Exploring Science Teacher Educators’ Evaluation of a Score Report to Support Content Knowledge for Teaching
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Abstract
We conducted a usability study to explore how elementary science teacher educators: (1) understand and interpret a score report prototype providing information on one class of preservice teachers (PSTs’ content knowledge for teaching (CKT) about matter and its interactions and (2) evaluate its utility for use within elementary science teacher education courses.

Conceptual Framework
• The score report prototype was developed along with a new CKT assessment to measure PST’s CKT about matter and its interactions. The score report was designed to support preservice teacher educators in identifying strengths and areas for improvement in PSTs’ CKT performance and making formative decisions to help develop PSTs’ CKT.

• Score report characteristics. When designing score reports research has suggested the importance of defining a purpose, identifying target audience and needs, developing a prototype, and conduct usability testing (Zenisky and Hambleton, 2012). Displays that combine enhanced text and enhanced graphics tend to be more helpful to facilitate users’ understanding (Zwick, Zapata-Rivera, & Hegarty, 2014), so they can take actionable steps.

• Research Questions

  1. How does a group of elementary teacher educators understand and interpret information on a score report about PSTs’ CKT about matter and its interactions?

  2. How does a group of elementary teacher educators evaluate the utility of the score report for use within science teacher education courses?

Findings: Research Question 1
• Most teacher educators were able to correctly understand the information presented about individual and class performance and use the functions included in the score report, such as sorting and filtering.

• Their understanding of how to interpret score certainty, however, tended to be less accurate (64%) in comparison to the other item categories.

• This finding suggests that several teacher educators, although able to recognize the importance of the standard error of measurement, struggled to explain what it meant and how to use that information to interpret and understand the PSTs’ CKT scores, especially when comparing two or more PSTs’ scores.

Findings: Research Question 2

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<thead>
<tr>
<th>Score Report Sections</th>
<th>Examples</th>
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<tr>
<td><strong>Read me.</strong> Introduces the score report and explains how to navigate through the sections.</td>
<td>Score report includes relevant information to understand and interpret PSTs’ scores and class performance</td>
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<td><strong>Scale scores.</strong> Describes individual (i.e., PSTs) and aggregated (i.e., class) scores on the CKT matter assessment, using various tables and graphs (see Figure 1).</td>
<td>“...most students showed improvement; the gains are mostly positive…(but) two students have low gains or negative gains. I recognize the class is above the field sample. The score looks good, aggregated at the individual level.”</td>
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<td><strong>Item map.</strong> Ranks a subset of the CKT assessment items by difficulty and summarizes the skills assessed by each item.</td>
<td>Appreciation of the score report organization and layout – including multiple representations to represent PSTs’ performance</td>
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<td><strong>Resources.</strong> Describes the content categories of the assessment and provides links to instructional materials and assessment tasks.</td>
<td>“...the histograms and bar charts provide quick summaries and show how the class moved; ...right amount of information that I can manage it…, what the columns are, maps and diagrams about PSTs’ performance. It is good.”</td>
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Discussion and Implications
• Teacher educators were able to understand the information provided in the score report about PSTs’ performance at the individual and class levels and appreciated the inclusion of different representations for scores as well as supporting materials for interpretation and instructional support.

• However, teacher educators tended to struggle to determine how to use this information to provide specific help to PSTs and tended to show limited understanding of some information about student and class performance, such as the standard error of measurement.

• Adding guidance about how to connect the item descriptors, the information of the content categories and teacher practices, and the use of the resources provided would be important for improving the usability of the score report (Zapata-Rivera, van Winkle & Zwick, 2012), especially to identify specific actions to be implemented in their science content and methods courses to better support PSTs’ CKT development.

References

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For more information, visit http://cktscience.org/