DATA TALKS: CONVERSATIONS THAT GIVE PRESERVICE TEACHERS THE SKILLS THEY NEED TO ANALYZE AND IMPROVE INSTRUCTION

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Abstract

Accountability policies impact the way educators use data within schools and subsequently, how educator preparation programs (EPPs) train new graduates. Unfortunately, while the value of data has become more prevalent in school settings, and the amount of field data available has expanded exponentially; preservice teacher training data utilization has the potential to lag significantly behind. Many teachers, especially preservice ones, feel overwhelmed and uncertain when they are tasked with reviewing standardized test score data and making appropriate interpretation/use of results in the classroom. Teacher educators debate the advantages and disadvantages of using testing data for interpreting student progress; yet, it remains clear that data has become a primary tool for measuring practicing teachers' effectiveness. The Data Chat instructional intervention is one practice-based model that addressed the need of data literacy proficiency among preservice teachers in an experiential manner. Participating students honed their skills in areas such as progress monitoring, appropriate student instructional placement, data-driven decision making, and reflective practice.

Keywords: preservice teachers, data literacy, experiential learning, data-driven instruction

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Accountability practices and policies impact the ways in which educators use data within schools; and subsequently, how educator preparation programs (EPPs) train new graduates. Unfortunately, while the value of data has become more dominant and the amount of data available in the field has expanded exponentially; the training preservice teachers receive on effective utilization of that data often lags significantly behind (Piro, Dunlap, & Shutt, 2014). Currently, many EPPs do not explicitly address curricula using instructional practices that engage preservice educators in the practice of data literacy behaviors (Mandinach & Gummer, 2016). Teacher preparation programs have traditionally placed more emphasis on theoretical, rather than practical uses of data in preservice courses; potentially creating a systemic lack of adequately prepared teachers to effectively/accurately utilize data (Leńko-Szymańska, 2017; Creighton, 2007). Training novice teachers to understand, interpret, and use standardized testing data is necessary; as once teacher candidates become practicing educators, they are expected to disaggregate student data to improve the effectiveness of their practice (U.S. Department of Education, Office of Planning, Evaluation and Policy Development, 2011). Consequently, schools of education have a responsibility to include foundational training in the application of data-driven practices within their preservice educator courses of study (Mandinach & Gummer, 2013). Indeed, one problem that arises from expanded expectations for data use by professional teachers is how EPPs sufficiently prepare their graduates to productively use data for instructional interventions.

With major accountability measures tied to standardized testing scores, there has been a "shift to the age of big data" (Cibulka, 2012). NCATE's 2010 call to action, *Transforming Teacher Education through Clinical Practice* promoted "implementing accountability systems based on assessment measures of graduates' and programs' performance through value-added and other measures in state and district longitudinal data systems" (p. 25). In a study of data-use with both practicing and preservice teachers, Reeves, Summers, Grove, and Boylan (2016) found that only 23% of preservice teacher

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candidates with access to data systems reported having had formal coursework on the use of making data-driven decisions in their teacher education preparation programs. Engaging preservice teachers in environments that require the creation of instructional interventions as a common practice in teacher education coursework may become a non-negotiable skill expected of even the novice teacher. The author, based on research, defined the term, data literacy to mean the "ability to understand and use data effectively to inform decisions" (Mandinach & Gummer, 2013, p. 30; Mandinach, Honey, Light, & Brunner, 2008).

Many teachers, especially preservice ones, feel overwhelmed and uncertain when they are tasked with reviewing standardized test score data and making appropriate interpretation/use of the results in the classroom (Mertler, 2001). Novice teachers perceive themselves lacking the knowledge, skills, and confidence in data manipulation necessary to guide instructional decisions (Rogers, 2015). Assessment education, therefore, is needed to meet the demands of multiple stakeholders (DeLuca, 2012; DeLuca & Bellara, 2013; DeLuca, Chavez, Bellara, & Cao, 2013).

Classroom teachers have traditionally gathered data from readily available classroom sources, such as homework, in-class tests and anecdotal performance, to create instructional interventions (Brunner, et al, 2009). Such preferences may have originally stemmed from the fact that standardized test data were not collected specifically for diagnostic or formative purposes at the time; therefore, teachers may have responded to those data systems with hesitancy and distrust (Popham, 1999; Schmoker, 2000). Hence, there are disadvantages to the exclusive use of district-made or teacher-generated data for instructional interventions in teacher education programs. Such practices often reflect a narrow focus and they "report" only individual and case-by-case results rather than classroom or school-wide trends.

Teaching data literacy through summative assessments at the preservice level enhances the integrity of educational curricula via inclusion of measurement theory that addresses acquisition of skills essential for accurate data disaggregation from standardized/end-of-course state assessments. As in the cases of Australia, Finland and Singapore, summative assessment data was used to validate local assessments (Darling-Hammond, Wilhoit, & Pittenger, 2014). Consequently, teaching the use of standardized testing data may have significance for teacher education curricula as part of comprehensive data literacy outcomes now required in some state teacher performance standards.

Within the current accountability-oriented landscape, teachers must be able to use assessment data to monitor and scaffold student learning (DeLuca & Bellara, 2013). Since *No Child Left Behind* and *Race to the Top* accountability policies have been enacted in the United States, the public and their policymakers have come to depend upon standardized test scores for measures of accountability. Teacher educators debate the advantages and disadvantages of using standardized test results as a basis for individual accountability; yet, it remains clear that student performance on standardized tests has become a primary tool for measuring practicing teacher effectiveness. According to Piro et al., (2011), a majority of the states in the U.S. now use some form of student achievement measures to evaluate teachers. Teaching preservice educators how and when to analyze standardized student achievement data is simply a realistic and responsive practice in which teacher educators must learn to engage.

A major goal of teaching is the participation of students in the meaning-making process. Preservice teachers are expected to learn the conceptual foundations of subject-matter and how to deliver instruction to a diverse group of students. Additionally, they are expected to understand how individual students learn, what teaching strategies facilitate students' learning and, within content, determine which topic-oriented instructional tools will best facilitate effective lessons. Each of these knowledge bases requires application and transfer to authentic site-based settings. In effect, teacher education must provide the scaffolding to help preservice teachers facilitate learner-centered classrooms where the influence of teaching on learning is considered to be a central outcome (Hakkinen et al., 2017).

Data Chat

Teacher education programs that promote learner-centered instruction by engaging preservice teachers in the real-world application of understanding, analyzing and using data for instructional interventions may be interpreted as valid,

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practice-based, educational models (Wagner, Hammerschmidt-Snidarich, Espin, Seifert, & McMaster, 2017). Inspiring learner-centered instruction via the teaching of data literacy in a manner consistent with professional expectations is one essential component of a comprehensive, transformative teacher education curriculum that addresses the dual purposes of accountability and developmentally appropriate instruction.

The Data Chat instructional intervention is one such practice-based model that addressed the need of data literacy proficiency among preservice teachers. Through collaboration with a local school district, authentic, de-identified, classroom level state mandated test data was secured. Preservice teacher candidates were placed in small, collaborative groups according to his/her level of certification. For example, a student pursuing an Early Childhood-6 degree might be placed in a group working with a 3rd grade math data set; one pursuing 4-8 grade certification might work on a 7th grade social studies data set; and a student pursuing English 7-12 may work on the End of Course (EOC) English I data. Groupings were purposefully designed to help bridge theory to practice realities.

The Data Chat project involves a variety of steps. Students take a specific grade level/content area de-identified data set and:

- Identify strengths and weakness (whole class, disaggregated student groups, and individual students)
    - For areas of strength, identify strategies that may be used to maintain/enhance/encourage further exploration of the targeted subject/skill
    - For two challenging areas students are to:
        - identify research-based strategies to help students remediate misunderstood concepts and skills;
        - develop interventions/practices to use during instruction to address areas of student confusion or misunderstanding; and
        - create formative and summative assessments that could be used to monitor student progress/mastery of targeted skills.

- Design a presentation inclusive of data results applicable for delivery to one of three audiences:
    - School personnel (grade level, departments, cross curricular teams on a campus)
    - Parents
    - School administration such as School Board, District Officers, etc.

Prior to working directly with the classroom level data sets, undergraduate preservice teachers participated in scaffolded lessons where they became knowledgeable of (1) language/definition of terms utilized in state mandated testing and reporting, (2) basic statistical terms and procedures needed to correctly disaggregate and derive meaning from the data, and (3) research-based instructional strategies and procedures utilized to help struggling students master challenging test objectives. Once these tasks were accomplished, the experiential transfer of skills began.

A Case in Point: One Group's Journey

To illustrate, undergraduate students pursuing initial teacher certification were enrolled in an Instruction and Assessment course during the Fall 2017 semester. For the Data Chat Project, the instructor placed students in groups of three according to the specific degree classification. To facilitate collaboration, the instructor created Blackboard (Bb) student groups with full privileges associated (chat, file exchange, discussion board, task list, etc.). In this illustrative case, all group members were seeking a Bachelor of Science in Interdisciplinary Studies, Grades 4-8/ ESL. Each week a task contributing to completion of the final project was assigned to the group. This particular 4-8 ESL group chose to work with data from the state's 5th grade Science standardized test.

The group spent two weeks (inclusive of both in-class and online collaboration) disaggregating student test score results according to a variety of state criteria such as ethnicity, economically disadvantaged status, and academic groupings (Special Education, English as a Second Language, Gifted/Talented, etc.). The degree of academic progress was analyzed, and student group data were charted to identify areas of strength and challenge. As the areas of concern surfaced from test

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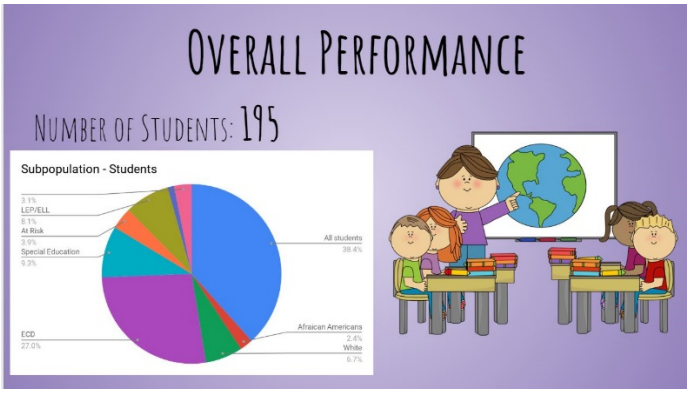
data, the group examined the 5th grade science blueprint from the state released test version to locate category(ies) giving 5th grade learners the most trouble. Once these categories were known, the group began developing interventions to address the deficits.

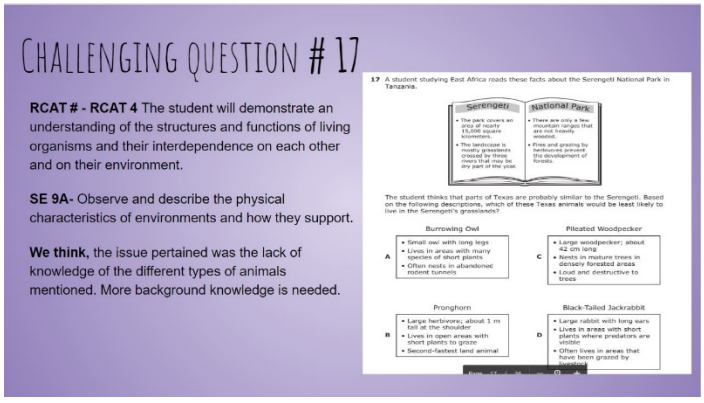
For purposes of the Data Chat assignment, the group determined which two skills 5th graders had the most difficulty mastering on this particular science test administration. For each of the identified areas of weakness, a minimum of two relevant research-based instructional strategies that could potentially help students master the targeted skill(s) were selected and a rationale was written explaining why the chosen strategy(ies) were deemed appropriate. Next, to monitor student progress toward improvement/mastery of difficult concepts, the group was charged with developing two formative and two summative assessments to use during/following utilization of their instructional strategies.

The culminating Data Chat assignment was the creation of a presentation showcasing data results through an experiential lens. The group chose a specific audience (campus/grade level/department colleagues, district administration, or parents) for dissemination of information. Presentations were designed to:

- summarize basic data set information;
- include visual representations of student score disaggregation by ethnicity, academic grouping, and/or socio-economic status;



- highlight category(ies) of most challenging skills and suggested remediation strategies;



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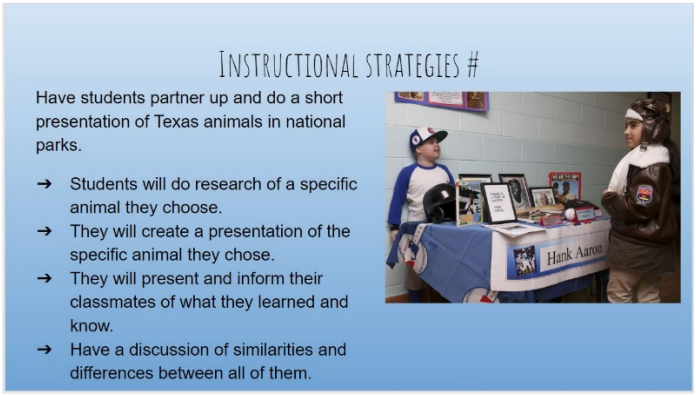
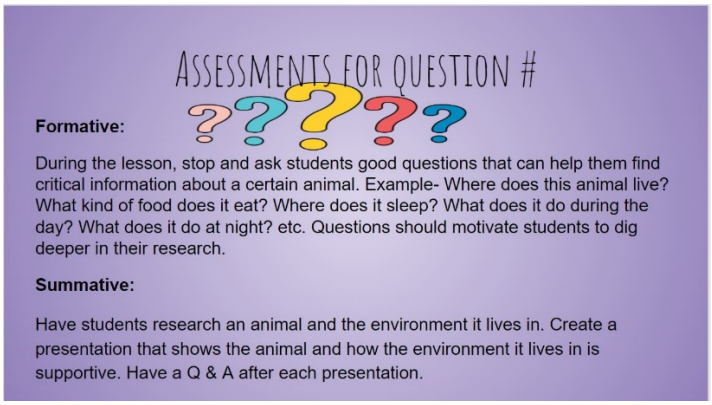
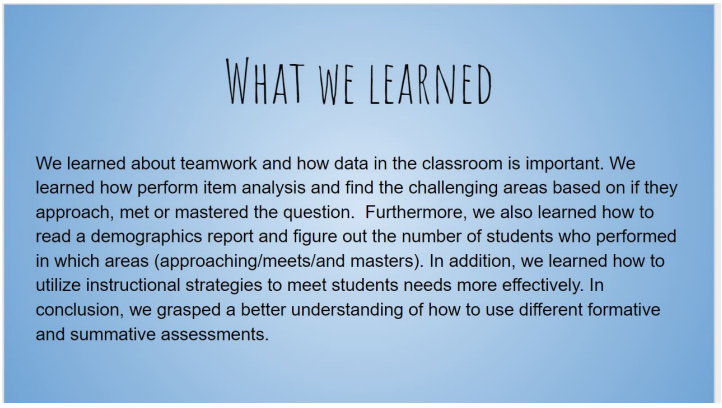


- provide explanations of formative and summative assessments for two challenging skills/concepts;



- incorporate resources necessary for the targeted audience; and
- articulate findings in language appropriate for the targeted audience.



*above examples from a 5th grade science presentation. Used with permission.

Project Significance

Data Chat provided preservice teachers the opportunity to develop a new focus on synthesizing evidence for the betterment of informed decisions, instructional differentiation, and student achievement. This was a new mode of operation as preservice teachers had not yet been tasked with collecting, organizing, analyzing and using data for instructional

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purposes/improvement. Participating students honed their skills in areas such as progress monitoring, appropriate student instructional placement, data-driven decision making, and reflective practice. Therefore, as accountability demands continue to rise at the local, state, and federal policy levels, perhaps Data Chat participants gained the foundational skills necessary to engage in data-based decision making beginning the very first moment they step into their own classroom.

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