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Teacher Perceptions of Elasticity in Student Questioning

Brian Stone[a], Rachael Pearson[b]
[a]Northern Arizona University, [b]Kyrene School District

Dr. Brian Stone is an Assistant Professor at Northern Arizona University. He is the faculty lead for the Professional Development School program and the Museum of Northern Arizona Partnership program at NAU. He received his doctorate in curriculum and instruction with a content concentration in science and math education. He also holds two master's degrees, one in elementary education, and another in World War II studies. He teaches both undergraduate and graduate courses, including courses in the doctoral program. Dr. Stone specializes in science education, but also teaches methods courses in social studies, math, literacy, and assessment. While at NAU, Dr. Stone has led multiple study abroad trips all around the world to study multiage education and integrated curriculum. He has taken students to New Zealand, Australia, the United Kingdom, Ireland, Germany, Austria, Switzerland, and France. Dr. Stone also serves as the editor for the STEAM section of the International Journal of the Whole Child. He is a Play Ambassador and recurring Expert Contributor for the Genius of Play (a non-profit website devoted to play advocacy), which is a part of The Toy Association. Dr. Stone has many areas of expertise and interests including scientific inquiry, play, integrated curriculum, and multiage education. Prior to teaching in higher education, Dr. Stone served as a 4th, 5th, and 6th grade multiage teacher. He was the lead multiage teacher in his school and helped other multiage teachers in their implementation of multiage strategies in the classroom. He also works as an educational consultant, traveling all over the United States and around the world helping schools with multiage programs. Dr. Stone has authored many peer-reviewed journal articles and book chapters in the aforementioned areas.

Rachael Pearson is an elementary school teacher in Phoenix, Arizona. She is currently in her eighth year of teaching, all in third grade. She received her undergraduate degree from Northern Arizona University (NAU) in Elementary Education, with a certificate in Early Childhood Education, and a Spanish Minor. She also holds a master's degree from NAU in Elementary Education with a K-8 reading emphasis as well as a second master's degree from Boston College in Educational Leadership & Policy. Rachael has served on various school and district wide committees including one focusing on diversity and equity initiatives. She is also a Play Ambassador for the Genius of Play which is part of The Toy Association. In her free time, Rachael enjoys hiking, traveling, cooking, and spending time with family and friends.

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Abstract

Elasticity, the capacity for students to explore or investigate their own questions of interest during or after teacher-directed events in the classroom, is highly beneficial for students in terms of their retention and deeper understanding of the content. An elastic environment is child-centered and inquiry-based. An inelastic environment (teacher-directed) results in students refraining from asking, investigating, or exploring their interests/curiosities. Teachers' perceptions of their classroom environments become an important consideration when evaluating their ability to enact elastic explorations. In this pilot study, teachers (two separate public-school districts) completed surveys describing perceptions of elasticity in their classrooms. Results indicate teachers' high value for elasticity in learning, inquiry-based investigating, and authentic student questioning. However, most teachers describe their environments as highly inelastic due to multiple barriers including time, standards, testing, stress, and a lack of training. The authors discuss potential pathways for increasing elastic environments including teacher training, professional development, and administrative support. The authors also discuss the relationship between teachers' beliefs and developing an elastic classroom environment.

Keywords: Inquiry, Questioning, Child-Centered, Constructivism, Elasticity

Introduction

Teacher perceptions remain a critical component in implementing curriculum in elementary classrooms. These perceptions generate from a combination of training in theoretical knowledge and practical classroom experience. An exploration of teachers' perceptions provides valuable information regarding whether teachers believe themselves to be child-centered or teacher-directed (Luan et al., 2010). The current design follows previous research exploring teacher perceptions of child-centered learning (Greaves & Bahous, 2020; McCombs et al., 2008). Specifically, narrative data in this study describe elementary (kindergarten through fifth grade) teachers' perceptions of the concept of elasticity in three schools (from two distinct districts and regions) located in the Southwest.

The authors define elasticity as the capacity for children to pose and explore their own questions of interest during or after a teacher-directed event (lesson). If the children do not pose or explore their own questions, the environment is considered inelastic. Previous research describes the benefits of student-directed inquiry in multiple subject areas (Patchen & Smithenry, 2013; Stone, 2016; Stone, 2020). However, the existing data describing teachers' perceptions associated with elasticity are minimal. In particular, there is a paucity of data regarding the perceived existence of elasticity in the classroom environment, its overall effectiveness, and the barriers diminishing its implementation. Therefore, the purpose of this current pilot study is to investigate general elementary teachers' perceptions of elasticity in their own classrooms with particular regard for self-described usage, perceptions of the value for creating elastic environments, and the perceived barriers to elasticity.

Authentic Inquiry and an Open-Ended Process

Student-directed inquiry is a way of thinking that supports students developing explanations using evidence and logic. It is an active process that resides within the individual (Crawford, 2015). These evolving student processes are guided and supported by the teacher. However,

many classroom teachers use outdated practices by not facilitating learning or thinking in the manner of real scientists (Crawford, 2015). Children become limited in their capacity to ask questions and may be unable to embark upon research processes involving free exploration of the content, experimentation, and construction of understandings (Stone, 2016).

Inquiry, within an understanding of constructivist theory, emphasizes the "active task of the subject and the significance of his/her inner presumptions" (Serafin et al., 2015, p. 593). Individuals build their understandings through personally meaningful and relevant experiences, and they should have plenty of opportunities to ask their own questions (Brooks & Brooks, 2001). Fosnot (2005) suggests that constructivist teaching gives learners the chance for "concrete, contextually meaningful experience through which they can search for patterns; raise questions; and model, interpret, and defend their strategies and ideas" (p. ix). This means, as children build understandings, their ability to question is paramount to navigating content and constructing meaning. Furthermore, questioning is a fundamental tool to "resolve a curiosity and grapple with trying to understand the answer" (Vale, 2013, p. 681). Children construct knowledge through relevant, meaningful, active experiences and questions (inquiries), which provide the mode for continual exploration (Lister, 2015).

However, education often focuses on the "game of facts rather than the exploratory root of scientific process," and if students "are placed in an environment that does not encourage active questioning, then that skill will not become an active habit of the mind" (Vale, 2013, p. 681). Rubin (2018) suggests that teachers ask, "all the questions and the students' job is to supply the correct answers" (para. 4). These "teacher-directed" questions are common; in contrast, when students ask their own questions (and subsequently explore/research), discourse is promoted, and creative thinking will ensue (Peters & Stout, 2006). Standards, testing, coverage mindsets and prescribed curricula (collectively referred to as "instructionism") negate the potential for elasticity (Zion & Mendelovici, 2012). Questioning is a critical component of constructivism, as inquiries remain rooted in interest, prior knowledge, and the child's unique interpretation of the world (Lister, 2015; Walker & Shore, 2015). A child's questions become expressions of innate curiosity, an attempt to understand, a starting point for investigation and process-oriented activity and are intrinsically motivated (Aulls & Shore, 2008; Stone et al., 2019).

Elasticity, Self-Motivation and Students' Inquiries

Elasticity fits well (or is evident) in an autonomy-supportive environment, as teachers in these types of classrooms guide students' personal constructions of knowledge by nurturing their interests, curiosities, and questions (Reeve, 2006). An autonomous learning environment leads to higher academic achievement and enjoyment of school (Furtak & Kunter, 2012). In contrast, controlling teachers interfere with students' self-determination because they require students to adhere to their strict agenda (Reeve, 2006; Furtak & Kunter, 2012). Furthermore, "the starting point for a controlling motivating style is the prioritization of the teacher's perspective to the point that it overruns the students' perspective" (Reeve, 2009, pp. 160-161).

Constructivist teachers utilize and foster inquiry processes; in contrast, teachers who gravitate towards passively delivering curriculum eliminate opportunities for students to construct their own knowledge (Brooks & Brooks, 2001). Previous research suggests that teachers who

implement such strategies as “Inquiry-Based learning, Project-Based Learning, Problem-Based Learning, Genius Hour, Passion-Based Learning, Personalized Learning, and Open Inquiry” share the common belief that it is critical teachers provide students with choice and autonomy in the classroom (Buchanan et al., 2016, p. 25). This pilot study contributes to these foundations an understanding of teachers’ self-ascribed value for elastic environments in their classrooms and, describes barriers they believe preclude such inquiry strategies.

Teachers often impose limitations because they follow the demands of prescribed curricula. In remaining teacher directed, they do not allow students the freedom to explore through the mode of their authentic inquiries (Stone, 2020). Despite these well-known barriers to student questioning, the literature describing teachers’ perceptions with regard to students’ authentic questioning and the construct of elasticity remains sparse.

Theoretical Foundations

This current research project is situated in a constructivist framework. Eick and Reed (2002) suggest inquiry is rooted in constructivism, and it is highly child-centered (Levy et al., 2010). Walker and Shore (2015) suggest inquiry-based learning is a key component of social constructivism and necessary for reform. Lister (2015) elaborates on this connection by suggesting that constructivism is rooted in and shaped by one’s experiences, is a personal interpretation of the world and that authentic, student-directed inquiry is the primary mode through which children construct knowledge.

Guiding Questions and Methodology

Research Questions

Based on previous literature and definitions of elasticity and inelasticity, the researchers asked the following questions:

- According to teacher perceptions of their own pedagogy and classroom environments, do their students exhibit elasticity in their questioning after teacher-directed events (lessons, teacher-directed questions, uniform assessments)?
- Are children afforded the time and resources/materials needed to explore their own questions of interest despite teacher-directed instruction, or in place of teacher-directed instruction?
- What are the teachers’ perceptions of the value of an elastic environment?
- What are the teachers’ perceptions of the barriers to an elastic environment?

Data Sources and Procedures

Data was collected through a qualitative, descriptive survey (Bogdan & Biklen, 2006). Ninety kindergarten through fifth grade teachers from three schools in two separate districts in the Southwest were asked to participate; fourteen teachers volunteered to complete the online survey.

A ten-question survey was sent to the teachers as shown in Table 1. All participation was on a voluntary basis, and teachers were given an online consent form as well as an explanation of the research in the recruitment email.

Participants were provided with a two-week period to complete the online survey. After the conclusion of the open-survey period, the researchers used the coding structures of open, axial, and selective coding to examine the descriptive data for emergent concepts and categories (Williams & Moser, 2019).

Table 1

Teacher Perceptions of Elasticity Survey Questions

1. Given the definitions and examples provided above, please describe your classroom environment in terms of elasticity/inelasticity.
2. Is your environment more or less elastic based on subject areas (math, science, language arts, social studies, arts, etc. . . .)? In other words, does the level of elasticity change with the subject? Please explain.
3. Personally, how much value do you give to students' questions?
a. Do you feel there are any constraints that hinder students' questioning in school?
4. Please explain any barriers to students' questioning/elasticity in your classroom, if any.
5. Do you feel the need to increase or decrease the amount of time or resources available for students to pose questions, investigate, and present results or conclusions?
6. Do you feel that as the teacher, you have the freedom/autonomy to change the amount of time/number of resources you give for students' questions?
7. Do you have any further comments on the concept of elasticity?

Reliability and Validity

Internal validity was checked through a standardized survey tool sent to all participants (Bhandari, 2020). Additionally, researchers used respondents' direct language to support emergent themes. The instrument provided standardized, structured questions for all participants.

The researchers triangulated the study through the use of respondent triangulation in that teachers from two different cities, districts, and schools were surveyed with a cross-case analysis (school groups) of responses in order to confirm that the data were replicative between the two schools. Furthermore, investigator triangulation was used as the two different researchers separately confirmed the findings including coding structures and emergent themes (Bhandari, 2022). Finally, theoretical triangulation was used as the results were examined through the lens of constructivist theory and previous literature (Bogdan & Biklen, 2006; McMillan, 2012).

Barriers to Student-Directed Inquiries and Classroom Elasticity

Out of ninety surveys sent, fourteen responded for a rate of 15.5%. It is important to note that all qualified teachers at the three schools received the email link to the survey. The survey was entirely descriptive and included demographic data. Demographics included 100% Caucasian; 93% female and 7% male; 71% had six or more years teaching, 21% had four-five years of teaching, and 7% taught for one year or less.

The researchers reviewed the data and used open coding to begin looking for emergent concepts. Axial coding was used to identify relationships among the open codes. Finally, selective codes were used to find core ideas from the data (Williams & Moser, 2019). Table 2 shows the axial codes by question.

Table 2: Axial Codes by Question

Question	Axial Codes
1. Given the definitions and examples provided above, please describe your classroom environment in terms of elasticity/inelasticity.	Inelasticity; time and curriculum as barriers; science and social studies tend to be more elastic; teachers see value in elasticity.
2. Is your environment more or less elastic based on subject areas (math, science, language arts, social studies, arts, etc…)? In other words, does the level of elasticity change with the subject? Please explain.	Science and social studies have the most opportunities for elasticity, fewer opportunities for elasticity in math and ELA; curriculum, time, and standards listed as barriers.
3. Personally, how much value do you give to students' questions? a. Do you feel there are any constraints that hinder students' questioning in school?	High value was ascribed to elastic Environments; differentiated learning by interest and ability; high level of engagement in elastic environments; social learning; benefits include connections to content, high-level thinking, higher curiosity, exploration and validation, interest, engagement, discovery learning, social learning, and diverse understandings/learning.
4. Please explain any barriers to students' questioning/elasticity in your classroom, if any.	Time, curriculum, scripted materials, pacing guides, assessments, tests, teachers' stress.
5. Do you feel the need to increase or decrease the amount of time or resources available for students to pose questions, investigate, and present results or	Increase time for elasticity; interest-based learning; counteract stress of standardized

conclusions?	tests; decrease strict curriculum compliance.
6. Do you feel that as the teacher, you have the freedom/autonomy to change the amount of time/number of resources you give for your students' questions?	No freedom or autonomy; compliance; limited by large class sizes

Emergent categories provide strong evidence for curriculum-centered classrooms; responses indicate highly inelastic environments. Consistent barriers and constraints include time limits, scripted curricula, identified standards, pacing guides, mandated tests, teacher stressors, limits regarding curiosity/interest, class sizes and deficiencies in teacher knowledge to respond to students' questions. For example, one teacher noted that "state standards, district-wide curriculum…and assessments" are barriers to elasticity. However, most teachers did convey a high value for students' questions and elastic environments. Teacher respondents describe the following benefits when students freely question: connections to content, high-level thinking, higher curiosity, exploration and validation, interest, engagement, discovery learning, social learning, and diverse understandings/learning. For example, one teacher describes, "I think it is incredibly important for students' questions to be validated and to give them time to explore what questions they have." Teachers even mentioned the value for themselves by providing such an environment including the following: job satisfaction, teachers getting to be facilitators of learning, and increased teacher learning. Teachers identify science and social studies as the most elastic subjects; overall, most teachers describe highly inelastic environments across all subject areas. Twelve teachers report they would prefer an increase in time and resources available for an elastic environment. One teacher describes a preference for a decrease in time available for students' questions. Another teacher shares a level of comfort with the amount of time necessary for questioning. It is interesting to compare the two teachers who preferred no change or a decrease in time because both responded having a high value for elastic environments. Finally, most teachers discuss how they had no autonomy to change the amount of time for students' questions, and as well an inability to provide more elastic environments with two notable exceptions. For example, one teacher said, "No [I have no autonomy], but I believe most teachers do what they can to work around the system in order to teach to their students' interests." Two gifted education teachers, who were exceptions, felt they had the autonomy to make changes and increase elasticity.

The selective codes or main ideas include highly inelastic environments despite teachers valuing elasticity. Additionally, teachers report constraining factors related to a curriculum-centered culture even though they would prefer to have more autonomy and to see an increase in elasticity.

Areas for future research include observational analysis to investigate if there is any misalignment between teacher perceptions of elasticity in their own classrooms and their actual practice. Furthermore, future research could include a multi-level analysis examining elasticity from both the teachers' and students' points of view.

Discussion

These current data suggest factors inhibit teachers from implementing a child-centered, elastic learning environment. For change to occur, school personnel and policymakers will need to commit to work together to overcome barriers, so elasticity is supported in classrooms. Two of these barriers are discussed along with a description of how teachers can implement small changes to create an environment more elastic in order to enhance children's learning. First, teachers describe the value in creating elastic environments allowing for student questioning; yet they report the barrier of no perceived time during the school day to provide for this inquiry. This can be attributed to the rigorous demands compelling educators to teach to the standards, follow the curriculum with fidelity, and aim for strong test scores by adhering to a coverage mindset. Secondly, educational leaders may not support a child-centered philosophy regarding learning environments, a barrier which precludes teachers' flexibility to appropriately meet students' needs and interests.

Grounded in the research, it is imperative school personnel and policymakers advocate for the increased use of elastic environments (Aflalo, 2018; Chin & Osborne, 2008). Furthermore, most teachers in this study describe significant benefits to elastic environments including teachers experiencing higher job satisfaction as well as students developing emerging critical thinking skills, seeing connections through cross-curricular content, and showing autonomy in their learning.

However, teachers could resist transitioning from a teacher-centered approach to a child-centered environment due to a lack of self-confidence and/or self-efficacy in changing current practices and implementing a new methodology. In order to affect authentic changes, it is important to provide teachers with high quality professional development opportunities on how to best implement elasticity in their classrooms. Furthermore, it is important for administrative understanding and support to enact elastic, child-centered strategies. It is also critical policymakers understand and support inquiry-based learning. Inquiry-based learning contributes significantly to students' understandings as well as fosters their unique interests. Lastly, teacher education programs must ensure quality inquiry-based training for pre-service teachers by providing pre-service teachers with time and practice in order to build a level of comfort and a capacity for teaching in an elastic environment.

Current teachers may begin with small, manageable steps to affect change in their classrooms. For example, teachers may strategically plan a span of 30 minutes of inquiry time each day to support divergent explorations based on each student's interest. Teachers can also provide more opportunities for student-led projects using the Project Approach and create choice-based centers where students can exercise their curiosity through multiple dynamic investigations. If teachers can start small and take baby steps, they can gradually move towards a more child-centered, elastic environment that supports student voice, autonomy, and child-led inquiry-based investigations. Engaging in a constructivist approach to learning through an elastic environment, children will build their own understanding of the world.

Conclusion

Data generating from this pilot study suggest most teachers express a high level of value for elasticity in the classroom with multiple benefits for the students and the teachers themselves.

However, they also perceive a significant lack of elasticity in their own classrooms and cite multiple barriers inhibiting them from enacting a more child-centered approach. Commonly mentioned barriers and constraints include time restraints, scripted curricula, standards, pacing guides, mandated tests, teacher stressors, limits regarding curiosity/interest, class sizes and deficiencies in teacher knowledge to answer students' questions. The current data indicate a significant disconnect between teachers' perceived value for elastic investigations and the fact that their students often do not explore their own questions of interest. Based on previous literature, the benefits of authentic, student-directed inquiry remain undeniable and can lead to deeper understandings, longer retention, better connection to the material, and the formation of an academic identity that leads to future success. Significant structural barriers can be overcome with relevant training, professional development, administrative support, and policy changes that afford teachers the opportunity to employ child-centered, constructivist strategies in their classroom. This current research adds to the growing evidence for using a variety of strategies including student-directed inquiry and creating more elastic environments as they relate to constructivist theory.

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