Lisa Abrams

Email: lmabrams@vcu.edu
School of Education, Virginia
Commonwealth University,
1015 West Main Street,
P.O. Box 842020, Richmond,
Virginia 23284, USA

Divya Varier

School of Education, Virginia
Commonwealth University,
1015 West Main Street,
P.O. Box 842020, Richmond,
Virginia 23284, USA

Lisa Jackson

School of Education, Virginia
Commonwealth University,
1015 West Main Street,
P.O. Box 842020, Richmond,
Virginia 23284, USA

Unpacking instructional alignment: The influence of teachers' use of assessment data on instruction

Abstract

The use of assessment data to inform instruction is an important component of a comprehensive standards-based assessment programme. Examining teachers' data use for instruction can reveal the extent to which instruction is aligned with established content standards and assessment. This paper describes results of a qualitative study of teachers' data use in a mid-Atlantic metropolitan area in the United States. Focus group interviews with 60 upper elementary and middle school teachers from 45 schools were conducted. Findings indicate teachers aligned instruction and assessments with the state curriculum with the goal of improving student performance. While teachers found day-to-day informal assessments essential to shaping instruction, periodic formal assessments helped them monitor student progress and remediation efforts. Teachers described challenges associated with the misalignment of periodic assessments with instructional content, the breadth of content and higher cognitive demand expected in the newer state curriculum and the lack of infrastructure to support data use.

Keywords: *Assessment literacy; instructional alignment; data-driven decision making; qualitative methods*

1. Introduction and background

Alignment of instruction and assessment is fundamental for the accurate measurement of student learning. As such, the alignment or coherence among curriculum standards, instruction, and assessment is essential for standards-based assessment and evidenced-based instructional programmes. Assessment data are intended to inform instruction and broader school improvement efforts and guide administrative and instructional decisions in an effort to raise student achievement. According to Turner and Coburn (2012: 3), the use of data is "one of the most central reform ideas in contemporary school policy and practice".

In the United States, aligning content standards and assessments became federally required during the 1994 reauthorisation of the Elementary and Secondary Education Act, specifically within the Improving America's Schools Act (Rabinowitz *et al.*, 2006). In the US, alignment has been a core issue in test-based accountability programmes and is

considered an important source of validity evidence to warrant how test scores are used to make decisions about schools and students. The emphasis on accountability for improved test scores has contributed to the expansion of assessment programmes at the local levels. For example, school districts began to implement interim testing programmes in order to monitor student progress toward meeting the achievement goals associated with the annual state exam with the purpose of using test scores to identify student misunderstandings with sufficient time to make instructional adjustments. These tests are administered several times throughout the school year, typically every nine weeks, are aligned to state tests and are used widely across the US (Burch, 2010; Perie *et al.*, 2007).

The current emphasis in the US and internationally on evidenced-based instruction and reform strategies assumes strong alignment among content standards, instruction, school district and state assessment programmes. The implementation of interim assessments, coupled with classroom assessments, has created a "data use" mechanism that can facilitate stronger alignment between content standards, daily instruction and year-end assessments.

Empirical literature on teachers' assessment data use is dominated by teachers' use of interim assessment results (Datnow & Hubbard, 2015). These assessments evaluate students' learning on a set of content standards. Studies of teachers' use of interim assessments to guide instruction have found that use of these assessment data was limited due to reported time constraints caused by tensions to remediate as well as pressure to keep pace with specified instructional content coverage (Abrams, Varier & McMillan, 2013). Other studies noted the influence of favourable data use cultures in the school and the district, viz., policies, resources, and collaboration with other teachers to foster data use (Goertz, Oláh & Riggan, 2009). Without extensive support, teachers' use was characterised by perfunctory examination of trends, averages and class level analysis as opposed to in-depth discussions about individual results or actions based on data (Abrams *et al.*, 2013; Hoover & Abrams, 2013).

Many studies have also framed data use practice in terms of formative assessment (e.g., Goertz *et al.*, 2009) which emphasises instructional uses of assessment results. However, recent conceptualisations of data use are focused on a cyclical process of improvement situated within a larger context driven by federal and state accountability policies, district and school policies and resources.

Jennings (2012) has urged researchers to orient empirical research to examine interactional elements between the contexts of accountability systems and teacher characteristics that affect data use. While studies have shown that using data can help teachers, students and schools, an overly narrow use of data to improve test scores can undermine teaching and learning. In Jennings' 2012 review, she described that the features of accountability systems affect data use. For example, if teachers are urged to use data to improve the percentage of students who pass a test, teachers might use data narrowly to identify those children who are at the cusp of passing and direct remediation efforts toward them. On the contrary, if teachers are provided with time and resources to identify learning gaps and provide the appropriate remediation to help all students to master the necessary content and skills, they might use data to group students who have mastered content with those who are still learning the content. Alternatively, they might reteach a lesson to the whole class if the majority of students performed poorly on a test.

2. Theoretical framework

The current investigation is based on two theoretical frameworks established in the literature (Christman *et al.*, 2009; Marsh, 2012) – a process and a structural framework. The theories informed the study design, instrument development and data analyses of the focus group transcripts. Christman *et al.* (2009) provided a conceptual structural framework within the context of organisational learning where relational cultures and an organisation's capacity to shape learning and action. With regard to data use, state and federal accountability policies and a school district's management system created the context within which teachers engaged in the data use process in an effort to improve learning. A school's human resources, material resources, social culture and policies influence the use of data.

Marsh (2012) provided a theory of action on the data use process where raw data are organised and filtered to become information; information is combined with teacher expertise to become actionable knowledge about students and this knowledge is applied in the form of instructional actions to achieve desired outcomes. Finally, these outcomes are evaluated in relation to the effectiveness of the instructional actions that resulted from data use.

Related to the process and structure frameworks, is the theory of integrated assessment systems, intended to account for the multiple purposes assessments served in test-based accountability models. Bennett (2015) describes a third generation of assessments that are designed for institutional and individual-learning purposes. The current emphasis on using assessment data to inform evidence-based instructional decisions in an effort to improve learning requires an "integrated system of assessment" (Bennett & Gitomer, 2009), one that includes formative and summative assessments and provides results on which to base instructional responses and student actions.

The current US model of state-level assessments and aligned local interim assessments mixes summative and formative uses of assessment results and is similar in theory to the tightly integrated assessment system described by Bennett (2015). In the cases of formative and summative assessment, how teachers use data to guide instruction is an essential component with the potential to bring greater coherence to the broader assessment system.

Researchers have examined teachers' use of interim assessment data in order to inform teaching and learning. Such studies focused on how teachers engaged with data, their assessment or data literacy, skills in analysing and interpreting data to draw conclusions about student learning and identifying the next steps for instruction (e.g., Oláh, Lawrence & Riggan, 2010; Hoover & Abrams, 2013; Blanc *et al.*, 2010; Shepard, Davidson & Bowman, 2011; Abrams, McMillan & Wetzel, 2015; Wohlstetter, Datnow & Park, 2008). Collectively, these studies found that teachers interpret assessment data from a macro-classroom level rather than a micro-level focused on individual student learning and misconceptions. For example, teachers use data to identify student weaknesses and misconceptions as indicated by wrong test answers and the content of their instruction but were less likely to make connections between student misconceptions and the instructional method used for delivery. Teachers used interim assessment data to identify and address areas of student weakness, inform remediation plans, re-teaching at the class level or modify the grouping of students in their classes – all broad-brush instructional decisions as opposed to deep and specific pedagogical connections between re-teaching and student misconceptions (Oláh *et al.*, 2010, Shepard *et al.*, 2011). These studies also indicated that having timely access to data, the format of the data reports, in addition to organisational factors such as leadership and policy support influenced teachers' data use.

Based on studies that have examined teachers' skills to use data, other empirical investigations have focused (as a natural consequence) on developing professional development targeting data use capacity and skills. Further, researchers called for examining the impact of teachers' data use practice or related professional development on student achievement. This work has increasingly been the focus of recent studies of data use (Mandinach & Gummer, 2015; Marsh & Farrell, 2014). In these studies, data use was conceptualised as a practice based on formative assessment, the efficacy of which to improve student learning has been well-established (Black & Wiliam, 1998; Kingston & Nash, 2011). A third focus in this cluster of studies was to examine the organisational conditions that influenced teachers' data use in an attempt to account for the collaborative and contextual factors that seemed to affect teachers' data use (Christman *et al.*, 2009; Copland, 2002; Goertz *et al.*, 2009; Supovitz & Klein, 2003).

Teachers' data use practice poses an interesting challenge to the concept of the validity of inferences made from assessments. In essence, data use involves the use of assessments for making a variety of instructional decisions. The ways in which and the extent to which these decisions lead to effective learning is important but challenging for many teachers. However, research on the process of assessing the validity of instructional inferences is lacking. Moss (2013) advocated for a better understanding of teachers' data use and the conditions surrounding the use of assessments to inform the process of gathering validity evidence for assessments. Although interim assessments were, in theory, designed specifically to monitor learning in relation to the annual state assessments, studies on the development or quality of the assessments that make them suitable for that intended purpose are limited (e.g., Chen, 2014; Martin, 2012). Typically, interim assessments are locally developed for the instructional pacing guides, curriculum standards and the (time, technology, policy) constraints of the school district. Several studies found that the information provided by early interim assessment programmes was often too global to provide teachers with sufficient information to make inferences about subsequent instructional steps aligned to misconceptions (Oláh *et al.*, 2010; Shepard *et al.*, 2011). As such, the literature on teachers' data use was extended to include the use of informal and classroom assessments.

According to Christman *et al.* (2009), it is posited that the institutional expectations and available resources influence teachers' data use. These factors are largely determined by accountability systems. Examining teachers' use of assessment data can provide insight into alignment issues that support or hinder data use for teaching and learning. Understanding these alignment issues can encourage greater coherence among curriculum standards, instruction and assessment through the development of a framework for a programme of assessments that meet instructional needs and support achievement of learning standards.

3. Methods

Study design

The study reported in this paper is part of a larger mixed-methods research project aimed at examining teachers' data use practice. It is intended that the results of the study will be used to inform the development and implementation of professional development programmes to enhance teachers' assessment literacy and capacity for data use. The literature on teachers' data use has primarily focused on issues of access to data, how teachers use data and different strategies to guide these practices. Further exploration is needed to understand the links between data use, teachers' instructional responses and the impact of these responses

on student outcomes (Roderick, 2012). Little (2012: 143) contends, "micro-process studies – investigations of what teachers and other[s] actually do under the broad banner of 'data use' … remain substantially underdeveloped" and argues that micro-process research is greatly needed if the field is going to develop more conceptually rigorous research on data use. As such, the present study was implemented to provide for an in-depth micro-process investigation of the connections between data use practice, instruction and student learning with the broader test-based accountability context.

A qualitative design was implemented, as in-depth understanding of teachers' uses of data was sought. The study was based on 14 focus group interviews. The aim of the focus group sessions was to gather information from teachers about how they used assessment data to inform their instruction, the types of support and barriers to data use they experience and the data elements and assessments most useful for guiding instruction. It also aimed to investigate how they collaborated or interacted to examine and interpret data in ways that shaped instructional decisions.

Participants

The sample for the current study included 60 teacher participants from elementary and middle school levels. There were 14 focus groups conducted, eight sessions with elementary (grades 4 and 5) and six sessions with middle school (grades 6-8) teachers. In all, participants represented 28 elementary schools and 17 middle schools from four large school districts in the mid-Atlantic United States. Each session averaged between 4-6 participants, with the exception of one session, which was conducted as a structured one-on-one interview. Of the 60 participants, approximately 82% were white, 13% were black while the remaining population was spread evenly amongst those who identified as Asian, Hispanic and Native American. An overwhelming majority of the participants were female (93%). Participants' teaching experience ranged from 1-35 years, with an average of 11.7 years and a median of 10.5 years.

Instruments

The theoretical frameworks were used to guide the development of a semi-structured focus group protocol and identify specific lines of questioning related to the process of data use and the structural context in which data use practice occurred. The protocol included 20 questions and several probes and prompts were used to gather teachers' perspectives regarding the data use culture, use of data to support instruction and professional development needs for using assessment data. In addition to the protocol, we administered a short demographic form to collect data on years of teaching experience, race/ethnicity and the different types of data they used. The purpose of this last question was to orient teachers to a common definition of assessment data as well as to the key topics in the protocol. The main purpose of the form was to enable researchers to provide a description of the study sample and the variety of assessment data available.

Data analysis

The focus group sessions were audio recorded and professionally transcribed. Three members of the research team analysed the transcripts using Atlas.ti Version 7, a widely used qualitative data analysis software program. The approach to data analysis involved regular discussions among research team members regarding emergent themes and clarification

of codes, alternating with periods of individual analysis. Prior to analysis, the researchers developed a codebook using the guidelines established by MacQueen *et al.* (1998) for team-based coding and analysis. The codes were organised according to the structure and process theoretical frameworks to capture structural and process elements of data use (Christman *et al.*, 2009; Marsh, 2012). The research team coded excerpts of randomly selected transcripts until researchers arrived at a shared understanding of all the codes.

Trustworthiness

The study design, implementation, data analysis and interpretation were informed by widely accepted qualitative and mixed-methods research literature (Creswell & Plano Clark, 2011; Hsieh & Shannon, 2005; MacQueen *et al.*, 1998; Saldaña, 2016; Shenton, 2004; Yin, 2013). Efforts to ensure trustworthiness were articulated prior to the implementation of the study and reviewed periodically during implementation using tools based on Shenton's (2004) strategies in an attempt to meet the four elements of trustworthiness (credibility, confirmability, dependability and transferability) recommended by Guba (1981). These strategies included documentation of plans and procedures, writing reflective commentaries and memos during data analysis as well as making connections to the theoretical and empirical literature to inform the analysis.

4. Findings

This paper reports on two main themes that emerged from the coding and analysis. The first of these themes was that teachers' data use practice was situated within their school's data use culture. Data use culture is defined for the purposes of this study as the structural policies and expectations about data use, leadership, language and collegial interactions surrounding data. The second emerging theme was that the nature or type of assessment data influenced teachers' data use in a way that reflected a complex negotiation between expectations for using each source of data, the quality of evidence presented in each source and the time constraints for making instructional adjustments. There were four "strands" or "sub-themes" to this second theme. The different themes corresponded to teacher responses to questions in the protocol that addressed the school and school district cultures, sources of data and related instructional changes, as follows.

Theme 1: The influence of data use culture in the school on teachers' data use

The nature and extent of teachers' data use varied according to several factors including school level (elementary, middle), subject area and to a smaller extent, their personal beliefs about data use. However, a school's data use culture emerged as a primary factor in teachers' data use and accounted for differences across subject areas and school level data use practices. In other words, while teachers who taught the same or similar subjects may have shown common data use practices, the same teachers were likely to describe data use differently if their school culture toward data use differed considerably.

It was found that schools that performed poorly on the annual assessments typically responded by establishing a data-driven approach toward school improvement. This approach manifested in the schools and procedures, resource allocation and an overall data driven language embedded in the social fabric of the school. Two variations were observed regarding how schools implemented this approach. For example, some teachers described policies that required grade level meetings about data among teachers, established data charts or

boards to display and track progress or defined specific remediation plans based on regular summative assessment data to improve the school's results on annual assessments. These teachers were often systematic in their data use practice. An elementary school teacher from a low-performing school said,

> We have a data wall and the data is out there for everybody to see, the kids, parents, anyone…so [as a classroom teacher], if you want your data to look acceptable then you've got to do some things in your classroom…We also, every teacher has a data board and on that… it has students' names and where they are in their tier group.

Alternatively, some teachers described their school's data culture as being less directly tied to performance on annual assessments. In these cases, teachers described policies and procedures that were similar to those in other schools; however, they also described a high level of social support from the school principal and colleagues to use data. Teachers were still focused on meeting the federal accountability requirements but they described data use as being more closely aligned with curriculum standards than with performance on the annual assessments. An instructional specialist described her experience of a school principal as follows:

> [The principal] has the teachers look at the data, find the strengths, find the weaknesses and lets them come up with the solution. – 'what can we do to bring these children to the level they need to be?'

In schools that performed well on the state assessment and typically met accountability requirements, teachers' recounted data use practices that were not as systematic as those practices seen in schools that performed less well. For example, a middle school teacher's whole school did not have accountability related pressures and described her approach to data use this way:

> I don't know how my school uses [data], but it doesn't seem to be very stringent. At meetings we mostly talk more about lesson planning than looking at tests as a whole team…

The process/cycle and structural components of data use were not explicit and well defined. Rather, these teachers took on data use as an approach to track progress and implement evidence-based instruction without the obligation to comply with expectations from the leadership. In schools that were at the cusp of failing to meet federal requirements or had only recently met accountability requirements, teachers described increased or decreased expectations of using data respectively.

Theme 2: Teachers relied on a variety of assessments, informal and formal data sources

Teacher responses were classified into four sub themes related to data sources and the value of these sources for making instructional adjustments. Teachers' descriptions of the use of specific sources indicated that they balanced expectations regarding their use with what inferences they are able to make from the sources.

Sub theme 1

Teachers relied on informal, day-to-day activities to gather evidence of student under-standing. Most teachers used short cycle assessments embedded within instruction to inform subsequent teaching steps. Popular strategies included the use of exit tickets, quick computer

based interactive quizzes and questioning during instruction. Teachers described these as being the most useful in terms of their formative use. Some teachers also described these tools as self-assessment activities that involved students in gaining an understanding of their own learning. The benefits were characterised by an ease of development and administration, time efficiency and close alignment to instruction and standards. These types of assessments provided the granular information needed to guide instruction. One teacher described what she sees her students doing.

> *On a daily basis is more meaningful in terms of helping me with instruction than the information that I get from the benchmarks because it is not fair to assess a fish on whether it can climb a tree.*

Sub-theme 2.

In a second sub-theme identified, teachers described periodic summative assessments as being useful for making more collective instructional decisions at grade level meetings. For example, remediation decisions were made based on students' performance on the interim or benchmark assessments. All participating school districts administered summative assessments every nine weeks called benchmark assessments. These assessments mimicked the annual state assessment and were designed to provide a progress report of students' mastery of content and skills that would be measured on the state assessment. The usefulness of the results, however, depended on teachers completing the content of the benchmark assessments within the nine-week period, the extent to which tests were aligned to the state assessment and the technical quality of the test items.

The test forms were prepared by the school division and were based on instructional pacing guides. These pacing guides were often incongruent with the actual instructional pace. As one teacher noted, "…the reason we would score poorly on the benchmarks is because we just didn't get to that part before the benchmark test at the time [the school district] was asking us to take it". The expectation to administer benchmark assessments every nine weeks was often incongruent with the actual pace of instruction. Almost all teachers used a web based assessment system to administer benchmark assessments. Although beneficial in terms of timeliness of receiving data reports, alignment with the state assessment and the considerable depth of analysis possible on this account, the use of data to inform instructional adjustments was diminished.

Some teachers also described how benchmark assessment results underestimated their students' understanding of content in comparison with what emerged in their daily interactions with students and classroom assessment results. Teachers attributed these discrepancies to the relative difficulty and complex test vocabulary of benchmark assessments that were aligned with the state curriculum standards and assessment. The following short excerpt below from a focus group discussion illustrates three teachers' views of the complex disconnect between learning standards, benchmark assessments and classroom assessments.

> *Teacher A: The [learning] standards are very broad and not very deep*

> *Teacher B: Yet, the [benchmark assessment] questions are very deep*

> *Teacher C: I find some of [my students] do pretty well on the end of unit assessments… but when you put all the skills together… [as in a benchmark assessment]…they get a 45 (indicative of a low score) … they have to able to do that (putting all skills together) for the [state assessment].*

In a related comment, an elementary school teacher described the need for assessments that cover more than one skill so that "our kids can discriminate what skill to use … so they are prepared for the [state assessment]".

Sub-theme 3

In a third sub-theme, previous performance on the state assessments and longitudinal data were important sources that were useful to guide instruction early in the academic year. Almost all teachers looked at the previous year's state assessment performance, at the individual student level as well as at school level to identify strengths. The teachers were expected to use state test data, were provided with data reports and dedicated meeting times for this purpose. Teachers discussed the data at formal grade level meetings to inform the grouping of students and to discuss the planning and pacing of instruction. Previous performance on the state assessment was a major source of data at the school level and teachers described breaking down data based on the state curriculum standards and sub-group student populations to inform placing emphasis on certain areas where students showed weaknesses in the previous year. As one teacher noted,

> We are expected to use [state assessment or another standardised assessment] data from the previous year. Once we receive our roster of students, we are expected to look at the data from the previous year.

Many teachers expressed the usefulness of having a longitudinal data system with information on previous test performance, portfolio grades, teacher comments on progress reports and demographic data as being potentially powerful tools to tailor instruction to meet the needs of individual students. Some teachers mentioned that such data helped to fill in the blanks regarding a student's learning. Teachers had an intimate knowledge of how social factors influenced student performance, as one teacher noted:

> I think [a child's cumulative file] explains a lot… there are a lot of things in a social history that don't come out on the surface.

All school districts subscribed to a web based data system that recorded student data cumulatively but only one school district used the feature and another was in the process of making longitudinal data accessible to teachers.

Sub-theme 4

In a fourth sub-theme, teachers described that test vocabulary in the state assessments was more complex than that used in schools. Reasons given for this complexity included the recent modifications made to traditional multiple choice test items in order to incorporate technology enhancements and the inclusion of language relating to the application of knowledge and critical thinking skills. Mathematics teachers reflected on how students could not decipher the language of the test items and as a result may have missed questions related to mathematics concepts that they knew. For example, teachers discussed the issue of including vocabulary terms while teaching a concept to ensure students became familiar with words that are likely to be used in the state assessment. One middle school math teacher commented,

> …one of the things the students have to do is order integers from <u>least</u> to <u>greatest</u> and <u>greatest</u> to <u>least</u>. So we get back data after two or three months after the [state assessment] our kids did so badly and this is so easy. So then we saw a question of a released [state assessment], and it said the words: <u>ascending</u> or <u>descending</u>.

She further noted the effect of these changes on their analyses of assessment results to include discussing test vocabulary. Some teachers also felt compelled to set aside time to teach test-taking strategies in this regard. Interestingly, teachers' knowledge of students' weaknesses in test vocabulary was an inference made from multiple data sources. While classroom and interim assessments showed that students had learned concepts, under-performance in sections of the annual tests led teachers to make connections between the differences in content related language used in the classroom versus that used in the state assessments as an explanation of students' performance.

5. Discussion

The study findings indicate that teachers rely on a variety of data sources and types of assessments to guide instruction and support student learning. Teachers described using a mixture of informal, formative and summative assessment data to answer different types of questions about student learning and reflected varying proximity of data analysis to instruction. In this regard, teachers described a comprehensive approach to the role of assessment data for teaching, similar in theory to the formalised and structured integrated assessment system described by Bennett (2015). This finding suggests that further examination of instructional responses to formative and summative assessments may illuminate the ways in which instruction is most closely aligned with state content standards and assessments.

Consistent with literature on data use, teachers in this study relied on informal assessments to modify instruction during delivery and on benchmark assessments to monitor student progress and make decisions about remediation, re-teaching and future instruction of new content (Goertz *et al.*, 2009). The assessment literature references the formative and summative uses of classroom assessments and the multiple purposes that single classroom assessment can serve (Bennett, 2011; Brookhart, 2003; 2010; Hoover & Abrams, 2013). The study findings extend this idea to suggest that the different types of assessments are used in *combination* to meet teachers' varied information needs as they prepare students for annual state assessments.

The state assessment and curriculum standards were powerful levers on how teachers approached data use and on the emphasis placed by teachers on different sources of information. Yet, there seems to be key differences in the characteristics of data use cultures and the manner in which social support, resources and infrastructure influence how teachers engage with assessment data. Knowledge of these variations and how they can foster or hinder effective use of assessment data is critical for our understanding of the role of the culture established by school leadership (Jennings, 2012) and how school leaders respond to accountability pressures (Cho, Jimerson & Wayman, 2015). Furthermore, such knowledge can help school districts and teachers develop clear and consistent expectations for using assessment data effectively.

The findings have two main implications for the issues regarding the alignment between instruction, assessment and curriculum standards. Firstly, assessments aligned with curriculum standards do not automatically render themselves suitable for instructional use. Secondly, the realities of classroom instruction require that teachers navigate several intended uses of assessments that can impose barriers to using data effectively for instruction. For example, in the context of the study reported in this paper, benchmark assessments were aligned with the state's curriculum standards and assessment but also with predetermined instructional

pacing guides. From the perspective of the school district, the main objective of benchmark assessments was to track progress toward meeting the associated curriculum standards every nine weeks of instruction. If the actual pace of instruction was slower than the expected pace, teachers had to choose between meeting the district's expectation for administering the test at the end of nine weeks (which compromised the quality of the resulting data) versus waiting to administer the test until all of the prescribed content was adequately covered (at the risk of failing to meet administrative regulations). Therefore, meaningful alignment may involve putting the instructional use of data at the centre of gathering validity evidence for assessments. At the very least, instructional use of data needs to be explicitly considered in gathering alignment and validity evidence for assessments (Moss, 2013).

6. Conclusion

The study reported in this paper set out to examine how teachers were using data, under what conditions and the extent to which assessment data use informed instruction strengthened the coherence between their practice on one hand and the state curriculum standards and assessment on the other. The findings indicate that the accountability associated with the assessment system was a defining feature of many school cultures and shaped the environment in which data use practices were implemented. Future student performance on the state assessments was a strong motivating influence on teachers' long-term instructional goals. The use of informal, formative, classroom and benchmark assessments served as incremental indicators of performance toward successful performance on the state assessment. As such, teachers' described use of multiple and varied types of assessments suggest the potential for a comprehensive and linear alignment among instruction, content standards and assessment that emphasises enabling teachers' data use to improve student learning.

7. Acknowledgments

References

Abrams, L.M., McMillan, J.H. & Wetzel, A.P. 2015. Implementing benchmark testing for formative purposes: Teacher voices about what works. *Educational Assessment Evaluation and Accountability*, 27(4), 347-375. https://doi.org/10.1007/s11092-015-9214-9

Abrams, L.M., Varier, D., & McMillan, J.H. 2013. *Teachers' use of benchmark assessment data to inform instruction and promote learning* (American Educational Research Association). 2013 Annual Meeting, San Francisco, CA.

Bennett, R.E. & Gitomer, D.H. 2009. Transforming K-12 assessment: Integrating accountability, testing, formative assessment, and professional support. In: C. Wyatt-Smith & J. Cummings (Eds.). *Educational assessment in the 21st century*. New York: Springer. pp. 43-61. https://doi.org/10.1007/978-1-4020-9964-9_3

Bennett, R.E. 2011. Formative assessments: A critical review. *Assessment in Education: Principles, Policy & Practice,* 18(1), 5-25. https://doi.org/10.1080/0969594X.2010.513678

Bennett, R.E. 2015. The changing nature of educational assessment. *Review of Educational Research*, 39, 370-407. https://doi.org/10.3102/0091732X14554179

Black, P. & Wiliam, D. 1998. Assessment and classroom learning. *Assessment in Education,* 5(1), 7-74. https://doi.org/10.1080/0969595980050102

Blanc, S., Christman, J., Liu, R., Mitchell, C., Travers, E. & Bulkley, K. 2010. Learning to learn from data: Benchmarks and instructional communities. *Peabody Journal of Education,* 85(2), 205-225. https://doi.org/10.1080/01619561003685379

Brookhart, S.M. 2003. Developing measurement theory for classroom assessment purposes and uses. *Educational Measurement: Issues and Practice*, 22(4), 5-12. https://doi.org/10.1111/j.1745-3992.2003.tb00139.x

Brookhart, S.M. 2010. Mixing it up: Combing sources of classroom achievement information for formative and summative purposes. In H. Andrade & G. Cizek (Eds.). *Handbook of formative assessment*. New York: Routledge. pp. 279-296.

Burch, P. 2010. The bigger picture: Institutional perspectives on interim assessment technologies. *Peabody Journal of Education*, 85(2), 147-162. https://doi.org/10.1080/01619561003685288

Chen, T.W. 2014. Predictive utility and achievement outcomes of two simultaneous district-developed interim assessment programs. Unpublished PhD thesis. Florida: University of North Florida.

Cho, V., Jimerson, J.B. & Wayman, J.C. 2015. Data system implementation: A leader navigates people problems around technology and data use. *Journal of Cases in Educational Leadership,* 18(2), 134-143. https://doi.org/10.1177/1555458915584677

Christman, J., Neild, R., Bulkley, K., Blanc, S., Lui, R., Mitchell, C., & Travers, E. 2009. *Making the most of interim assessment data: Lessons from Philadelphia.* Philadelphia: Research for Action.

Copland, M. 2002. The Bay Area school reform collaborative: Building the capacity to lead. In: J. Murphy & A. Datnow (Eds.). *Leadership lessons from comprehensive school reforms*. Thousand Oaks: Corwin Press. pp. 159-183.

Creswell, J.W. & Plano Clark, V. 2011. *Designing and conducting mixed methods research*, 2nd ed. Thousand Oaks: Sage Publications.

Datnow, A. & Hubbard, L. 2015. Teachers' use of assessment data to inform instruction. Lessons from the past and prospects for the future. *Teachers College Record,* 117(4), 1-40.

Goertz, M., Oláh, L. & Riggan, M. 2009. *Can interim assessments be used for instructional change? CPRE policy briefs*. Available at http://www.cpre.org/images/stories/cpre_pdfs/rb_51_role%20policy%20brief_final%20w eb.pdf. [Accessed December 5, 2013].

Guba, E.G. 1981. Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology,* 29(2), 75-91.

Hoover, N. & Abrams, L. 2013. Teachers' instructional use of summative student assessment data. *Applied Measurement in Education,* 26(3), 219-231. https://doi.org/10.1080/08957347.2013.793187

Hsieh, H. & Shannon, S.E. 2005. Three approaches to content analysis. *Qualitative Health Research,* 15(9), 1277-1288. https://doi.org/10.1177/1049732305276687

Jennings, J.L. 2012. The effects of accountability system design on teachers' use of test score data. *Teachers College Record,* 114(11), 1-23.

Kingston, N. & Nash, B. 2011. Formative assessment: A meta-analysis and a call for research. *Educational Measurement: Issues and Practices,* 30(4), 28-37. https://doi.org/10.1111/j.1745-3992.2011.00220.x

Little, J.W. 2012. Understanding data use practice among teachers: The contribution of micro-process studies. *American Journal of Education,* 188(2), 143-166. https://doi.org/10.1086/663271

MacQueen, K.M., McLellan, E., Kay, K., & Milstein, B. 1998. Codebook development for team-based qualitative analysis. *Cultural Anthropology Methods*, 10(2), 31-36. https://doi.org/10.1177/1525822x980100020301

Mandinach, E.B. & Gummer, E.S. 2015. Data-driven decision making: Components of the enculturation of data use in education. *Teachers College Record,* 117(4), 1-12.

Marsh, J.A. 2012. Interventions promoting educators' use of data: Research insights and gaps. *Teachers College Record,* 114(11), 1-48

Marsh, J.A. & Farrell, C.C. 2014. How leaders can support teachers with data-driven decision making: A framework for understanding capacity building. *Educational Management Administration and Leadership,* 43(2), 269-289. https://doi.org/10.1177/1741143214537229

Martin, P.L. 2012. A preliminary examination of the intended purpose, actual use, and perceived benefit of district-led interim assessments on student achievement in North Carolina schools. Unpublished PhD thesis. North Carolina: East Carolina University.

Moss, P.A. 2013. Validity in action: Lessons from studies of data use. *Journal of Educational Measurement* 50(1), 91-98. https://doi.org/10.1111/jedm.12003

Oláh, L., Lawrence, N. & Riggan, M. 2010. Learning to learn from benchmark assessment data: How teachers analyze results. *Peabody Journal of Education,* 85(2), 226-245. https://doi.org/10.1080/01619561003688688

Perie, M., Marion, S., Gong, B. & Wurtzel, J. 2007. *The role of interim assessments in a comprehensive assessment system*. Washington, DC: The Aspen Institute.

Rabinowitz, S., Roeber, E., Schroeder, C. & Sheinker, J. 2006. *Creating aligned standards and assessment systems*. Council of Chief State School Officers. Available at: http://www.ccsso.org/Documents/2006/Creating_Aligned_Standards_2006.pdf [Accessed February 1, 2010].

Roderick, M. 2012. Drowning in data but thirsty for analysis. *Teachers College Record,* 114(11), 1-9.

Saldaña, J. 2016. *The coding manual for qualitative researchers,* 3rd ed. Thousand Oaks: Sage

Shepard, L., Davidson, K., & Bowman, R. 2011. *How middle school mathematics teachers use interim and benchmark assessment data* (CRESST Report No. 807). Available at http://www.cse.ucla.edu/products/reports/R807.pdf [Accessed December 5, 2013].

Shenton, A.K. 2004. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information,* 22(2), 63-75.

Supovitz, J. & Klein, V. 2003. *Mapping a course for improved student learning: How innovative schools systematically use student performance data to guide improvement*. Philadelphia: Consortium for Policy Research in Education.

Turner, E.O. & Coburn, C.E. 2012. Interventions to promote data use: An introduction. *Teachers College Record,* 114(11), 1-13.

Wohlstetter, P., Datnow, A. & Park, V. 2008. Creating a system for data-driven decision making: Applying the principal-agent framework. *School Effectiveness and School Improvement*, 19(3), 239-259. https://doi.org/10.1080/09243450802246376

Yin, R.K. 2013. *Case study research, design and methods,* 5th ed. Newbury Park: Sage Publications.