

Montessori Teachers' Conceptions of Assessment

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Introduction

Assessment can and should serve three purposes – improve teaching and learning, measure school in teacher performance under accountability systems, and hold students accountable for learning (Popham, 2009). When assessment is used for these purposes, it supports the Montessori philosophy and can help teachers monitor student progress, understand student's strengths and weaknesses in any given area, adjust teaching to make it more effective, and make general educational decisions about students (Cogley, 2013; Popham, 2011). Conversely, when a teacher's view and understanding of assessment is narrow, the teacher will be less likely to use assessment to create a more effective learning environment. Assessing teachers' beliefs and understandings of assessment may offer insight into assessment practices in the classroom (Ajzen, 2005; Brown & Harris, 2009); using teachers' beliefs to shape professional development may be the best route for changing assessment practices.

For teachers in non-Montessori school, assessment for accountability has been a reality since the early 2000's, but in private Montessori schools, the decision to assess and how to assess has been the choice of the school. When public Montessori schools became more prevalent, the mismatch between Montessori philosophy and some forms of assessment became more apparent. The public Montessori schools argued they could not be measured by a single assessment produced at a state level – this type of assessment would not provide information on educational effectiveness (Dunn, 2000). In her dissertation, Roemer found Montessori schools were not outcome driven, which made assessment a challenge for the newly formed public Montessori schools (Dunn, 2000). Montessori schools used forms of assessment – observation, checklists, formative assessment in three-period lessons, anecdotal evidence, portfolios – but there was a disconnect between these forms of assessment and accountability for student learning or school performance (Cogley, 2013; Dunn, 2000). We argue that an understanding of assessment is fundamental for all teachers – public, private, Montessori, non-Montessori - but we also acknowledge the mismatch of Montessori teachers' beliefs and understandings about assessment may be more visible in the public schools.

Research Questions

Our study was designed to evaluate Montessori teachers' beliefs and understandings about assessment. We used an instrument validated in New Zealand and Europe– Conceptions of Assessment (COA: Brown, 2006) – to measure three constructs related to use of assessment: school accountability, student accountability, and improving education. A fourth construct, irrelevance of assessment, was also assessed. We also used open-ended questions to provide context for the responses on the COA. We used the results to answer the following research questions:

1. How well does the originally validated structure of the COA (Brown, 2006) fit the data from a sample of Montessori school teachers?
2. Do public and private Montessori teachers differ on responses to the COA?
3. How do Montessorians feel about their assessment preparation and what needs should be addressed through targeted professional development?

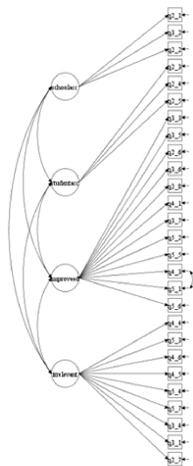


Figure 1. Original structure of COA

Participants and Procedures

We surveyed members of the Teacher Research Panel for AMS; all included teachers taught in either lower or upper elementary. Of the 248 surveyed, 99 responded. The demographics of the sample include in Table 1.

The instrument, Conceptions of Assessment (Brown, 2006), has been validated with non-Montessori teachers from New Zealand, England, and three Middle Eastern countries. The four-factor structure – school accountability, student accountability, educational improvement, and irrelevance of assessment - has been reproduced with each new sample. Model fit for the New Zealand sample appeared within acceptable ranges (Root Mean Square Error Approximation (RMSEA) < .08; Comparative Fit Indices (CFI) < .90; non-significant chi square).

The original 27-item survey was converted to Qualtrics for electronic data collection. Some open-ended items were added to the original survey; the open-ended items collected information on current needs with respect to professional development and teacher usage of assessment in the classroom. Participants of the Teacher Research Panel who teach primarily in lower or upper elementary received an email invitation for the survey in early November, 2019, and those who did not complete the survey within a week received a reminder email.

Data collection closed in early December and the results were analyzed used a combination of Statistical Package for Social Sciences (SPSS: v.25) and *Mplus* (v.8.0).

Results

Descriptive statistics were calculated using SPSS (v.25) and are presented in Table 1. We attempted to fit the original conceptual model of COA – see Figure 1 - to the data from the Montessori teacher sample used *Mplus* (v.8.0). The small sample size may contribute to the variability that was not explained by the model and may account for some of the model misfit. The original four-factor model did not fit the data from our sample: $\chi^2(317) = 567.2, p = .001; CFI = .69; RMSEA = .10$.

The results from this model suggested some areas of strain that could be corrected using correlations between two sets of items – one set measuring teacher use of assessment and one set measuring the validity of assessment data – and a need to drop the factor associated with student accountability. The new model demonstrated improved fit - $\chi^2(184) = 300.0, p = .001; CFI = .81; RMSEA = .09$.

The results of the second model suggested a need to drop all factors except improvement of education. The final model with all adjustments included is shown in Figure 2. A single-factor model with two sets of correlated items appeared to have the best fit to the data. While the $\chi^2(88) = 128.7, p = .003$; was still significant, the reduction in the value demonstrates a better match of the model to the data. Chi square, a measure of goodness of fit, tells us the overall differences in observed values and reproduced values. Smaller values indicate a better match between estimated outcomes and the existing data. CFI is another measure of goodness of fit and the single-factor model returned a CFI = .90, which is well within the range of acceptable. RMSEA accounts for both fit and parsimony. It is possible the RMSEA values with the four-factor model were inflated because of the complexity as well as the misfit. The single-factor model returned an RMSEA = .08 and like the CFI, this value is within the range of acceptable values.

Since the original model did not fit the data, the differences between public and private Montessorians were calculated using the single-factor model. An independent *t-test* for differences between means was conducted in SPSS (v.25). Levene's Test for Equality of Variances was not significant, $F = .884, p = .350$ demonstrating the data met this assumption. There was no difference between public and private Montessori teachers on the Improving Education factor of the COA - $t(68) = -.200, p = .842$.

Qualitative data were analyzed using a constant comparative method. Themes were identified and then reorganized into meta-themes. Teachers indicated most of their assessment training was through on-the-job experiences, professional development sessions, or teacher training programs.

Results for Public Montessorians:

- reported use of benchmark assessments and state-mandated assessments as well more traditional methods of assessment used in Montessori
- expressed frustration over the mis-match of standardized assessments and Montessori curriculum, especially when the data are used as a singular measure of student learning or school performance.
- novel approaches – exit tickets, portfolios, and performance-based assessments
- Seven of the seventeen public school Montessorians mentioned specific standardized assessments by title while only three of the twenty private school Montessorians mentioned assessments by name.

Types of assessment training:

Observation was the most often taught assessment practice in the teacher training programs for these participants. Observation during the three-period lesson was a common theme among the participants; the field notes from a three-period lesson could be used in both formative and summative capacities, making it a highly versatile type of assessment. Some participants mentioned they were training in the 1990s and assessment was not a part of their training. Other participants, even those currently at private schools, credited work in public schools for their understanding of assessment.

Many Montessorians requested training in assessment for public/charter schools as well as training in methods to reduce test anxiety. They also expressed interest in creative, formative assessments that would honor the Montessori curriculum but also allow teachers to gather data on student performance.

Table 1
Demographics of sample

	Frequency	Mean (SD)
Gender		
Male	5	
Female	72	
School		
Public	29	
Private	45	
Highest degree		
Bachelor	9	
Post graduate certificate	13	
Master	54	
Doctorate	2	
Region represented		
Northeastern	6	
Southern	17	
Midwestern	22	
Western	24	
Other	3	
Years teaching Montessori		16.4 (9.0)
Years as a teacher		18.0 (9.5)

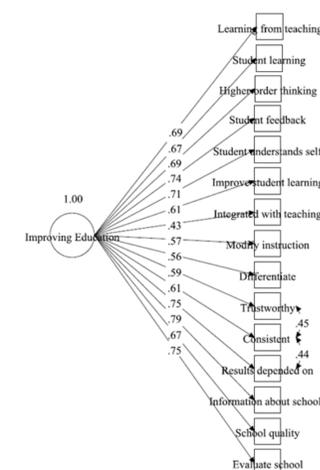


Figure 2. Revised COA structure

Discussion

To help readers contextualize the findings, we will discuss implications and conclusions by research question.

1. How well does the originally validated structure of the COA (Brown, 2006) fit the data from a sample of Montessori school teachers?
 - Rather than a four-factor model, a one-factor model demonstrates better fit for this sample. This is not what was found in prior studies of non-Montessori teachers – even in studies of cross-cultural differences, the four-factor structure held.
 - **Conclusion:** Montessorians in this sample appear to see assessment as a way to improve education; accountability factors were not stable with this group.
 - **Implications:** Montessori and non-Montessori teachers may not think of assessment in the same manner.
2. Do public and private Montessori teachers differ on responses to the COA?
 - The results of the *t-test* on the single-factor showed public and private Montessori teachers have similar views of assessment used to improve education. Since the four-factor model did not fit the data, differences on those factors were not calculated.
 - **Conclusion:** When considering assessment in Montessori, public and private school teachers may be less different than we think. They will each have unique challenges, but overall, they appear to view assessment the same way.
 - **Implications:** Both public and private school teachers could benefit from similar professional developments. There may be a need to have some smaller sessions that address specific needs for each group.
3. How do Montessorians feel about their assessment preparation and what needs should be addressed through targeted professional development?
 - Matching assessment to Montessori philosophy was a strong theme in the qualitative responses. Many Montessorians attributed their strong observation skills to their training programs, but also suggested they need more training in using these methods to track student progress. Training in emotional and social assessment was also requested; teachers want to reduce test anxiety and understand each and every child's social and emotional needs.
 - **Conclusion:** Training in formative assessments that are appropriate for Montessori classrooms should be offered.
 - **Implications:** For Montessori to be viewed as an evidence-based practice, we will need data and Montessori teachers appear to want to provide this data and evidence.

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