

Learner Agency in Mathematics When Classroom Instruction Incorporates Voice, Choice, and
Opportunity in Demonstrating Understandings

By Michael J. Miller Jr.

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Masters Committee:

Alison K. Mercier, Assistant Professor, Chair

Michelle T. Chamberlin, Associate Professor

Miriam Sanders, Assistant Professor

Abstract

This action research study grew out of my desire to rethink what mathematics learning looked like in my seventh-grade classroom. Over time, I began to question how often students were being asked to simply follow directions rather than actively participate in their learning in meaningful ways. This study focused on how voice, choice, and opportunity shaped students' experiences in mathematics and how intentional changes in my teaching influenced student engagement, classroom interactions, and my own growth as a teacher.

The study took place in my advanced seventh-grade mathematics classroom and centered on my shift away from a more traditional, teacher-directed approach toward one that gave students more flexibility in how they demonstrated understanding. Rather than collecting formal student interviews or surveys, I relied on ongoing teacher reflection, classroom observation, and classroom artifacts to examine what changed as I implemented more choice-based learning experiences.

Through this reflective process, I noticed important shifts in both my students and myself. Students appeared more engaged, more willing to share their thinking, and more open to taking risks when they were given meaningful opportunities to make decisions about their learning. I also saw changes in my own role as I moved from being the primary director of learning to more of a facilitator. Overall, this study suggests that creating space for voice, choice, and opportunity can support learner agency and contribute to a more engaging middle grades mathematics classroom.

Dedication

This work is dedicated to my wife, Alexa, and my daughters, Cecilia and Claire Rose, whose love, patience, and unwavering support carried me through this journey and reminded me why this work mattered. It is also dedicated to my parents, whose belief in me, constant encouragement, and lifelong support have shaped who I am and made opportunities like this possible. I am deeply grateful as well to Lindsay for the support she gave me and for the time we spent completing classes together, which made this process more manageable and meaningful. Finally, I want to thank the professors I had during my time in the University of Wyoming Science and Math Teaching Center program for their guidance, encouragement, and investment in me as both a student and an educator. I truly could not have done this without the support of all of these people.

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Chapter 1: Introduction

Introduction

The first time I gave students a meaningful choice in how they could demonstrate their understanding, I expected engagement. What I did not expect was how quickly that choice would change the energy in the room. Students began working on their projects with a level of curiosity and investment that stood out immediately. Rather than doing only what was required, several students started pushing their work further than I had asked. They experimented with new ideas, revised their work, researched information on their own, and continued improving their projects even after the basic expectations had been met.

What struck me most was not only the quality of the work, but the way students interacted with one another. Some students chose to work with classmates they would not normally select, simply because they discovered a shared interest in what they were creating. Their common interest in the project seemed to matter more than their usual social preferences. Students were talking, problem solving, revising, and exploring in ways that felt different from what I had typically seen during more traditional assignments.

That experience caused me to reflect on what had shifted. The content had not dramatically changed, but the conditions for learning had. Students were given room to make decisions, express ideas in ways that felt meaningful to them, and act on their thinking with a sense of purpose. They were not simply completing a task. They were taking ownership of it. As I reflected on that moment, I began to think more deeply about what it meant for students to have an active role in their learning and how that role might shape their engagement in mathematics.

Learner agency provides a way to understand that shift. For the purposes of this study, learner agency refers to students' perceived and enacted ability to take an active role in their

learning through voice, choice, and meaningful opportunities to participate in decisions, problem solving, and classroom processes (Lee, 2019). In mathematics, learner agency is reflected in how students explain their thinking, make decisions about strategies, take risks, and demonstrate understanding in ways that move beyond simple compliance (Mitchell 2023). Because mathematics learning depends so heavily on reasoning, communication, and productive struggle, understanding how students experience learner agency in this setting is especially important. This moment in my classroom led me to wonder how students perceive their own agency when they are given meaningful opportunities to make decisions and show understanding in ways that matter to them.

Statement of the Problem

Despite growing emphasis on student-centered learning, many middle grades mathematics classrooms continue to operate within structures that limit students' opportunities to exercise voice, make meaningful choices, and participate actively in decisions about how they demonstrate understanding. Traditional instructional models often prioritize procedural fluency, uniform task completion, and teacher-directed demonstrations of learning (Jansen et al 2013). While these approaches can support skill development, they may also constrain students' sense of ownership and active participation in their learning processes.

Research on learner agency suggests that students are more likely to engage deeply in learning when they perceive that their ideas matter, that they can influence aspects of their learning, and that they are positioned as legitimate contributors within the classroom (Raymond and Cloonan 2022). Learner agency is not merely a personal disposition; it is shaped by the interaction between students and the instructional structures that organize classroom life. When opportunities for voice, meaningful choice, and authentic participation are limited, students may

comply with expectations while avoiding risk-taking, withholding emerging ideas, or relying exclusively on safe, familiar strategies.

In middle grades mathematics classrooms, this pattern can be particularly consequential. Mathematics often requires students to reason publicly, justify their thinking, revise strategies, and engage in productive struggle. When students are hesitant to share incomplete reasoning or attempt unfamiliar approaches, opportunities for deeper learning may be reduced. Although instructional reforms frequently encourage collaborative learning and problem solving, less is known about how students themselves perceive their learner agency when classroom structures intentionally incorporate voice, choice, and opportunity in how understanding is demonstrated. There is a need to better understand how students experience these instructional shifts and how such experiences influence their willingness to take academic risks and engage creatively in mathematics learning.

Purpose of the Study

The purpose of this action research study is to examine how seventh-grade students perceive their learner agency in mathematics when classroom instruction incorporates voice, choice, and opportunity in demonstrating understanding. This study seeks to understand how intentionally embedding structures that support student voice, meaningful choice, and authentic opportunities to act on their thinking influences students' perceptions of themselves as active participants in their mathematical learning.

Particular attention will be given to students' willingness to take academic risks and engage in creative approaches when showcasing their understanding. In this study, risk-taking refers to students' readiness to share incomplete ideas, attempt unfamiliar strategies, revise their thinking, and explore multiple representations or methods without immediate certainty.

Creativity refers to students' use of original reasoning, varied approaches, and personalized ways of demonstrating mathematical understanding beyond procedural replication.

Through this inquiry, I aim to better understand how classroom structures that promote voice, choice, and opportunity shape students' perceptions of ownership, participation, and active engagement in mathematics. The findings of this study will inform my instructional practice and contribute to ongoing conversations about fostering learner agency in middle grades mathematics classrooms.

Research Question

This study is guided by the following research question: What changes do I perceive in my instruction, in students' ways of demonstrating their knowledge, and in their classroom culture when my instruction includes voice, choice, and opportunity in ways they demonstrate their understanding?

Significance of the Study

This study is significant because it explores how seventh-grade students perceive their learner agency in mathematics when they are given voice, choice, and meaningful opportunities to demonstrate understanding. In many mathematics classrooms, students are expected to complete the same tasks in the same ways, which can limit their sense of ownership and participation in the learning process. By examining how students experience instructional structures that intentionally support learner agency, this study may provide insight into how classroom practices influence engagement, risk-taking, creativity, and students' perceptions of themselves as mathematical learners.

This study is also significant for classroom practice. As a teacher-researcher, I am interested in understanding how shifts in instruction may create more meaningful opportunities

for students to participate actively in mathematics. The findings may help inform my own teaching by identifying the kinds of structures and experiences that support students in feeling more confident, invested, and willing to share their thinking. In this way, the study contributes directly to reflective practice and to the ongoing improvement of instruction within my own classroom.

In addition, this study may contribute to broader conversations in middle grades mathematics education about the importance of learner agency. While research has increasingly emphasized student voice, engagement, and participation, fewer studies have focused specifically on how middle school students perceive their own agency when demonstrating mathematical understanding. By centering students' perspectives, this study may offer a more detailed understanding of how learner agency is experienced in practice and why it matters in mathematics classrooms.

Finally, this study is significant because middle school is an important period in the development of students' academic identities, confidence, and willingness to take intellectual risks. The ways students experience mathematics during these years may shape how they view themselves as learners and problem solvers. Understanding how learner agency is supported in this context may help educators create mathematics classrooms where students see their ideas as valuable, their choices as meaningful, and their participation as an important part of learning.

Chapter 2: Literature Review

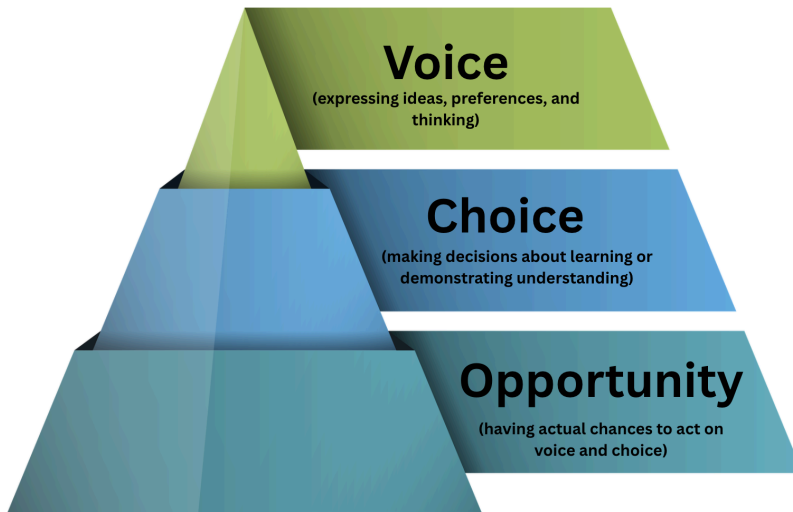
Learner Agency and the Choice, Voice, and Opportunity Framework

For the purposes of this study, learner agency is defined as students' perceived and enacted ability to take an active role in their learning through choice, voice, and meaningful opportunities to participate in decisions, problem solving, and classroom learning processes. This definition is informed by research on learners and the agency they experience in learning contexts, and it emphasizes students' sense that their ideas matter, that they can make productive decisions about their learning, and that they can contribute in ways that influence their engagement and growth in mathematics (Raymond & Cloonan, 2022).

A framework for learner agency (adapted from Lee, 2019) that is useful for this study is the Choice, Voice, and Opportunity model shown in Figure 1. The layered triangle visual represents learner agency as a connected structure: Voice refers to how learners express ideas, preferences, and thinking; Choice refers to how learners make decisions about learning or demonstrate understanding; and Opportunity refers to whether learners have real chances to act on their Voice and Choice in classroom learning (Lee, 2019). In this framework, learner agency is strengthened when all three elements are present and supported through daily instruction. When teachers intentionally support learner agency, students are more likely to engage meaningfully in learning, develop a stronger sense of ownership, and participate more confidently in mathematical thinking and problem solving. Over time, these experiences can support students' sense of themselves as capable mathematical thinkers whose ideas and actions matter in the learning process.

Figure 1

A framework for learner agency (adapted from Lee, 2019)



Choice, Voice, and Opportunity as a Conceptual Framework

Within this study, *voice* refers to students' ability to express their ideas, perspectives, questions, and thinking in ways that are taken seriously within the classroom. Across the literature, voice is described as more than simply speaking up. Raymond and Cloonan (2022) caution that student voice can become superficial if students are listened to but not given real influence, noting that listening alone is not automatically empowering. Their work shows that voice is often treated as a starting point for agency, but not the endpoint.

Voice becomes more meaningful when students are not only sharing opinions, but also participating as active partners and decision-makers. Schaefer et al. (2024) emphasize that students bring important knowledge about learning and that classrooms improve when students' ideas are respected and used to shape instruction. In Gutstein's (2007) mathematics work, voice is visible when students critique what they are learning, question accepted knowledge, and speak publicly about issues that matter to them. Their examples show voice as both classroom discourse and civic expression, with students learning to articulate their thinking and take a position.

Within this study, *choice* refers to students making meaningful decisions about how they engage in learning, how they approach problem solving, and how they demonstrate understanding. Raymond and Cloonan (2022) show that choice is commonly included in school-based definitions of agency, but they also warn that choice can be framed too narrowly if it is treated only as individual responsibility or compliance. In their discussion, choice is important, but it must be connected to relationships and classroom conditions in order to support deeper agency.

Choice involves collaborative decision-making, not just student feedback. Schaefer et al. (2024) highlight that middle grades students benefit when they have opportunities to make decisions, experience autonomy, and help shape learning environments. Gutstein (2007) adds a mathematics-specific lens by showing that students developed agency when they were not just receiving answers, but using mathematical tools to analyze issues, make interpretations, and form their own judgments. In long-term reflections, students described moving from memorizing information to making their own decisions about what to think. This is a strong example of choice as an intellectual agency.

Within this study, *opportunity* refers to the actual classroom conditions that allow students to act on their voice and choice in meaningful ways. Opportunity is what turns voice and choice into enacted agency. Raymond and Cloonan (2022) are especially helpful here because they describe agency as shaped by the cultural, structural, and material conditions of the learning environment. In other words, students may have ideas and preferences, but agency develops when the classroom creates real openings for participation, dialogue, and shared decision-making.

Active student voice and agency produce stronger outcomes when students are given real roles in improving classroom learning and school experiences. Schaefer et al. (2024) repeatedly point to the importance of creating spaces where students can act on their ideas, partner with teachers, and contribute to change. Gutstein's (2007) work makes opportunities especially concrete in a mathematics classroom. Gutstein argues that students begin to develop agency when teachers create conditions for them to use mathematics as an analytical tool and connect that work to authentic action or reflection. He also shows the opposite side of this issue: systems focused on testing can reduce opportunity by limiting time and space for student thinking, critique, and participation.

Instructional Relevance of the Choice, Voice, and Opportunity Framework

Learner agency has clear relevance to classroom instruction. Raymond and Cloonan (2022) argue that agency is not simply an individual trait, but something that emerges through the interaction between students and the classroom environment, including cultural, structural, and material conditions. In practical terms, this means instruction matters because teachers shape the conditions that either support or constrain agency through classroom relationships, routines, discourse, roles, and learning structures. They also caution that classrooms can mistake voice or choice for agency if students appear self-managing but are still dependent on teacher direction. This makes it especially important for instruction to create authentic opportunities for dialogue and participation rather than surface-level involvement.

Student voice and agency are strongest when students are not only giving input, but serving as active and collaborative partners in learning. Schaefer et al. (2024) describe classrooms where students' ideas are respected, where they are given space to make decisions, and where their knowledge helps shape teaching practices and classroom environments. These

classrooms are more responsive and student-centered, and the authors note that actively engaging student voice and agency can improve learning spaces, support engagement, and contribute to stronger academic outcomes and identity development.

Gutstein's (2007) article adds a mathematics-specific example of why this framework matters for instruction. He shows that students began developing agency when mathematics instruction gave them meaningful chances to analyze real issues, discuss their interpretations, and connect mathematical thinking to action and reflection (praxis). Gutstein's (2007) examples suggest that agency grows when instruction invites students to use mathematics as a tool for sense-making and critique, rather than only memorizing procedures or reproducing answers. Gutstein also points out that high-stakes testing environments can reduce agency by limiting opportunities for students to think critically and participate in richer forms of learning.

Donnini's (2015) study further supports the instructional relevance of this framework by showing that student voice and choice become meaningful when they are built into the design of learner-centered classrooms rather than treated as occasional options. In a qualitative case study of upper elementary classrooms, Donnini found that voice and choice contributed to a more collaborative classroom culture, increased engagement with learning standards, and helped students develop stronger understandings of themselves as learners, including connections to respect, pride, and freedom (Donnini, 2015). The study also emphasizes that voice and choice depend on instructional structures, including multiple pathways aligned to learning targets, opportunities for collaboration, and classroom routines that support students as partners in the learning process. At the same time, Donnini (2015) identifies barriers that can limit these opportunities, such as teacher control needs, classroom management concerns, and the planning demands required to create meaningful pathways. Although this study was conducted in upper

elementary settings, its findings are still highly relevant to the present study because they reinforce a central idea of the choice, voice, and opportunity framework - learner agency is shaped not only by student motivation, but by the classroom conditions and instructional decisions that make agency possible (Donnini, 2015).

Why the Choice, Voice, and Opportunity Framework Fits Middle Grades Mathematics

This framework is appropriate for studying middle school mathematics learning because it aligns with both the developmental needs of young adolescents and the demands of meaningful mathematics instruction. Schaefer et al. (2024) emphasize that middle grades students benefit from environments that respect their ideas, autonomy, and participation in decisions, and they specifically call for more research on how active voice and agency shape motivation, engagement, belonging, achievement, and classroom teaching in middle school contexts. This makes the choice, voice, and opportunity framework, or learner agency framework (Lee, 2019), a strong fit for the present study because it provides a clear way to examine how students experience agency during mathematics learning, not just whether they complete tasks.

This framework is also especially appropriate for middle school mathematics because mathematics classrooms naturally require students to explain their thinking, make decisions about strategies, and participate in problem solving. These are the same kinds of actions reflected in choice, voice, and opportunity (Lee, 2019). Gutstein's (2007) work shows that when students are given real opportunities to use mathematics to interpret situations, question ideas, and form judgments, they begin to see themselves as capable mathematical thinkers and contributors. In this way, the learner agency framework supports an understanding of learner agency in mathematics as something students experience through classroom participation, not simply as a personal attitude.

Learner Agency in Middle Grades Mathematics: A Choice, Voice, and Opportunity Perspective

While learner agency can be defined broadly across educational settings, this study is focused on what learner agency looks like in the day-to-day reality of a middle grades mathematics classroom. In mathematics, agency is not only about whether students are given choices; it is also about whether they are positioned to think, explain, question, and contribute in ways that matter to the learning process (Brown, 2020). The structure of tasks, the way teachers respond to student thinking, and the norms for participation all shape whether students experience meaningful agency. For that reason, this section turns to mathematics education literature to examine how learner agency is described and enacted through choice, voice, and opportunity in middle grades classrooms.

Building from the learner agency framework (Lee, 2019) established earlier in this chapter, the following sections examine how mathematics education literature describes learner agency in middle grades classrooms. This review focuses on how students are positioned to make decisions, share reasoning, and participate meaningfully in classroom learning, as well as the instructional conditions that support or constrain those opportunities.

Choice in Middle Grades Mathematics Classrooms

Curricular and Task-Level Choice. In standards-based mathematics classrooms, learner agency is often visible in the ways students are positioned as active decision-makers rather than passive recipients of procedures (Manouchehri, 1998). Reform-oriented curricula can create space for students to decide how to approach problems and how to communicate their mathematical thinking. Rather than limiting students to isolated skill practice, several studies describe classroom environments built around whole-task engagement, where students are

expected to reason through complex problems, stay with mathematical ideas over time, and take ownership of the problem-solving process (Jansen et al 2013; Taylor, 2008).

Whole-task structures matter because they create room for students to engage in sustained sense-making. In these settings, students are not just completing assignments; they are making decisions about how to begin, what strategies to test, what to revise, and how to justify their thinking. This shift away from compliance-focused work and toward deeper mathematical engagement supports a stronger form of learner agency grounded in meaningful participation.

Strategy and Solution Choice. One of the clearest indicators of agency-supportive instruction is the invitation for students to use and discuss multiple solution strategies (Jansen et al 2013). When teachers intentionally welcome different approaches, students are positioned as mathematical thinkers rather than students whose main job is to produce a correct answer. This matters because it communicates that reasoning, comparison, and justification are valued in the classroom, not just speed or accuracy (Dunleavy, 2015; Turner et al., 2013).

Encouraging students to choose methods that make sense to them supports both autonomy and ownership. Students are more likely to experience agency when their approaches are treated as valid contributions to mathematical discussion and when they are given opportunities to explain why a method works . These invitations also challenge narrow views of mathematical competence by reinforcing that understanding develops through exploration and sense-making.

Structural and Technological Choice. Some studies describe learner agency in structural or procedural terms, such as students' ability to pause, continue, or extend participation in mathematical tasks, particularly in technology-supported settings (Nguyen et al., 2018; Lack, 2010). These forms of Choice may increase autonomy on the surface because students can make

decisions about pacing or engagement. However, the literature suggests that these options alone do not automatically produce meaningful learner agency.

Without clear expectations and instructional support, students may not use these forms of autonomy in productive ways. In some cases, students may disengage rather than self-direct, especially when classroom norms for participation are not well established (Nguyen et al., 2018). This distinction is important because it shows that learner agency is not simply about offering options. Meaningful agency depends on the combination of Choice, support, and structured participation.

Material and Tool Selection. Access to mathematical tools, including manipulatives, is often described as a concrete expression of learner agency (Moyer et al., 2004). When students can choose tools to represent, test, and explain their thinking, they have more ways to engage with mathematical ideas and participate in the learning process. In this sense, tool use can support agency by expanding how students make meaning and communicate reasoning.

At the same time, the literature shows that teacher mediation plays a major role in whether tool access becomes truly exploratory or remains tightly controlled (Moyer et al., 2004). If manipulatives are used only for teacher demonstration or in highly prescribed ways, students' opportunities for agency remain limited. In contrast, when students are invited to choose tools, adapt their use, and explain their reasoning, tool use becomes part of how students participate as mathematical sense-makers.

Voice in Middle Grades Mathematics Classrooms

Student Reasoning and Mathematical Contribution. A second major strand of the literature connects learner agency to student voice and shared mathematical authority. In agency-supportive classrooms, teachers create space for students to explain their reasoning,

compare ideas, and make their thinking visible. These practices position students as capable sense-makers whose ideas matter to the collective work of the class, rather than as passive recipients of instruction (Dunleavy, 2015; Turner et al., 2013).

Voice in this context means more than simply talking in class. It includes having one's reasoning taken seriously as part of the mathematical work. When students are invited to justify, clarify, and revise their thinking, they participate as contributors to classroom meaning-making rather than simply responding to teacher questions. This kind of participation is central to learner agency because it reflects both expression and influence.

Shared Leadership and Distributed Expertise. In some classrooms, learner agency is further supported through shared leadership structures that redistribute mathematical authority. When teachers delegate parts of the mathematical work to students, they disrupt traditional teacher-centered hierarchies and expand who gets to shape the learning conversation (Dunleavy, 2015). Students are not only allowed to contribute; they are expected to help move the mathematical work forward.

This redistribution of authority is visible in studies that describe distributed expertise and peer-supported practices, including forms of "secret teaching" in which students help explain and support one another's thinking (Fulton, 2009). These structures highlight an important point: student Voice becomes stronger when students are positioned not just as individuals answering questions, but as active contributors to a mathematical community.

Students Influencing Pedagogy and Classroom Norms. In some studies, student voice extends beyond problem solving and classroom discussion to include influence over instruction itself. For example, Ambassador models positioned students to review classroom data and provide feedback to teachers about instructional improvement, allowing students to participate

directly in shaping teaching decisions (Lee 2019). This broadens learner agency by recognizing students as co-constructors of the classroom environment.

Journal writing has also been used as a form of student voice that informs pedagogy, especially when teachers use student reflections to make instructional decisions. Similarly, classroom norms and identities can be co-constructed through ongoing interactions in which students help shape what counts as participation, belonging, and competence in mathematics (Ruef et al., 2022). Taken together, these findings suggest that learner agency includes not only Voice in solving mathematics problems, but also Voice in shaping the relational and instructional conditions of the classroom.

Opportunity in Middle Grades Mathematics Classrooms

Opportunity as Structure, Access, and Positioning. Within a learner agency framework (Lee, 2019), opportunity refers to the classroom conditions that make meaningful participation possible. This includes access to rich tasks, time for discussion, tool use, supportive norms, and instructional structures that position students to make decisions and contribute reasoning. Opportunity is not just the setting around instruction; it is the set of conditions through which learner agency is either supported or constrained.

Across the literature, opportunities for learner agency are often created through reform-oriented task design, discussion-based instruction, and classroom environments that prioritize reasoning over answer production (Manouchehri, 1998; Jansen et al 2013). However, the presence of these structures alone is not enough. Students also need to be positioned as legitimate participants. In other words, opportunity includes both access and recognition: students need entry points into the work, and they need classroom messages that their contributions are mathematically valuable.

Teacher Practices That Create Opportunity. Teacher practice is one of the strongest influences on whether opportunities for learner agency are created and sustained.

Agency-supportive teachers often take a facilitative stance, using questioning and probing instead of direct telling to move learning forward (Manouchehri, 1998). This shifts the teacher's role from the sole source of knowledge to the person who structures opportunities for student thinking and participation.

Teachers also create opportunities for agency when they transfer responsibility to students and press for conceptual understanding rather than procedural completion (Jansen et al 2013). These moves communicate that students are expected to reason, explain, and make sense of mathematics, not just reproduce steps. When this happens, opportunity becomes more than access to a task; it becomes access to meaningful participation in mathematical thinking.

Discourse moves are also a key part of Opportunity. Non-evaluative language can reduce status differences and increase students' willingness to take risks (Dunleavy, 2015). Explicit validation of student reasoning helps position students as legitimate mathematical contributors and supports broader participation in discussion (Turner et al., 2016). Invitations to justify, clarify, and compare strategies create opportunities for students to engage in mathematical argumentation and collective meaning-making.

Practices That Limit Opportunity. The literature also identifies classroom practices that limit opportunities for learner agency. One recurring issue is the lowering of cognitive demand, which reduces students' opportunities to engage in genuine reasoning and decision-making (Jansen et al 2013). When tasks are simplified too quickly or reduced to procedural steps, students have fewer chances to make judgments, test ideas, or develop ownership of the work.

Other practices can limit participation by reinforcing status hierarchies or restricting exploration. For example, labeling a small group of students as the "smart" or "genius" students can narrow who is seen as capable of contributing. Likewise, demonstration-only uses of manipulatives can limit students' opportunities to explore and make sense of ideas for themselves (Moyer et al., 2004; Thompson, 2023). Limited tolerance for tinkering, productive struggle, or nonstandard methods may also communicate that mathematics is about compliance instead of reasoning. In middle grades classrooms, these patterns are especially important because students' mathematics identities are still forming.

Barriers to Enacting Learner Agency

Teacher-Level Barriers. Even when teachers value learner agency, the literature suggests that implementation can be challenging. Teachers often report difficulty shifting away from answer-focused instruction and grading toward practices that emphasize communication, reasoning, and process. This is not just a strategy shift; it also requires a shift in beliefs about what counts as mathematical learning and how students demonstrate understanding. Limited pedagogical content knowledge can also make agency-supportive teaching harder to enact, especially in relation to manipulatives and discussion-based instruction (Moyer et al., 2004; Kalchman et al., 2011). Teachers may provide tools or offer choices, but still struggle to structure those opportunities in ways that support sustained mathematical thinking. As a result, classrooms may include surface-level agency (such as choices in format or pacing) without consistent opportunities for meaningful student decision-making and Voice.

Student-Level Barriers. The literature also shows that students do not always use choice effectively, especially in classrooms with high autonomy but limited scaffolding (Nguyen et al., 2018). Some students may struggle with self-regulation, persistence, or decision-making when

expectations are unclear or when they are not used to agency-supportive structures. This is especially relevant in middle grades mathematics, where students may be adjusting to more teacher-directed learning environments.

Students may also hesitate to use their voice in mathematics when classroom norms do not support risk-taking. Socio-cognitive risks related to public error can discourage participation, especially when students fear being wrong in front of peers (Lack, 2010). Students may withhold ideas, avoid strategy sharing, or disengage from discussion if they do not feel safe taking intellectual risks. These findings reinforce that learner agency depends not only on instructional design, but also on emotional safety and social positioning in the classroom.

Institutional and Systemic Barriers. Broader school and system-level factors also shape whether classrooms can sustain choice, voice, and opportunity. Traditional school structures, including pacing demands and limited time for discussion, can reduce opportunities for sustained mathematical conversation and collaborative sense-making (Restani, 2021). In many cases, structural expectations prioritize coverage and efficiency over depth and student-led reasoning.

Assessment pressures and standards alignment demands may further narrow instructional possibilities, especially when teachers feel pressure to prioritize procedural performance over exploration and explanation (Kalchman et al., 2011). In addition, dominant views of mathematics instruction often privilege certainty, speed, and compliance, which can conflict with agency-supportive practices that depend on dialogue, experimentation, and student influence (Thompson, 2023). Resource limitations and deficit-oriented beliefs about students can also restrict who is invited into rich mathematical participation.

Synthesis and Implications for the Present Study

Across the literature, learner agency in middle grades mathematics is most visible in the ways students are positioned to make decisions, share reasoning, use tools strategically, and contribute to classroom meaning-making. When viewed through a learner agency framework (i.e., choice, voice, and opportunity; Lee, 2019), these studies show that learner agency is not simply a student trait. Instead, it is shaped by classroom structures, teacher moves, and the kinds of participation made available to students.

At the same time, the literature remains inconsistent in how learner agency is defined. Many studies describe agency-supportive practices without explicitly naming or clearly theorizing learner agency as a construct. This gap matters for the present study. By defining learner agency through the connected dimensions of choice, voice, and opportunity, this study provides a clear framework for examining how agency is enacted in a middle grades mathematics classroom and how students experience those conditions in practice.

What the Literature Says About Learner Agency in Middle Grades Mathematics

Across the mathematics education literature, learner agency is most often described through what students are able to do within the learning process (Mitchell 2023). In middle grades mathematics classrooms, learner agency often becomes visible when students are able to choose strategies, select representations, use tools to support reasoning, and explain why their thinking makes sense. In this way, agency is not about students doing whatever they want. Rather, it is about students making meaningful mathematical decisions within the structures of the classroom.

Several scholars help clarify what learner agency looks like in mathematics settings. Mitchell (2023) offers one of the most operational descriptions of agency in a mathematics classroom by showing how agency is enacted through students' choices of methods,

representations, and tools, as well as through their justifications for those decisions. This work is especially useful because it makes agency visible in day-to-day classroom practice rather than treating it only as an abstract concept. Sengupta-Irving (2016) similarly describes agency as purposeful mathematical action, emphasizing that students develop agency when they are engaged in doing meaningful disciplinary work rather than merely following procedures. Her framing of agency as a human and disciplinary “dance of agency” is especially helpful because it shows that agency develops through the interaction between students and the mathematical work itself.

Other literature adds important conceptual depth to this understanding. Moses et al. (2020) define agency in relation to intentionality, self-regulation, and reflection, while also connecting agency to the pedagogical decisions teachers make and the constraints they face in practice. Sharrock and Rubenstein (2019) further position agency as relational and socio-constructivist, connecting it to belonging, growth mindset, and relevance in mathematics learning. Gutstein (2007) broadens the meaning of learner agency by showing that students can use mathematics not only to solve problems, but also to interpret inequity, critique social conditions, and become active subjects in the world. Taken together, these studies suggest that learner agency in middle grades mathematics is best understood as meaningful participation in mathematical thinking, decision-making, and sense-making within classroom structures that either support or constrain that participation.

The Three Pillars of Learner Agency in Mathematics Classrooms

Because this study uses learner agency, or choice, voice, and opportunity, as its conceptual framework, it is important to consider how these three dimensions are described specifically within mathematics education research. Although these ideas are closely connected

in practice, the literature suggests that each contributes something distinct to the enactment of learner agency in middle grades mathematics classrooms.

Choice and Its Impact

Research in mathematics education often connects student choice to increased motivation, ownership, and engagement. At the same time, the literature also makes clear that choice is most meaningful when it is structured and supported rather than completely open-ended. Simply giving students options does not automatically create agency. Students need clear expectations, supportive routines, and meaningful mathematical tasks in order for choice to lead to deeper participation.

Mitchell (2023) is especially helpful here because she shows that structured choice is embedded in classroom norms, lesson design, and teacher responsiveness. Her work suggests that choice functions best when it is intentionally planned and supported through routines that help students make productive decisions. Sengupta-Irving (2016) adds that choice is closely tied to authority and collaboration in mathematics classrooms. In her study, high cognitive demand served as an important guardrail, allowing students to participate in authentic mathematical thinking while preventing instruction from slipping into low-level procedural work. This is an important distinction because procedural remediation can actually reduce learner agency by removing opportunities for students to make sense of mathematics for themselves. Sharrock and Rubenstein (2019) also connect choice to autonomy through self-determination theory, showing that students are more engaged when they experience ownership over their learning. Together, these studies suggest that choice matters not because it creates freedom alone, but because it can position students as active participants in mathematical learning when supported by strong instruction.

Voice and Its Impact

Student voice in mathematics classrooms is often visible through explanation, reasoning, argumentation, and participation in mathematical discussion. However, voice is not only about how often students speak. It is also about whether their ideas are taken seriously and whether they are able to influence the learning process through their contributions. In mathematics, voice becomes meaningful when students are encouraged to explain their reasoning, compare strategies, ask questions, and participate in collective sense-making.

The literature also highlights the importance of psychological safety in supporting student voice. Moses et al. (2020) identify student choice and voice as themes connected to teachers' efforts to construct agentic spaces, while also showing that teachers face obstacles in sustaining those spaces. Their work is particularly useful for understanding that voice depends on more than teacher invitation; it also depends on whether students feel safe enough to participate. Mitchell (2023) similarly emphasizes the role of classroom norms in supporting mathematical talk and co-constructing conditions where students can think and speak with confidence. Sengupta-Irving (2016) shows that in collaborative algebra settings, students' voices become more powerful when authority is distributed and students engage in debating, reasoning, and revising ideas together. Gutstein (2007) extends this understanding by positioning voice as sociopolitical, where students read and write the world through mathematics and use their ideas as tools for critique and expression. Across these studies, voice is strengthened when classrooms value understanding over answer-getting and when students are positioned as legitimate contributors to mathematical work.

Opportunity and Its Impact

Opportunity to learn is a central part of learner agency because not all students are given equal access to rigorous tasks, meaningful roles, or chances to participate in mathematical discourse. For that reason, opportunity is not simply the background condition for agency. It is part of the structure of agency itself. Students may be encouraged to speak or choose, but if they are consistently given easier work, fewer leadership roles, or limited time to engage with ideas, then learner agency remains constrained.

Sengupta-Irving (2016) is especially important in this regard because she directly critiques the lowering of cognitive demand for students perceived as underperforming. Her work suggests that organizing for agency requires maintaining access to high-demand mathematical work as an equity practice. (Sharrock and Rubenstein 2019) add that opportunity is also shaped by belonging, competence, and the ways classrooms reinforce or disrupt status hierarchies. Their critique of bias and giftedness narratives shows that agency can be limited when only certain students are positioned as capable of engaging deeply in mathematics. Gutstein (2007) expands opportunity even further by showing that students can be given opportunities to use mathematics to interrogate injustice and connect mathematical reasoning to broader social understanding. Mitchell (2023) also reminds us that classroom norms and social relationships mediate who feels invited into participation. Together, this literature shows that opportunity is inseparable from access, positioning, and equity. Learner agency depends not only on what options students have, but also on whether the classroom creates real openings for them to participate fully.

Student Choice in Learning and Demonstrating Understanding in Mathematics

An especially important area within this literature is the role of student choice in learning mathematics and in demonstrating mathematical understanding. Studies suggest that giving students meaningful choices can increase their sense of ownership, strengthen engagement, and

support deeper reflection on their thinking. At the same time, the literature also points to challenges. Choice can become confusing or unproductive when expectations are vague, tasks are weak, or teachers step back without providing enough structure or support. Choice appears to work best when tasks are meaningful, norms are clear, and teachers continue to press students to explain and justify their thinking (Mitchell 2023).

Mitchell's (2023) work is especially relevant to this study because it provides detailed empirical evidence about how often choice appears in mathematics classrooms, what kinds of choices students are given, and how students justify those decisions. Her findings suggest several benefits of choice, including increased ownership, reflection, and awareness, while also identifying challenges related to self-management and social expectations. Importantly, Mitchell shows that choice is most productive when supported by task structure and teacher responsiveness. Sengupta-Irving (2016) reinforces this point by showing that agency-supportive choice is strongest when classrooms maintain high cognitive demand, distribute mathematical authority, and support collaborative norms. This work also shows the opposite: when instruction moves toward procedural remediation, opportunities for agency are reduced. Sharrock and Rubenstein (2019) similarly connect choice to autonomy and competence, emphasizing that engagement increases when students feel both ownership and belonging.

This literature is highly relevant to the present study because it helps explain the conditions under which student choice may support learner agency in mathematics classrooms. At the same time, an important gap remains. While many studies examine student choice during problem solving, far less attention is given to how students themselves perceive agency when they are demonstrating their understanding. This distinction matters. Students may be offered options in format, strategy, or representation, but it is still necessary to ask whether they actually

experience those opportunities as meaningful forms of agency. That gap provides a strong rationale for the present study.

Chapter Summary

This chapter reviewed literature related to learner agency and examined how agency has been conceptualized and enacted in middle grades mathematics classrooms. Across the literature, learner agency is most consistently associated with students having meaningful opportunities to make decisions, express reasoning, participate in discourse, and contribute to classroom learning in ways that matter. When viewed through the learner agency framework (Lee, 2019), learner agency is not simply an internal trait or disposition. Instead, it is shaped by classroom structures, teacher practices, task design, discourse norms, and the broader conditions that either support or constrain participation.

The literature also shows that choice, voice, and opportunity are closely connected in mathematics learning. Choice is strengthened when it is meaningful, structured, and connected to rich mathematical work. Voice becomes more powerful when students feel psychologically safe, when their ideas are treated seriously, and when they are positioned as contributors to mathematical understanding. Opportunity matters because agency depends on access to rigorous tasks, legitimate roles in classroom participation, and equitable conditions for engagement. Together, these dimensions provide a useful framework for examining learner agency in middle grades mathematics.

At the same time, the literature reveals important areas that remain less understood. Although many studies describe agency-supportive practices, fewer studies center students' own perceptions of agency, especially in relation to how they demonstrate understanding in mathematics. Much of the existing research focuses on teacher moves, task design, or classroom

structures, but less attention has been given to how students interpret those experiences and whether they perceive them as meaningful opportunities for choice, voice, and participation.

This gap directly supports the purpose of the present study. By examining how seventh-grade students perceive learner agency when demonstrating understanding in mathematics, this study responds to a need for more student-centered research in middle grades mathematics education. The learner agency framework provides a clear conceptual lens for investigating those experiences and aligns directly with the study's focus on how students perceive opportunities to act as active participants in their own mathematical learning.

Chapter 3: Methodology

Research Design

This study used an action research design (Mertler, 2024) because the purpose was to examine and improve a specific instructional practice in my own classroom: introducing student choice in how learners demonstrated their mathematical understanding. Action research was a strong fit for this study because it is a form of practitioner inquiry in which educators investigate their own practice in order to improve student learning and refine instruction (Mertler, 2024). Rather than separating research from practice, action research positions teachers as reflective practitioners who engage in ongoing cycles of planning, acting, observing, and reflecting (Kemmis et al., 2014).

This design was appropriate for my study because it focused on implementing an instructional change grounded in learner agency and examining how that change influenced instruction and student participation. By using action research, I was able to focus on what was happening in my own classroom, make adjustments as I learned, and use the process to strengthen my teaching practice (Cochran-Smith & Lytle, 2015).

Context and Participants

This action research study took place in my classroom, a seventh-grade mathematics classroom at a public middle school in a Mountain West city. The school serves a diverse population of students and includes a range of academic needs, learning preferences, and levels of engagement. As a middle school setting, it provided a meaningful context (e.g., like what?) for examining instructional practices designed to increase learner agency in mathematics.

The focal class for this study was one of my seventh-grade math classes. I selected this class because it represented a typical classroom context for my teaching and provided an

appropriate setting to implement and observe an instructional change connected to the learner agency. The class included students with varied levels of confidence, participation, and mathematical readiness, which made it a meaningful group for examining how voice, choice, and opportunity were enacted in practice.

My role in this study was both the classroom teacher and a researcher. I am an experienced middle school educator and currently teach seventh-grade mathematics. I have been an educator for 16 years, with the last four spent in middle school, teaching 7th grade mathematics. My interest in this study grew from my commitment to improving student engagement and creating classroom experiences where students have meaningful opportunities to participate, make decisions, and demonstrate their learning in ways that support both confidence and growth in mathematics.

Instructional Changes

Before this study, my classroom instruction typically relied on more teacher-directed ways for students to demonstrate mathematical understanding. In most cases, students completed the same type of task or product after instruction, which created consistency but also limited the ways they could show their thinking and engage in decisions about their learning.

During this study, I introduced instructional changes designed to increase learner agency by giving students more choice in how they demonstrated their mathematical understanding. I intentionally created multiple options for students to show what they knew while keeping all options aligned to the same mathematical learning goals. This shift moved my instruction toward a more student-centered approach by creating more space for voice, choice, and opportunity within the learning process.

The unit used for this project focused on systems of equations. It included six lessons and

was designed to last approximately 12 instructional days. Each lesson followed a two-day format. The first day was used for whole-group instruction, teacher modeling, and guided examples. The second day provided students with work time, along with enrichment or reteaching opportunities based on student needs.

The primary standard addressed in this unit was 8.EE.C.8: Analyze and solve pairs of simultaneous linear equations. This standard requires students to understand that the solution to a system of two linear equations in two variables represents the point of intersection of their graphs because that point satisfies both equations simultaneously. Students are also expected to solve systems of linear equations algebraically, estimate solutions by graphing, solve simple cases by inspection, and apply systems of equations to real-world and mathematical problems.

After completing the unit, students were introduced to a choice board that included nine different activities. Each activity included a brief explanation and example to help students understand the expectations. Before students selected an activity, I shared examples of previous student work and led a discussion about appropriate ways to demonstrate mathematical understanding. Students then reviewed the available options and selected the activity that most interested them.

Table 1 provides an overview of the unit structure, lesson sequence, and instructional changes made during the implementation of this project.

Table 1

A description of the organization of instructional changes

6 Lesson Unit	
Lesson 1	
Day 1	Day 2
Day 1 followed a more traditional lesson structure using an “I do, we do, you do” format. During this time, I provided example problems and modeled the processes students would need to use when solving systems of equations. Students watched as I worked through problems step by step and were given opportunities to ask questions throughout the lesson. They then worked through similar problems as a whole group, discussed what they noticed, and asked any additional questions that came up during the process.	Day 2 was used as student work time. During this lesson, students were introduced to the choice board and given the opportunity to select an activity that interested them. After reviewing the available options, students began working on their chosen activity as a way to demonstrate their understanding of systems of equations.

Data Collection

The data I collected for this study included three transcripts of recorded reflections. I collected lesson plans as well as samples of student work from the different response options I provided in order to reflect on how the introduction of choice was enacted in practice and how students responded to it. These artifacts, the lesson plans and student work samples, served as artifacts and evidence during my reflection process and helped me examine how my instructional decisions played out in the classroom.

I recorded and transcribed structured reflections about my teaching. I responded to a set of reflection questions designed to prompt analysis of instructional shifts, student participation, and connections to learner agency, especially the constructs of voice, choice, and opportunity

(Mertler, 2024). Table 2 shows example reflection questions and the full set of reflection questions can be found in Appendix A. Together, these data sources supported a systematic examination of my instructional decision-making and students’ responses to the changes I implemented.

Table 2
Example reflection questions

Question Topic	Example Question
Clarifying the Change	How did you define “learner agency” (voice, choice, opportunity) going into this project?
Teacher Control & Decision-Making	How did your role shift—from evaluator, to facilitator, to coach, or something else?
Voice	In what ways did students have a voice in how they demonstrated their learning?
Choice	What patterns did you notice in student selections (e.g., who chose what, and why)?
Opportunity	How did offering choice create new opportunities for students to demonstrate mathematical understanding?
Looking Forward	How has this project reshaped your beliefs about what seventh graders are capable of when given voice, choice, and opportunity?

AI Use to Support Reflection

To support my structured reflection process, I used ChatGPT version 5.3 (OpenAI) as a generative tool to help develop a set of reflection questions aligned with my conceptual framework. I first described my project in detail, including the instructional change I was studying and the learner agency framework guiding the study. I then prompted ChatGPT to generate reflection questions that (a) focused on the instructional change of introducing student

choice in how learning was demonstrated, (b) surfaced shifts in my teaching practice, (c) examined students' experiences and participation, and (d) connected to the core constructs of learner agency: voice, choice, and opportunity (Lee, 2019).

After ChatGPT generated an initial set of questions, I reviewed, revised, and refined them to ensure they aligned with the goals of my project and the study's conceptual framework (Lee, 2016). ChatGPT functioned only as an idea-generation support tool. All final decisions regarding question selection, wording, and use were made by me as the researcher. The final list of reflection questions can be found in Appendix A.

Data Analysis

My data analysis focused on my reflection responses and followed two phases of qualitative coding (Saldaña, 2021). In the first phase, I used open coding to identify key ideas, actions, and perceptions present in the reflection transcripts. During this initial cycle, I labeled short segments of text with descriptive codes. This process helped me capture shifts in instructional planning, facilitation, assessment practices, and my observations of student engagement and participation. In this phase, I stayed close to the data and worked to generate a broad set of initial codes (Saldaña, 2021).

In the second phase, I reviewed, compared, and grouped the initial codes using pattern coding to identify broader categories and emerging themes (Saldaña, 2021). I examined relationships among codes, with particular attention to patterns connected to learner agency and the framework of voice, choice, and opportunity. Codes with similar meanings were clustered together and then collapsed into broader themes (Saldaña, 2021). Through this process of moving from initial codes to thematic patterns, I developed a deeper interpretation of how learner agency was enacted and experienced in my classroom.

Table 3 describes the coding and analysis process in more detail. For data analysis, I used two rounds of qualitative coding. The first round was open coding. In that stage, I looked closely at my reflection transcripts and identified key ideas, actions, and perceptions. I was asking,

"What is happening here?" and "What patterns are beginning to show up?" The second round was pattern coding. In that stage, I grouped related codes into broader categories and looked for larger themes. Through that process, three major findings emerged: changes in me as the teacher, changes in students as learners, and changes in classroom culture. One example was the choice board. It created more student pathways, but it also shifted my role. I could not just be the answer key anymore. I had to become more of a coach and facilitator.

Table 3*Description of coding and analysis process*

Piece of Reflection Transcript	Open Coding Descriptive Codes	Second Level Coding
<p>That was a big shift, especially the first day. I introduced a choice board with nine possible options and told students to find something that interested them and answer the question in a way that made sense to them. What changed immediately was that I no longer had one clear pathway for all 30 students. Students kept coming up to ask whether they were on the right track, but because everyone was doing something different, I had to respond more like a coach than an answer key. That forced me to think on my feet a lot more.</p>	<ul style="list-style-type: none"> • Big shift • No clear path • Giving students choice • Different role 	<p><i>Shift in the role of the teacher</i> (Choice & Opportunity)</p>
<p>At the same time, the room felt different because students were interpreting the task in their own ways instead of following a single worksheet. I intentionally asked them not to announce every idea to the whole class, because I wanted to protect space for originality rather than ending up with 30 versions of the same project.</p>	<ul style="list-style-type: none"> • Opportunity for creativity • Space for individuality • Room felt different 	<p><i>Changes in the "feeling" of the room</i> (Opportunity)</p>
<p>What I saw was students branching off from one another, taking ideas in different directions, and producing work that reflected their own thinking.</p>	<ul style="list-style-type: none"> • Owning their creativity • Different interpretations • Doing their own thing 	<p><i>Students breaking off from the norm</i> (Voice)</p>

Note: Connections to framework are in **bolded** text, while connections to themes are in *italicized* text

Trustworthiness

To strengthen the trustworthiness of this action research study, I used multiple sources of data and a structured reflection process. The use of classroom artifacts (lesson plans and student work samples) alongside transcripts of recorded reflections allowed me to examine my instructional changes from more than one perspective. Using more than one data source supported a more credible interpretation of what happened in my classroom and helped me ground my reflections in evidence rather than memory alone.

I also used a consistent set of reflection questions across the study to support

dependability in my data collection process. These questions helped me examine instructional shifts, student participation, and learner agency in a systematic way over time. In addition, I documented my coding process in two phases (open coding and pattern coding), which created a clear and traceable path from the raw reflection data to the final themes (Saldaña, 2021). This process supported transparency in how I interpreted the data and developed findings.

Because I served as both teacher and researcher, I also worked to strengthen trustworthiness through ongoing reflexivity. Throughout the study, I paid attention to how my own assumptions, expectations, and instructional goals could shape what I noticed and how I interpreted student responses. By intentionally reflecting on my role in the study, I was better able to remain thoughtful and critical in my analysis of learner agency in my classroom.

Researcher Positionality

I conducted this study as the classroom teacher and researcher, which means my role in the setting was both a strength and a limitation. As the teacher, I had direct knowledge of my students, my instructional routines, and the classroom context. This allowed me to closely examine how the instructional changes unfolded in real time and to interpret student responses within the day-to-day reality of the classroom.

At the same time, my position as the teacher-researcher shaped the study in important ways. I entered this research with a strong belief that increasing learner agency through voice, choice, and opportunity could improve student engagement and participation in mathematics. Because of this, I recognized the need to be intentional about not only noticing moments that supported my beliefs, but also attending to moments of challenge, inconsistency, or limited impact. I addressed this by grounding my reflections in classroom artifacts and using a structured reflection process to examine my decisions and students' responses.

My professional background also influenced this work. As a middle school mathematics teacher, I care deeply about creating classroom environments where students feel capable, involved, and valued in the learning process. This commitment shaped my interest in learner agency and my decision to study how instructional choices might open more space for students' voice, choice, and opportunity. Rather than trying to remove myself from the research process, I approached this study with the understanding that action research values practitioner knowledge while also requiring careful reflection and transparency about the researcher's role (Mertler, 2024).

Ethical Considerations

This study was conducted in my own classroom and focused on improving instructional practice through action research. Because the study involved students and classroom-based data, I took steps to protect participants and maintain ethical research practices. Student work samples were used as classroom artifacts to deepen my reflections, and any identifying information was removed or anonymized during analysis and reporting. The goal of the study was not to evaluate individual students, but to examine how an instructional change related to learner agency was enacted and experienced in the classroom.

I also took care to ensure that participation in classroom learning activities remained part of normal instruction and that the instructional changes aligned with the learning goals of the class. The choices I introduced for demonstrating mathematical understanding were designed to support student learning and did not place students at an academic disadvantage. In this way, the research process remained connected to my role as a teacher and to my responsibility to provide equitable learning opportunities.

Because I served as both teacher and researcher, I also considered the power dynamics

present in the classroom. I recognized that students may respond to classroom activities within the context of my authority as their teacher. For that reason, my analysis focused on patterns in instructional practice and student participation rather than judgments about individual students. I also maintained a reflective stance throughout the study to ensure that my interpretation of student responses remained focused on the instructional questions guiding the research.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the study took place in one seventh-grade mathematics classroom in a single school setting. Because the study was context-specific and focused on my own practice, the findings are not intended to be broadly generalizable. Instead, the purpose was to develop a deeper understanding of how learner agency through voice, choice, and opportunity was enacted and experienced in my classroom.

A second limitation is my dual role as teacher and researcher. While this role gave me valuable insight into the classroom context, it also introduced the possibility of bias in how I observed, reflected on, and interpreted the data. I addressed this through structured reflection, the use of classroom artifacts, and a systematic coding process; however, my interpretations were still shaped by my perspective as the person implementing the instructional changes.

A third limitation is the nature of the data sources. This study relied primarily on classroom artifacts and my recorded reflections, which means the analysis centered on my observations and interpretations of instructional practice and student participation. Although student work samples provided important evidence, the study did not include direct student interviews or surveys. As a result, the findings reflect an interpretation of learner agency from my teacher-researcher perspective rather than a full account of students' perspectives in their

own words.

Finally, the study examined instructional change over a limited period of time. Learner agency develops over time and may shift as students become more familiar with classroom routines, expectations, and opportunities for participation. Because of the limited timeframe, the findings represent an early view of how students responded to increased choice in demonstrating mathematical understanding rather than a long-term measure of change.

Summary

This chapter described the methodology I used to examine how introducing student choice in demonstrating mathematical understanding influenced learner agency in my seventh-grade mathematics classroom. I used an action research design to study and improve my own instructional practice through cycles of implementation and reflection. The chapter outlined the research design, context and participants, instructional changes, data collection procedures, use of AI to support reflection, and data analysis process.

This chapter also addressed trustworthiness, researcher positionality, ethical considerations, and limitations of the study. Together, these methodological decisions supported a systematic and reflective examination of how voice, choice, and opportunity were enacted in my classroom and how students responded to those instructional shifts. Chapter 4 presents the findings that emerged from the analysis of the reflection data and classroom artifacts.

Chapter 4: Findings

The purpose of this action research study was to examine how seventh-grade students perceived their learner agency in mathematics when classroom instruction incorporated voice, choice, and opportunity in demonstrating understanding. This chapter addresses the research question, What changes do I perceive in my instruction, in students' ways of demonstrating their knowledge, and in their classroom culture when my instruction includes voice, choice, and opportunity in ways they demonstrate their understanding?

Through analysis of the data, three themes emerged: changes in me as a teacher, changes in my students as learners, and changes in classroom culture. Together, these themes show how introducing greater voice, choice, and opportunity influenced not only the ways students demonstrated understanding, but also the ways teaching, learning, and participation were experienced in the classroom. The following sections describe each theme in greater detail. All quotes in this chapter are attributed to me and come from reflection transcripts.

Changes in the Teacher (Myself)

One of the biggest changes I observed in myself was that I moved away from the traditional structure I had relied on for most of my teaching career. In the transcript, I explained that “most of my teaching followed an ‘I do, we do, you do’ structure” and that students were usually given “a specific worksheet” or task that I had already chosen for them. As I made this change, I moved away from requiring one product from every student and instead started asking students to “show me that they understand in a variety of ways.” That shift changed my role as the teacher because I was no longer simply delivering a lesson and assigning the same follow-up task to everyone. Instead, I began creating space for students to make more decisions about how they would demonstrate understanding, which made my teaching feel more aligned with learner agency than with compliance. This shift is reflected in my teacher's reflection when I wrote,

“Instead of staying in that black-and-white evaluator role, I moved into a much grayer space where I was asking them to reflect on whether their work truly showed understanding.” This shows that my role changed from simply deciding whether an answer was right or wrong to helping students think more deeply about the quality of their own mathematical understanding.

Another change I observed was that I started thinking differently about voice and about my own role in the classroom. Before this work, I mostly thought of voice as students sharing or talking in class. Over time, that understanding changed. In the reflection, I said that I saw voice as students having “a real say in the direction of their learning and in how they make sense of the lesson.” That change also pushed me to see my role differently. Rather than controlling every step of the lesson, I found myself shifting more toward facilitation. As I described it, “My role has shifted more toward facilitation,” where I set the purpose for the lesson and then “create room for students to take the conversation somewhere meaningful.” This was a major shift in my teaching because it required me to value student thinking more openly and allow their ideas to shape how the learning unfolded.

Another change I observed was that I became more laid back. In my reflection I said, “I have had to become more laid back in some ways.” I had to trust students more and trust that their thinking could look different. As I put it, I had to “trust students more, trust that thinking can look different,” and trust that “not every productive moment will look like students quietly working through the same problem at the same pace.” I noticed myself becoming more comfortable with moments that felt less structured or predictable than what I had been used to. I also realized that I had to release some of the traditional power of the classroom and allow more discussion, more variation, and more uncertainty. In that way, this shift changed not only what I asked students to do, but also how I understood productive learning in my classroom.

I also noticed that my planning became more creative and less fixed. In the reflection, I explained that planning used to feel “straightforward: teach the lesson, give the notes, hand out the worksheet, and have students complete it.” Once I introduced more choices, that no longer worked in the same way. I found that I had to think ahead about “multiple ways students might show understanding,” and I started learning from the work students actually produced. I mentioned examples of students using graph paper, Desmos, screenshots, and written explanations, and I realized that these products were helping me build “a bank of models that supports future choice without taking the ownership away from students.” This was a clear change in my teaching because planning was no longer about preparing one path for all students. Instead, it became more about anticipating possibilities, collecting examples, and designing for flexibility.

A final change I noticed in myself was in the way I thought about assessment and teacher authority. In the transcript, I said that students often wanted me to tell them “whether they were right, whether they were doing enough, and whether they were on the correct path.” In the past, that kind of evaluator role felt more natural because everyone was doing the same work. With this shift, however, I moved into what I described as “a much grayer space” where I was asking students to reflect on whether their work actually showed understanding. I also realized that I needed “better tools for judging the quality of what they produce when the products are no longer all identical,” which kept bringing me back to the need for “a rubric or some kind of shared criteria.” This showed me that changing instruction also required me to rethink how I assessed student understanding and how I communicated rigor without returning to total control.

Changes in Students

One change I noticed in students was in their engagement. In the reflection, I described

the first day as feeling “exploratory,” and I said there was “a buzz in the room” because students were trying to figure out what I wanted, what they were supposed to do, and what others were choosing. By the second day, that energy became more focused. I noted that students were “more motivated to produce something and to explore the task more seriously.” What stood out to me was that engagement seemed to grow as students began to see what was possible. Rather than simply finishing an assignment because it was required, students responded to the task with more curiosity and more investment as they watched peer ideas develop around them.

I also noticed changes in students’ ownership and persistence. In the reflection, I said that “once they saw what they could create, there was more ownership and more pride in the work.” One student, for example, kept returning to graphing tools even after the class had moved on, “not because he had to, but because he wanted to keep improving what he was making.” I also described a student who chose “the hardest option and would not let it go,” even when I gave her chances to switch. That kind of persistence stood out to me because it suggested that ownership could keep students with a task longer than a traditional assignment might. When students had room to create, revise, and extend, the work became something they wanted to return to rather than something they completed just for points.

Another change I observed in students was that choice revealed strengths and patterns I would not have noticed through a worksheet alone. In the transcript, I said that the shift helped me notice “who takes ownership, who experiments, who persists, and who stays with the safest path.” I was surprised that some students I expected to be the most creative chose a “simple paper-and-pencil option,” while some students who were usually comfortable leaving work unfinished “really took ownership and ran with the task.” That mattered because it showed me that student agency did not always appear in the ways I might predict. It also reminded me that

students sometimes needed examples and scaffolds before they were ready to make meaningful choices, especially when the work was more open-ended than what they were used to.

I also saw students begin to interact differently with one another. In the reflection, I noted that students who did not usually work together ended up choosing similar kinds of tasks and then started “sharing strategies, comparing products, and almost competing in a productive way to make their work stronger.” This was important because it allowed different strengths to come forward in ways that did not always happen in more typical classroom structures. Instead of only completing their own work in isolation, students noticed what others were doing, talked about different approaches, and used peer ideas as a way to strengthen their own understanding. That kind of interaction suggested that student choice was not only changing the products they created, but also the way they participated as learners in the room.

Changes in Culture

One of the clearest cultural shifts in the classroom was that the room became less centered on teacher control and more centered on shared responsibility. In my reflection, I said that I had to “release some of the traditional power of the classroom” and allow “more discussion, more variation, and more uncertainty.” I also said that this changed the classroom because “the room becomes less about teacher control and more about shared responsibility for learning.” This felt like an important cultural shift because it reflected a change in what students and I were both expected to do. Instead of the classroom operating as a place where I directed every step, it became a space where students had more responsibility for thinking, deciding, and contributing.

This cultural shift is supported by my reflection when I wrote, “That changes the classroom culture too, because the room becomes less about teacher control and more about

shared responsibility for learning.” This shows that the classroom culture changed because students were expected to take a more active role in the learning process, and the responsibility for learning was no longer held only by the teacher. I also noticed that classroom culture changed because students began to see that math could exist in more than one format and that success did not have to follow a single teacher-approved path. In the reflection, I explained that students were “interpreting the task in their own ways instead of following a single worksheet,” and that they were “branching off from one another, taking ideas in different directions, and producing work that reflected their own thinking.” Later, I noted that students began to see “multiple ways of being successful in math rather than one teacher-approved path.” That shift mattered because it changed the message students received about what counted as mathematical competence. The culture became more open to variation, creativity, and individual thinking rather than only valuing sameness and compliance.

Finally, the classroom culture changed because students began learning not only from me, but also from each other. I described how, as the day went on, I started collecting student samples and using them to help later classes understand what meaningful demonstrations could look like. I noted that this “made a huge difference” because students were no longer “just hearing directions from me”; they were also “analyzing peer examples and discussing what actually showed understanding.” In that way, the classroom became more collaborative and more dialogic. Students were not only completing tasks, but also helping shape the opportunity structure of the room by asking questions, sharing examples, and expanding what others believed was possible.

Chapter 5: Discussion

Discussion of the Findings

The findings of this study support the literature on learner agency by showing that when students were given meaningful voice, choice, and opportunity in how they demonstrated understanding, they became more engaged, more invested, and more willing to take ownership of their learning. This finding is consistent with the conceptual framing used in this study (i.e., learner agency), which positions learner agency as emerging through the interaction of choice, voice, and opportunity rather than as a fixed student trait alone. In this study, students did not simply complete an assignment in different formats. Instead, they returned to their work voluntarily, revised their thinking, explored tools and representations, and demonstrated greater pride in what they produced. These findings make sense in light of the literature reviewed in Chapter 2 (Mitchell, 2023; Sengupta-Irving, 2016; Sharrock & Rubenstein, 2019), particularly the work emphasizing that learner agency in mathematics becomes visible when students are able to make meaningful decisions, explain reasoning, select tools and strategies, and participate as active mathematical thinkers. The increased engagement and ownership observed in this study suggest that when students are provided with structured opportunities to make decisions within clear expectations, they are more likely to experience mathematics as something they do rather than something that is done to them (Sengupta-Irving, 2016).

The findings also support the literature by showing that learner agency depended not only on student choice, but also on changes in my own teaching and on the instructional conditions of the classroom (Raymond & Cloonan, 2022). As I moved away from requiring one identical product and shifted toward facilitation, flexibility, and shared criteria, I saw students respond with greater independence, persistence, and variation in their thinking. This finding aligns with

the literature suggesting that learner agency is shaped by classroom structures, teacher decisions, and the ways students are positioned within the learning environment (Raymond & Cloonan, 2022; Mitchell, 2023). The findings from this study make sense because students were not being asked to work without structure; rather, they were being invited to participate within a classroom that increasingly valued different ways of showing understanding. At the same time, the data also showed that this shift required more intentional planning, stronger teacher responsiveness, and clearer thinking about assessment. In this way, the findings reinforce the idea that learner agency is not created by simply giving students more freedom. Instead, it develops when teachers deliberately design the conditions that make meaningful participation possible (Donnini, 2015).

A third way the findings connect to the literature is through the theme of classroom culture. As students were given more voice, choice, and opportunity, the classroom became less centered on compliance and more centered on shared responsibility, collaboration, and multiple ways of being successful in mathematics (Donnini, 2015; Ruef et al., 2022). Students began to interact differently with one another, sharing strategies, comparing products, and using peer ideas to strengthen their own thinking. This finding is consistent with the literature suggesting that learner agency is relational and socially constructed, particularly in mathematics classrooms where discourse, belonging, and mathematical authority shape participation (Sharrock & Rubenstein, 2019; Ruef et al., 2022; Sengupta-Irving, 2016). The cultural shift observed in this study makes sense because when students were no longer limited to one teacher-approved path, they had greater opportunities to see themselves and others as legitimate contributors to mathematical learning. As a result, learner agency appeared to influence not only individual engagement, but also the broader norms, interactions, and expectations of the classroom. The findings suggest that when learners are positioned as contributors rather than compliance-driven

task completers, the classroom itself can become more dialogic, more collaborative, and more responsive to student thinking (Donnini, 2015; Schaefer et al., 2024).

Recommendations

Based on my findings, I recommend that middle grades mathematics teachers intentionally incorporate structured opportunities for voice, choice, and opportunity into the ways students demonstrate understanding. This recommendation does not suggest removing teacher guidance or replacing rigor with unlimited freedom. Instead, it suggests that classrooms should be designed so that students can make meaningful decisions within clear academic boundaries. Teachers can support this work by beginning with clear learning targets, designing tasks that allow for more than one valid way to demonstrate understanding, and developing shared criteria or rubrics that communicate expectations across varied products. Because the findings of this study showed that students responded positively when they could revise, extend, and personalize their work, teachers should also plan for reflection, revision, and the use of multiple representations as part of regular classroom practice.

Planning for a learner agency also requires teachers to think ahead about the support students may need in order to use choice productively. In this study, students benefited from seeing examples, observing peer ideas, and having opportunities to discuss what counted as evidence of understanding. For that reason, I recommend that teachers build in scaffolds such as student models, peer discussion, reflection prompts, and teacher conferences when implementing more open-ended demonstrations of learning. In addition, teachers should anticipate that planning for learner agency may initially feel less predictable than preparing one assignment for all students. However, as this study showed, collecting student examples over time can help teachers build a stronger bank of models and create future opportunities for choice without

taking ownership away from students. In this way, learner agency should be planned for not as an add-on, but as an intentional instructional approach.

Moving forward, I would recommend that mathematics teachers intentionally build opportunities for choice, voice, and opportunity into their regular instruction rather than treating them as separate projects or extra activities. For example, in a mathematics classroom, this might include allowing students to choose how they demonstrate understanding of a concept, such as solving systems of equations through a written explanation, graphing task, real-world scenario, visual model, or technology-based activity. Teachers can also provide students with opportunities to explain their reasoning, compare strategies, ask questions, and reflect on which methods make the most sense to them. This keeps the focus on mathematical understanding while also giving students more ownership in how they engage with and communicate their learning.

Finally, I recommend that teachers view this work as both an instructional shift and a cultural shift. Supporting a learner agency requires more than changing the product students complete. It also involves reconsidering teacher authority, assessment practices, classroom norms, and beliefs about what productive mathematical learning can look like. When students are given meaningful opportunities to show understanding in different ways, they may become more willing to take risks, collaborate with peers, and see themselves as capable mathematical thinkers. For that reason, I would recommend this approach for middle grades mathematics classrooms because it has the potential to support stronger engagement, greater ownership, more creative demonstrations of understanding, and a classroom culture that values student thinking as an essential part of learning.

Conclusion

This study examined how seventh-grade students perceived their learner agency in

mathematics when classroom instruction incorporated voice, choice, and opportunity in demonstrating understanding. The findings suggest that when students are given meaningful opportunities to make decisions, share their thinking, and act on their ideas within supportive classroom structures, they may become more engaged, more persistent, and more invested in their learning. The findings also suggest that learner agency influences not only students, but also teaching practice and classroom culture. As I shifted my own role from directing one identical pathway toward facilitating multiple meaningful pathways, I observed corresponding changes in student participation, ownership, and collaboration. Taken together, these findings reinforce the value of learner agency as an important consideration in middle grades mathematics instruction and suggest that designing for voice, choice, and opportunity may help create classrooms where students experience mathematics as a space for thinking, contributing, and growing.

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APPENDIX A

Reflection Questions for Action Research Project

I. Clarifying the Change

1. What specific change did you introduce in your classroom related to student choice in demonstrating learning?
2. How did you define “learner agency” (voice, choice, opportunity) going into this project? Has that definition shifted?

II. Planning & Instructional Design

A. Shifts in Planning

4. How did planning for multiple demonstration options differ from planning a single, uniform assessment?
5. What new considerations emerged (e.g., clarity of learning goals, alignment, scaffolding, time management)?
6. How did you ensure that all options maintained rigor and aligned with the intended mathematical learning outcomes?
7. In what ways did you need to anticipate student decision-making when designing the choices?

B. Teacher Control & Decision-Making

8. What aspects of control did you intentionally release to students?
9. How did your role shift—from evaluator, to facilitator, to coach, or something else?

III. Voice

11. In what ways did students have a voice in how they demonstrated their learning?
12. Did students express preferences, interests, or strengths through their chosen formats?
13. Were there students whose voices seemed amplified or muted by the change? Why might that be?

IV. Choice

15. How did students make decisions about which demonstration option to pursue?
16. What patterns did you notice in student selections (e.g., who chose what, and why)?
17. Were there instances where choice appeared superficial versus deeply connected to ownership of learning?

V. Opportunity

19. How did offering choice create new opportunities for students to demonstrate mathematical understanding?
20. Were there students who benefited more from this structure? Why?
21. Did this shift create new opportunities for revision, risk-taking, or creativity?

VI. Student Engagement & Learning

23. What differences did you notice in student engagement?
24. Did students persist differently when working on self-selected tasks?

VII. Equity & Access

27. Did providing choice disrupt or reinforce existing participation patterns in your classroom?
28. Were certain students better positioned to take advantage of the choices?

VIII. Instructional Implications

30. How has this experience changed how you think about assessment in mathematics?
31. What did you learn about your students as learners?
32. What did you learn about yourself as a teacher?
33. If you were to implement this again, what would you refine or redesign?

IX. Tensions & Constraints

35. What constraints (time, curriculum pacing, grading, standards) shaped how much agency you could realistically offer?

X. Looking Forward

38. How has this project reshaped your beliefs about what seventh graders are capable of when given voice, choice, and opportunity?
39. What does “agency” now mean to you in the context of mathematics instruction?
40. What is one concrete shift you will carry forward into your future teaching practice?