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ESTIMATING THE RELIABILITY OF THE TEACHER QUESTIONNAIRE USED IN THE TEACHER EDUCATION AND LEARNING TO TEACH (TELT) STUDY

Zongyi Deng

National Center for Research on Teacher Learning

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Abstract

This paper offers a reliability analysis of the teacher questionnaire used in the TELT Study conducted by the National Center for Research on Teacher Education (NCRTE). Factor analysis and LISREL are used for this analysis. This analysis provides information about the individual item and the composite reliabilities for teacher knowledge and belief indices in the questionnaire.
ESTIMATING THE RELIABILITY OF THE TEACHER QUESTIONNAIRE USED IN THE TEACHER EDUCATION AND LEARNING TO TEACH (TELT) STUDY

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Introduction

The teacher questionnaire--developed by the National Center for Research on Teacher Education (NCRTE)\textsuperscript{2}--has created strong interest among researchers and teacher educators throughout this country. This questionnaire was designed to examine teachers' and prospective teachers' knowledge and beliefs about writing and mathematics, about teaching, learning, and teachers' role, and learning and learners, and about context of schooling. It was used as one of the data collection instruments\textsuperscript{3} in a multi-site, multi-year study of Teacher Education and Learning to Teach (TELT) conducted by the Center for the purpose of investigating how teachers and prospective teachers' knowledge, beliefs, and reasoning about teaching changed over time as they participated in a variety of teacher education programs (Kennedy, Ball, & McDiarmid, 1993).

The purpose of this article is to present a reliability assessment of this teacher questionnaire. In the assessment, reliability is estimated through factor analysis and LISREL--a methodology of reliability assessment which had been popular in social science (see Carmines & Zeller, 1979; Bagozzi, 1981; Smith, 1974; Long, 1986). By using factor analysis and LISREL in estimating reliability, the article is able to provide the information about both the reliabilities of individual items and the composite reliabilities for teacher knowledge and belief indexes in the questionnaire. The author hopes this information will

\textsuperscript{1}Zongyi Deng is graduate research assistant in the National Center for Research on Teacher Learning, and doctoral candidate in the Department of Teacher Education at Michigan State University. The author gratefully acknowledges Dr. Robert Floden for his helpful comments on the early drafts. The author also wishes to thank Dr. Williamson McDiarmid for his support and encouragement on this work, and to thank Dr. Len Biarchi for the helpful conversations on LISREL.

\textsuperscript{2}The NCRTE is housed at Michigan State University and sponsored by the United States Department of Education, Office of Educational Research and Improvement.

\textsuperscript{3}Three data collection instruments--an interview, observation guide, and questionnaire--were used in the TELT study.
be of value to the researchers and teacher educators who are interested in using this questionnaire's items and indexes as a tool for additional inquiry.

Beliefs and Knowledge Measured on the Questionnaire

This reliability analysis is conducted on the basis of dimensions and categories of teacher knowledge and beliefs that the TELT study attempts to tap. The dimensions and categories are summarized in a "conceptual map" in which all items are grouped according to the category of knowledge or belief the investigators intended the item to assess (see Kennedy, Ball, & McDiarmid, 1993). Classification of items into these categories was done by the judgments of the investigators. This initial classification is the basis for the face validity of individual items as indicators for their category. This reliability analysis only focuses on the items with ordinal scales as well as the multiple-choice items with "right" or "wrong" answers (e.g., A47 to A50; B42 to B45). The analysis does not include other multiple-choice items (e.g., A23 to A29; B18 to B22) because of the difficulty in doing reliability analysis for these items due to their value-latent feature.

The following are the dimensions and categories of teacher knowledge and beliefs in the above mentioned conceptual map, and the items selected for this analysis. The items are represented by their item numbers as they appear in the questionnaire, and are grouped conceptually according to the categories of teacher knowledge and beliefs. The dimensions, the categories, and the conceptual grouping of items constitute the theoretical framework for this analysis.

A. The Teaching and Learning of Writing

I. SUBJECT MATTER

1. Personal attitudes and behaviors (enjoyment; confidence; avoidance; behavior) A1, A3, A6, A7, A8, A9, A10, A11

2. Ideas about good writing (effective communication; mechanics & grammar; nice or correct product form; logical organization; audience/voice/purpose; creative; revised product; separate subject or integrated with others; connection with reading; neatness) A5, A12, A14, A16, A23, A30, A31, A32, A33, A34, A36, A37, A38, A66, A67, A68, A69, A73, A76, A77, A92, A98, A97, A99, A106, A109, A101,

4In doing the analysis, these multiple-choice items were recoded into dichomous items.
A111, A120, A121, A122, A123, A124, A125, A126, A127, A128, A129, A130, A131

3. **Purposes for teaching writing** (job skill; school skill; tool in life/communication; express thoughts & feelings; way of thinking; be literate)
   A13, A14, A15, A17, A18, A19, A20, A21, A22, A23, A24, A26, A68, A74

4. **Knowledge of writing** (structure; composition, syntax; voice/audience; punctuation; writing process)

**II. TEACHING AND LEARNING**

5. **Tasks (activities)** (responding to students; evaluating students)

6. **Teachers' role (approach)** (directive; facilitative; modeling)

7. **How learning occurs** (development; constructing knowledge; additive)
   A36, A40, A44, A45, A47, A48, A49, A50, A72, A75, A93, A99, A100

8. **Social dimensions** (interaction with others; individual)
   A35, A46, A73, A78, A80

9. **What to do to learn** (repetition; drill; engagement in the craft of doing; memorization)
   A45, A46, A99, A116

**III. LEARNER**

10. "**Ability**" (sources of failure; sources of success; native ability; effort; self-confidence; interest, anyone can achieve)
    A31, A41, A42, A43

11. **Diversity** (social class; handicaps/gifted; gender; students having difficulty; age; visual learners)

**IV. LEARNING TO TEACH**

12. **What teachers need to know** (subject matter; skills of teaching, what other
teachers do; students; experience; patience; curriculum; how authors work)

13. How teachers learn
A55, A56, A57, A58, A59, A60, A61, A62, A63, A64, A65

B. The Teaching and Learning of Mathematics

I. SUBJECT MATTER

1. Personal attitudes (enjoyment; confidence; avoidance)
   B2, B3, B4, B5

2. Ideas about mathematics (rules/procedures; body of knowledge; way of thinking;
   linear/step by step; arbitrary/abstract; creative)
   B6, B7, B8, B9, B14, B15, B23, B24, B25, B26, B31, B35, B38, B65, B68, B69, B93, B94, B97

3. Knowledge of mathematics (proportion/ratio/ division; rectangle; place value;
   negative numbers, slope; equation; fractions)
   B77, B78, B79, B80, B81, B82, B84, B92, B98, B99, B100, B101, B102, B103, B104, B105, B106, B107, B108, B109, B110, B111

4. Purposes for teaching mathematics (think better; school skill; tool in life/jobs &
   careers; be educated)
   B10, B11, B12, B13, B16

II. TEACHING AND LEARNING

5. Tasks (activities (explaining/showing how/modeling; responding to students;
   evaluating students)
   B65, B68, B70, B73, B94, B95, B96, B97, B98, B99, B100, B101, B102, B103, B104, B105, B106, B107, B108, B109, B110, B111, B132

6. Teachers' role (approach) (directive; facilitative)
   B63, B64, B67, B94, B96, B97, B98, B99, B100, B107, B108, B109, B110, B111, B116, B119

7. Curricular decisions
   B86, B87, B88, B89, B90, B91

8. How learning occurs (development; adaptivity)
   B32, B36, B37, B38, B63, B64, B66

9. Social dimensions (interaction with others; individual)
   B35, B71, B72, B95
10. **What to do to learn** (repetition/drill; memorization)
   B8, B32, B33, B66, B85, B100, B104, B105, B106, B111

III. **LEARNERS**

11. "Ability" (sources of failure; sources of success; effort; self-confidence; interest)
   B3, B5, B27, B29, B30, B40

IV. **CONTEXT**

12. **Classroom context** (individual; differentiated or based on ability)
   B70, B71, B72

V. **LEARNING TO TEACH**

13. **What teachers need to know** (subject matter; skills of teaching; what other teachers do; students; experience; patience; curriculum; how mathematicians work)
   B46, B47, B48, B49, B50, B51, B52, B53, B54, B55, B56, B57, B58, B59, B60, B61, B62

14. **How teachers learn**
   B52, B53, B54, B55, B56, B57, B58, B59, B60, B61, B62

C. **Teaching and Learning in General and Teaching as a Career**

1. **Diversity** (social class; handicaps/gifted; students having difficulty)
   C9, C14, C16, C26, C27

2. **Organizing students** (whole group; small group; individual)
   C11, C15, C16

3. **Expectations and feelings about the job**
   D1, D2, D4 to D13

**Constructing Teacher Knowledge and Belief Indexes through Factor Analysis**

In seeking for an empirical estimate of theoretically true reliability, factor analysis can be used as a tool for constructing a composite index (Carmines & Zeller, 1979; Smith, 1974). In this analysis, the teacher knowledge and belief indices are constructed on the basis of both the conceptual (or theoretical) structures underlying the categories of teacher knowledge and beliefs in the above conceptual framework and the factor (or empirical) structures underlying a set of items within the categories identified through factor analysis.
Given a category of teaching knowledge and belief--e.g., ideas about good writing, the forming of teacher knowledge and belief indices involves the following procedures.

1. We assumed that each set of items in the conceptual map defines a general area of knowledge or belief. For example, items A1, A3, A6, A7, A8, A9, A10, and A11 were judged to be the indicators of "personal attitudes and behaviors;"

2. For each set of items, we used exploratory factor analysis to identify subscales of at least three items;

3. We examined items in each subscale to decide on an appropriate label.

The composite indices and their individual items for most categories\(^5\) of teacher knowledge and belief are summarized in a set of tables about individual item and composite reliabilities.

As a result, the development of teacher knowledge and belief indices is on the basis of the theoretical framework, with factor analysis as a tool. Through this procedure, the author attempts to create each index which is indeed unidimensional, and to avoid the likely ambiguities or artifacts created by factor analysis in the assessment of empirical measurements (see Carmines & Zeller, 1979).

The Estimate of Individual Item and Composite Reliabilities

The individual item reliabilities and the composite reliabilities for indexes can be estimated on the basis of the LISREL congeneric measurement model. This measurement model is defined by the equations,

\[
X_1 = \lambda_1 \zeta + \phi_1 \\
X_2 = \lambda_2 \zeta + \phi_2 \\
\ldots \ldots \\
X_q = \lambda_q \zeta + \phi_q
\]

\(^5\)Several categories were not included because they did not have any factor which has at least three items. They were "ability" (writing); what to do to learn (math); classroom context (math).
with the assumption that \( \delta_1, \delta_2, \ldots, \delta_q \) are uncorrelated with \( \zeta \).

For an index with \( q \) individual items, \( \zeta \) represents the theoretically true (or latent) variable of the knowledge and belief measured in this index, \( X_1, X_2, \ldots, X_q \) represent the observed variables of the knowledge and belief measured in individual items, \( \delta_1, \delta_2, \ldots, \delta_q \) are random measurement errors in the \( X_1, X_2, \ldots, X_q \) measures, and the quantities \( \lambda_1, \lambda_2, \ldots, \lambda_q \) are fixed parameters in a given population. This model implies that covariance matrix of the observed variables \( X_1, X_2, \ldots, X_q \) is of the form,

\[
\begin{bmatrix}
\lambda_1^2 + \theta_{11} \\
\lambda_2 \lambda_1 & \lambda_2^2 + \theta_{22} \\
\lambda_q \lambda_1 & \lambda_q \lambda_1 & \ldots & \ldots & \lambda_q^2 + \theta_{qq}
\end{bmatrix}
\]

In this matrix, \( \theta_{11}, \theta_{22}, \ldots, \theta_{qq} \) represent the variance of \( \delta_1, \delta_2, \ldots, \delta_q \).

The reliability of individual item, \( i \), can be computed as

\[
P_{ii} = \frac{\lambda_i^2}{\lambda_i^2 + \theta_{ii}}
\]

Where \( \lambda_i^2 \) is the theoretically true variance of \( X_i \) and \( \lambda_i^2 + \theta_{ii} \) is the observed variance of \( X_i \). The composite reliability of measure of \( \rho_c \) can be computed as

\[
P_c = \frac{\sum \lambda_i^2}{\sum (\lambda_i^2 + \theta_{ii})}
\]

Where \( \Sigma \lambda_i^2 \) is the total theoretically true variance of \( X_1, X_2, \ldots, X_q \) and \( \Sigma (\lambda_i^2 + \theta_{ii}) \) is the total observed variance of \( X_1, X_2, \ldots, X_q \) measures.

Like Cronbach’s \( \alpha \), \( \rho_c \) provides a measure of internal consistency for a composite
index. Unlike Cronback's $\alpha$, however, instead of being based on the assumption that the composite is the unweighted sum of items, $\rho_c$ effectively treats each item as an individual measure and the composite as a unequal item weighing. The composite as the weighted sum best estimates the factor. Consequently, $\rho_c$ produces a closer estimate of the true reliability of the composite than $\alpha$ does (Smith, 1974).

The individual item reliabilities and composite reliability show how well the observed variables serve, separately or jointly, as measurement instruments for the theoretically true (latent) variable (Bagozzi, 1981; Joreskog & Sorbom/SPSS Inc., 1989).

The LISREL 7 program provides a reliability estimate for each individual item separately and a composite reliability estimate for all individual items jointly within an index. In computing the reliability of the teacher questionnaire with LISREL, because the items for knowledge and belief indices are ordinal or dichotomous scales, an asymptotic covariance matrix as well as a matrix of polychoric and polyserial correlations for each index need to be created through PRELIS first. Consequently, the matrix of polychoric and polyserial correlations is analyzed by WLS method with the asymptotic covariance matrix in running LISREL (Joreskog & Sorbom/SPSS Inc., 1989).

**The Sample**

The sample for conducting this analysis is the TELT baseline sample. At the beginning of the TELT study, 648 teachers and prospective at eleven teacher education program sites located throughout the nation were randomly selected to complete the questionnaire. Data from these 648 participants were used for the reliability analysis.

**Results**

The following tables summarize the knowledge and belief indices created through factor analysis, and their individual item reliabilities and composite reliabilities. For the indices represented by Table a1, a2, a3, a4, a7, a8, a9, a10, a20, a21, a23, b1, b2, b4, b7, b13, b20, b21, and c3, although some individual item reliabilities are low, the composite reliabilities are all higher than .70. Overall, then, the measures of these indices achieve internal consistency.

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6Some of the multiple-choice items were recoded into dichotomous items.
A. Indices, Individual Item Reliabilities, and Composite Reliabilities in Part A: The Teaching and Learning of Writing

I. SUBJECT MATTER

   a. Personal attitudes and behaviors

Table a1. Individual Item and Composite Reliabilities for Measures of attitude toward writing (enjoyment; avoidance; confidence)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1. Writing is an enjoyable activity for me.</td>
<td>.998</td>
<td></td>
</tr>
<tr>
<td>A2. I really only write when I have to.</td>
<td>.389</td>
<td>.998</td>
</tr>
<tr>
<td>A3. I am a pretty good writer.</td>
<td>.307</td>
<td></td>
</tr>
</tbody>
</table>

Table a2. Individual Item and Composite Reliabilities for Measure of behavior in writing

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A10. I rarely outline my ideas before I start writing.</td>
<td>.678</td>
<td></td>
</tr>
<tr>
<td>A11. For most of the things I write, I only write one draft.</td>
<td>.130</td>
<td>.72</td>
</tr>
<tr>
<td>A9. I often figure out what I want to say in the process of writing.</td>
<td>.085</td>
<td></td>
</tr>
</tbody>
</table>
2. **Ideas about good writing**

Table a3. Individual Item and Composite Reliabilities for Measures of beliefs about good writing (mechanics & grammar; effective communication; nice or correct product form)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A68.</td>
<td>In evaluating students’ reports or papers, it is important to assign considerable weight to technical correctness.</td>
<td>.458</td>
</tr>
<tr>
<td>A5.</td>
<td>Conventions of mechanics and grammar are critical for effective writing.</td>
<td>.335</td>
</tr>
<tr>
<td>A99.</td>
<td>It is important that he review the elements of complete sentence, see appropriate examples, and practice writing complete sentences.</td>
<td>.279</td>
</tr>
<tr>
<td>A69.</td>
<td>Students should not be asked to write long reports or stories until they know fundamentals of grammar, punctuation, and structure.</td>
<td>.280</td>
</tr>
<tr>
<td>A66.</td>
<td>A piece of writing should be judged more for how well it conveys the writer’s message than for how technically correctly it is written.</td>
<td>.231</td>
</tr>
<tr>
<td>A111.</td>
<td>I would make the needed corrections and have the students copy it over.</td>
<td>.252</td>
</tr>
</tbody>
</table>
Table a4. Individual Item and Composite Reliabilities for Measures of beliefs about good writing (mechanics & grammar; revised product; nice or correct product form; neatness; logical organization; connection with reading; audience)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A37. To be good at writing, you need to know the parts of speech and the terms people use to describe writing conventions.</td>
<td>.364</td>
<td></td>
</tr>
<tr>
<td>A33. To be good at writing, you need to write more than one draft.</td>
<td>.211</td>
<td></td>
</tr>
<tr>
<td>A34. To be good at writing, you need to be able to write in a variety of genres or forms (e.g., letters, reports, poems).</td>
<td>.328</td>
<td></td>
</tr>
<tr>
<td>A38. To be good at writing, you need to pay attention to the quality and appearance of the final product.</td>
<td>.462</td>
<td>.736</td>
</tr>
<tr>
<td>A30. To be good at writing, you need to present ideas logically.</td>
<td>.175</td>
<td></td>
</tr>
<tr>
<td>A36. To be good at writing, you need to read widely.</td>
<td>.135</td>
<td></td>
</tr>
<tr>
<td>A32. To be good at writing, you need to consider the particular audience for whom you are writing.</td>
<td>.187</td>
<td></td>
</tr>
</tbody>
</table>

Table a5. Individual Item and Composite Reliabilities for Measures of beliefs about good writing (audience/voice/purpose; nice or correct product form; neatness)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A131. Used a tone and mood appropriate for a friendly letter.</td>
<td>.494</td>
<td></td>
</tr>
<tr>
<td>A129. Thanked Ms. Wexford for something special.</td>
<td>.314</td>
<td>.685</td>
</tr>
<tr>
<td>A130. Used the appropriate form for a letter.</td>
<td>.209</td>
<td></td>
</tr>
<tr>
<td>A128. Wrote carefully and neatly.</td>
<td>.181</td>
<td></td>
</tr>
</tbody>
</table>
Table a6. Individual Item and Composite Reliabilities for Measures of beliefs about good writing (mechanic & grammar; neatness; nice or correct product form)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A120. Demonstrated grammatical competence.</td>
<td>.271</td>
<td></td>
</tr>
<tr>
<td>A122. Wrote carefully and neatly.</td>
<td>.354</td>
<td></td>
</tr>
<tr>
<td>A121. Spelled correctly.</td>
<td>.241</td>
<td>.604</td>
</tr>
<tr>
<td>A124. Used the appropriate form for a letter.</td>
<td>.224</td>
<td></td>
</tr>
</tbody>
</table>

3. Purpose for teaching writing

Table a7. Individual Item and Composite Reliabilities for Measures of beliefs about purposes for teaching writing (being literate; job skill; school skill)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A21. It is important that pupils learn to write so that they will be considered literate.</td>
<td>.553</td>
<td></td>
</tr>
<tr>
<td>A22. It is important that pupils learn to write so that they will qualify for careers which require a lot of writing.</td>
<td>.380</td>
<td>.705</td>
</tr>
<tr>
<td>A20. It is important that pupils learn to write so that they can take notes in class.</td>
<td>.351</td>
<td></td>
</tr>
</tbody>
</table>
Table a8. Individual Item and Composite Reliabilities for Measures of *beliefs about purposes for teaching writing* (*expressing thoughts & feelings; communication; way of thinking*)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A18. It is important that pupils learn to write so that they can keep track of their own thoughts and feelings.</td>
<td>.580</td>
<td></td>
</tr>
<tr>
<td>A19. It is important that pupils learn to write so that they can share information with others.</td>
<td>.522</td>
<td>.752</td>
</tr>
<tr>
<td>A17. Writing helps you think better.</td>
<td>.357</td>
<td></td>
</tr>
</tbody>
</table>

4. **Knowledge of writing**

Table a9. Individual Item and Composite Reliabilities for Measures of *knowledge of writing (structure)*

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A112. A student asks you whether to use <em>is</em> or <em>are</em> in the following sentence. Neither of the books in the library.</td>
<td>.288</td>
<td></td>
</tr>
<tr>
<td>A113. Some people recommend a diet of fish and chicken, but most Americans still prefer beef. Begin the sentence with <em>although</em> and change the transition to: 1. chicken, most; 2. chicken, while; 3. chicken, even though; 4. chicken, yet; 5. I’m not sure.</td>
<td>.596</td>
<td>.815</td>
</tr>
<tr>
<td>A114. The new graduation requirements provoked several students into changing their majors. If you replace <em>provoked</em> with <em>caused</em>, you should replace <em>into changing</em> with: 1. with changing; 2. to the changing of; 3. to change; 4. I’m not sure.</td>
<td>.676</td>
<td></td>
</tr>
<tr>
<td>A115. Who is right? (Choose one.)</td>
<td>.311</td>
<td></td>
</tr>
</tbody>
</table>

Table a10. Individual Item and Composite Reliabilities for Measures of *knowledge of*
writing (composition; syntax; voice/audiences)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A85. Sentences should never end with prepositions.</td>
<td>.582</td>
<td></td>
</tr>
<tr>
<td>A84. Sentences should never end with &quot;and&quot; or because.&quot;</td>
<td>.524</td>
<td></td>
</tr>
<tr>
<td>A83. A report or essay should always be divided into an introduction, body and conclusion.</td>
<td>.329</td>
<td>.805</td>
</tr>
<tr>
<td>A86. Paragraphs should always begin with a topic sentence.</td>
<td>.330</td>
<td></td>
</tr>
<tr>
<td>A87. Whenever you introduce a new idea, you should start a new paragraph.</td>
<td>.278</td>
<td></td>
</tr>
<tr>
<td>A88. You should avoid using the first person (&quot;I&quot;) when writing formal reports.</td>
<td>.205</td>
<td></td>
</tr>
</tbody>
</table>

II. TEACHING AND LEARNING

5. Tasks

Table a11. Individual Item and Composite Reliabilities for Measures of knowledge or beliefs about evaluating students' competence with written language

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A103. Consult with last year's teacher.</td>
<td>.122</td>
<td></td>
</tr>
<tr>
<td>A104. Examine students' language arts workbooks.</td>
<td>.461</td>
<td>.601</td>
</tr>
<tr>
<td>A105. Give a standardized test of written language.</td>
<td>.340</td>
<td></td>
</tr>
</tbody>
</table>
6. Teachers' role (approach)

Table a12. Individual Item and Composite Reliabilities for Measures of beliefs about teaching approaches (directive)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A99.</td>
<td>.274</td>
<td></td>
</tr>
<tr>
<td>A70.</td>
<td>.299</td>
<td>.586</td>
</tr>
<tr>
<td>A81.</td>
<td>.379</td>
<td></td>
</tr>
</tbody>
</table>

A99. It is important that he review the elements of a complete sentence, see appropriate examples, and practice writing complete sentences.

A70. If students are to improve their writing, it is important for teachers to grade most students papers.

A81. A major responsibility of teachers in school is to correct students' nonstandard English.

Table a13. Individual Item and Composite Reliabilities for Measures of beliefs about teaching approaches (facilitative)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A109.</td>
<td>.298</td>
<td></td>
</tr>
<tr>
<td>A109.</td>
<td>.302</td>
<td>.478</td>
</tr>
<tr>
<td>A119.</td>
<td>.055</td>
<td></td>
</tr>
</tbody>
</table>

A109. I would ask the student for more detail and request a rewrite.

A109. I would help the student reorder the ideas.

A119. Use her question to introduce a class discussion on what it means to write poetry.
7. How learning occurs

Table a14. Individual Item and Composite Reliabilities for Measures of beliefs about learning to write (addictiveness; development)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A75. There is a logical progression to be followed in teaching particular punctuation skills to students (e.g., students should learn to use periods before they are taught about semicolons.)</td>
<td>.235</td>
<td>.463</td>
</tr>
<tr>
<td>A40. Students should not begin cursive writing until they have mastered printing.</td>
<td>.259</td>
<td></td>
</tr>
<tr>
<td>A44. Young children lack too many skills to be able to do much writing.</td>
<td>.170</td>
<td></td>
</tr>
</tbody>
</table>

Table a15. Individual Item and Composite Reliabilities for Measures of beliefs about learning to write (development; additive)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A45. Students get better at writing by having opportunities to write.</td>
<td>.275</td>
<td></td>
</tr>
<tr>
<td>A72. Students need to learn specific strategies for composing and revising text, such as how to get ready to write and how to revise what they have written.</td>
<td>.290</td>
<td>.499</td>
</tr>
<tr>
<td>A36. To be good at writing, you need to read widely.</td>
<td>.171</td>
<td></td>
</tr>
</tbody>
</table>
8. **Social dimensions**

Table a16. Individual Item and Composite Reliabilities for Measures of beliefs about social dimension in writing (individual; interactions with others).

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A78.</td>
<td>It is not a good idea to have students help each other with writing assignments because the brighter students will do all the work for the others.</td>
<td>.338</td>
</tr>
<tr>
<td>A73.</td>
<td>Students should not be asked to share their written work with others until they think it is in final form.</td>
<td>.264</td>
</tr>
<tr>
<td>A46.</td>
<td>Students get better at writing by having opportunities to discuss their ideas with classmates and respond to one another’s writing.</td>
<td>.346</td>
</tr>
<tr>
<td>A80.</td>
<td>Giving each child a chance to read aloud something he/she has written is impractical in a class of 25-30 students.</td>
<td>.263</td>
</tr>
<tr>
<td>A35.</td>
<td>To be good at writing, you need to discuss ideas with others while work is in progress and seek feedback on drafts.</td>
<td>.209</td>
</tr>
</tbody>
</table>
III. LEARNERS

II. Diversity

Table a17. Individual Item and Composite Reliabilities for Measures of beliefs about diversity in learning to write (age; gender; native ability)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A44.</td>
<td>Young children lack too many skills to be able to do much writing.</td>
<td>.363</td>
</tr>
<tr>
<td>A39.</td>
<td>In general, girls tend to be naturally better than boys at writing.</td>
<td>.192</td>
</tr>
<tr>
<td>A77.</td>
<td>The writing curriculum in the early elementary grades should emphasize handwriting.</td>
<td>.126</td>
</tr>
<tr>
<td>A41.</td>
<td>There are some students who can simply never be good at writing.</td>
<td>.145</td>
</tr>
</tbody>
</table>

Table a18. Individual Item and Composite Reliabilities for Measures of beliefs about diversity in learning to write (age; native ability; handicaps/gifted)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A44.</td>
<td>Young children lack too many skills to be able to do much writing.</td>
<td>.247</td>
</tr>
<tr>
<td>A41.</td>
<td>There are some students who can simply never be good at writing.</td>
<td>.238</td>
</tr>
<tr>
<td>A39.</td>
<td>In general, girls tend to be naturally better than boys at writing.</td>
<td>.173</td>
</tr>
<tr>
<td>A79.</td>
<td>Planning writing instruction for gifted writers is easier than for students with language-related learning disabilities.</td>
<td></td>
</tr>
</tbody>
</table>
IV. LEARNING TO TEACH

12. What teachers need to know

Table a19. Individual Item and Composite Reliabilities for Measures of beliefs about what teachers need to know in order to teach writing (skills of teaching; subject matter; students)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A63. Take a course on teaching writing.</td>
<td>.407</td>
<td></td>
</tr>
<tr>
<td>A62. Take a course on writing.</td>
<td>.472</td>
<td>.673</td>
</tr>
<tr>
<td>A64. Study samples of student writing and see how others have evaluated student writing.</td>
<td>.236</td>
<td></td>
</tr>
<tr>
<td>A57. Read a variety of kinds of writing.</td>
<td>.149</td>
<td></td>
</tr>
</tbody>
</table>

Table a20. Individual Item and Composite Reliabilities for Measures of beliefs about what teachers need to know in order to teach writing (subject matter)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A53. To teach writing effectively, teachers need to know parts of speech and terms people use to describe writing conventions.</td>
<td>.791</td>
<td></td>
</tr>
<tr>
<td>A54. To teach writing effectively, teachers need to know terms people use to describe the writing process.</td>
<td>.544</td>
<td>.841</td>
</tr>
<tr>
<td>A56. Review grammar.</td>
<td>.233</td>
<td></td>
</tr>
</tbody>
</table>
Table a21. Individual Item and Composite Reliabilities for Measures of beliefs about what teachers need to know in order to teach writing (what other teachers do; how writers work)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A60. Observe or talk to other teachers of writing.</td>
<td>.601</td>
<td></td>
</tr>
<tr>
<td>A59. Be observed by other teachers of writing and get their comments.</td>
<td>.549</td>
<td>.748</td>
</tr>
<tr>
<td>A61. Interview writers about how they write.</td>
<td>.195</td>
<td></td>
</tr>
</tbody>
</table>

Table a22. Individual Item and Composite Reliabilities for Measures of beliefs about what teachers need to know in order to teach writing (subject matter)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A51. Teachers must write a lot in order to teach writing effectively.</td>
<td>.172</td>
<td></td>
</tr>
<tr>
<td>A52. Being a good writer oneself has very little to do with being a good teacher of writing.</td>
<td>.064</td>
<td>.574</td>
</tr>
<tr>
<td>A55. Do more writing myself.</td>
<td>.292</td>
<td></td>
</tr>
<tr>
<td>A57. Read a variety of kinds of writing.</td>
<td>.217</td>
<td></td>
</tr>
</tbody>
</table>

13. How teachers learn

Table a23. Individual Item and Composite Reliabilities for Measures of beliefs about how teachers learn to teach writing

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A63. Take a course on teaching writing.</td>
<td>.459</td>
<td></td>
</tr>
<tr>
<td>A65. Get some (or more) experience teaching writing.</td>
<td>.554</td>
<td></td>
</tr>
<tr>
<td>A58. Improve general teaching skills--like how to motivate students.</td>
<td>.154</td>
<td>.718</td>
</tr>
<tr>
<td>A64. Study samples of student writing and see how others have evaluated student writing.</td>
<td>.213</td>
<td></td>
</tr>
</tbody>
</table>
Table a24. Individual Item and Composite Reliabilities for Measures of beliefs about how teachers learn to teach writing

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>A55. Do more writing myself.</td>
<td>.351</td>
<td></td>
</tr>
<tr>
<td>A62. Take a course on writing.</td>
<td>.318</td>
<td></td>
</tr>
<tr>
<td>A57. Read a variety of kinds of writing.</td>
<td>.233</td>
<td>.597</td>
</tr>
<tr>
<td>A56. Review grammar.</td>
<td>.144</td>
<td></td>
</tr>
</tbody>
</table>

B. Indices, Individual Item Reliabilities, Composite Reliabilities in Part B: The Teaching and Learning of Mathematics

I. SUBJECT MATTER

1. Personal attitudes

Table b1. Individual Item and Composite Reliabilities for Measures of attitude toward mathematics (enjoyment; confidence; avoidance)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1. Math just is not my strength and I avoid it whenever possible.</td>
<td>.809</td>
<td></td>
</tr>
<tr>
<td>B2. I'm pretty good at math and I enjoy the challenge of it.</td>
<td>.744</td>
<td></td>
</tr>
<tr>
<td>B3. I can handle basic math, but I do not have the kind of mind needed to do advanced mathematics.</td>
<td>.480</td>
<td>.894</td>
</tr>
<tr>
<td>B5. If I would give it full effort, I know I could learn advanced math.</td>
<td>.245</td>
<td></td>
</tr>
</tbody>
</table>
2. Ideas about mathematics

Table b2. Individua! Item and Composite Reliabilities for Measures of beliefs about mathematics (linear/step-by-step; body of knowledge; rules/procedures)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B24. To be good in mathematics, you need to think in a logical step-by-step manner.</td>
<td>.455</td>
<td></td>
</tr>
<tr>
<td>B23. To be good at mathematics, you need to remember formulas, principles, and procedures.</td>
<td>.528</td>
<td></td>
</tr>
<tr>
<td>B25. To be good at mathematics, you need to have basic understandings of concepts and strategies.</td>
<td>.339</td>
<td>.758</td>
</tr>
<tr>
<td>B69. To do well, students must learn facts, principles, and formulas in mathematics.</td>
<td>.287</td>
<td></td>
</tr>
<tr>
<td>B7. Doing math is usually a matter of working logically in a step-by-step fashion.</td>
<td>.117</td>
<td></td>
</tr>
<tr>
<td>B38. It is important for pupils to master the basic computational skills before studying topics like probability and logic.</td>
<td>.128</td>
<td></td>
</tr>
</tbody>
</table>
Table b3. Individual Item and Composite Reliabilities for Measures of beliefs about mathematics (way of thinking; arbitrary/abstract; creative)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B9. High school algebra is totally unlike anything presented to students in the lower grades.</td>
<td>.204</td>
<td></td>
</tr>
<tr>
<td>B8. A lot of things in math must simply be accepted as true and remembered; there aren’t explanations for them.</td>
<td>.360</td>
<td></td>
</tr>
<tr>
<td>B6. Doing math allows room for original thinking and creativity.</td>
<td>.297</td>
<td>.633</td>
</tr>
<tr>
<td>B26. To be good at mathematics, you need to be able to think flexibly.</td>
<td></td>
<td>.236</td>
</tr>
<tr>
<td>B35. If students get into arguments about ideas or procedures in math class, it can impede their learning of math.</td>
<td></td>
<td>.148</td>
</tr>
</tbody>
</table>

3. Knowledge of mathematics

Table b4. Individual Item and Composite Reliabilities for Measures of knowledge of mathematics (negative number; division)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B80. You can not subtract a larger number from a smaller one.</td>
<td>.750</td>
<td></td>
</tr>
<tr>
<td>B84. To divide fraction, invert and multiply.</td>
<td>.368</td>
<td>.817</td>
</tr>
<tr>
<td>B79. When you are setting up a division problem, the greater number always goes inside the bracket.</td>
<td></td>
<td>.470</td>
</tr>
</tbody>
</table>
Table b5. Individual Item and Composite Reliabilities for Measures of Knowledge of mathematics (multiplication; slope; power)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B104. When you multiply two negatives together, you always get a positive.</td>
<td>.464</td>
<td></td>
</tr>
<tr>
<td>B105. The slope of a vertical line is undefined.</td>
<td>.251</td>
<td>.626</td>
</tr>
<tr>
<td>B106. Any nonzero number to the zero power is 1. (x^0 = 1)</td>
<td>.321</td>
<td></td>
</tr>
</tbody>
</table>

Table b6. Individual Item and Composite Reliabilities for Measures of knowledge of mathematics (proportion/ratio; slope; place value; division)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B77. Which of the students has represented the relationship best? (Choose one.)</td>
<td>.235</td>
<td></td>
</tr>
<tr>
<td>B103. If you asked your students to write what &quot;slope&quot; is, which of the following responses would you accept? (Choose one.)</td>
<td>.156</td>
<td>.548</td>
</tr>
<tr>
<td>B92. What do you think about this?</td>
<td>.317</td>
<td></td>
</tr>
<tr>
<td>B78. Which of the following is a good story problem to illustrate what 1 1/4 divided by 1/2 means?</td>
<td>.206</td>
<td></td>
</tr>
</tbody>
</table>
4. **Purposes for teaching mathematics**

Table b7. Individual Item and Composite Reliabilities for Measures of **beliefs about the purposes for teaching mathematics** (think better; school skill; tool in life; be educated)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B10. Math helps you learn to think better.</td>
<td>.387</td>
<td></td>
</tr>
<tr>
<td>B12. To succeed in school, you need to be good in math. Heir comments.</td>
<td>.253</td>
<td></td>
</tr>
<tr>
<td>B11. Math is needed for many jobs and careers.</td>
<td>.412</td>
<td>.700</td>
</tr>
<tr>
<td>B13. To be well-educated person, it is just as important to study major areas of math as it is to read classic literary work.</td>
<td>.393</td>
<td></td>
</tr>
</tbody>
</table>

II. **TEACHING AND LEARNING**

5. **Tasks (activities)**

Table b8. Individual Item and Composite Reliabilities for Measures of **teachers’ inclination** (responding to students)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B98. I would remind the child that rectangles have two sides longer and two sides shorter, while squares have sides of equal length.</td>
<td>.193</td>
<td></td>
</tr>
<tr>
<td>B94. I would tell her that I would like her to concentrate on learning the standard way of doing it.</td>
<td>.449</td>
<td>.657</td>
</tr>
<tr>
<td>B95. I would discourage her from using it because it would confuse the rest of the class.</td>
<td>.408</td>
<td></td>
</tr>
<tr>
<td>B111. I would tell them they simply have to remember that these are different.</td>
<td>.146</td>
<td></td>
</tr>
</tbody>
</table>
6. Teachers’ role (approach)

Table b9. Individual Item and Composite Reliabilities for Measures of beliefs about teaching approaches (directive; facilitative)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B108.</td>
<td>I would draw a picture of each one and compare them.</td>
<td>.294</td>
</tr>
<tr>
<td>B97.</td>
<td>I would ask her to explain how she figured this out and why she think it works.</td>
<td>.108</td>
</tr>
<tr>
<td>B110.</td>
<td>I would create story problems illustrating each expression.</td>
<td>.282</td>
</tr>
</tbody>
</table>

Table b10. Individual Item and Composite Reliabilities for Measures of beliefs about teaching approaches (facilitative)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B99.</td>
<td>I would ask the child why he or she is calling it a rectangle.</td>
<td>.264</td>
</tr>
<tr>
<td>B97.</td>
<td>I would ask her to explain how she figured this out and why she think it works.</td>
<td>.434</td>
</tr>
<tr>
<td>B64.</td>
<td>Teachers should not necessarily answer students’ questions but should let them puzzle things out themselves.</td>
<td>.078</td>
</tr>
</tbody>
</table>
Table b11. Individual Item and Composite Reliabilities for Measures of beliefs about teaching approaches (directive)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B67. If a student is confused in math, the teacher should go over the material again more slowly.</td>
<td>.588</td>
<td></td>
</tr>
<tr>
<td>B107. I would show them by replacing the variables with numbers and then show that two results are different.</td>
<td>.073</td>
<td>.619</td>
</tr>
<tr>
<td>B63. Students should never leave math class (or end of the math period) feeling confused or stuck.</td>
<td></td>
<td>.109</td>
</tr>
</tbody>
</table>

7. Curricular decisions

Table b12. Individual Item and Composite Reliabilities for Measures of curricular decisions

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B88. I would save it and see if I had time for this chapter at the end of the year.</td>
<td>.477</td>
<td></td>
</tr>
<tr>
<td>B87. I would not bother with this chapter.</td>
<td>.348</td>
<td>.630</td>
</tr>
<tr>
<td>B86. I would begin the year with this chapter.</td>
<td></td>
<td>.129</td>
</tr>
<tr>
<td>B89. I would plan to weave this content in across the year.</td>
<td></td>
<td>.100</td>
</tr>
</tbody>
</table>
8. How learning occurs

Table b13. Individual Item and Composite Reliabilities for Measures of beliefs about mathematics learning (additive; development)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B36.</td>
<td>In learning math, students must master topics and skills at one level before going on.</td>
<td>.564</td>
</tr>
<tr>
<td>B38.</td>
<td>It is important for pupils to master the basic computational skills before studying topics like probability and logic.</td>
<td>.371</td>
</tr>
<tr>
<td>B66.</td>
<td>If students are having difficulty in math, a good approach is to give them more practice in the skills they lack.</td>
<td>.250</td>
</tr>
<tr>
<td>B32.</td>
<td>For students to get better at math they need to practice a lot.</td>
<td>.215</td>
</tr>
<tr>
<td>B37.</td>
<td>A teacher should wait until pupils are developmentally ready before introducing new ideas and skills.</td>
<td>.310</td>
</tr>
</tbody>
</table>

9. Social dimensions

Table b14. Individual Item and Composite Reliabilities for Measures of beliefs about social dimensions in mathematics teaching (interaction with others; individual)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B35.</td>
<td>If students get in to arguments about ideas or procedures in math class, it can impede their learning of math.</td>
<td>.281</td>
</tr>
<tr>
<td>B95.</td>
<td>I would discourage her from using it because it would confuse the rest of the class.</td>
<td>.143</td>
</tr>
<tr>
<td>B71.</td>
<td>It is not a good idea to have students work together in solving math problems because the brighter students will do all the work.</td>
<td>.269</td>
</tr>
</tbody>
</table>
III. LEARNERS

11. "Abilities"

Table b15. Individual Item and Composite Reliabilities for Measures of beliefs about sources of success for a mathematics learner (effort; self-confidence; interest)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B29. To be good at mathematics, you need to work hard at it.</td>
<td>.247</td>
<td></td>
</tr>
<tr>
<td>B27. To be good at mathematics, you need to have confidence you can do it.</td>
<td>.324</td>
<td>.498</td>
</tr>
<tr>
<td>B30. To be good at mathematics, you need to be interested in mathematics.</td>
<td></td>
<td>.115</td>
</tr>
</tbody>
</table>

Table b16. Individual Item and Composite Reliabilities for Measures of beliefs about sources for success for a mathematics learner (native ability)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B28. To be good at mathematics, you need to have a kind of &quot;mathematical mind&quot;.</td>
<td>.552</td>
<td></td>
</tr>
<tr>
<td>B40. Math is a subject in which natural ability matters a lot more than effort.</td>
<td>.287</td>
<td>.639</td>
</tr>
<tr>
<td>B3. I can handle basic math, but I do not have the kind of mind needed to do advanced mathematics.</td>
<td></td>
<td>.118</td>
</tr>
</tbody>
</table>
IV. LEARNING TO TEACHING

13. What teachers need to know

Table b17. Individual Item and Composite Reliabilities for Measures of beliefs about what teachers need to know in order to teach mathematics (what other teachers do; curriculum; experience; skills of teaching)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B60.</td>
<td>Look at examples of student work in math.</td>
<td>.455</td>
</tr>
<tr>
<td>B61.</td>
<td>Learn more about the school's math curriculum.</td>
<td>.423</td>
</tr>
<tr>
<td>B62.</td>
<td>Get (some or more) experience teaching math.</td>
<td>.236</td>
</tr>
<tr>
<td>B58.</td>
<td>Improve general teaching skills--such as how to motivate students.</td>
<td>.148</td>
</tr>
</tbody>
</table>

Table b18. Individual Item and Composite Reliabilities for Measures of beliefs about what teachers need to know in order to teach mathematics (subject matter)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B49.</td>
<td>In order to teach problem solving, teachers have to do a lot of math problem solving themselves.</td>
<td>.404</td>
</tr>
<tr>
<td>B50.</td>
<td>It is important for teachers to know mathematical terminology.</td>
<td>.366</td>
</tr>
<tr>
<td>B48.</td>
<td>Understanding math as a discipline is important for teaching math at any level.</td>
<td>.233</td>
</tr>
<tr>
<td>B46.</td>
<td>If a student asks a question in math, the teacher should know the answer.</td>
<td>.134</td>
</tr>
</tbody>
</table>
Table b19. Individual Item and Composite Reliabilities for Measures of beliefs about what teachers need to know in order to teach mathematics

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B52. Review basic skills, such as factoring or operations with fractions.</td>
<td>.086</td>
<td></td>
</tr>
<tr>
<td>B51. Basic computational skill and a lot of patience are sufficient for teaching elementary school math.</td>
<td>.410</td>
<td>.452</td>
</tr>
<tr>
<td>B47. Being good at mathematical problem solving personally has little to do with being a good math teacher.</td>
<td>.034</td>
<td></td>
</tr>
</tbody>
</table>
Table b20. Individual Item and Composite Reliabilities for Measures of beliefs about how teachers learn to teach mathematics

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B54.</td>
<td>Be observed by other math teachers and get their comments.</td>
<td>.593</td>
</tr>
<tr>
<td>B60.</td>
<td>Look at examples of student work in math.</td>
<td>.301</td>
</tr>
<tr>
<td>B61.</td>
<td>Learn more about the school's math curriculum.</td>
<td>.327</td>
</tr>
<tr>
<td>B59.</td>
<td>Take a course on teaching math.</td>
<td>.282</td>
</tr>
<tr>
<td>B53.</td>
<td>Observe other math teachers and get their comments.</td>
<td>.534</td>
</tr>
<tr>
<td>B55.</td>
<td>Take a math course.</td>
<td>.386</td>
</tr>
<tr>
<td>B62.</td>
<td>Get (some or more) experience teaching math.</td>
<td>.168</td>
</tr>
<tr>
<td>B58.</td>
<td>Improve general teaching skills—such as how to motivate students.</td>
<td>.116</td>
</tr>
<tr>
<td>B52.</td>
<td>Review basic skills, such as factoring or operations with fractions.</td>
<td>.121</td>
</tr>
<tr>
<td>B56.</td>
<td>Find out more about how mathematicians work.</td>
<td>.157</td>
</tr>
<tr>
<td>B57.</td>
<td>Read about great mathematicians and the history of mathematics.</td>
<td>.006</td>
</tr>
</tbody>
</table>
Table b21. Individual Item and Composite Reliabilities for Measures of beliefs about how teachers learn to teach mathematics

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>B52. Review basic skills, such as factoring or operations with fractions.</td>
<td>.006</td>
<td></td>
</tr>
<tr>
<td>B53. Observe other math teachers and get their comments.</td>
<td>.483</td>
<td>.940</td>
</tr>
<tr>
<td>B55. Take a math course.</td>
<td>.065</td>
<td></td>
</tr>
<tr>
<td>B54. Be observed by other teachers and talk with them.</td>
<td>.936</td>
<td></td>
</tr>
</tbody>
</table>

C. Teaching and Learning in General and Teaching as a Career

1. Diversity

Table c1. Individual Item and Composite Reliabilities for Measures of beliefs about diversity (social class; handicaps/gifted)

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>C16. When working with students form low-income families, teachers should rely primarily on teacher-directed, focused, whole-group instruction.</td>
<td>.455</td>
<td></td>
</tr>
<tr>
<td>C14. When working with slow learners, teachers should focus nearly all their instruction on &quot;minimum competency&quot; objectives.</td>
<td>.276</td>
<td>.565</td>
</tr>
<tr>
<td>C9. Handicapped children who are placed in regular classes should not be expected to keep up with the rest of the class.</td>
<td>.079</td>
<td></td>
</tr>
</tbody>
</table>
2. **Organizing students**

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>C16. When working with students form low-income families, teachers should rely primarily on teacher-directed, focused, whole-group instruction.</td>
<td>.327</td>
<td></td>
</tr>
<tr>
<td>C11. It is impractical for teachers to tailor instructions to the unique interests and abilities of different students.</td>
<td>.200</td>
<td>.577</td>
</tr>
<tr>
<td>C15. When students work in groups, the teachers can not really evaluate student's work.</td>
<td>.386</td>
<td></td>
</tr>
</tbody>
</table>

3. **Expectations and feelings about the job**

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>D7. I have been thinking about leaving teaching in the near future.</td>
<td>.559</td>
<td></td>
</tr>
<tr>
<td>D8. If I could get another job I would leave teaching.</td>
<td>.779</td>
<td>.852</td>
</tr>
<tr>
<td>D6. I am sure teaching will be my life-long career.</td>
<td>.254</td>
<td></td>
</tr>
<tr>
<td>D5. I am not as happy about teaching as I thought I would be.</td>
<td>.385</td>
<td></td>
</tr>
</tbody>
</table>
Reference


