Meeting psychometric requirements for disposition assessment: valid and reliable indicators of teacher dispositions

Pattie Johnston, Ph.D.
The University of Tampa

Adrianne Wilson, Ed.D.
The University of Tampa

Gina M. Almerico, Ph.D.
The University of Tampa

ABSTRACT

Research links to positive student outcomes have highlighted the need to address disposition during teacher clinical practice using sound measures. Education preparation providers may use these indicators to create defensible measures of disposition by formatting the indicators into Likert scales or rubrics. Authors have extended the psychometric evaluation of validated indicators by calculating reliability estimates. Additional evidence of construct validity was also provided by aligning the nine dispositions with prominent teacher evaluation instruments and quality standards.

Keywords: disposition assessment, teacher dispositions, clinical expectations, teacher character

Copyright statement: Authors retain the copyright to the manuscripts published in AABRI journals. Please see the AABRI Copyright Policy at http://www.aabri.com/copyright.html
Background

Delineating standards reflecting positive teacher qualities is at the forefront of teacher preparation programs around the globe. The collective expectations of quality generally include the ability of the candidate to demonstrate content and pedagogical knowledge associated with best practices during clinical experiences. Tamim, Colburn and Karp (2017) state content knowledge implies that teachers understand that something is so and why it is so. These authors use Shulman’s notions of general and specific pedagogical knowledge to advance the understanding of pedagogy. General pedagogical knowledge is thought to be broad applications of classroom management that appear to be relevant across contents. Specific pedagogical content knowledge is a blend of content and pedagogy specific to academic domains.

Standards worldwide have begun to expand clinical expectations beyond knowledge and pedagogy to include the demonstration of professional dispositions. Disposition is harder to define because construct delineation is in its infancy. The lack of a clear definition makes measurement difficult. The difficulties are furthered because there has been suggestions that assessing disposition may be too invasive especially considering the lack of psychometrically sound tools. This argument may be considered in an even a larger context that suggests problems associated with general limitations in measuring any psychological construct.

Are Dispositions Measurable?

Messick (1995) asserted that providing a case for measuring any construct in a worthy or valid way is difficult because it is hard to know what a score actually means. Sechrest (2005) noted that constructs have no verifiable reality beyond the specifics of their definition and operations proposed for measuring them. One could verify knowledge of addition by asking someone to add numbers. Their correct answer is evidence of knowing. Evidence of knowing constructs is not as straightforward because the knowing is usually derived from an assessment that is based on a consensus of community experts and not hard evidence. Miller, et.al. (2009) acknowledged this concern with the measurement of any subjective phenomena like disposition. They explained that a clear definition of the construct and its boundaries are needed because the definition will guide the generation and selection of items in the evaluation pool. Different definitions can lead to different sets of items. However, the cost to social science researchers of rejecting the measurement of constructs for these reasons would be so great that consensus with caution becomes acceptable. Acceptability of construct composition is further supported by adhering to measurement standards such as those delineated by the joint efforts of the American Educational Research Association (AERA), American Psychological Association (APA), and National Council of Measurement in Education (NCME) (2014). These groups collectively developed standards for the measurement evidences of representativeness or validity to be considered during peer review. The standards suggest beginning with a workable definition of the construct followed by preferred methods of attaining construct consensus.

Defining Dispositions

Disposition has been defined as the personal qualities or characteristics that are possessed by individuals, including attitudes, beliefs, interests, appreciations, values, and modes of
adjustments (Taylor & Wasicsko, 2000). The Interstate Teacher Assessment and Support Consortium (InTASC, 2011) use the following descriptors to encompass the concept of dispositions: adopts, appreciates, believes, is committed, has enthusiasm, persists, realizes, recognizes responds, seeks, is sensitive to, understands, and values. Villegas (2007) suggested dispositions are tendencies for individuals to behave in a manner based on their beliefs.

The definitions suggest that dispositions may be thought of as teacher associated behaviors closely related to collegiality and civility. These terms are used in generic work settings. They are generally considered extra role expectations because accountability for these types of breaches are typically found in a contract other than the formal contract. Rousseau (1995) suggests that there is another type of contract that exists between colleagues that serves to bind extra-role behaviors. She uses the term psychological contract to describe the subtle presence of expectations regarding terms of an exchange agreement between individuals and their organization. Such a contract might include extra role dispositional behaviors. The power of the psychological contract may be recognized when it is violated. The violation may be seen as more than just a failure to meet expectations rather a signal of a remarkable damage and perhaps dismissal. Teacher evaluation practices appear to be using implied contracts to cover dispositional obligations assumed in typical written contractual agreements. This trend in education appears to be changing as the need for disposition assessment is becoming formalized.

Other Reasons to Assess Dispositions

In addition to the abovementioned concern for formalizing disposition, countries around the world have delineated standards of teaching quality. There is an expected degree of agreement as to what constitutes quality teaching across countries. An example of this standard overlap may be found in the alignment mapping conducted by Michelli and Eldridge (2017). They mapped teacher quality standards from the United States, English Accrediting agencies, Saudi Arabia and Chili. Specifically, they identified unique and common themes across standards. The alignment suggests a collective understanding of quality expectations. Some commonalities include the development of a conceptual framework, the need for knowledge of subject and pedagogy, the use of an assessment system and community partnerships.

They noted an anomaly in the United States’ Council for Accreditation of Educator Preparation standards (CAEP, 2013). CAEP regards dispositions as being worthy of thoughtful consideration by teacher preparation programs. The accrediting body recognizes the need to examine teacher candidate dispositions as well as the complexity involved in conducting such a practice. To further the importance of dispositions, the standards mandate the assessment of disposition using psychometrically sound assessments that measure and document clinical dispositions. As a result, widely used evaluation instruments, including Marzano (2009) and Danielson (2009) include indicators of disposition in their teacher assessments.

CAEP was established with a clear international interest. CAEP is now on the precipice of emerging as a unified voice for the teaching profession in the international arena with the goal of improving teacher performance and student achievement worldwide (Eldridge & Dada, 2017).

The logical result of the CAEP initiative may be seen in other countries moving towards accountability for disposition. The movement towards accountability may be seen in behaviors of disposition embedded in quality standards. Michelli and Eldridge (2017) examined standards from varying countries that allowed for analysis of dispositional expectations. The set of national standards in Chile is referred to as the Framework for Good Teaching (FGT) and
establishes the rights and duties for teachers working in schools. These standards reflect dispositions by including professional responsibilities, positive relationships with all stakeholders and making others feel respected in their standards. The *Ontario College of Teachers’ Standards of Practice for the Teaching Profession* used in teacher preparation programs across Canada provides a framework that describes the knowledge, skills, and values essential in Ontario’s teaching profession. These standards also communicate a collective vision of dispositional behaviors including professionalism, care, respect and leadership. The *United Nations Educational, Scientific and Cultural Organization* (UNESCO) in agreement with the goals of the *Information and Communication Tools Competency Framework for Teachers* (ICT CFT) created their set of standards. The ICT CTF was developed to assist countries cultivate comprehensive national teacher ICT competency policies and standards (Santiago, et.al, 2013). These standards also reference dispositional behaviors that include working with others and partnering with parents.

The *National Association of School-Based Teacher Trainers* (NASBITT), *Universities’ Council for the Education of Teachers* (UCET) and *The Higher Education Academy* (2012) have collaboratively revised standards to govern teacher training in England (2012). This collective effort has also directly required dispositional accountability throughout their standards. For example, Part One of Guidance on the Teachers’ Standards suggests teachers are self-critical, forge professional relationships and work with stakeholders.

**Positive links to educational outcomes**

There are also research indications of a trend towards the formalization of assessing pre-service teacher dispositions. Motivation for assessing disposition may be particularly helpful for pre-service teachers to expedite the course of change needed to address problems associated with inappropriate attitudes and actions before and during clinical experiences (Dee & Henkin, 2002). Clinical assimilation can also be used to enhance application of formal dispositional expectations later in the field. Additionally, commonly used teacher evaluation instruments contain elements of dispositions (Marzano & Brown, 2009; Danielson, Axtell & McKay, 2009). Feedback from such evaluation tools is so critical to forward advancement that prior exposure to the construct of disposition could be beneficial to teachers. Dam, Nixon and Packard (2010) found that 53 percent of non-contract renewal was because the teacher did not demonstrate positive dispositional behaviors. Schulte, Edick, Edwards, and Mackiel (2004) also suggest that it is difficult to interact with teachers who lack the dispositions essential to effective teaching. Educators have also learned that a strong correlation exists between the dispositions of teachers and the quality of their students’ learning (Notar, Riley & Taylor, 2009). Rike and Sharp (2008) suggest supervisors need a way to clearly communicate the dispositional expectations. They also suggest that creating and using a research-based measure of dispositions ensures consistency and limits subjectivity on the part of the evaluator.

**Creating Sound Measures of Dispositions**

Measurement standards suggest the creation of a disposition assessment begins with a collective definition and is furthered by the identification of indicators that represent the defined construct. Teacher preparation faculty members have begun working towards an understanding of what these valid indicators of disposition would be. Validated indicators can better assure the
assessment is actually measuring deposition. In measurable terms, this foundation would be a list of indicators rated as highly representative of disposition by experts. The indicators provide the basis for a measure of dispositions that includes these agreed upon expectations. The measure could be formatted into a Likert scale or a rubric using the validated indicators as Likert items or rubric row cell expectation information.

A next step would be to assure a collective understanding of the indicators by asking experts to describe specific behaviors associated with each indicator. The collective understanding of each validated indicator could enhance the inter-rater reliability or the degree to which rater ratings agree. Estimating the inter-rater reliability would follow.

**Psychometric Specifics of Measuring Teacher Dispositions**

AERA, APA and NCME (2014) have provided criteria for the evaluation of tests. They recommend test authors provide evidences of validity and estimates of reliability. They further provide definitions and standards for evidences of validity and estimates of reliability.

Validity refers to the degree to which evidence supports the interpretations of test scores (AERA, APA, & NCME, 2014). Validation may be behaviorally viewed as developing a sound argument to support the intended interpretation of test scores and their relevance to the proposed use of the test. There are several types of validity based on the intent of what is being measured. ‘Teacher disposition’ is a construct so it requires evidence of construct validity. Construct validity of disposition may be defined as identification of the behaviors representing good dispositions and the level of agreement as to the representative of these behaviors by experts (Standard 1.7 AERA, APA & NCME, 2014). Evidence of construct validity suggests that all appropriate dispositional behaviors are included so that the measure is actually assessing what it is reporting to assess. In the case of disposition assessment, the measure should include all indicators that represent teacher disposition and no indicators that do not represent disposition. This assurance may be evidenced by efforts made towards getting a collective agreement as to what dispositions to include. Specifically, a common method is compiling a survey including all possible indicators and asking experts to rate the representativeness of each one. Highly rated indicators are retained and can then be turned into Likert items or rubric content expectations.

Once agreed upon dispositional behaviors have been identified, the indicators may still be open to subjectivity when rating. Experts may agree upon the factors but misunderstand what is meant by each indicator. For example, there may be agreement that ‘professionalism’ is an indicator of disposition but may disagree about what ‘professionalism’ is. Further refinement of each behavior may help raters better understand what is meant by each one.

In fact, professional standards suggest assessment makers estimate the reliability of the test. Reliability refers to the consistency of measurements when the testing procedure is repeated on a group of persons (AERA, APA & NCME, 2014). The specific reliability of concern when assessing dispositions is likelihood of separate evaluators having similar ratings of the same teacher’s dispositions (Standard 2.3 AERA, APA & NCME, 2014). The level of agreement or inter-rater reliability by evaluators is estimated by calculating the correlation between ratings of the same persons between two evaluators.
Current Psychometric Advancements

Nine indicators of disposition have been validated in previous research (identifying reference withheld until publication, 2011). The current team of researchers wanted to advance psychometric evaluation of the nine previously validated dispositional indicators. The advancement would serve to inform and clarify the implied expectations for teachers. The specific evaluation aims are:

1. To review the validation process employed that identified the nine indicators of disposition
2. To extend the psychometric review by calculating the degree of scoring agreement between raters/inter-rater reliability
3. To extend further the evidences of validity to include an alignment of the indicators with evaluation instruments and quality standards
4. To advance the administration of an assessment by providing indicator descriptions
5. To suggest two formats for using the nine indicators to create an assessment

Review of Initial Validity Evidences

Initial efforts to assess this construct were aimed at obtaining a collective agreement in the identification of depositional indicators. The first step in providing evidence of the construct validity was asking experts to rate the level of representativeness of possible research based indicators compiled. Seventeen indicators of disposition from teacher evaluation studies were compiled to enhance the likelihood of incorporating all possible behaviors (Taylor & Wasicsko, 2000; Rike & Sharp, 2008; Notar, Riley & Taylor, 2009; Stewart & Davis, 2009). Subject Matter Experts including principals, professors, students and cooperating teachers were asked to rate the degree each possible indicator represented disposition on a five point Likert scale (N=27). A rating of one indicated the behavior did not represent disposition at all and a rating of five indicated the behavior was very representative of disposition. Mean ratings were calculated for each indicator. The result of the ratings included eleven indicators of disposition with average ratings of 4.00 or higher. Six indicators were dropped because of low mean ratings of less than 4.00.

Inter-rater Reliability of the Indicators

Current evaluators continued the psychometric examination of the construct by estimating the inter-rater reliability or examination of agreement between different raters of the same teacher candidate. Enhancing the understanding of each indicator serves to increase the agreement between raters. Raters may be more likely to agree on a teacher’s “professionalism” if there is a collective understanding of what ‘professionalism’ is. To advance the collective understanding, researchers interviewed a panel of stakeholders and asked them to provide specific behaviors associated with each indicator (N=22). The resulting measure included the nine indicators with clarifying behaviors associated with each indicator. Two indicators were dropped because their associated behaviors were too similar. Inter-rater reliability was then estimated. Pearson Product Moment correlation coefficients were calculated using ratings between two separate raters of the same group of students on the nine indicators. These coefficients were generally high which indicates that the raters did agree upon
their ratings of the same students \( (r = .60 \text{ to } .26) \). Table 1 lists the nine dispositions and the inter-reliability coefficients of all items.

The oral and written communication dispositions have the lowest associated inter-rater reliability although both are indicative of a highly moderate relationship. Rater training prior to first administration of the assessment using further clarifications of each indicator could serve to enhance the collective understanding of the disposition and therefore, increase the degree of agreement between raters.

Alignment with Quality Standards and Evaluation Instruments

The next step was to provide additional evidence of construct validity by checking the alignment of their nine research based dispositional indicators with quality standards and major evaluation measures. Each of these sources have identified indicators of disposition based on expertise so they serve as a proxy for individual subject matter experts. The multiple source indicators should be aligned if they are all suggesting behaviors associated with the same construct. This alignment may be seen as evidence of construct validity because there is agreement of dispositional indicators and therefore, more assurance that the instrument is actually measuring what it reports to be measuring. Lack of alignment is a threat to the construct validity of any tool designed to assess dispositions because standards suggest the importance of assessments capturing all indicators of the construct (Standard 1.7 AERA, APA & NCME, 2014).

A Q-Sort procedure was first conducted to determine the alignment of the nine indicators with the standards of disposition in the United States. A group of stakeholders including principals, cooperating teachers, education students, professors and supervising teachers were gathered \( (N=16) \). The stakeholders were given dispositional standards from CAEP (2013), InTASC (2011), Danielson (2009) and Marzano (2009) evaluation instruments and asked to align them with the nine research based indicators. CAEP standards were used as proxy for quality standards because they represent a set of national standards developed in terms of dispositional embedding. Agreement was generally high but there were three indicators with slightly low alignment agreement. A five point Likert scale was then created that asked raters to rate the level of alignment each of the three indicators had with the research based indicators. Results from this survey suggested strong indications of alignment.

Disposition Indicator Descriptions

Administration is further enhanced by assuring raters have a clear collective understanding of the scoring levels. The understanding was advanced by behaviorally describing each indicator. The EDA tool includes the nine dispositions with 27 associated indicators of those dispositions, providing evaluators with an operational definition of each behavior. An explanation of each disposition is included below.

Demonstrates effective oral communication skills

Communication skills include speaking using Standard English and syntax. A high rating indicates no grammatical errors produced. Other ratings are based on the frequency and severity of errors made.
**Demonstrates effective written communication skills**

Effective written skills also include demonstrating the ability to use proper grammar and spelling and is similar to oral communication in terms of looking at the severity and frequency of grammatical errors made. Tone is also an indicator of effective written communication skills.

**Demonstrates professionalism**

Professional behaviors include responding promptly, being punctual, maintaining proper boundaries and being appropriate inside and outside of the classroom. There was some indication that professional appearance was also important.

**Demonstrates a positive and enthusiastic attitude**

Positive and enthusiastic attitudes may be best seen when pre-service teachers go beyond requirements. For example, if pre-service teachers are asked to share one activity that they find useful; they should share two. Self-directed problem solving is another behavior identified as associated with this indicator. Pre-service teachers need to try to solve their own problems before bringing them to their cooperating teacher. Complaining should be avoided. It is of note that cooperating teachers often complain among themselves but view teacher candidates complaining as a negative.

**Demonstrates preparedness in teaching and learning**

The obvious behavior associated with this indicator is for pre-service teachers to come prepared with all necessary materials. There are other more subtle expectations. They include demonstration of reflective practices. That is, there some evidence the pre-service teacher is thinking and adjusting lessons. The thinking and adjusting is most often seen after instruction but could be demonstrated during instruction based on student cues.

**Exhibits an appreciation of and value for cultural and academic diversity**

Cultural and academic diversity may be difficult to demonstrate during clinical experiences because behaviors may be subtle. Often classrooms embracing cultural and academic diversities just ‘feel warm’. One behavior important to watch for would be seen in the pre-service teachers practicing a zero tolerance of negativity. This policy suggests that teachers not overlook negative comments students may make to one another.

**Collaborates effectively with stakeholders**

Collaboration with stakeholders is normally demonstrated when pre-service teachers meet with varying groups when needed. Perhaps the most nuanced aspect of collaboration may be demonstrated in the ability to express dissent respectfully. Full agreement in all matters within groups is rare. Dissent is part of the collaborative process and enhances good outcomes. It is important to maintain a respectful tone during such discussions.
**Demonstrates self-regulated learner behaviors/takes initiative**

Self-regulation of behaviors is most effectively demonstrated when pre-service teachers try to solve their problems first. Pre-service teachers speak of ‘running to them’ at the first sign of trouble. Problem solving help may be requested but only after evidence of proactive effort.

**Exhibits the social and emotional intelligence to promote personal and educational goals/stability**

Important aspects of social and emotional intelligence include controlled reactions to problematic situations and ‘grit’. Pre-service teachers will encounter problems during their clinical experiences. They must be able to demonstrate a visual calm reaction when handling problems.

**Resulting Use of Indicators to Create Measures**

The resulting nine indicators of teacher disposition with associated behaviors may be used by teacher preparation programs to create sound measures. They have the additional evidence of construct validity because they are aligned with quality standards and evaluation instrument items. The nine indicators can be turned into an assessment consisting of nine Likert items with associated behaviors. Rubrics could be also constructed using the nine indicators as rows with the associated behaviors as expectations found in the rubric column that describes the desired outcomes. Figure 1 shows examples of the scale item and rubric formats. Both formats would have evidences of validity as long as they are created using the exact validated indicators and behaviors.

**Summary**

The results of this study provide teacher preparation persons the basis for a psychometrically sound disposition assessment tool. Estimates of inter-rater reliability are high and suggest rater agreement in scoring. Alignment with quality standards and prominent evaluation tools extend the evidences of validity.

**Permission to Use the Indicators**

This evidence of validity was designed with careful consideration of the psychometric properties associated with informal assessment so that any inferences made about a teacher’s disposition are more likely to be true. Psychometric evaluation efforts were made that far extend expectations associated with informal assessments. The effort was done grounded in a sincere attempt to try to clear any confusion about the expectations so that growth in dispositions may be enhanced during coursework and subsequent clinical experience. Authors remind readers they may request a copy of an instrument already designed with the associated behaviors and technical manual.
References


National Association of School-Based Teacher Trainers, Universities’ Council for the Education of Teachers and Higher Education Academy. (2012). *Working with the Teachers’ Standards in Initial Teacher Education*.


APPENDIX

Table 1. 
*Inter-rater reliability coefficients of retained indicators*

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Communication</td>
<td>.32</td>
</tr>
<tr>
<td>Written Communication</td>
<td>.30</td>
</tr>
<tr>
<td>Professionalism</td>
<td>.57</td>
</tr>
<tr>
<td>Positive Attitude</td>
<td>.42</td>
</tr>
<tr>
<td>Preparedness</td>
<td>.48</td>
</tr>
<tr>
<td>Collaboration</td>
<td>.55</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>.60</td>
</tr>
<tr>
<td>Socioemotional</td>
<td>.42</td>
</tr>
<tr>
<td>Diversity</td>
<td>.26</td>
</tr>
</tbody>
</table>

Figure 1. 
*Examples of Likert items and rubrics based on the same indicator*

<table>
<thead>
<tr>
<th>Demonstrates effective oral communication skills</th>
<th>1 Strongly disagree</th>
<th>2 Disagree</th>
<th>3 Agree</th>
<th>4 Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models Standard English</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varies their oral communication to excite students</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicates at an appropriate student level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments regarding strengths/areas for growth:

- Does not consistently model Standard English as evidenced by making major errors
- Does not vary oral communication to motivate students as evidenced by monotone voice with visible lack of student participation
- Models Standard English and makes common and noticeable errors
- Strives to vary oral communication as evidenced of some students demonstrating a lack of participation
- Models Standard English with a high level of competence as evidenced by no errors
- Varies oral communication as evidenced by encouraging participatory behaviors