Educational Research and Reviews Vol. 5 (12), pp. 758-769, December 2010
Available online at http://www.academicjournals.org/ERR
ISSN 1990-3839 © 2009 Academic Journals

Full Length Research Paper

An exploratory study on measuring educators' attitudes toward educational research

Mehmet Ali Ozturk

Department of Curriculum and Foundations, Cleveland State University, Cleveland, OH, U.S.A.
Department of Computer Education and Instructional Technologies, Bahcesehir University, Istanbul, Turkey.
E-mail: m.ozturk@csuohio.edu. Tel: 90 – 212 – 381 0303.

Accepted 27 October, 2010

This article reports a study intended to develop a scale that measures attitudes of PreK-12 in-service educators toward educational research. A major part of the study was an exploratory factor analysis of the Educators' Attitudes Toward Educational Research Scale. The scale was given to 193 PreK-12 in-service educators (teachers, school counselors, school psychologists, etc.) working at schools in a big mid-western city in the US. The original scale had 40 Likert-type items intended to measure eight dimensions of the construct (five items for each). Based on the results, some items were eliminated; however, the revised scale could still measure all eight dimensions with at least three items each. At the time of data collection, focus groups were held with some of the respondents to discuss the scale. Comments from the focus groups matched highly with the statistical results in identifying the malfunctioning items in the original scale. Since there were no established variables in the literature to serve as measures of criterion-related validity of measurement of attitudes toward educational research, data were collected on a number of variables predicted to be correlates of this construct. To examine which ones might serve as criterion variables, analyses were performed to correlate these variables with factor scores from the Educators' Attitudes Toward Educational Research Scale.

Key words: Educational research, teacher attitudes, factor analysis, scale development.

INTRODUCTION

Applying educational research to everyday practices in classrooms and schools is difficult for a number of reasons. First, complexities of educational research make it one of the most difficult sciences. For example, unlike natural sciences, many variables in education cannot be studied under strict control, which brings about limited generalizability due to the unique effects of contexts on their respective populations (Berliner, 2002). Secondly, there has usually been limited utilization of research in educational practice (Bracey, 1998; Levine, 2007). Thirdly, practitioners have generally held mostly negative perceptions about educational research (Isakson and Ellsworth, 1978; Levine, 2007). Fourthly, attitudes of students in educational research courses toward educational research have generally been negative (Isakson and Ellsworth, 1979; Onwuegbuzie et al., 2000). All of the aforementioned issues are, either directly or indirectly, related to attitudes toward educational research. It also follows that, in order to effectively study these issues, we need to measure this variable successfully.

However, there has not been much work in this direction. Although there are several instruments that measure practitioners' or students' attitudes toward educational research, which were developed by researchers for their specific studies and/or populations (West and Rhoton, 1994; Richardson and Onwuegbuzie, 2002; Papanastasiou, 2005), only one instrument intended for broader use could be located. Attitudes Toward Educational Research Scale (ATERS) was developed by Isakson and Ellsworth (1979) to measure teachers' attitudes toward educational research. After their work, which was more than a quarter of a century ago, there has not been any published research either to develop a new instrument or to improve or revalidate the existing ones. Besides, for an effort to develop an instrument

measuring educators' attitudes toward educational research, there is an additional motive brought about by recent legislation that started with No Child Left Behind (NCLB) Act of 2001. In line with the need for sound research, followed by successful implementation of research findings to tackle the many challenges faced by the practice of education today, NCLB put much emphasis on scientifically based research and evidence-based practices to be employed in schools (Levine, 2007). Such language implies that educational research will have more weight in daily practices of educators and that educators should wisely use research findings. From the perspective of educators, this brings about an additional burden of making oneself more knowledgeable in research methods and even applying these methods in their schools/classrooms to improve their practices. Therefore, the effect of NCLB and practices thereafter on every aspect of educators' attitudes toward educational research is yet to be seen. By the same token, any effort to develop an instrument measuring this construct should consider the changing environment and climate in schools due to recent legislation. This also means that even if there were measurement instruments that once measured this construct effectively, they would need to be revalidated for the new circumstances. In other words, the need for such an instrument has been magnified by the recent emphasis on educational research.

An attempt was made to fulfill this need through the research study reported in this article. To begin with, a scale (namely, Educators' Attitudes Toward Educational Research Scale) with eight subscales thought to represent eight different dimensions of educators' attitudes toward educational research was created. The study's approach had been that each subscale could produce reliable and meaningful information about a different dimension of educators' attitudes toward educational research. It is thought that such a scale could be used by educational administrators, policymakers and researchers to assess attitudes of individuals or groups of educators. These assessments could provide valuable information in identifying individuals' or groups' misperceptions about or incorrect approaches to educational research. Such information, in turn, could be used in designing a variety of policies and practices aimed at improving educators' attitudes toward educational research, including but not limited to in-service training programs for educators, mentoring programs for the newly hired and policies encouraging informed use of educational research. The scale was designed for all PreK-12 in-service educators such as teachers, school psychologists and school counselors, with the thinking that all these educators are potential producers and/or consumers of educational research.

The present article provides results of an exploratory factor analysis on this scale. Additional findings from focus groups held with some of the respondents and from correlational analyses to explore the relationship of educators' attitudes toward educational research with several demographic and career-related variables that are predicted to be correlates of this variable were also reported.

METHOD

Development of the Educators' Attitudes Toward Educational Research Scale

While developing the instrument, the study benefited from the experiences of the author as an instructor of educational research. In addition, it benefited from two sources. The first one was the Attitudes Toward Educational Research Scale (ATERS) that was developed by Isakson and Ellsworth (1979), while the second one was a scale developed by West and Rhoton (1994) intended to measure attitudes toward research held by superintendents, supervisors and principals of the public schools in Tennessee.

One could ask why the study preferred not to combine the aforementioned existing scales and decided to create a new one. First, there were no complete reports on the measurement characteristics of these two instruments, in that both articles that mentioned these instruments mainly discussed the findings around some research hypotheses. Therefore, there was little or no information about the validity and reliability of the instruments. Secondly, the target population for West and Rhoton's (1994) scale was superintendents, supervisors and principals; hence, the wording of items was done accordingly. Thirdly, based on the author's own experiences and observations, it was necessary to delete some dimensions in these instruments and add new ones. All of these reasons in combination led the author to create a new scale rather than combine the existing ones. Educators' Attitudes Toward Educational Research Scale ended up having eight different subscales measuring the following dimensions of the variable:

1. Whether educators value training in educational research.
2. Whether educators believe that those who keep up with research are better educators.
3. Whether educators value doing research in their classrooms/schools.
4 Whether educators believe that research findings are applicable to real life contexts.
5. Whether educators believe that research reports are understandable.
6. Whether educators believe that they have time and resources to make use of research findings.
7. Whether educators incorporate their own research in their practices.
8. Whether educators invest time and effort in learning about research findings.

Another legitimate inquiry about the development of the scale would be to ask why two subscales measuring 'actual practices' (7^{th} and 8^{th} dimensions previously listed) were included in a scale measuring 'attitudes' toward educational research. Although there was an awareness that the higher the number of components, the more difficult it would generally be to have differentiation among the components, the study still included these two components due to three reasons. First, even though these dimensions seem as if they can be directly measured (that is, they are not constructs), it is still thought that there is an underlying mindset for each of these two sets of activities. Therefore, each of these two subscales has been thought to represent these mindsets. Secondly, it is thought that a significant percentage of studies relating attitudes toward educational research to other variables would also be interested in measuring the actual practices either directly for their research hypotheses or indirectly for descriptive purposes. The third reason

was the study's intent to provide evidence for discriminant validity by showing that the scale could differentiate between attitudes and actual practices. On a side note, it is thought to be safe to include these subscales, thinking that researchers using this measurement instrument could exclude any of the subscales they deemed unnecessary in their own studies.

There were 40 items on the scale with five items for each of the eight subscales. The items were on a Likert scale, with five choices ranging from 'strongly agree' (coded as 1) to 'strongly disagree' (coded as 5). To avoid response patterns, 28 items were positively phrased and 12 were negatively phrased. Besides, sequencing of items was mixed, that is, items measuring the same dimension were not located on the scale one after another.

Measurement of demographic and career-related variables

In addition to these 40 items, a number of demographic and career-related variables have also been measured. The variables on which data were collected only for descriptive purposes in the present study included gender, employment status (full-time/part-time/substitute) and the type of school where the respondent worked (public/private/charter).

Data were collected on four more variables to examine whether they might serve as criterion variables in criterion-related validity of measurement of educators' attitudes toward educational research. Typically, evidence for criterion-related validity of a scale is provided in the form of meaningful correlations of scores from the scale with variables that are well-established correlates of the variable that the scale is supposed to measure (Pedhazur and Schmelkin, 1991). Even though the study wanted to check the criterion-related validity of the Educators' Attitudes Toward Educational Research Scale, it could not find in the literature any variable that has been consistently shown to be related to attitudes toward educational research. Although relationships between this variable and a number of other variables have been investigated [for example, knowledge of educational research (Napier, 1978/1979; Isakson and Ellsworth, 1978)], the study still did not come across any well-established correlations in the literature to serve as a measure of validity of the scale.

In the absence of such well-established correlations, data were collected on four variables that were thought to correlate with educators' attitudes toward educational research to see if they might serve as criterion variables. It should be kept in mind that this was purely exploratory and not for the purpose of providing evidence of criterion-related validity of the Educators' Attitudes Toward Educational Research Scale.

Three of these four variables were age, years of teaching/school services experience and the number of research methods courses taken in education and in other social sciences (such as psychology). Finally, respondents were asked to rate themselves on a five-point scale from 1 (not at all) to 5 (very much) in terms of how much they use books, academic journals and Internet sites of well-established institutions/organizations to learn about educational research findings. Separate ratings were requested for these three sources of educational research findings. The fourth variable was the sum of these three ratings. There are other sources from which one can learn about educational research findings, such as TV/radio or in-service training programs; however, the selected three sources require that the individuals deliberately seek and explore them with their free will, which can really be associated with positive attitudes toward educational research. In contrast, one might simply come across research findings on TV while having dinner, without having to put any effort to learn about these findings, or educators might be required, regardless of their will, to attend in-service training programs, where they can learn about research findings. These haphazard or mandatory encounters with educational research findings might be difficult to relate to positive attitudes toward educational research. In other words, it is thought that if there is any correlation to be found between attitudes toward educational research and intensity of use of sources to learn about educational research findings, then these three sources would be the best to look at.

Data collection

Data were collected from educators of grades PreK-12 who worked in a school at the time of data collection. The term 'educator' was used to include teachers as well as school services personnel, such as school counselors, administrators, speech and hearing specialists and school psychologists. These educators were students in Master's level education courses in the Fall 2005 or Spring 2006 semester in a state university at a Midwestern urban location. All the data were collected after the approval of the university IRB. To maintain anonymity, respondents were asked not to put any personal information on the scales. A total of 193 educators filled out the scale. Even though the adequacy of the sample size depends on a number of factors (such as the magnitude of communalities) (Henson and Roberts, 2006), the sample size in this study was only a few less than the minimum of 5 respondents per variable (5 x 40 = 200 in this study) suggested by Stevens (1996).

Male educators made up 23% of the sample, while females made up 77%. The average age of respondents was 32 with a standard deviation of 8.6 (min = 22; max = 57). About 83% of the respondents were full-time educators, 6% were part-time and 10% were substitutes. Among the 140 valid responses for the number of research methods courses taken in education and in other social sciences (such as psychology), 31% indicated that no research methods courses were taken at all; 24% indicated only one course; 24% two courses; 13% three courses; 6% four courses and 1% five courses. The average number of years of teaching/school services experience was 5.4 with a standard deviation of 4.1 (min = 1; max = 27). About 75% of the respondents worked in a public school, 8% in private schools and 10% in charter schools. The remaining 7% marked "other" for the type of school at which they work.

At the beginning of the Spring 2006 semester, focus groups were also held with a number of educators, after they filled out the scale. After explaining the purpose of the entire study in general, and of the focus group in particular, the structure of the scale was explained, that is, the eight subscales and items were explained for each. Then, each item was discussed with these educators as to whether they understood what the item meant and whether the item measured the dimension it was assigned to. Also, they were asked whether they thought there was an overlap between any two subscales and any additional dimensions of the variable they could think of.

Fundamentally, focus groups can be used for a variety of research purposes (Morgan, 1997). When combined with other methods, it can also be used for scale development (Morgan, 1997; Vogt et al., 2004). More specifically, one can find in the literature examples of how focus groups have been used for developing scales (Wolff et al., 1993), improving scales (O'Brien, 1993) and adapting scales to new populations (Fuller et al., 1993). However, combining focus groups with other methods for the purpose of scale development has been limited (Vogt et al., 2004). In this respect, the present study can be seen as a rare example of this practice.

Data analysis

There were no non-responses for any of the 40 items. After data entry, reverse coding was done for some of the items so that higher scores indicated a more positive attitude/perception for all items. Then, exploratory factor analysis was performed using SPSS 16.0

(SPSS Inc., 2007). Exploratory factor analysis is for "…exploring the relationships among measured variables and trying to determine whether these relationships can be summarized in a smaller number of latent constructs" (Thompson, 2004, p. 10).

Principal components analysis was used as the extraction method. While there has been a long heated debate over the use of principal components analysis versus principal axis factoring as the appropriate factor extraction method in exploratory factor analysis (Thompson, 2004), both have been used by researchers (Henson and Roberts, 2006). Correlation matrix was analyzed. Following Fabrigar et al. (1999) recommendation that, even when the correlations among components are negligibly low, researchers should run an oblique rotation, an oblique (Promax with a Kappa of 4) rotation was applied. Finally, the internal consistency reliability coefficients (Cronbach's alphas) were calculated for each component, using the item scores of the items measuring each component.

Comments from the focus groups were also analyzed and wording of items was scrutinized in light of these comments. Data from focus groups were also compared with the statistical results to see how much they agreed.

To explore the potential of four variables (age, number of years of teaching/school services experience, number of research methods courses taken in social sciences and the intensity of use of books, academic journals and Internet sites of well-established institutions/organizations to learn about educational research findings) to serve as criterion variables in criterion-related validity of measurement of educators' attitudes toward educational research, component scores of respondents were first calculated for each of the eight subscales. Component scores are calculated based on loadings of items on each component. While an alternative to component scores was factor-based scales (mostly calculated as the sum of points on items assigned to a component), both have been used by researchers (Pedhazur and Schmelkin, 1991). After calculating the component scores, the relationships between each of the components and the four measured variables were studied.

RESULTS

Exploratory factor analysis

At the first step, using the 'eigenvalue greater than one' criterion and an oblique (Promax) rotation, the analysis with 193 cases on all 40 items generated eleven components, explaining 65% of the total variance. Then, each item was assessed in terms of the following criteria: (1) whether it has a loading of greater than or equal to 0.50 on the dimension it is intended to measure, while having no loadings of greater than or equal to 0.50 on other dimensions (as an indicator of simple structure); (2) whether there are at least two other items that measure the same dimension and meet the first criterion (as an indicator of strength and stability of extracted components) (Costello and Osborne, 2005). The items which did not meet the criteria were eliminated. In this way, 11 items were removed from the scale and 29 were retained.

The same analysis was, then, rerun with these 29 well-behaved items (Table 1 shows items, loadings, eigenvalues and percentage of variance accounted for by each component in the second analysis). Using the 'eigenvalue greater than one' criterion, this analysis yielded eight components (same as the number of dimensions intended to be measured), explaining the same percentage (65%) of the total variance in the reduced dataset. In other words, this second analysis with fewer items was as successful in explaining the variance in the dataset as the first one, indicating the parsimony of the revised scale. All the items had loadings of greater than or equal to 0.50 (only one has a loading of 0.490) on the dimensions they were intended to measure, but none except one of the items had loadings greater than or equal to 0.50 on the dimensions they were not intended to measure. Following Thompson's (2004) recommendation that the criteria to retain or eliminate items should not be used with excessive rigidity, that item was also retained because it cross-loaded on only one of the other components, which is less of a problem compared to loadings on multiple other components. Also, there was no negative feedback from the focus groups about the wording or the assignment of this item to its intended dimension. In summary, a simple structure was also achieved in this analysis. Finally, there were at least three items per component, indicating the strength and stability of extracted components. It should be noted that it will also be important to have at least three items per component in a future confirmatory factor analysis of the revised scale (Bollen, 1989).

Internal consistency reliability coefficients (coefficient alphas) of scores were calculated for the extracted components (Table 1 shows reliability coefficients). While five of the eight reliability coefficients were above the most commonly used acceptability threshold of 0.70, two were around 0.65 and only one had a value of 0.477. Finally, the reliability coefficient of scores on all 29 well-behaved items was 0.861. Nunnally (1967) states: "In the early stages of research on predictor tests or hypothesized measures of a construct, one saves time and energy by working with instruments that have only modest reliability, for which purpose reliabilities of 0.60 or 0.50 will suffice" (p. 226). Therefore, the reliability coefficients which were below 0.70 can be viewed as acceptable in this exploratory work.

Since an oblique rotation was performed, correlations among components were also calculated (Table 2 shows component correlation matrix). While 20 of the 28 correlations among the eight components were statistically significant ($p<0.05$), some of the statistically significant correlations were not high enough to signify a meaningful relationship. The correlations that can be considered high enough indicate relationships that can be anticipated, even though there were no a priori hypotheses about the magnitudes of these correlations. As an example, the highest correlation (0.379) which is between the component "whether educators believe that research findings are applicable to real life contexts" and the component "whether educators believe that those who keep up with research are better educators" can easily be

Table 1. Factor loadings of the well-behaved items with an oblique (Promax) rotation

	Factor loadings (pattern matrix coefficients)							
Item	**Component 1 (value training in educational research)**	**Component 2 (belief that they have time and resources to make use of research findings)**	**Component 3 (belief that research reports are understandable)**	**Component 4 (incorporate doing their own research in their practices)**	**Component 5 (invest time and effort in learning about research findings)**	**Component 6 (belief that research findings are applicable to real life contexts)**	**Component 7 (belief that those who keep up with research are better educators)**	**Component 8 (value doing research in their classrooms/ schools)**
Educators can achieve a better understanding of research findings through training in research methods. (R)*	0.820**	0.066	-0.084	-0.020	-0.096	-0.095	0.104	-0.092
Training in educational research can improve educators' skills to do research in their fields. (R)	0.745**	-0.069	-0.133	0.032	0.026	0.126	-0.005	0.098
Training educators in research methods is one way to improve the quality of education in schools. (R)	0.620**	-0.067	-0.037	0.099	0.176	0.188	-0.042	0.122
Training in educational research can help educators improve their practice. (R)	0.606**	0.068	0.014	-0.077	-0.024	0.116	0.231	-0.064
Training in educational research may help educators make more informed decisions in their practices. (R)	0.560**	-0.047	0.084	0.023	0.032	0.173	0.220	0.099
My school provides me with easy access to academic journals. (R)	0.091	0.856**	-0.015	-0.129	0.066	0.017	-0.196	-0.123
Administrators in my school put money aside for research-related activities. (R)	-0.071	0.791**	-0.019	-0.073	-0.086	0.034	-0.108	0.243
My school administration encourages me to read research. (R)	-0.070	0.745**	0.017	0.081	-0.041	0.002	0.239	-0.029

Table 1. Continues

My administrators provide me with the time and the resources for research. (R)	0.109	0.711**	-0.028	-0.016	0.053	-0.067	-0.036	0.018
My administrators encourage me to engage in research-related activities. (R)	-0.099	0.628**	0.000	0.216	0.068	0.042	0.118	0.019
Research reports present their findings in a confusing manner.	-0.104	-0.054	0.857**	0.017	-0.014	0.134	0.094	-0.085
I would read more research reports if they were easier to understand.	-0.152	-0.074	0.814**	-0.050	-0.074	-0.241	0.061	0.096
Research reports are often too difficult to understand.	0.042	0.040	0.765**	0.030	0.069	0.099	-0.068	0.057
Research terminology makes research reports too technical.	0.025	0.049	0.763**	-0.007	0.077	0.217	-0.115	-0.003
I systematically collect and record data in my classroom/school. (R)	-0.186	0.034	0.048	0.833**	0.083	0.077	0.015	0.000
I collect my own data in my classroom/school to assess/revise my practice. (R)	0.062	0.005	0.019	0.827**	-0.095	-0.171	0.086	0.096
I keep a log for my observations in my classroom/school. (R)	0.143	-0.057	-0.078	0.797**	0.043	0.039	-0.226	-0.041
I use every means to update myself about research in my field. (R)	0.015	0.120	-0.031	-0.010	0.791**	0.066	-0.010	0.002
I regularly visit professional websites to learn about latest developments in my field. (R)	0.146	-0.051	0.072	0.093	0.779**	-0.144	-0.051	-0.020
I regularly read academic journals in my field. (R)	-0.177	-0.018	0.002	-0.078	0.734**	-0.003	0.414	-0.002

Table 1. Continues

Professors/researchers who do research do not really know the conditions in schools.	0.128	-0.001	0.094	-0.023	-0.011	0.790**	-0.196	-0.231
Most educational research findings are not applicable in schools.	0.082	0.031	0.110	-0.053	0.088	0.566**	0.017	0.147
Recommendations made in research reports are not realistic.	0.226	0.029	0.063	0.070	-0.308	0.546**	0.312	-0.108
Reading research can provide insight into issues regarding one's practice. (R)	0.200	-0.036	0.015	-0.012	-0.064	-0.101	0.728**	0.197
Educators who keep up with research in their fields tend to be better educators than those who do not. (R)	0.138	-0.049	-0.030	-0.079	0.231	0.025	0.635**	-0.014
Reading research is an effective means to become a successful educator. (R)	0.476	0.031	-0.024	-0.006	0.086	-0.136	0.490**	-0.122
Observations made in classrooms/schools are of little use to shape one's practice.	0.000	0.070	0.043	0.075	0.003	-0.140	0.140	0.756**
Educators can learn very little by doing their own research in their classrooms/schools.	-0.204	-0.064	-0.199	-0.045	-0.003	0.560**	0.059	0.584**
Careful analysis of their own classroom/school experiences is an important learning experience for educators. (R)	0.452	0.052	0.184	-0.058	-0.044	-0.154	-0.100	0.537**
Eigenvalues	6.631	2.930	2.469	1.825	1.405	1.294	1.226	1.043
% of variance	22.865	10.102	8.514	6.293	4.845	4.463	4.229	3.598
Reliability coefficients (Cronbach's alphas)	0.835	0.816	0.820	0.756	0.753	0.639	0.658	0.477

*(R) indicates that the item was reverse-coded. ** Factor loadings over 0.50.

expected, since one can hold the second belief only when he/she thinks positively about the first. However, substantive and holistic interpretation of relationships among the components can only be made within a theoretical framework where the hypothesized relationships (including the mediating and/or moderating variables) between components are specified and tested. This is beyond the scope of the present study and perhaps, such a study should even follow a confirmatory factor analysis to cross-validate the scale on a different sample.

Feedback from focus groups

As a source of qualitative data, focus groups held with some educators who filled out the scale helped the study to realize the problems in the wording of some items in the original scale. In fact, there was a big overlap between the comments made by participants in these focus groups and results from statistical analyses in the sense that items perceived to have poor/awkward wording did not perform well in statistical analyses and were eliminated from the scale.

The following are a couple of examples as to how comments from focus group participants were in accordance with the statistical results for the poor items. For example, the item in the original scale "Educators can easily apply most research findings in their classrooms/schools" was supposed to measure whether educators believe that research findings are applicable to real life contexts. The people in focus groups stated that the expressions "easily apply" and "most research findings" combined made this item an easily disagreeable statement. The item in the original scale "I collaborate with my colleagues for large-scale research in my school/school district" was supposed to measure whether educators incorporate doing their own research in their practices. It specifically asked about educators' collaborations with their colleagues for large-scale research in their schools/school districts. Educators in the focus groups indicated that, unlike other items measuring the same dimension, large-scale research was beyond the control of individual educators and that there might be many factors limiting collaboration in this type of research endeavor. Finally, the item in the original scale "I discuss new research findings in my field with my colleagues" was supposed to measure whether educators invest time and effort in learning about research findings, but the participants of the focus groups stated that the educators in today's schools might not have the time to discuss new research findings with their colleagues. They added that, while other activities mentioned in the other items for the same dimension could be done individually, this item asked about an activity that required multiple people meeting during school time.

While the practice of analyzing qualitative data from focus groups along with performing an exploratory factor analysis on quantitative data is rare (Vogt et al., 2004), it proved quite useful as a form of triangulation in the present study. In view of the fact that the focus groups were carried out before the statistical analyses, it is surprising to see how statistical results agreed with the comments from the focus groups.

Correlations of eight components with demographic and career-related variables

Another set of findings in the present study is the correlations between component scores of eight components extracted and four variables predicted to be correlates of educators' attitudes toward educational research. As explained before, no well-established correlates of attitudes toward educational research could be found; therefore, all the correlations reported here should be seen as results of exploratory work. The first correlation was between the component scores and the age of the respondent and none of the eight bivariate correlations was statistically significant at the 0.05 level.

The second variable was the number of years of teaching/school services experience of the respondent, and only the component "whether educators believe that research findings are applicable to real life contexts" had a barely significant ($p = 0.043$) negative correlation ($r = -0.147$) with it. Since this correlation is low and barely significant, it indicates a very weak relationship and does not warrant any substantive interpretation.

The third variable was the number of research methods courses taken in social sciences, and there was no correlation between this variable and any of the eight components. Similarly, there was no mean difference in terms of any of the eight components between educators who have never taken any research methods courses and those who have taken at least one.

The fourth variable was the intensity of use of three sources to learn about educational research findings. Respondents were asked to rate themselves on a five-point scale from 1 (not at all) to 5 (very much) in terms of how much they use books, academic journals and Internet sites of well-established institutions/organizations to learn about educational research findings. Separate ratings were requested for these three sources of educational research findings. The fourth variable was the sum of these three ratings.

While all but one of the bivariate correlations between the fourth variable and the component statistically significant at the 0.01 level, they were not high in magnitude (Table 3 shows correlation

Table 2. Component correlation matrix.

Component	Component 1 (value training in educational research)	Component 2 (belief that they have time and resources to make use of research findings)	Component 3 (belief that research reports are understandable)	Component 4 (incorporate doing their own research in their practices)	Component 5 (invest time and effort in learning about research findings)	Component 6 (belief that research findings are applicable to real life contexts)	Component 7 (belief that those who keep up with research are better educators)	Component 8 (value doing research in their classrooms/schools)
2	0.128							
3	0.221**	0.127						
4	0.214**	0.218**	0.040					
5	0.248**	0.366**	0.177*	0.316**				
6	0.334**	0.160*	0.211**	0.177*	0.221**			
7	0.302**	0.252**	0.190**	0.186**	0.225**	0.379**		
8	0.170*	0.060	0.080	0.050	0.091	0.165*	0.076	1.000

*Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

coefficients). Yet, they can still be evaluated in terms of their relative standing. From this perspective, it was good news that the highest correlation (0.628) was with the most relevant component (the component measuring whether the respondent invests time and effort in learning about research findings). It was also good to see that the only nonsignificant correlation (0.077) was with the least relevant component (the component measuring the value assigned to 'doing research', not 'learning about research findings'). Among the correlations in-between, perhaps the most encouraging one was the second highest (0.380) with the component measuring whether the respondent values training in educational research. It is interesting that this relationship was at least as strong as the one with the component measuring whether the respondent believes that he/she has time and resources to make use of research findings (0.305), the one with the component measuring whether the respondent thinks that research findings are applicable to real life contexts (0.322) and the one with the component measuring whether the respondent believes that research reports are understandable (0.187). It would be safe to say that the three components listed in the previous sentence could have been perceived and/or presented by educators as excuses to not put any effort to learn about research findings. Particularly, as a professor of educational research, it is encouraging to see that the value assigned to training in educational research was as important as the three components in the efforts to learn about research findings. The remaining two correlations were with the component measuring whether the respondent believes that those who keep up with research are better educators (0.266) and with the component about respondents' doing their own research in their practices (0.225).

As explained before, there are various sources to learn about research findings other than the three used in this analysis. In this respect, the correlations presented reflect the relationship of the components with the intensity of use of only these three specific sources. As a concluding remark, the fourth variable did not exhibit much potential to serve as a criterion variable in the measurement of the dimensions of educators' attitudes toward educational research, at least when this variable and the dimensions were measured in the way presented in this article.

DISCUSSION

The present study can be seen as a first step towards developing a scale that measures educators' attitudes toward educational research. It can be said that three sets of analyses were performed. The first set was about the exploratory factor analysis. The second was about the analysis of qualitative data that came from focus groups with some of the respondents. The third one was about some further exploratory work to examine a

Table 3. Correlations of eight components with the intensity of use of books, academic journals and Internet sites of well-established institutions/organizations to learn about educational research findings.

	Component 1 (value training in educational research)	Component 2 (belief that they have time and resources to make use of research findings)	Component 3 (belief that research reports are understandable)	Component 4 (incorporate doing their own research in their practices)	Component 5 (invest time and effort in learning about research findings)	Component 6 (belief that research findings are applicable to real life contexts)	Component 7 (belief that those who keep up with research are better educators)	Component 8 (value doing research in their classrooms/ schools)
Intensity of use of sources	0.380*	0.305*	0.187*	0.225*	0.628*	0.322*	0.266*	0.077

* Correlation is significant at the 0.01 level (2-tailed).

number of predicted correlates of educators' attitudes toward educational research.

Regarding the first set of analyses, the results were satisfactory in the sense that all dimensions were measured successfully by at least three items in the revised scale. In addition, this was achieved with perfect differentiation of subscales from each other despite the fact that it is very difficult to reach such a solution in an exploratory factor analysis with eight components. As explained before, two subscales were intended to measure the 'actual practices' around educational research. In addition to the six components related to 'attitudes' toward educational research, these two dimensions were also successfully measured. This can be seen as evidence of discriminant validity of the scale since it can differentiate between 'attitudes' and 'actual practices'. Five of the eight components reached the most commonly used acceptability threshold of 0.70 in reliability and the remaining three coefficients which were below 0.70 were still acceptable for such an exploratory study at its early stages as the present one (Nunnally, 1967).

Furthermore, these statistical results should be evaluated in light of two facts. First, the wording of the items was longer than that of many other scales some of which have items made up of three or four words. Such short wording makes it much easier to reach desirable statistical results in terms of validity and reliability at the expense of not receiving thoughtful responses from the respondents. A second feature of the scale was that it had both negatively and positively worded items that avoided response patterns. Having all items worded in the same direction can easily cause response patterns where the respondent tends to give the same response to all or most items without giving much thought, and this may generate artificially high measures of validity and/or reliability. In other words, the ability of the scale in this study to elicit quality responses from respondents was not sacrificed to artificially high measures of validity and/or reliability.

The second set of analyses that provided feedback from the focus groups made the study stronger. Data from focus groups explained why some items in the original scale did not function well in the statistical analyses. In this way, removal of these items did not have to be based only on statistical results that are heavily influenced by sampling error. In other words, such high level of agreement between the outcomes of the focus groups and the statistical results served as a form of triangulation. In this respect, researchers can see the present study as a successful example of application of both qualitative and quantitative methods in the same study for the purpose of triangulation.

The third set of analyses was aimed at examining some predicted correlates of educators' attitudes toward educational research. In the absence of well-established correlates to serve as criterion variables in criterion-related validity of the scale, such analyses were undertaken as exploratory work to provide future researchers with some preliminary findings that relate attitudes toward educational research to a number of variables. Three of the four variables examined were age of the respondent, the number of years of teaching/school services experience of the respondent and the number of research methods courses taken in social sciences. While all three can be thought to be influential on educators' attitudes toward educational research, none of them were found to be related to attitudes. The fourth variable, which is the intensity of use of books, academic journals and Internet sites of well-established institutions/organizations to learn about educational research findings, can be thought to be influenced by attitudes toward

educational research. While seven of the eight components had statistically significant correlations with this variable, none of these correlations were high in magnitude. In summary, none of the variables examined in the third set of analyses appeared as significant correlates of educators' attitudes toward educational research.

Conclusions

To conclude, the study has been successful in reaching its objectives. After an exploratory factor analysis with revisions to the original scale, it has been shown that the revised scale could measure all eight dimensions of educators' attitudes toward educational research that were intended to measure. Substantively, this means that the study provided at least an initial understanding that educators' attitudes toward educational research should be conceived with all these eight dimensions and that these dimensions can be differentiated from each other when it comes to their measurement. In addition to the results from the exploratory factor analysis, feedback from focus groups has been used. Through the high level of agreement between the feedback from focus groups and the results from the exploratory factor analysis, the study has been strengthened. Finally, several variables have been explored in terms of their relationship with these eight dimensions. While none of the variables examined were considerably related to educators' attitudes toward educational research, the findings can still be seen to have added to our knowledge base on the topic with scarce previous research.

Since this study was mostly a measurement study, generating and testing theories or hypotheses about the nature of relationships between dimensions of attitudes toward educational research or about this variable's relationship with some other variables was not aimed. Therefore, all the correlational analyses presented in this article should be seen as preliminary work for such theoretical research. On the other hand, the area of educators' attitudes toward educational research holds much potential for future research. The following are four topics which solicit for further research: (1) the relationships between dimensions of attitudes toward educational research, (2) the mechanisms through which these attitudes influence actual practices around research, (3) the interaction among attitudes, actual practices, the demographic characteristics of educators and the conditions in schools or other educational settings and (4) stability of these attitudes over time or their potential for change through educators' activities, such as attending professional development on research and data use. If educational research is to become an influential part of practice in the world of education, all the unknowns have to be investigated. Needless to say, such research will have to be theory-based and holistic, in trying to understand the big picture. To this end, more qualitative work will be needed, perhaps in the form of focus groups or interviews with educators and administrators, to understand the nature of the interaction among all the factors involved. Such work may lead to successful theorizations of relationships. Once formulations toward explaining these relationships are achieved, statistical testing of these formulations can be performed through advanced methods, such as structural equation modeling or hierarchical linear modeling.

Once again, successful measurement of educators' attitudes toward educational research is a prerequisite for the study of the aforementioned topics. In this respect, the natural continuation of the exploratory factor analysis in the present study will be a confirmatory factor analysis to cross-validate the Educators' Attitudes Toward Educational Research Scale on a new and more representative sample of educators. Once the Educators' Attitudes Toward Educational Research Scale is shown to be successfully measuring attitudes toward educational research for a larger group of educators, the next step might be to formulate and statistically test theoretical explanations about the relationships between the dimensions of attitudes toward educational research and the variables hypothesized to be related to them.

REFERENCES

Berliner DC (2002). Educational research: The hardest science of all. Educational Researcher, 31(8): 18-20.

Bollen KA (1989). Structural equations with latent variables. New York: Wiley.

Bracey GW (1998). Educational research and educational practice: Ne'er the twain shall meet? Educational Forum, 62(2): 140-145.

Costello AB, Osborne JW (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. Practical Assessment, Research, and Evaluation, 10(7). Retrieved September 21, 2010, from http://pareonline.net/pdf/v10n7.pdf

Fabrigar LR, Wegener DT, MacCallum RC, Strahan EJ (1999). Evaluating the use of exploratory factor analysis in psychological research. Psychological Methods, 4: 272-299.

Fuller TD, Edwards JN, Vorakitphokatorn S, Sermsri S (1993). Using focus groups to adapt survey instruments to new populations: Experience from a developing country. In D.L. Morgan (Ed.), Successful focus groups: Advancing the state of the art (pp. 89-104). Newbury Park, CA: Sage.

Henson RK, Roberts JK (2006). Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. Educational and Psychological Measurement, 66: 393-416.

Isakson RL, Ellsworth R (1979). The measurement of teacher attitudes toward educational research. Educational Research Quarterly, 4(2): 12-18.

Isakson RL, Ellsworth R (1978). Teachers' attitudes toward educational research: It's time for a change. Teacher Educator, 14(2): 8-13.

Levine A (2007). Educating researchers. Retrieved September 21, 2010, from http://www.edschools.org/EducatingResearchers/educating_researchers.pdf

Morgan DL (1997). Focus groups as qualitative research (2nd ed.). Thousand Oaks, CA: Sage.

Napier JD (1979). An experimental study of the relationship between attitude toward and knowledge of educational research. J. Exper. Educ. 47(2): 131-134.

Nunnally J (1967). Psychometric theory. New York: McGraw-Hill.

O'Brien K (1993). Improving survey questionnaires through focus groups. In D.L. Morgan (Ed.), Successful focus groups: Advancing the state of the art (pp. 105-117). Newbury Park, CA: Sage.

Onwuegbuzie AJ, Slate J, Paterson F, Watson M, Schwartz R (2000). Factors associated with achievement in educational research courses. Research in the Schools, 7(1): 53-65.

Papanastasiou EC (2005). Factor structure of the "Attitudes toward Research" scale. Statistics Educ. Res. J., 4(1): 16-26. Retrieved September 21, 2010, from http://www.stat.auckland.ac.nz/~iase/serj/SERJ4(1)_Papanastasiou.pdf

Pedhazur EJ, Schmelkin LP (1991). Measurement, design, and analysis: An integrated approach. Hillsdale, NJ: Lawrence Erlbaum Associates.

Richardson D, Onwuegbuzie AJ (2002). Attitudes toward research of African-American graduate students as a function of locality. Paper presented at the annual meeting of the Mid-South Educational Research Association, Chattanooga, TN.

SPSS Inc. (2007). SPSS 16.0 [Computer software]. Chicago, IL: Author.

Stevens J (1996). Applied multivariate statistics for the social sciences (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.

Thompson, B. (2004). Exploratory and confirmatory factor analysis. Washington, DC: American Psychological Association.

Vogt DS, King DW, King LA (2004). Focus groups in psychological assessment: Enhancing content validity by consulting members of the target population. Psychological Assessment, 16, 231-243.

West RF, Rhoton C (1994). School district administrators' perceptions of educational research and barriers to research utilization. ERS Spectrum, 12(1): 23-30.

Wolff B, Knodel J, Sittitrai W (1993). Focus groups and surveys as complementary research methods: A case example. In D.L. Morgan (Ed.), Successful focus groups: Advancing the state of the art (pp. 118-136). Newbury Park, CA: Sage.