (4.3)	19.6 (4.4)	19.6 (4.3)	1.66	.015	.158
Factor 2: Value of research skills	28.2 (3.1)	27.9 (3.7)	27.1 (4.4)	26.9 (4.1)	26.7 (4.0)	1.63	.015	.166
Factor 3: Usefulness of research skills	18.3 2.7	18.4 2.5	17.5 (2.9)	17.3 (3.3)	18.0 (2.6)	2.14	.020	.076

**Level of Education.** Teachers were significantly less likely to report learning about education research findings that they could use in their classroom from school inservice programs if they were teachers who had earned 15 credits or more beyond a master's degree (57%) than if they had earned a bachelor's degree (78%), a bachelor's

plus fifteen credits (72%), or a master's degree (28%),  $\chi^2 (3, N = 446) = 9.42, p = .02, V = .15$ .

An analysis of variance (ANOVA) test was used to compare the ATERS-19 and the factor subscale scores on highest level of education attained. The groups were bachelor's degree, a bachelor's degree plus 15 credits, a master's degree and more than a master's degree. As displayed in Table 14, there was not a statistically significant difference between groups for ATERS-19 ( $F(3, 396) = 1.18, p = .32$ ), factor 1 ( $F(3, 424) = .36, p = .78$ ), factor 2 ( $F(3, 418) = 2.35, p = .07$ ), nor factor 3 ( $F(3, 423) = 1.18, p = .85$ ) as determined by a one-way ANOVA.

Table 14

*Teachers' Attitudes by Level of Education*

<i>Highest level of education attained</i>	<i>Bachelor's degree (n=34)</i>	<i>Bachelor's +15 (n=81)</i>	<i>Master's degree (n=166)</i>	<i>Master's +15 or more (n=119)</i>	<i>F</i>	<i><math>\eta_p^2</math></i>	<i>p</i>
ATERS-19	64.6 (8.0)	63.6 (10.1)	65.8 (9.3)	64.3 (10.3)	1.18	.009	.316
Factor 1: Participation in research	19.7 (3.5)	19.6 (4.1)	20.1 (4.0)	19.7 (4.4)	6.13	.003	.781
Factor 2: Value of research	27.2 (3.6)	26.4 (4.2)	27.7 (3.7)	26.9 (4.2)	2.35	.017	.072
Factor 3: Usefulness of research skills	17.7 2.4	17.6 3.0	17.9 (2.9)	17.8 (3.1)	0.27	.002	.847

**Teacher Research.** Teachers with a master's degree or higher were significantly more likely to report participating in teacher research than teachers with a bachelor's degree or a bachelor's degree plus fifteen credits, with 45% of teachers with a master's degree and 51% of those with 15 credits or more beyond a master's degree reporting having been involved in teacher research, compared with 16% of teachers with a bachelor's degree and 33% of teachers with a bachelor's plus fifteen credits,  $\chi^2 (3, N = 442) = 18.44, p < .001, V = .20$ .

Teachers who had taken a graduate level education course in the previous three years were significantly more likely to have participated in teacher research than those who had not, with 50% of those who had taken a graduate education class reporting teacher research activity compared to 32% of teachers who had not recently taken a graduate education course.  $(32\%), \chi^2 (1, N = 441) = 14.15, p < .001, \phi_c = .18$ .

Teachers who had taken a professional development course in the prior three years were significantly more likely to have participated in teacher research than if they had not, with 50% of teachers who had taken a professional development course reporting activity in teacher research, compared with 32% of teachers who had not taken a professional development course.  $(50\%)$  than if they had not  $(32\%), \chi^2 (1, N = 441) = 6.12, p = .01, \phi_c = .12$ .

An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who had participated in teacher research in the past and those who had not. There was a significant difference in the scores for teachers who had participated in teacher research ( $M = 67.5, SD = 9.2$ ) and teachers who had not ( $M = 62.9,$

SD=9.5); ( $t(397) = 4.83, p < .001$ ). This suggests that teachers who have participated in teacher research in the past have a more positive attitude toward education research than teachers who have not. There was a similarly significant difference in scores for the factor 1, factor 2, and factor 3 subscales, as reported in data Table 15. Teachers were also asked to indicate the frequency of their participation in teacher research. An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who reported occasional or frequent participation in teacher research and those who reported rarely participating in teacher research. There was a significant difference in the scores for teachers who occasionally or frequently participated in teacher research ( $M = 69.0, SD = 8.1$ ) and teachers who rarely participated ( $M = 65.8, SD = 9.3$ ); ( $t(198) = 2.43, p = .02$ ).

Table 15

*Teachers' Attitudes by Participation in Teacher Research*

<i>Participates in teacher research</i>	<i>Has ever participated in teacher research (n=187)</i>		<i>Has never participated in teacher research (n=258)</i>		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	67.5	9.2	62.9	9.5	4.83	.000
Factor 1: Participation in research	21.3	3.9	18.9	4.0	6.24	.000
Factor 2: Value of research	27.8	4.0	26.7	3.9	2.66	.008
Factor 3: Usefulness of skills	18.4	2.7	17.3	3.0	3.97	.000

In summary, the third research question related to the differences in teachers' attitudes toward education research based on grade level taught, subject taught, gender, years of experience, educational background and teachers' experience with teacher research. Significant differences in attitude score were found for grade level taught and teachers' experience with teacher research. Elementary teachers were found to have a significantly more positive attitude toward education research than secondary teachers (Table 10), and teachers who had experience with teacher research (action research) had a more significantly higher attitude score than teachers who had no experience with teacher research (Table 15). There were no significant differences in teachers' attitude toward education research for teachers' gender, subject taught, years of experience, or educational background.

### **Teachers' Sources of Education Research**

The fourth research question examines how teachers' attitude toward education research differed based on teachers' reported sources of education research. These sources include graduate level education courses, professional development courses, the What Works Clearinghouse (WWC), teacher inservice opportunities, other teachers, administrators, and professional reading. On the survey questionnaire, professional reading was broken down into the reading of education journals and books and the reading of subject-specific journals and books. Independent samples t-tests were used to evaluate how teachers' attitude scores differed based on these variables. T-tests were also used to analyze differences in attitude scores based on teachers' reported use of education research in graduate courses and professional development courses. It should

be noted that within the county in which the study was conducted there is a distinction between inservice courses and professional development courses. Inservice courses are of short duration, lasting between 1 and 5 hours. Professional development courses cover a greater amount of time, usually 30-40 hours over the duration of the course.

**Graduate education course enrollment.** Teachers were asked to report whether they had enrolled in a graduate level education course in the previous 3 years, and also to report on the level of use of education research in the course. An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who had taken a graduate level education course in the past 3 years and those who had not. There was a significant difference in the scores for teachers who had taken a graduate level education course in the previous 3 years ( $M=66.8$ ,  $SD=9.4$ ) and teachers who had not taken a graduate level education course ( $M=62.2$ ,  $SD=9.3$ ); ( $t(397) = 4.82$ ,  $p<.001$ ). There was a similarly significant difference in scores for the factor 1, factor 2 and factor 3 subscales, as reported in data Table 16.

Table 16

*Teachers' Attitudes by Recent Graduate Education Coursework*

<i>Graduate education course in past 3 years</i>	<i>Recent graduate education course (n=189)</i>		<i>No recent graduate education course (n=256)</i>		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	66.8	9.4	62.2	9.3	4.82	.000
Factor 1: Participation in research	20.7	4.0	18.7	4.0	5.21	.000
Factor 2: Value of research	27.8	4.0	26.4	3.9	3.47	.001
Factor 3: Usefulness of skills	18.2	2.9	17.2	2.9	3.85	.000

**Use of research in graduate course.** Teachers who had recently taken a graduate-level education course were asked how often they learned about or used education research in the course: never, rarely, occasionally or frequently. From these responses teachers were placed into two groups: (1) those who reported no or rare use of education research; and (2) those who reported occasional or frequent use of education research in the course. An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who reported occasional or frequent use of education research in the graduate education course and those who reported rare or no use of education research in the graduate education research course. There was a significant difference in the scores for teachers who reported occasional or frequent use ( $M=68.2$ ,  $SD=8.7$ ) and teachers who reported rare or no use of education research in the graduate level education course ( $M=61.6$ ,  $SD=10.0$ ); ( $t(251) = 5.01$ ,  $p<.001$ ). There was

a similarly significant difference in scores for the factor 1, factor 2 and factor 3 subscales, as reported in data Table 17.

Table 17

*Teachers' Attitudes by Frequency of Use of Research in Graduate Course*

<i>Level of use of education research in graduate education course</i>	<i>Frequent or Occasional use of education research in grad course</i> (n=212)		<i>Rare or no use of education research in grad course</i> (n=67)		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	68.2	8.7	61.6	10.0	5.01	.000
Factor 1: Participation in research	21.2	3.7	18.8	4.3	4.40	.000
Factor 2: Value of research	28.2	3.9	26.3	3.7	3.51	.001
Factor 3: Usefulness of skills	18.6	2.6	16.7	3.3	4.68	.000

**Professional development course enrollment.** Teachers were asked to report if they had enrolled in a professional development course in the previous 3 years, and also to report on the level of use of education research in the course. An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who had taken a professional development course in the past 3 years and those who had not. There was not a significant difference in the ATERS-19 scores for teachers who had taken a professional development course and those who had not ( $t(397) = .35, p=.72$ ), nor were there differences in the factor subscales, as shown in Table 18.

Table 18

*Teachers' Attitudes by Recent Professional Development Course*

<i>Professional development course in past 3 years</i>	<i>Recent professional development course (n=374)</i>		<i>No recent professional development course (n=69)</i>		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	64.9	9.8	64.5	9.0	0.36	.722
Factor 1: Participation in research	20.0	4.1	19.3	4.1	1.31	.191
Factor 2: Value of research	27.2	4.0	27.3	3.8	0.21	.832
Factor 3: Usefulness of skills	17.8	3.0	17.8	2.5	0.04	.967

**Use of research in professional development course.** Teachers who had recently taken a professional development course were asked how often they learned about or used education research in the course: never, rarely, occasionally or frequently. From these responses teachers were placed into two groups, those who reported no or rare use of education research and those who reported occasional or frequent use of education research in the course. An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who reported occasional or frequent use of education research in the professional development course and those who reported rare or no use of education research in the professional development course. There was a significant difference in the scores for teachers who reported occasional or frequent use ( $M= 66.5, SD=9.8$ ) and teachers who reported rare or no use of education research in the graduate level education course ( $M=62.9, SD=9.4$ ); ( $t(339) = 3.46$ ,

p=.001). There was a similarly significant difference in scores for the factor 1, factor 2 and factor 3 subscales, as reported in data Table 19.

Table 19

*Teachers' Attitudes by Use of Research in Professional Development Course*

<i>Level of use of education research in professional development course</i>	<i>Frequent or Occasional use of education research in prof. dev. cs. (n=209)</i>		<i>Rare or no use of education research in prof. dev. cs. (n=172)</i>		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	66.5	9.8	62.9	9.4	3.46	.001
Factor 1: Participation in research	20.6	4.2	19.2	4.0	3.04	.003
Factor 2: Value of research	27.7	4.0	26.5	3.9	3.34	.001
Factor 3: Usefulness of skills	18.2	2.9	17.2	3.0	3.46	.001

**Knowledge of What Works Clearinghouse.** Participants were asked to report if they had heard of the What Works Clearinghouse and if they had ever used it. In 2002 the What Works Clearinghouse (WWC) was created for educators, researchers and policy makers in order to facilitate sharing the results of scientifically based studies (see <http://ies.ed.gov/ncee/wwc> ). The WWC provides a format for sharing and disseminating research findings. Only 14.4% of teachers (64 of 445) reported that they had ever heard of the WWC, and far fewer, 4.3% of teachers (19 of 445) reported that they had ever used the WWC as a source of research findings.

Teachers who had participated in teacher research were significantly more likely to report having ever heard of the What Works Clearinghouse than those who had not, with 20% of teachers who reported participating in teacher research also reporting that they had heard of the What Works Clearinghouse, compared to 11% of those who had not participated in teacher research,  $\chi^2(1, N = 442) = 7.83, p = .01, \phi_c = .11$ .

A one-way between subject ANOVA was conducted to compare ATERS-19 and the factor subscales for teachers who had never heard of the WWC, those who had heard of it and never used it, and those who had heard of and used the WWC. There was a statistically significant difference between groups for ATERS-19 ( $F(2, 395) = 9.658, p < .001$ ). Post hoc comparisons using the Tukey HSD test indicated that the mean attitude score for teachers who had heard of the WWC and used it ( $M = 74.1, SD = 10.6$ ) was significantly different from the mean attitude score for teachers who had heard of the WWC but never used it ( $M = 64.2, SD = 7.5$ ) and from the mean attitude score for teachers who had never heard of the WWC ( $M = 64.2, SD = 9.6$ ). However, there was no significant difference between the attitude scores for teachers who had heard of the WWC but never used it and teachers who had never heard of the WWC.

There was a statistically significant difference between groups for factor 1 ( $F(2, 424) = 7.90, p < .001$ ) and factor 2 ( $F(2, 418) = 7.002, p = .001$ ) as determined by a one-way ANOVA. Post hoc comparisons using the Tukey HSD test indicated that factor 1 and factor 2 displayed the same differences as the ATERS-19, with significant differences between teachers who had heard of the WWC and used it and the other two

groups (teachers who had heard of the WWC but never used it and teachers who had never used it.) These results are displayed in table 20.

There was also a statistically significant difference between groups for factor 3 ( $F(2, 422)= 6.308, p=.002$ ) as determined by a one-way ANOVA. Post hoc comparisons using the Tukey HSD test indicated that the mean factor 3 subscale score was significantly different for teachers who had heard of the WWC and used it ( $M=19.9, SD=2.8$ ) and those who had not heard of it ( $M=17.6, SD=2.9$ ). However, the mean factor 3 score for teachers who had heard of the WWC and never used it did not significantly differ from either of the other groups. The findings are presented in Table 20.

Table 20

*Teachers' Attitudes and Awareness of the What Works Clearinghouse*

<i>Ever heard of/used the What Works Clearinghouse (WWC)</i>	<i>Never heard of WWC (n=343)</i>	<i>Heard of but never used it (n=37)</i>	<i>Heard of and used it (n=18)</i>	<i>F</i>	<i><math>\eta_p^2</math></i>	<i>p</i>
ATERS-19	64.2 (9.6)	65.8 (7.5)	74.1 (10.6)	9.66	.047	.000
Factor 1: Participation in research	19.6 (4.1)	20.2 3.6	23.5 (4.2)	7.90	.036	.000
Factor 2: Value of research	27.0 (4.0)	27.1 (3.2)	30.5 (4.4)	7.00	.032	.001
Factor 3: Usefulness of skills	17.6 2.9	18.2 2.3	19.9 (2.8)	6.31	.029	.002

**Source of education research: inservice or administrator.** Teachers were asked to report in what other ways they had learned about education research findings that they could use in their classroom. The options included inservice courses, administrators, other teachers, or professional reading of education journals or books or subject-specific journals or books.

**Research from an inservice.** Of the 451 participants, 66% (297) reported that they had learned about research findings from an inservice course. New teachers (those with 1-3 years of teaching experience) were significantly more likely to report learning about education research from a school inservice than teachers with more experience, with 54% of teachers with 1-3 years of teaching experience reporting learning about education research from a school inservice, compared to 28% of those who had taught for 4-6 years, 36% of those with 7-10 years of experience, 32% of those had taught for 11-20 years, and 31% of teachers with 21 or more years teaching experience,  $\chi^2(4, N = 447) = 9.579, p=.048, V = .146$ .

An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who reported learning about education research findings from an inservice and those who did not report this. There was not a significant difference in the scores for teachers who reported learning about education research findings at an inservice and those who did not ( $t(400) = 0.604, p=.546$ ). Those results are presented in Table 21.

Table 21

*Teachers' Attitudes by Research Source: Inservice Course*

<i>Learned about education research at an inservice</i>	<i>Research from an inservice (n=297)</i>		<i>No research from an inservice (n=154)</i>		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	65.0	9.9	64.4	9.2	0.60	.546
Factor 1: Participation in research	20.0	4.1	19.6	4.1	1.16	.247
Factor 2: Value of research	27.1	4.1	27.4	3.8	0.94	.347
Factor 3: Usefulness of skills	17.8	2.9	17.7	3.0	0.63	.531

***Research from an administrator.*** An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who reported learning about education research findings from an administrator and those who did not report this. As displayed in Table 22, there was not a significant difference for teachers who reported learning about education research findings from an administrator and those who did not ( $t(400) = 0.374, p = .709$ ). Of the 451 participants, 37% (165) reported that they had learned about research findings from an administrator.

Table 22

*Teachers' Attitudes by Research Source: Administrator*

<i>Learned about education research from an administrator</i>	<i>Research from an administrator (n=165)</i>		<i>No research from an administrator (n=286)</i>		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	64.6	9.8	65.0	9.5	0.37	.709
Factor 1: Participation in research	19.9	4.2	19.9	4.1	0.07	.948
Factor 2: Value of research	26.9	4.1	27.4	3.9	1.15	.250
Factor 3: Usefulness of skills	17.8	3.0	17.8	2.8	0.03	.975

**Research from another teacher.** Another potential source of research findings is another teacher, and 37% of participants (166 of 451) reported learning about education research findings from one of their colleagues. An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who reported learning about education research findings from another teacher and those who did not report this. There was not a significant difference in the ATERS-19 score for teachers who reported learning about education research findings from another teacher ( $t(400) = -1.421, p=.156$ ). There was, however, a significant difference in the factor 3 subscale score for teachers who learned about education research findings from another teacher ( $M=18.1, SD=2.8$ ) and those who did not report this ( $M=17.6, SD=2.9$ ). There were not significant differences in the factor 1 and factor 2 subscale scores, as shown in Table 23.

Table 23

*Teachers' Attitudes by Research Source: Another Teacher*

<i>Learned about education research from another teacher</i>	<i>Research from another teacher (n=166)</i>		<i>No research from another teacher (n=285)</i>		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	65.7	9.1	64.3	9.9	1.42	.156
Factor 1: Participation in research	20.2	3.9	19.7	4.2	1.21	.229
Factor 2: Value of research	27.3	3.8	27.1	4.1	0.62	.536
Factor 3: Usefulness of skills	18.1	2.8	17.6	2.9	1.99	.048

**Research from professional reading.** Reading professional literature, including education and subject-specific journals and books, is another avenue through which teachers learn about education research findings. As shown in Table 4, about one-half (50.3 %) of the teachers who participated in this study reported learning about education research findings from some type of professional reading. Professional reading included teachers who reported education journals and books as sources of education research (39.9%) and teachers who reported reading subject specific journals and books (28.2%) as sources of education research. There was also a group of teachers who reported learning about education research from both education and subject specific journals and books (17.8%).

Teachers' professional reading seems to be related to teachers' highest degree. Teachers who had a master's degree or higher were significantly more likely to report learning about education research findings that they could use in their classroom from professional reading than teachers with only a bachelor's degree. Of teachers with a

master's degree, 52 % reported professional reading as a source of education research findings, and 61% of teachers who had earned 15 credits or more beyond a master's degree reported the same. In contrast, 33% of teachers with only a bachelor's degree and 40% of teachers with a bachelor's degree plus 15 credits reported learning about education research findings from professional reading,  $\chi^2 (3, N = 446) = 14.389, p=.002, V = .180$ .

Teachers' professional reading also seems to be related to teachers' previous experience with teacher research. Teachers who had participated in teacher research were more likely to report professional reading as a source of education research findings that they could use in their classroom than if they had not participated in teacher research, with 65% of teacher researchers reporting professional reading as a source of education research findings, compared to 41% of those who had not participated in teacher research,  $\chi^2 (1, N = 445) = 24.206, p< .001, \phi_c = .233$ .

An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who reported learning about education research findings from any type of professional reading and those who did not report this. There was a significant difference in the attitude score for teachers who reported learning about education research findings from professional reading ( $M=67.5, SD=9.2$ ) and those who did not report professional reading as a source of education research findings ( $62.9, 9.5$ ); ( $t (400) = 5.447, p<.001$ ). The teachers' professional reading consisted of education journals and books and subject-specific journals and books. The findings are presented in Table 24.

Table 24

*Teachers' Attitudes by Professional Reading Conducted*

<i>Learned about education research from any professional reading</i>	<i>Research from any professional reading (n=277)</i>		<i>No research from any professional reading (n=224)</i>		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	67.5	9.2	62.9	9.5	5.45	.000
Factor 1: Participation in research	21.3	4.0	18.9	4.0	5.89	.001
Factor 2: Value of research	27.8	4.0	26.7	3.9	3.29	.000
Factor 3: Usefulness of skills	18.4	2.7	17.3	3.0	5.47	.000

***Professional reading: education journals and books.*** Teachers who had a master's degree or higher were significantly more likely to report learning about education research findings that they could use in their classroom from reading education journals and books than teachers with only a bachelor's degree. Of teachers with a master's degree, 40% reported professional reading as a source of education research findings, and 50% of teachers who had earned 15 credits or more beyond a master's degree reported the same. In contrast, 28% of teachers with only a bachelor's degree and 33% of teachers with a bachelor's degree plus 15 credits reported learning about education research findings from reading education journals and books,  $\chi^2(3, N = 446) = 10.318, p=.016, V = .152$ . Teachers who had participated in teacher research were more likely to report education journals and books as a source of education research findings

that they could use in their classroom than if they had not participated in teacher research, with 52% of teacher researchers reporting education journals and book as a source of education research findings, compared to 32% of those who had not participated in teacher research,  $\chi^2(1, N = 445) = 17.470, p < .001, \phi_c = .198$ .

An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who reported learning about education research findings from education journals and books and those who did not report this. There was a significant difference in the attitude score for teachers who reported reading education journals and book ( $M=68.1, SD=8.8$ ) and those who did not ( $M=62.6, SD=9.5$ ); ( $t(400) = 5.814, p < .001$ ).

Table 25

*Teachers' Attitudes by Professional Reading: Education Journals/Books*

<i>Learned about education research from education journals/books</i>	<i>Research from education journals &amp; books (n=180)</i>		<i>No research from education journals &amp; books (n=271)</i>		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	68.1	8.8	62.6	9.5	5.81	.000
Factor 1: Participation in research	21.3	3.8	18.9	4.0	6.16	.001
Factor 2: Value of research	28.0	3.9	26.6	3.9	3.45	.000
Factor 3: Usefulness of skills	18.7	2.6	17.1	2.9	5.65	.000

***Professional reading: subject-specific journals and books.*** Teachers with more experience were significantly more likely to report learning about education research from subject-specific journals and books than less experienced teachers, with 39% of those with 11-20 years of teaching experience and 29% of those who had taught for 21 or more years reporting reading subject-specific journals and books. In contrast, 21% of those who had taught for 1-3 years, 21% of teachers with 4-6 years experience, and 21% of teachers with 7-10 years experience reported learning about education research findings in at subject-specific book or journal ,  $\chi^2 (4, N = 447) = 12.906, p=.012, V = .170$ . Teachers who had participated in teacher research were more likely to report reading subject specific journals and books in order to learn about education research findings that they could use in their classroom than those who had not participated in teacher research, with 41% of teacher researchers reporting subject specific journals and book as a source of education research findings, compared to 20% of those who had not participated in teacher research,  $\chi^2 (1, N = 445) = 23.16, p< .001, \phi_c = .228$ .

An independent-samples t-test was conducted to compare ATERS-19 and the factor subscales for teachers who reported learning about education research findings from subject-specific journals and books and those who did not report this. There was a significant difference in ATERS-19 score for teachers who reported learning about education research findings from subject-specific journals or books (M=67.0, SD=9.9) and those who did not report this (M=64.0, SD=9.5); (t(400)=2.916, p=.004). There were similar differences in factor subscales on professional reading sources, with the notable exception of the factor 2 subscale, for which there was no significant difference for

teachers who reported reading subject-specific journals and books ( $t(429) = 1.44, p=.15$ ).

The t-test statistics for the research related questions for the ATERS-19 and the factor subscales are provided in Table 26.

Table 26

*Teachers' Attitudes by Professional Reading: Subject-Specific Journals/Books*

<i>Learned about education research from subject-specific journals/books</i>	<i>Research from subject- specific journals &amp; books</i>		<i>No research from subject- specific journals &amp; books</i>		<i>t</i>	<i>p</i>
	<i>(n=127)</i>		<i>(n=324)</i>			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
ATERS-19	67.0	9.6	64.0	9.5	2.92	.004
Factor 1: Participation in research	21.0	4.0	19.4	4.1	3.61	.000
Factor 2: Value of research	27.6	4.0	27.0	4.0	1.44	.150
Factor 3: Usefulness of skills	18.5	2.7	17.5	2.9	3.46	.001

In summary, research question 4 examined sources of research and how they explained differences in teachers' attitude toward education research. Significant differences in attitude score were found for teachers who were aware of the WWC, who had heard of the WWC, who had taken a graduate education course in the past three years, and who used education research findings occasionally or frequently in the graduate education course. Significant differences were not found for teachers who had taken a professional development course in the past 3 years, but there were significant differences for teachers who reported occasional or frequent use of education research in the professional development course as compared with teachers who reported rare or no use of education research in the course. Some additional sources of education research also explained differences in attitude toward education research. There were significant differences in attitude score for teachers who reported learning about education research findings that they could use in their classroom from their own professional reading, both from education journals and book and from subject specific journals and books. There was no significant difference in attitude score for teachers who reported learning about education research at an inservice or from an administrator. There was a significant difference in the factor 3 subscale for teachers who reported learning about education research from other teachers, but there was no difference in the ATERS-19 score or the other factor subscales for this source of education research.

### **Summary**

The data from the administration of the revised Attitude Toward Education Research Scale were analyzed with a principal components analysis (PCA), resulting in a

reduced scale of 19 items. The ATERS-19 had a Cronbach's coefficient alpha of 0.91, a high reliability score. The PCA was used to isolate three factors that comprise teachers' attitudes toward education research. These factors were participation in research, value of education research, and usefulness of education research skills. Differences in participants' attitude score on the ATERS-19 and the three factor subscales were analyzed using t-tests and analysis of variance tests to determine if differences could be explained by the teachers' demographic characteristics or teachers' prior experience with research and sources of research findings. Significant differences in ATERS-19 score were found for grade level taught and for teachers' prior experience with teacher research. Significant differences in teachers' attitudes toward education research were also found for teachers who had recently taken a graduate level education course, for teachers who reported occasional or frequent use of education research in a recent graduate education or professional development course and for teachers who reported learning about education research findings that they could use in their classroom in general education journals and books and in subject-specific journals and books. A significant difference in teachers' attitude score was not found for teachers who reported learning about education research findings from an administrator or a school inservice. Teachers' familiarity with the What Works Clearinghouse (WWC) also explained some differences in teachers' attitudes toward education research.

## CHAPTER 5: CONCLUSION, DISCUSSION, AND IMPLICATIONS

The purpose of this research study was to update and validate the Attitude Towards Education Research Scale (ATERS) (Isakson and Ellsworth, 1979) to measure teachers' attitudes toward education research, to examine how teachers learn about research-based practices for classroom use, and look at the relationships between teachers' attitudes toward education research and selected demographic variables.

Understanding teachers' attitudes toward education research is the first step toward understanding how and why teachers use or do not use education research findings to inform their teaching practice. This allows us to begin to examine the research to practice gap through the lens of teachers' attitudes. As Fishbein and Azjen (1978) and Azjen (2005) theorize, there is a connection between teachers' attitudes toward education research and teachers' use of education research findings.

As presented in Chapter 4, the results found that the ATERS-19 had a reliability estimate of .91 using Cronbach's coefficient alpha and three factors that accounted for 51.5% of the variance in teachers' attitudes toward education research. The three factors were: (1) teachers' participation in education research; (2) the teachers' perceived value of education research; and (3) their perceptions of the usefulness of research skills for teachers. The results from the initial validation of the ATERS-19 indicate that this scale reliably measures teachers' attitudes toward education research. Over half of the variance

in the attitude measure is explained by the three factors. This indicates that these factors are an excellent first step in explaining teachers' attitudes toward education research. As attitudes are theoretically related to teachers' actions (Fishbein & Azjen, 1978), further analysis of the ATERS-19 and the three factors can begin to explore why teachers choose to use education research findings in their teaching.

Analyses of the variables that relate to teachers' attitudes toward education research reveal that activities that expose teachers to education research over extended periods of time are most likely to make a difference in teachers' attitudes, and thus to teachers' actions. These activities include the use of education research within graduate education and professional development courses, engagement of teachers in teacher research, and teachers' own professional reading. The What Works Clearinghouse (WWC) is a potential source of education research findings for teachers, but is neither well known nor well utilized by teachers. Short-term exposures to education research, such as learning about education research findings from an inservice course, or from a peer teacher or an education administrator were not found to make a difference in teachers' attitude scores.

Further, most of the demographic characteristics of the teachers in this study do not explain differences in attitude scores, which indicates that gender, years of experience, subject taught, highest degree earned and path to licensure are not important variables in examining the research to practice gap. Grade level taught is the one demographic feature for which differences in attitude score were found. Elementary teachers had more positive attitudes toward education research than secondary teachers,

particularly in terms of the value they place on education research. The reason for this difference is unclear, but one can speculate that it could speak to differences in school cultures in elementary and secondary schools. However, much more research is needed on whether elementary teachers are more interested in basing their practice on research than are their peers in the secondary schools.

## **Discussion**

**Scale Validation.** This study focused on updating a previously used scale and working through the initial validation of the ATERS-19. The ATERS-19 scale had a Cronbach's alpha of 0.91, a high reliability rating by DeVellis's (2003) standards. This value suggests that the ATERS-19 has a high value of internal consistency. The three factor subscales of the ATERS-19 all had Cronbach's alpha values that exceeded 0.70, indicating that the ATERS-19 is made up of three subscales that consistently measured some value or quality. These values help to establish the reliability of the ATERS-19. The values measured by the ATERS-19 and the three factor subscales are best considered through an analysis of the validity of the scales and subscales.

Validity of the scale and subscales is best established in several different ways. The panel of experts established content validity, indicating that items on the scale represent teachers' attitudes toward education research. The scale's validity is further established by the factor analysis, which indicates the three factors that account for fifty percent of the variance in teacher's attitudes toward education research. Additional evidence of validity of the scale is found from the analysis of demographic data used to address research questions three and four. Final validity of the ATERS-19 will be best

established through a final validation stage, including additional data collection with the ATERS-19 and a confirmatory factor analysis. This will be recommended for future research later in this chapter.

The ATERS-19 captures teachers' attitudes toward education research as a whole, but each of the three factors contributes to this score. The factor analysis identified three factors: (1) teacher participation in education research; (2) the perceived value of education research; and (3) the usefulness of research skills. Teachers' attitudes toward education research are best understood through an analysis of each of these factors

Participation in education research is made up of items that relate to specific and general involvement in education research. This factor suggests that teachers would like more opportunities to be active participants in conducting education research. For example, item #42 states "There should be more opportunities for teachers to be involved in education research." Other items that make up this factor are more specific, including item #25, which states "I would like to carry out some research in my own classroom," In addition to teacher research (or action research), participation in education research may also include teachers serving as participants in education research studies and teachers advising education research studies. Participating in a research study may mean filling out a survey, such as the one discussed in this research, or being interviewed or observed for a research study, or it may mean teachers working with education researchers, such as in the role of advisor or facilitator, or as part of a research team that is conducting a research scale. Participation in education research may also refer to teachers' engagement in teacher research or action research, either individually or with a team of teachers,

usually in their own classroom or school. The importance of participation in research to teachers' attitude toward education research is supported in the previous research of Zeuli and Tiezzi (1993), who found that teachers who had participated in education research studies had a more positive attitude toward education research and were more likely to have a clear understanding of the benefits of using education research, and challenges the conventional wisdom that teachers are uninterested in education research. The findings from the present study suggest there is a subset of teachers who would like to engage in this aspect of the profession.

The second factor, the perceived value of education research, suggests that teachers view the results of education research as yielding interesting and innovative developments in education. In the items that comprise this factor, item #5 garnered the most positive response of any item on the ATERS-19. It states "Education research has revealed important information about the teaching and learning process," indicating that teachers in general hold education research findings in esteem. Contrasting with this, teachers also reacted strongly and positively to item #37, which states "Education researchers can make data show whatever they want." This item may suggest that teachers do not trust education researchers, or it may instead demonstrate a depth of understanding among teachers that statistics can be interpreted in different manners via different methodological analyses. It is not clear from this question whether this item is about a lack of trust, and in turn if the lack of trust is for education researchers or the data analysis, or some combination of the two. A lack of trust for education research was previously found in a study from Boardman, et al., (2005) in which teachers explained

that they were skeptical of education research findings presented in professional development. Further research into what item #37 suggests, whether it be a lack of trust for education researchers and research findings or teachers' awareness of the depth of meaning in may aid in further understanding the research-to-practice gap.

The third factor, usefulness of research skills, is made up of items that relate to teachers using education research findings and methods, though not as participants in research. The way that teachers use research findings and methods are illustrated by item #33, "Being able to read a research article critically is a valuable skills for teachers to acquire," and item #18, "An understanding of the methods used by education researchers can help teachers take a more systematic approach to solving education problems." Usefulness of research skills is a factor that represents how teachers believe they can utilize education research in their teaching. Papanastasiou (2005) found that teachers' perception of the usefulness of research was the strongest factor in teachers' attitudes toward research. The items that made up Papanastasiou's factor were related to the usefulness of research in a general way and were not specific to education research or to research skills. In addition, Bilgili (2005) found that teachers who attended an action research workshop valued the research skills they learned for how they helped them in the classroom.

From these three factors one can begin to see what teachers perceive as the barriers and facilitators to narrowing the gap between education research and their practices. The facilitators include regular exposure to research and participation in research. The barriers include the distrust in research found in the previous literature

(Boardman, et al., 2005). In this instance, these respondents reported a certain amount of caution in how researchers can present their findings. Given that these respondents held more positive attitudes about themselves as researchers or as participants in research and the usefulness of research skills, it suggests that teachers do not feel connected to the research enterprise, which can understandably lead to distrust. From this observation, one of the ways to narrow the gap is for researchers to include teachers in their studies as co-investigators as well as participants. Another is for school leaders to provide opportunities for teachers to engage as teacher researchers on problems and topics important to school and/or instructional improvement.

### **Understanding the research to practice gap**

This study sought to better understand teachers' attitudes toward education research, and to speculate on why the gap between research and practice is wide. It was theorized that differences in gender, subject taught, grade level taught, years of experience, and educational background might explain some differences in teachers' attitudes toward education research. The quantitative analysis described in chapter four revealed that there few differences explained by these characteristics. For most demographic characteristics there were no significant differences in attitude score, with one exception.

The school level at which the respondents teach is the only purely demographic characteristic for which a difference in teachers' attitudes toward education research was found. Elementary teachers were found to have a significantly more positive attitude toward education research than secondary teachers. None of the previous attitude studies

found this difference, but Gitlin, et al.'s (1999) comparison of elementary and secondary preservice teachers noted differences in perceptions of education research based on school level. Both groups of teachers in the Gitlin, et al. study explained why they did not use education research findings to advise their teaching. Elementary teachers gave the inaccessibility of education research as their reason, and high school teachers pointed to time as the limiting factor. The Gitlin, et al. study included different treatments for the two groups, so the differences in perceptions of education research based on school level may be related to the treatment, making it difficult to compare the Gitlin, et al. results with those of the current study. In addition, there are differences between the elementary and secondary teachers and schools that were not investigated in this study, such as the differing emphasis on high stakes assessments. Further research should seek to confirm that this attitude difference between elementary and secondary teachers exists for other samples, and then examine the reasons for this difference.

Previous research on teachers' attitudes toward education research found a significant difference in attitude based on teacher gender in favor of women teachers, but these studies had contrasting results. Specifically, Williams and Coles (2007) found that women held more positive attitudes about education research than did their male counterparts, yet Johnson (1966) found that men had more positive attitudes toward education research. The current study found no differences in the ATERS-19 score based on gender, which suggests the need for more research on the influence of gender and school level on whether these variables can be leveraged to close the gap between research and practice.

It was theorized that subject taught might explain some differences in the attitude scores. Short and Szabo (1974) found differences in attitude score for social studies teachers, who scored significantly lower than teachers of other subjects on their attitude measure, and for math teachers, who scored significantly higher than teachers of other subjects. However, there were no significant differences in attitude score on the ATERS-19 for subject taught in the present study.

Teacher's experience, measured in number of years teaching, was hypothesized to explain differences in teachers' attitudes toward education research, but there were no significant differences in ATERS-19 score based on years of experience. Teachers' educational background was also measured using two different variables: teachers' path to certification; and the highest level of education attained by the teacher. Neither of these variables explained differences in teachers' attitudes toward education research.

**Recent education course.** Teachers' behaviors can be more powerful predictors of teachers' attitudes toward education research than demographic characteristics. In the present study, teachers' enrollment in graduate education courses, professional reading and engagement in teacher research all explain differences in attitude toward education research score.

Teachers who had enrolled in a graduate education course in the previous three years had higher attitude scores than those who had not recently taken a graduate education course. More frequent use of education research in the graduate education course was also related to a higher attitude score. These findings are supported by previous research studies that found teachers' attitudes toward education research became

more positive after taking an education research course (Isakson & Ellsworth, 1979; Napier, 1979). However, the current study finds that this impact exists for all graduate education courses, and especially for those that use education research findings. It is not surprising that taking an education research course would increase attitude score; it is interesting to note that learning about education research findings in any education course has an impact on attitude score. These findings suggest that graduate education courses, and specifically those that emphasize the study of or use of education research, are an effective method for closing the research to practice gap.

Unlike graduate education courses, professional development courses may not encourage teachers' use of education research findings. Teachers who had recently enrolled in a professional development course did not have higher attitude scores than other teachers. Further analysis of frequency of use of education research findings revealed an important difference, as those who reported more use of education research within the professional development class had higher attitude scores than teachers who reported little or no use of education research. These findings suggest that professional development courses offered by the school district as an alternative to graduate education courses are somehow different from traditional university-based graduate education courses. Professional development courses with little or no use of education research have no impact on teachers' attitudes toward education research, but courses that emphasize the use of education research findings are an effective method for closing the research to practice gap. The effect of this type of course on teachers' attitudes toward education research has not been previously studied in other research.

Graduate education courses and professional development courses are both used by teachers to fulfill the continuing education requirements of the school system in which this study was conducted. It is not surprising that teachers' exposure to education research is related to their attitudes toward education research, but it has significant implications for practice. These implications will be discussed later in this chapter.

**Teaching experience.** Although teachers' years of experience did not explain any differences in attitude score, there are differences in professional reading related to teaching experience. Beginning teachers are more likely to learn about education research from inservice activities than teachers with more experience, and teachers with more years of experience are more likely to learn about education research from professional reading than teachers with fewer years of experience. This difference is important because teachers who read professional literature tend to have higher attitudes toward education research, but no such link exists for teachers who get research from inservice activities. Novice teachers may be more likely to view inservice activities as sources of education research because of other issues not examined in this study, such as time pressures or lack of other experiences, or simply because they remain more hopeful that teaching is a research-informed profession. In contrast, teachers with more years of experience are more likely to make the time to read professional literature for education research findings, perhaps because their classroom experiences have taught them to be skeptical of the concepts introduced in inservice activities, or because they are more aware of or more interested in seeking new ideas from the literature. Lastly, it may also suggest a continuum of professional growth in that as teachers move from novice to

experienced status, they shift their focus for professional learning from inservice workshops and courses to reading and graduate coursework.

**Teachers' professional reading.** Many teachers reported learning about education research findings by independently reading professional literature. Professional literature includes both education journals and books and subject-specific journals and books. Teachers who reported reading professional literature of either type had significantly higher attitude scores than teachers who did not report reading professional literature. Teachers who read education journals and books had a higher mean attitude score than teachers who read subject-specific journals and books, but both of these groups had significantly higher attitude scores than those who did not report reading each type of literature. The scores on the factor sub-scales were significantly higher for both types of reading, as well, with one notable exception. The teachers who reported reading education journals and books had a significantly higher score on factor 3, value of research, yet teachers who read subject-specific journals and books showed no difference in valuing research. This is not surprising, as it indicates that teachers who value education research also read about it, but it does provide further support for the factor analysis.

These findings are supported extensively by the extant literature. Previous studies about teachers' professional reading found that teachers who reported more time spent on professional reading held more positive attitudes toward education research (Johnson, 1966), and that teachers who had a positive attitude about reading education journals and books had a more positive attitude toward education research (Benton & Jerrolds, 1984).

Littman and Stodolsky (1998) found that teachers who read more professional literature were more aware of current education reforms and were more likely to report altering their instruction to adhere to reforms. Although the current study does not examine the connection between teachers' professional reading and changes they make to their classroom, Littman and Stodolsky's findings suggest that a connection may exist, and that further research is necessary to understand the influence of professional reading on teachers' attitudes.

**Teacher research.** Teacher research is the use of research methods by teachers to examine their own practices and classrooms. Their engagement in teacher research is related to many variables in this study, including their attitudes toward education research, their professional reading, and other experiences that expose them to education research. Forty-two percent of the respondents in this study reported participating in teacher research at some point, indicating that although engagement in teacher research is not universal, neither is it uncommon.

Previous research (Williams and Coles, 2007) found that teachers who had participated in teacher research had more positive attitudes about education research in general. The current study of the ATERS-19 found similar results, with significant differences in attitude toward education research for teachers who had participated in teacher research. Teachers who reported ever participating in teacher research had a significantly more positive attitude toward education research. Frequency of participation in teacher research is also important, as teachers who participated in teacher research more frequently had higher attitude scores than teachers who reported rarely

participating in teacher research. This suggests that repeated exposure to education research through teacher research influences teachers' attitudes toward education research.

Zeuli and Tiezzi (1993) also found that teachers who had participated in teacher research were likely to view education research as a source of ideas and insight into their own teaching. This is supported by the findings of the current study, and also allows us to examine why teacher research may relate to teachers' positive attitudes toward education research. Teacher researchers may seek out education research findings or use research methods themselves to address problems or issues in their classroom.

In addition to having more positive attitudes toward education research, teacher researchers are also more likely to engage in professional reading, including both education journals and books and subject specific journals and books. Teacher researchers are also more likely to have heard of the WWC, perhaps because they have sought out research findings made available through the WWC. The typical teacher researcher engages in practices that contribute to the teacher researcher's positive attitude toward education research.

How a teacher gets involved in teacher research is best understood through an examination of other findings of this study. Teachers with a master's degree or higher are more likely to engage in teacher research. Teachers who have taken either a professional development course or a graduate education course in the previous three years are also more likely to participate in teacher research. These findings indicate that teacher researchers learn about teacher research in graduate level courses and

professional development courses. As previously suggested, teacher enrollment in graduate education and professional development courses that emphasize the use of education research is an effective method for bridging the research to practice gap.

Teachers who have participated in teacher research are more likely to have a positive attitude toward education research and are also more likely to engage in activities that contribute to a positive attitude toward education research. Teacher research should be considered as one way to bridge the research-to-practice gap in education research, as teachers who have this experience are more likely to seek out professional literature in which research findings that could be used in the classroom are published.

**What Works Clearinghouse.** Teachers were also asked about whether they had heard of the What Works Clearinghouse (WWC), and whether they had ever used the resource. Founded after the passage of NCLB (2002), the WWC was created for educators, researchers and policy makers in order to facilitate sharing the results of scientifically based studies. The WWC's self-stated goal is to provide educators with the information they need to make evidence-based decisions. Only 14.4% of teachers reported ever hearing of the WWC, and only 4.3% of teachers reported ever using the WWC, suggesting that this research resource is neither well known nor well utilized by teachers. Teachers who reported use of the WWC had a more positive attitude toward education research than teachers who heard of the WWC but never used it and teachers who had not heard of the WWC. It is likely that teachers who have more positive attitudes toward education research are more likely to use the WWC, so the WWC should

also be viewed as a potential tool for use in closing the research to practice gap. Very few teachers know of the WWC as a resource; why and how some teachers use the WWC is not well understood from the current literature, and likely represents a major issue in the dissemination of research findings through a more impersonal online venue. As the findings in this study indicate, most teachers did not know it even existed, and its intention is to narrow the gap between research and practice.

**Summary.** The results of this study suggest that teachers' attitudes toward education research are related to and influenced by the frequency and intensity of teachers' exposure to education research. Teachers who had recently taken a graduate or professional development course that focused on education research had more positive attitudes toward education research. Similarly, teachers who reported learning about research findings from their own professional reading, and teachers who had participated in teacher research also had more positive attitude scores. Teachers with more years of experience were more likely to learn about research from professional reading than teachers with fewer years.

No differences in attitude score were found for teachers who learned about education research findings from an administrator, from another teacher, or from a school inservice activity. These findings suggest that brief exposure to education research has far less impact on teachers than extended exposure to or use of education research over time. In terms of attitudes toward education research, teachers who learn about education research findings from school inservice activities, or who are given education research findings by their principal, are no different than teachers who did not learn about

education research findings from any source. Inservice activities that do not stress education research in some depth are not effective venues for closing the research to practice gap.

### **Implications**

The research-to-practice gap that exists in education has long been lamented but has not been well explored. This study of a scale to measure teachers' attitudes toward education research will aid in further exploration of this gap by increasing our understanding of the avenues that education research findings travel in their journey to teachers. There is not enough evidence from this study to suggest that teachers' attitudes toward education research is a personality variable, but there are indications in these data that there are environmental or contextual variables to consider that can improve their attitudes. For example, teachers who undertake their own research, teachers who independently and voluntarily read professional literature and teachers who enroll in graduate level education courses are all experiences that appear to generate positive attitudes toward education research because they provide regular exposure to research. These experiences can serve to bridge the gap between education research and classroom practice. In short, these data suggest that there are conditions that can be created that can increase the number of teachers who would use the findings from education research to inform their instructional practices. As such, there are implications for the practices of teachers, teacher educators and school leaders and offices of professional development. .

**Implications for Teachers.** In order to be prepared to teach students with methods based on the most current research, teachers must seek out experiences that will

increase their exposure to education research. Teachers can do this in a variety of ways, including reading education literature or literature from their subject field, enrolling in graduate education or professional development classes that emphasize the use of education research or research findings, and by engaging in teacher research. When faced with a classroom or instructional problem that needs to be solved, teachers should reference the relevant education research on the topic and look for ideas to apply the teachers' own classroom.

Teachers with an interest in participating in education research should consider participation in teacher research or enrollment in a graduate education course. Both of these experiences may serve as possible methods to increase teachers' knowledge of and use of education research findings in their classroom teaching.

**Implications for Teacher Educators.** In order to prepare teachers to evaluate and use education research findings, university graduate education programs and professional development programs should deliberately include the reading of and the use of education research as part of the experiences. Research skills, including critical analysis of research studies and hypothesis generation should also be explicitly taught. In addition, courses and programs promoting teacher research or action research is another venue that can encourage teachers to seek out education research articles and to utilize the findings in their classroom teaching. Teacher educators should encourage teachers to seek out relevant education research articles from which teachers can find applications to their own teaching. These efforts will increase teachers' openness to the use of education

research findings and increase teacher exposure to education research findings, which addresses the finding that regular exposure relates to a change of view.

One of the most encouraging findings in this study is that teachers are interested in participating in research, either as researchers or as participants/subjects. This opens the door for education researchers not only to conduct studies with teachers, but to include teachers as co-investigators. University professors engaged in education research should seek partnerships with teachers at schools to increase teacher involvement in education research and increase teacher ownership of education research findings. Teacher participation in research can and should be encouraged and facilitated by education faculty, university and school administration and school district personnel. Teacher research courses should be taught in education schools and teachers should be encouraged to share their findings with each other. Universities, school districts and administrators should seek to pull back the curtain that separates practicing teachers and the university and school district personnel who study teaching, learning, children, and schools. Teachers place value on participating in education research, but may not know how to get involved and need guidance as to how to become more engaged.

One of the potential uses for this scale beyond academic research includes use in teacher education courses or programs to study the effectiveness of the course or program that seeks to increase teachers' attitudes toward education research. This study found that teachers who had recently taken a graduate education course had more positive attitudes toward education research than those who had not, which suggests that enrollment in a graduate education course may increase teachers' attitudes toward education research.

This scale could be used as a pre- and post- assessment of attitude score to determine the effect of the course on attitude score.

**Implications for School Leaders and Offices of Professional Development.** In order to prepare teachers to evaluate and use education research findings, administrators and coordinators of staff development programs should promote the use of education research findings by teachers through meaningful and long-term exposure to education research. This will be a challenge when planning the short inservice programs that are common in schools, but are more likely to increase teachers' use of education research findings. In education, as in so many other areas, there are no quick fixes. Teachers who reported being given education research articles by their administrators or in short professional development workshops and classes did not have significantly higher attitude scores than teachers who did not report being in similar workshops and classes. If we want to promote the use of research to improve education, then we must look critically at the courses we offer to preservice and practicing teachers. We must incorporate the use of education research findings in our courses in order to promote teachers' beliefs that education research offers useful guidance for their practice.

In addition, school and school district leaders should seek out partnerships with university researchers so that teachers can collaborate with university researchers as participants in education research, as discussed above. School leaders and staff developers should also encourage teacher participation in teacher research by providing training in research skills and practice with conducting classroom research.

Potential uses for this scale include use by professional development instructors or use by professional learning communities to help better understand teachers' attitudes toward education research as they design and implement programs to improve teacher performance. Administrators or school districts could also use this scale to better understand teachers' perspectives on education research.

**Implications for future research.** This research study focused on the modification and initial validation of a scale to measure teachers' attitude toward education research. The next step will be administration of the ATERS-19 to a new sample of practicing teachers, followed by a confirmatory factor analysis to verify the factors found in the current study. The next sample of teachers will ideally be conducted in a different school district and perhaps in a different region of the country. The relationships between attitude score and the demographic variables can also be explored in this next study, to determine if these relationships still hold.

The three factors found in the current study only accounted for 51.5% of the variance in teachers' attitudes toward education research indicating that there are other factors that were not addressed in this study. Future research should look to hypothesize and explore the missing factors that could help to explain teachers' attitudes toward education research in more robust ways, as there are still other factors the ATERS-19 is not capturing.

Additional factors that explain teachers' attitudes toward education research may relate to two hypothesized factors that were largely missing from the results of the exploratory factor analysis of the ATERS-19. School support and accessibility of

research were both thought to relate to teachers' attitudes toward education research, but were not supported by the data. School support may be related to teachers' attitudes toward education research, as Gitlin, et al. (1999) found for preservice teachers, or teachers' attitudes toward education research may stand independent from the school in which they teach. Teachers complained of research inaccessibility in multiple studies (Carnine, 1997; Gitlin, et al., 1999; Shkedi, 1999). All of these studies were completed before the No Child Left Behind Act (NCLB, 2002). NCLB has brought greater accountability to many schools, as well as greater attention to the use of scientifically based research in schools. These studies also predate the current internet age, in which research findings are easily accessible through a variety of websites. Accessibility may no longer be a factor in teachers' attitudes toward education research because education research is more accessible than it ever was before. Future research may explore whether these factors help to explain teachers' attitudes toward education research more completely.

The three factors that comprise teachers' attitude toward education research in the present study together explain 51.5% of the variance indicating there are additional variables that need to be discovered. In addition to the initial validation and factor analysis of the ATERS-19, this study also examined how other characteristics of teachers may explain differences in their attitudes toward education research. Future research will also include a demographic survey with more in-depth questions or interviews with teachers to determine the connection between teachers' attitudes toward education research and how teachers use research findings in their classrooms. Although this study

has shined a light on teachers' attitudes toward education research, there remains much to be explored and understood about this construct and how it is connected to teachers' use of education research findings.

This study opens the door to further research about teachers' attitudes toward education research and teachers' use of education research. Although much is unknown, we do know that it is not enough for researchers to know how students can best learn to read, or to examine primary sources in history, or to solve physics problems. Teacher educators must equip practitioners to seek out relevant research findings and to read within their field. This study suggests how teacher education programs and school leaders can promote this, by encouraging the analysis of education research studies and the use of education research findings in classes and supporting teacher research efforts, respectively. As education researchers and policy makers look to promote the use of education research findings in practice, understanding teachers' attitude toward education research can aid in determining how to best do this in order to serve all learners.

The question of why teachers do and do not use education research findings to advise their teaching is complex. To address this question in the future it may be useful to examine this question for other professions, such as nursing or other professions in the medical field. An examination of research in other fields, along with additional study within the field of education, may help in the development of a more robust model that can explain teachers' attitudes toward education research

## **Limitations**

This research study focused on the initial validation and exploratory factor analysis of a scale to measure teachers' attitudes toward education research. Final validation, including a confirmatory factor analysis, is needed to determine if the ATERS-19 is both a valid and accurate measure of teachers' attitudes toward education research. All conclusions regarding the factors that comprise teachers' attitudes toward education research and the variables that explain differences in teachers' attitude must be treated cautiously, as they are applied to a scale for which validation has not been completed.

The items that were retained on the ATERS-19 are organized into three factors that make up teachers' attitudes toward education research. These factors, participation in education research, value of education research and usefulness of research skills, only explain 51.5% of the variance in ATERS-19 score. Additional factors may explain more of the variance, or variance in other variables may be the best explanation for why 48.5% of the variance in the ATERS-19 is not explained.

This study examined teachers' attitudes toward education research and the variables that explain differences in the attitude measure. This study did not examine how or why teachers use education research, though some conjecture on these points was made. This study did not examine any causal relationships and is unable to suggest that any experiences or behaviors on teachers' parts will cause an increase in attitude score.

**APPENDIX A: ORIGINAL ATTITUDES TOWARD EDUCATIONAL  
RESEARCH SCALE (ATERS)**

*From Isakson & Ellsworth (1979)*

This scale has been prepared to find out how you feel about educational research. Please fill in the letter on the answer sheet which indicates how you feel about each statement. Use the following:  
A = Strongly Agree    B = Agree    C = Undecided    D = Disagree    E = Strongly Disagree

1. I like to read textbooks and articles in education which are well documented with relevant research findings.	A B C D E
2. Teachers ought to consider it one of their responsibilities to keep current on the research in their specialty area.	A B C D E
3. Educational research has revealed important information about the teaching-learning process.	A B C D E
4. Schools should subscribe to at least a few educational research journals and make them available to the staff.	A B C D E
5. I have no desire to become involved in educational research in the schools.	A B C D E
6. When faced with a teaching problem, a good strategy is to go to the research findings on the problem for help.	A B C D E
7. Teachers who keep up-to-date on pertinent research are generally better teachers than those who do not.	A B C D E
8. Training in educational research can make a teacher a more effective observer of classroom behavior and problems.	A B C D E
9. Theoretical research that is carried out in a laboratory setting can seldom be applied to real educational problems.	A B C D E
10. Courses in educational research are of value to students in education.	A B C D E
11. It is important for teachers to know how to locate research that addresses itself to questions and problems that may arise in their teaching.	A B C D E
12. Teachers have a responsibility for participating in the scientific study of education through cooperative classroom research activities.	A B C D E
13. Educational Researchers are at the forefront of interesting new developments in education.	A B C D E
14. Teachers do not need to receive training in educational research.	A B C D E
15. It is valuable for teachers to understand indexing systems for	A B C D E

educational journals such as the <u>Education Index</u> .	
16. Professors of education should make greater efforts to encourage positive student attitudes toward educational research.	A B C D E
17. When preparing a new subject area for students, a teacher does not need to read the research articles available on that subject.	A B C D E
18. An understanding of the methods used by educational researchers can help teachers take a more systematic approach to solving educational problems.	A B C D E
19. Educational research that is not applicable to real-life problems is of little value to educators.	A B C D E
20. The methods used in educational research represent a logical way to obtain information about a problem in education.	A B C D E
21. I have some pertinent questions that I would like educational researchers to pursue.	A B C D E
22. It is not very interesting to read research articles relating to teaching.	A B C D E
23. Knowledge of educational research techniques is of little help to teachers in assessing the effects of educational programs.	A B C D E
24. Most innovations in education would not have occurred without the efforts of educational researchers.	A B C D E
25. I would like to carry out some research in my own classroom.	A B C D E
26. I prefer college instructors in education courses who bring important research findings into their instruction.	A B C D E
27. Teachers ought to read several journals regularly in order to keep current on what research is going on.	A B C D E
28. I would prefer to work for a principal who does not have a commitment to doing research in his school.	A B C D E
29. Educational research methods are confusing to me.	A B C D E
30. Encouraging and supporting research interests and activities of teachers needs not be a high-priority goal of public school administrators.	A B C D E
31. Educational trends are seldom influenced by research findings.	A B C D E
32. I feel that educational researchers have discovered information that would be important in my teaching, if I know about it.	A B C D E
33. Being able to read a research article critically is a valuable skill for teachers to acquire.	A B C D E
34. Practice in developing research hypotheses can be useful to the teacher in coming up with possible solutions to problems faced in the classroom.	A B C D E
35. It is not easy to justify spending class time to carry out educational research.	A B C D E
36. Theories based on educational research are not much help in giving explanations for many educational phenomena.	A B C D E

37. The efforts of educational researchers help to put education on a more scientific basis.	A B C D E
38. Inservice training given to teachers does not need to cover the topics of understanding and making use of educational research.	A B C D E
39. The scientific method employed in educational research helps to make the findings more valid.	A B C D E
40. Educational research has revealed important information about the nature of human learners.	A B C D E
41. Curriculum planning can be improved through use of current findings.	A B C D E
42. There should be more opportunities for teachers to be involved in educational research.	A B C D E
43. Teaching can be a more rewarding and interesting profession when the teacher is a knowledgeable consumer of, and participant in, educational research.	A B C D E
44. It is important for public school administrators and teachers to cooperate with those who would conduct research in the schools.	A B C D E
45. Educational research articles are presented at a technical level which I can usually grasp.	A B C D E
46. The money spent by federal, state, and local governments to support educational research is not justified by what the research has revealed about education.	A B C D E
47. Much educational research seems to be done mainly for the purpose of meeting professional or university requirements.	A B C D E
48. It can be exciting to learn about the research that has been conducted on a problem in education.	A B C D E
49. A knowledge of research methods can help a teacher detect possible strengths and weaknesses in educational practice.	A B C D E
50. I would like to share research knowledge that I might possess with my teaching colleagues.	A B C D E

*From Isakson & Ellsworth (1979).*

**APPENDIX B: MODIFIED ATTITUDES TOWARD EDUCATIONAL  
RESEARCH SCALE (ATERS-M)**

This scale has been prepared to find out how you feel about educational research. Please select the response that indicates how you feel about each statement.

<b>1. I like to read textbooks and articles in education.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>2. Education books and articles should be well documented with relevant research findings.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>3. Education research is not useful because every child learns differently.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>4. Teachers should consider it one of their responsibilities to keep current on the research in their specialty area.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>5. Education research has revealed important information about the teaching-learning process.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>6. Schools should subscribe to at least a few education research journals and make them available to the staff.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>7. I have no desire to become involved in education research in the schools.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>8. When faced with a teaching problem, a good strategy is to go to the research findings on the problem for help.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>9. Teachers who keep up-to-date on pertinent research are generally better teachers than those who do not.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>10. Training in education research can make a teacher a more effective observer of classroom behavior and problems.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>11. Theoretical research that is carried out in a laboratory setting can seldom be applied to real education problems.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>12. Courses in education research are of value to teachers.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>13. It is important for teachers to know how to locate research that addresses itself to questions and problems that may arise in their teaching.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>14. Teachers have a responsibility for participating in the scientific study of education through cooperative classroom research activities.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>15. Education researchers are at the forefront of interesting new developments in education.</b>

<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>16. Teachers do not need to receive training in education research.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>17. When preparing a new subject area for students, a teacher does not need to read the research articles available on that subject.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>18. An understanding of the methods used by education researchers can help teachers take a more systematic approach to solving education problems.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>19. Education research that is not applicable to real-life problems is of little value to educators.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>20. The methods used in education research represent a logical way to obtain information about a problem in education.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>21. I have some pertinent questions that I would like education researchers to pursue.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>22. It is not very interesting to read research articles relating to teaching.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>23. Knowledge of education research techniques is of little help to teachers in assessing teachers' effectiveness.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>24. Most innovations in education would not have occurred without the efforts of education researchers.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>25. I would like to carry out some research in my own classroom.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>26. I would only use research findings if they confirm what I already believe.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>27. Teachers should read several journals regularly in order to keep current on what research is going on.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>28. I would prefer to work for a principal who does NOT have a commitment to doing research in his school.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>29. Education research methods are confusing to me.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>30. Encouraging and supporting research interests and activities of teachers needs not be a high-priority goal of public school administrators.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>31. Education trends are seldom influenced by research findings.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>32. I feel that education researchers have discovered information that would be important in my teaching, if I know about it.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>33. Being able to read a research article critically is a valuable skill for teachers to acquire.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>34. Practice in developing research hypotheses can be useful to the teacher in coming up with possible solutions to problems faced in the classroom.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>35. It is not easy to justify spending class time to carry out education research.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree

<b>36. Education research findings are not much help in explaining issues in education.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>37. Education researchers can make data show whatever they want.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>38. Inservice classes for teachers do NOT need to cover the topics of understanding and use of education research findings.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>39. The scientific method employed in education research helps to make the findings more valid.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>40. Education research has revealed important information about student learning.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>41. Curriculum planning can be improved through use of current findings.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>42. There should be more opportunities for teachers to be involved in education research.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>43. Teaching can be a more rewarding and interesting profession when the teacher is a participant in education research.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>44. It is important for public school administrators and teachers to cooperate with those who would conduct research in the schools.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>45. Education research articles are presented at a technical level which I can usually grasp.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>46. The money spent by federal, state, and local governments to support education research is not justified by what the research has revealed about education.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>47. Education research studies with statistics are too complicated for me to use.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>48. It can be exciting to learn about the research that has been conducted on a problem in education.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>49. Knowledge of research methods can help a teacher detect possible strengths and weaknesses in education practice.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
<b>50. I would like to share research findings with my teaching colleagues.</b>
<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree

**APPENDIX C: UPDATED ATTITUDES TOWARD EDUCATIONAL  
RESEARCH SCALE (ATERS-19)**

Old	New	Item
5	1	<b>Education research has revealed important information about the teaching-learning process.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
7*	2*	<b>I have no desire to become involved in education research in the schools.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
15	3	<b>Education researchers are at the forefront of interesting new developments in education.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
16	4	<b>Teachers do not need to receive training in education research.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
17*	5*	<b>When preparing a new subject area for students, a teacher does not need to read the research articles available on that subject.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
18	6	<b>An understanding of the methods used by education researchers can help teachers take a more systematic approach to solving education problems.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
20	7	<b>The methods used in education research represent a logical way to obtain information about a problem in education.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
24	8	<b>Most innovations in education would not have occurred without the efforts of education researchers.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
25	9	<b>I would like to carry out some research in my own classroom.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
28*	10*	<b>I would prefer to work for a principal who does NOT have a commitment to doing research in his school.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree

32	11	<b>I feel that education researchers have discovered information that would be important in my teaching, if I know about it.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
33	12	<b>Being able to read a research article critically is a valuable skill for teachers to acquire.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
34	13	<b>Practice in developing research hypotheses can be useful to the teacher in coming up with possible solutions to problems faced in the classroom.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
37*	14*	<b>Education researchers can make data show whatever they want.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
40	15	<b>Education research has revealed important information about student learning.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
42	16	<b>There should be more opportunities for teachers to be involved in education research.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
43	17	<b>Teaching can be a more rewarding and interesting profession when the teacher is a participant in education research.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
46*	18*	<b>The money spent by federal, state, and local governments to support education research is not justified by what the research has revealed about education.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree
50	19	<b>I would like to share research findings with my teaching colleagues.</b>
		<input type="checkbox"/> Strongly disagree <input type="checkbox"/> Disagree <input type="checkbox"/> Neither agree nor disagree <input type="checkbox"/> Agree <input type="checkbox"/> Strongly Agree

\* Item was reverse-scored

## APPENDIX D: DEMOGRAPHIC SURVEY

**1. What grade level(s) do you teach?**

- Preschool
- Lower Elementary
- Upper Elementary
- Middle School
- High School

**2a. Are you licensed by the state for teaching students with special needs?**

- Yes
- No

**2b. Are you currently teaching students with special needs?**

- Yes
- No

**3. What subject do you teach for the majority of your teaching day?**

- English
- Mathematics
- Social Studies
- Science
- Foreign Language
- Art or Music
- Physical Education
- Career and Technical
- Bilingual/ESL/ESOL
- Other: \_\_\_\_\_

**4. What is your highest level of education?**

- Bachelor's degree
- Bachelor's plus 15 hrs
- Bachelor's plus 30
- Master's degree
- Master's plus 15
- Master's plus 30
- Doctorate
- Other Advanced Degree

**5. What was your field of study for your highest degree? \_\_\_\_\_**

**6. How did you become licensed as a teacher?**

- Undergraduate-level teacher education program
- Graduate-level teacher education program
- Alternative teacher certification program, such as Troops to Teachers, Teach for America
- I currently hold a provisional license.
- Other: \_\_\_\_\_

**7. What other certificates or endorsements do you possess?**

- National Board Certification
- Reading Specialist
- Math Specialist
- Science Specialist
- Technology Specialist
- Advanced Academic/GT Certification
- Other: \_\_\_\_\_

**8. a. Have you completed a graduate level education course in the last 3 years?**

- Yes
- No

**8. b. If yes, how often did you learn about education research and/or use it in the course?**

- None
- Rarely
- Occasionally
- Frequently

**9. a. Have you completed a professional development course in the last 3 years? (ex. County Academy class; not mandatory inservice courses)**

- Yes
- No

**9. b. If yes, how often did you learn about education research and/or use it in the course?**

- None
- Rarely
- Occasionally
- Frequently

**10. How else have you learned about education research findings that you can use in your classroom? Check all that apply.**

- School-sponsored inservices or workshops
- Another classroom teacher
- School administrator
- Reading of education journals or books (Please list titles below)
- Reading of subject-specific (not education) journals or books (If possible, list titles below)
- Other (please explain below)

Please list titles here: \_\_\_\_\_

**11. a. Have you ever participated in teacher research or action research?**

- Yes
- No

**11. b. If yes, how often do you participate in teacher research?**

- Rarely
- Occasionally
- Frequently

**12. Are you familiar with the What Works Clearinghouse (WWC)?**

- Yes, I have heard of it, and I have used this resource.
- Yes, I have heard of it, but I have never used this resource.
- No, I have not heard of this resource.

**13. How long have you been teaching?**

- 1-3 years
- 4-6 years
- 7-10 years
- 11-20 years
- 21 or more years

**14. What is your gender?**

- Male
- Female

**Would you be willing to be contacted for a follow-up interview on this topic for a future study? If yes, please enter your email address below:**

- No thanks.
- Yes, I am willing to be contacted. Here is my email address: \_\_\_\_\_

**Thank you for completing the survey. When you click “Submit” you will be connected to a separate page in which you may enter your name and email address in a drawing for a \$50.00 Amazon gift card. The data from your survey will remain confidential.**

**APPENDIX E: INFORMED CONSENT FOR PARTICIPANTS IN PANEL OF EXPERTS**

**Teachers' Attitudes Toward Education Research  
INFORMED CONSENT FORM**

**RESEARCH PROCEDURES**

You are invited to participate in a panel of experts as part of my dissertation research at George Mason University. This research is being conducted to investigate teachers' attitudes and beliefs about education research. If you agree to participate, you will be asked to participate in two small group discussions (3-5 participants) of approximately 2 hours each. The topic of the discussions will be teachers' attitudes toward education research and to share your opinion about the items on a survey on this topic. The researcher will take notes and with your permission will make an audio recording of these sessions.

**RISKS**

There are no foreseeable risks for participating in this research.

**BENEFITS**

There are no direct benefits to you as a participant other than to further research in teacher education and education research.

**CONFIDENTIALITY**

The data in this study will be confidential. You will not be identified by name or by any identifying characteristics in the written report for this research study. All notes and electronic audio recordings of the group meetings of the panel of experts will be stored in a locked cabinet and/or a password protected computer and destroyed at the conclusion of this study. While it is understood that no computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of the electronic data.

**PARTICIPATION**

Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you

or any other party. Any connection that you have with Fairfax County Public Schools or George Mason University will not be affected by your participation in this study.

**CONTACT**

This research is being conducted by Nancy Holincheck, a doctoral student at George Mason University. She may be reached via email at [nholinch@gmu.edu](mailto:nholinch@gmu.edu) for questions or to report a research-related problem. The faculty advisor for this study is Dr. Gary Galluzzo. He may be reached via email at [ggalluzz@gmu.edu](mailto:ggalluzz@gmu.edu). You may contact the George Mason University Office of Research Subject Protections at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

**CONSENT**

I have read this form and agree to participate in this study.

\_\_\_\_\_

Name

\_\_\_\_\_ I agree to audio taping.

\_\_\_\_\_ I do not agree to audio taping.

\_\_\_\_\_

Date of Signature

Version date: 10/2010

## **APPENDIX F: INFORMED CONSENT FOR ONLINE SURVEY PARTICIPANTS**

### **Teachers' Attitudes Toward Education Research INFORMED CONSENT FORM**

#### **RESEARCH PROCEDURES**

You are invited to participate in a survey as part of my dissertation research at George Mason University. This research is being conducted to investigate teachers' attitudes and beliefs about education research. You were selected to participate in this study because you have been and/or currently are engaged in teacher research. If you agree to participate, you will be asked to complete and submit the survey electronically. The survey responses will be confidential.

#### **RISKS**

There are no foreseeable risks for participating in this research.

#### **BENEFITS**

There are no direct benefits to you as a participant other than to further research in teacher education and education research.

#### **CONFIDENTIALITY**

The data in this study will be confidential. Survey responses will be confidential. You will only be asked to share your email address if you are willing to participate in a follow-up interview. If you provide your email address it will not be entered with the survey data in the database that will be used for analysis, and only the researcher will have access to the email addresses or original surveys. All survey data will be kept securely in my home. While it is understood that no computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of your transmission.

#### **PARTICIPATION**

Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party. Any connection that you have with Fairfax County Public Schools or George Mason University will not be affected by your participation in this study. All

teachers who participate in this study and complete a survey will be entered in a random drawing for an Amazon.com gift certificate. Ten \$50.00 gift cards will be awarded.

### **CONTACT**

This research is being conducted by Nancy Holincheck, a doctoral student at George Mason University. She may be reached via email at [nholinch@gmu.edu](mailto:nholinch@gmu.edu) for questions or to report a research-related problem. The faculty advisor for this study is Dr. Gary Galluzzo. He may be reached via email at [ggalluzz@gmu.edu](mailto:ggalluzz@gmu.edu). You may contact the George Mason University Office of Research Subject Protections at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

*The George Mason University Human Subjects Review Board has waived the requirement for signing the consent form. However, if you would like to sign consent, please contact Nancy Holincheck or Gary Galluzzo at [nholinch@gmu.edu](mailto:nholinch@gmu.edu) or [ggalluzz@gmu.edu](mailto:ggalluzz@gmu.edu).*

Version date: 2/2011

## **APPENDIX G: EMAIL SCRIPTS**

### **Script for email to participants four days before opening survey:**

Hi,

My name is Nancy Holincheck. I am a Physics teacher at Chantilly High School and a doctoral student in Education at George Mason University. I am writing to request your participation in my dissertation research. Later this week you will receive an email from me with a link to an online survey that will take approximately 15-20 minutes to complete. The survey is completely confidential. Neither your administrators nor I will know whether you participate, and your answers cannot be linked to your name in any way.

You are not required to complete the survey, but I am hoping that you will, as that will strengthen the quality of the study. I will not be able to complete my dissertation without your help.

If you complete the online survey and submit your email address at the end of it (a separate link), then your email address will be placed in a drawing for one of the ten \$50 Amazon gift certificates. Thanks for reading this email—please be on the lookout for my next email with the link to the survey.

Thanks again.

Nancy Holincheck

**Script for email requesting participation in online survey:**

Dear Teacher,

Thank you for reading this email and participating in the online survey. When you are ready to complete the survey please follow the link below. The online survey should take approximately 15-20 minutes to complete.

**<http://websurvey.gmu.edu/survey/entry.jsp?id=1291395375662>**

Your name and email address will not be connected in any way to the survey. Your responses will be completely confidential. At the end of the survey you will be given the option to follow a separate link to enter your email address in a drawing for an Amazon gift certificate. Ten \$50 Amazon.com gift certificates will be awarded.

If you have any questions please contact me at [nholinch@gmu.edu](mailto:nholinch@gmu.edu). Thank you.  
Nancy Holincheck

**Script for postcard, attached to small package of M&M's and placed in teachers' school mailboxes:**

**THANK YOU FOR YOUR HELP!**

I am a teacher at Chantilly High School and am asking for your help in filling out a survey for my dissertation research. The survey is online and should take you 15-20 minutes to complete. Your answers will be confidential. Survey participants who complete the survey will be entered in a drawing for one of ten \$50.00 Amazon gift certificates.

You should have received an email with the link below, but if not you can enter the web address in your browser:

**<http://websurvey.gmu.edu/survey/entry.jsp?id=1291395375662>**

If you have already filled out the survey, then thank you!

Please enjoy these M&M's as a thank you in advance for participating. If you have any questions, please email me, Nancy Holincheck, at [nholinch@gmu.edu](mailto:nholinch@gmu.edu).

**Script for follow-up email requesting participation in online survey:**

Dear Teacher,

This email is a final reminder requesting your participation in the online survey for my dissertation. The survey will closed in one week, at midnight on February 28. The survey will take 15-20 minutes to complete, your responses will be confidential, and when you complete the survey you are eligible for a drawing for one of ten \$50 Amazon.com gift cards.

Thank you to those of you who have already completed the survey. I appreciate your help.

If you have not completed the survey but are ready to, please follow the link below.

**<http://websurvey.gmu.edu/survey/entry.jsp?id=1291395375662>**

Thank you again,  
Nancy Holincheck

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## REFERENCES

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## **CURRICULUM VITAE**

Nancy Holincheck was born in Western New York and graduated from Williamsville East High School in East Amherst, NY. She received her Bachelor of Science in Physics from The College of William and Mary in 1997 and her Master of Science in Applied and Engineering Physics from George Mason University in 2003. A National Board Certified Teacher, she has taught physics in Fairfax County, Virginia for nine years. Nancy has also taught teacher research courses as an adjunct professor in the Graduate School of Education at George Mason University.