DOCUMENT RESUME

ED 464 106 TM 033 787

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TITLE A Follow-Up Study of "Teacher Beliefs Survey": A Psychometric Investigation of the Instrument and Its Educational Implications.

PUB DATE 2002-04-05

NOTE 12p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 1-5, 2002).

PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.

DESCRIPTORS *Administrators; Beliefs; *Construct Validity; Elementary Secondary Education; School Personnel; Sex Differences; *Teacher Attitudes; *Teachers; Teaching Experience; Volunteers

IDENTIFIERS Teacher Beliefs Study

ABSTRACT

The construct validity of the revised Teacher Beliefs Survey (TBS) (S. Woolley and A. Woolley, 1999) was examined, and the populations that can use this instrument reliably were explored in this study. The TBS was designed to identify the dimensions of classroom practices. The revised instrument, which contained additional subscale items, was administered to 446 educators from preschool through grade 12, including preservice and inservice teachers, classroom and non-classroom noncertified staff, support personnel, administrators, and volunteers. The results show a different structure of the TBS within different subgroups, suggesting that the different subgroups interpreted the items differently. Males and females also tended to interpret the items differently, and educators in different phases of professional development (preservice or inservice) had different perceptions of their teaching. The study recommends further refinement of the instrument for increased construct validity. (SLD)

A Follow-up Study of "Teacher Beliefs Survey"

A Psychometric Investigation of the Instrument and Its Educational Implications

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Paper Presented at

The American Educational Research Association Annual Conference, New Orleans

April 5, 2002

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A Follow-up Study of "Teacher Beliefs Survey": A Psychometric Investigation of the Instrument and Its Educational Implications

Purpose of the Research

The purpose of the study was to examine the construct validity of the revised Teacher Beliefs Survey (TBS) and to determine populations that can reliably utilize this instrument in educational decision-making.

TBS was designed to identify the dimensions of classroom practices. Although the previous study using the 34-item instrument provided information regarding the behaviorist and constructivist teaching practices of preservice teachers (Woolley, 1999b), it suggested a revision of the survey (Woolley, 2001). Based on an extended literature review of previous findings and additional interviews with eleven middle school teachers, a revised instrument containing 46 items was developed (Benjamin, 2001.) A psychometric investigation of the revised instrument was therefore designed using a broader sample of educators to increase external validity while reducing the 26 items to a simple structure of valid constructs. There are compelling political and philosophical reasons to have a reliable measure of educators' classroom practice patterns. Current reforms in education seek to hold schools accountable for student achievement, thus there is keen interest in identifying classroom practices that are used and their consequential effectiveness with students. However, many educators fear simplistic evaluation (Berliner, 2002), and are therefore interested in reliable instruments by which to empirically study the relationship between teaching and learning as well as monitor teacher effectiveness.

Another political concern involves the critical shortage of teachers in some locations and some disciplines. This resulted in creative recruiting and training strategies (e.g., Troops to Teachers) that demand reliable means to predict effectiveness in teacher candidates. Pedagogically there is also interest in the most effective means to help educators develop from novice through expert levels of practice. Furthermore, the logic by which educators decide classroom practice is not completely understood. Because of the complexity of classroom practice, there is a compelling interest in reducing a large domain of information to fewer, more manageable constructs that may have theoretical unity. At the same time, a critical shortage of

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teachers is creating the need to predict effectiveness in teacher candidates, and a reliable instrument may be used to effectively screen them. Results may thus serve the purpose of the refining educational philosophy involving constructivist and/or behaviorist learning theory.

Theoretical Framework

In response to the standards-based reforms, many American universities (i.e., the Department of Education and Special Education at Mansfield University, PA; the Albright Graduate School of Education at City University, WA) are implementing changes in their teacher preparation programs to meet the new standards of the National Council for Accreditation and Teacher Education (NCATE) and their state boards of education. The constructivist approach is reflected in the P-12 subject standards of many professional organizations (e.g., National Council Teaching Mathematics, 1985; National Science Education Standards, 1992; and the American Psychological Association, Lambert & McCombs, 1994).

To guide this work, many teacher educators have adopted Charlotte Danielson's *Framework for Teaching*" (1996), in which she pointed out "The framework for teaching is grounded in the belief that both positions are inadequate" (p. 17), while at the same time emphasizing the importance of constructivist methods. Matthews (2000) defined constructivism as a generic term for a group of ideological considerations that are not always compatible. In contrast, behaviorism is a clearly defined learning theory. As suggested by Piaget, Vygotsky, and others, socio-psychological constructivism is a learning theory which posits that the learner must actively construct meaning, that is, the learning process is most influenced by cognition, not reinforcement. By comparison, behaviorism is a learning theory based on conditioning by reinforcement. As suggested by Skinner and Bereiter, and exemplified by standards-based reforms using coercion to influence educational policy, behaviorism does not rely on personal construction of meaning. It relies on an established meaning which teachers then transmit to students. Woolley & Woolley (1998) suggested constructivism and behaviorism may not be mutually exclusive, although they are often presented as a dichotomy.

Dr. Sandy Woolley developed and validated a Teacher Beliefs Survey (Woolley, 1999a) to measure elementary teachers' beliefs about teaching as related to behaviorist and constructivist learning theories. The original survey containing thirty-four items was designed

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to assess four constructs: Behaviorist Management, Behaviorist Teaching, Constructivist Teaching, and Constructivist Parents. This survey was administered to pre-service teachers. The results suggested a revision of the survey, which included an elimination of some items and an increase in the number of items in each subscale. Based on suggestions of the previous study, the instrument was revised to include forty-six items. Thus, further validation of the revised instrument is necessary to provide answers for the posed research questions.

Research Questions:

This study intends to answer the following research questions:

1. What is the underlying dimensionality of the revised TBS?
2. Is the underlying factor structure consistent over the groups tested?
3. Is the instrument consistent within constructs?
4. Are there significant differences in the responses exhibited by different groups?

Method

a) Subjects:

The sampling unit included 446 educators, broadly defined as P-12 preservice and inservice teachers as well as classroom- and nonclassroom-based classified staff, certificated support personnel, administrators, and volunteers. For convenience and generalizability, the samples were located in western Washington, an area with a known student population of great diversity, but a state that has not yet enacted standardized teacher certification testing. They represented P-12 educators ranging from novice to expert.

b) Instruments:

1) The Revised TBS: The revised TBS instrument consisting of forty-six items was designed to assess four constructs. The TBS uses a seven point rating scale, with a rating of 1 indicating strongly disagree to a rating of 7 indicating strongly agree. The forty-six items were randomly ordered to avoid grouping by construct.

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2) Demographic Questionnaire: The Demographic Questionnaire included personal and professional information such as age, gender, ethnicity, academic background, education experience, and type of teacher preparation program and institution.

c) Procedures:

During spring and fall of 2001, author Petersen visited previously scheduled graduate education classes and K-8 faculty meetings, explained the purpose of the study and the confidentiality of responses, invited participation, and then collected surveys approximately fifteen minutes later. Participation was not tied to any course grade or condition of employment. Refreshments were provided as a courtesy for the time spent listening to the invitation, and were made available to all members of the group regardless of participation.

Results

Exploratory factor analysis was performed by authors Benjamin and Walker to investigate the underlying dimensionality of the revised TBS. Factors were extracted using a Principal Components Analysis Maximum Likelihood Method. Exploratory factor analysis was used because the links between the observed and latent variables were uncertain and the instrument was revised enough to be considered new. The exploratory factor analysis suggested a 3-factor model as the first 3 factors accounted for nearly thirty percent of the total variance. Table 1 shows the factor structure coefficient for each item.

After examining the inter-correlation of each item and their means and ranges, four items (#s 18, 24, 28, 36) were discarded as they appeared to be either unclear or misleading. In examining the factor pattern matrices for the three factor solution in Table 1, the items were roughly clustered into categories which we have named: Constructivist Teaching (CT), Behavioral Teaching (BT), and Constructivist Management (CM). Further analyses were performed using the remaining 42 items and the suggested 3-factor model.

Confirmatory factor analysis was performed using the suggested 3-factor model to examine whether the TBS structure was consistent across different subgroup. Because some of the subgroups only include a small number of subjects, we only performed subgroup that has more than 50 cases. Table 2 shows fit indices for different subgroup: both gender levels (Male and Female), two City University campus locations (Tacoma and Renton, both of which

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included both Master in Teaching and Master of Education course attendees), and then the Master in Teaching preservice teachers (Grp 1) and the K-8 inservice faculty meeting attendees (Grp 8). Author Benjamin found that the items loading on each factor were similar across the gender group (only 6 items loading on different factor). None of the fit indices confirmed the suggested model.

Internal consistency reliability of the TBS in each factor within each group is also shown in Table 3. For Constructivist Teaching, all of the internal consistency reliabilities were above 0.8 across all groups. For Behavioral Teaching, internal consistency exceeded 0.8 except for the male group and the Tacoma campus students, which was also close to 0.8. Constructivist Management with only 4 items showed very low internal consistency reliability across all of the subgroups.

MANOVA (gender, preservice and inservice group) was used to determine differences among the groups that respond to the three constructs differently. No significant interaction effect was found ($F=.279$, $df=3$, $p=.84$.) Further analysis examining each construct also showed no interaction effect of gender, professional development level and location across the three constructs. By looking at the gender and location, gender and professional development and location and education, only Constructivist Teaching showed gender and education effect ($F=2.961$, $df=5$, $p=0.013$). By examining the main effect, the Constructivist Teaching ($F=8.158$, $df=1$, $p=0.005$) and Behavioral Teaching ($F=9.962$, $df=1$, $p=0.002$) had gender difference. In addition, the Constructivist teaching also showed the difference among the levels of professional development (preservice and inservice) ($F=2.961$. $df=5$, $p=0.013$).

Conclusion

The original TBS was revised based on the suggestions of the previous study. The revised survey includes the addition of subscale items and was administered to a more diversified population. The results showed a different structure of TBS within different subgroups. It suggested that different subgroups interpreted the items differently. Based on their professional development, their perception of the philosophy of teaching may be quite different. In general, male and female interpreted the items differently. Educators in different

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phases of professional development (i.e. preservice or inservice) had different perceptions of their teaching and thus may hold different philosophies of education.

Location is problematic without consideration of possible interaction effects of the purposive nature of each convenience sample. While MIT programs at each site share the same conceptual framework and course sequence, the M.Ed. programs represent a much more diverse educational focus, e.g. counselors, reading specialists, administrators. Face validity of items was consistent within CT and BT constructs according to experts. However, it was not consistent within CM. Some of the CM items could be interpreted as Constructivist Teaching (e.g. "I wait for students to approach me before offering extra help"). There were only 4 items in this scale, and the reliability was very low. Unless the practices included in this scale contribute to the refinement of either theory or are proven effective with student performance, the construct they operationalize may not be of interest.

The study has limitation. Some of the items were not clear and may be misleading especially in Constructivist Management scale. Items would be improved if multiple constructs were eliminated in each or if they were consistently designed to report practice or indicate preference. The sample in each group was not equal, but may have been representative of the proportion of each characteristic in the larger population of educators. Further refinement of the instrument by eliminating ambiguity of individual items is recommended for increased construct validity. A larger and more diverse sample of each educator role would improve external validity. The findings could then be generalized so the differences in classroom decision-making exhibited by the faculty and community members attempting to work together in restructured schools may be better understood. In addition, as the teacher shortage inspires efforts to recruit more certificated educators from the ranks of classified staff, a valid instrument predicting classroom decisions would be useful to identify candidates and tailor alternative preparation models.

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Table I. Factor Pattern Matrix for a Principal Components Analyses

	Component		
	1 CT	2 BT	3 CM
TBS01	-8.759E-02	.378	-.160
TBS02	.461	-9.614E-02	.230
TBS03	.389	-.204	.199
TBS04	.490	2.977E-02	.174
TBS05	-.268	.403	3.998E-02
TBS06	-.356	.378	.175
TBS07	.425	.153	6.213E-02
TBS08	-.102	.644	9.088E-02
TBS09	-.212	.552	.268
TBS10	.520	-7.293E-03	6.610E-02
TBS11	.515	.157	-.265
TBS12	-.251	.523	-.174
TBS13	-6.916E-02	.544	-.160
TBS14	.546	.208	-.259
TBS15	.521	-2.089E-03	.163
TBS16	.489	-4.159E-02	.421
TBS17	.416	.184	-.176
TBS19	.392	.230	-2.807E-02
TBS20	-.178	.584	5.757E-02
TBS21	7.165E-02	.381	.136
TBS22	.388	2.974E-02	.505
TBS23	.534	.115	-.131
TBS25	5.254E-02	.592	-3.139E-02
TBS26	.434	.210	4.026E-02
TBS27	-3.701E-02	.611	1.891E-02
TBS29	-.141	.411	8.799E-02
TBS30	.309	.261	-.232
TBS31	-.214	.549	-7.100E-02
TBS32	.491	.221	-.256
TBS33	.472	-3.173E-02	5.642E-02
TBS34	.516	-7.894E-02	.209
TBS35	-.174	.190	.408
TBS37	.550	-.106	2.205E-02
TBS38	.592	7.539E-02	-.167
TBS39	.712	.112	-.195
TBS40	.565	.334	-.121
TBS41	.450	.228	-.124
TBS42	-.105	.422	.268
TBS43	.193	.110	.466
TBS44	-8.127E-02	.551	-9.099E-02
TBS45	.162	.162	.388
TBS46	-4.073E-02	.447	.224

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Table 2: Confirmatory Factor Analysis Indices for larger (n>50) subgroups

Group	N	X^2	df	RMSEA	GFI	AGFI	NFI	NNFI	CFI
Male	110	2958.49	861	0.093	0.59	0.55	0.31	0.38	0.41
Female	331	5725.90	861	0.089	0.70	0.67	0.45	0.50	0.52
CityU/Tacoma Preservice and Inservice Educators	173	4099.24	861	0.094	0.64	0.60	0.37	0.43	0.46
CityU/Renton Preservice and Inservice Educators	76	595.04	861	0.00	0.81	0.79	0.46	-0.95	
Preservice	168	4453.93	861	0.097	0.62	0.58	0.37	0.42	0.45
Inservice	145	3029.72	861	0.091	0.63	0.59	0.32	0.40	0.43

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Table 3 Internal Consistency Reliability of Each Subgroup

Group	CT	BT	CM
Total	N=384 R=.8451	N=395 R=.8147	N=423 R=.3585
Female	N=282 R=.8133	N=291 R=.8203	N=312 R=.3319
Male	N=96 R=.8755	N=99 R=.7674	N=105 R=.4626
City University/Tacoma Master in Teaching and Master of Education Students	N=161 R=.8424	N=161 R=.7956	N=166 R=.2872
City University/Renton Master in Teaching and Master of Education Students	N=63 R=.8283	N=64 R=.8619	N=71 R=.4600
Preservice Teachers in Master in Teaching Program	N=150 R=.8616	N=152 R=.8087	N=159 R=.3809
Inservice Educators attending K-8 faculty meetings	N=116 R=.8345	N=126 R=.8087	N=136 R=.4123

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