

EXPLORING HIGH SCHOOL TEACHERS' INCLUSION OF STATISTICS IN INTERMEDIATE ALGEBRA

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ABSTRACT

As statistics content standards are increasingly embedded in U.S. high school mathematics curricula, Intermediate Algebra has become a key course for students' statistical learning. This multiple case study used survey and interview data to examine how 10 high school mathematics teachers described their inclusion of statistics within Intermediate Algebra, as well as the rationales and curricular decisions guiding that work. Across cases, statistical literacy emerged as a shared instructional goal for including statistics in the course; teachers emphasized that learning statistics prepares students for the workplace and future professions, informed citizenship and personal choices, or both. Although teachers described teaching similar statistics content—primarily descriptive statistics, probability, and statistical association—statistical inference received comparatively limited attention. These findings highlight both the opportunities and constraints of including statistics content within Intermediate Algebra and offer implications for curriculum design, teacher preparation, and professional learning.

Keywords: *Statistics education research; Multiple case study; Secondary mathematics education; Statistical literacy; Practicing mathematics teachers*

1. INTRODUCTION

As society becomes increasingly data-driven, pre-tertiary education has sought to increase students' engagement with and exposure to statistics so they can effectively interpret and navigate the world around them (e.g., Bargagliotti et al., 2020; Ministry of Education, n.d.). In the United States (U.S.), this emphasis has led to the adoption of statistics content standards at both the state and national levels, resulting in a greater integration of statistics throughout K–12 mathematics curricula (Bargagliotti et al., 2021). These content standards reflect a shift from viewing statistics as an isolated subject toward positioning it as an integrated strand of mathematical reasoning across grade levels that includes reasoning with data, understanding variability, and engaging in statistical inference. As Burrill (2025) argues, this shift requires a reconceptualization of high school mathematics curricula to more fully embrace statistical thinking as essential for *all* students, rather than only for those pursuing advanced mathematics pathways.

One high school (grades 9–12) mathematics course that has taken on many of these statistical expectations is the second course in algebra (e.g., Intermediate Algebra, Algebra II, Integrated Math III, or the equivalent), which we refer to collectively as *Intermediate Algebra*. This course is positioned as an important context for developing students' foundational skills in statistics because it is completed by most U.S. high school students and often serves as a graduation requirement (National Center for Education Statistics, 2022). Appendix A of the *Common Core State Standards for Mathematics* (CCSSM) outlines course pathways for high school mathematics and provides a structural framework for organizing content standards into coherent and rigorous courses (National Governors Association

[NGA] & Council of Chief State School Officers [CCSSO], 2010b). Within these pathways, Intermediate Algebra is recommended to include statistics content standards that emphasize variability, data analysis, probability, making inferences, and justifying conclusions. Students in this course are expected to move beyond describing data toward making and justifying claims about populations based on samples, reflecting an increased emphasis on statistical inference within high school mathematics curricula. As a result, Intermediate Algebra has become a critical, yet understudied, setting where students' encounters with statistical inference may occur within required coursework.

As statistics content standards become more integrated within high school mathematics curricula, teachers face new challenges related to teaching statistics, creating a need to better understand when, where, and how statistics is being included in mathematics coursework. While numerous studies have examined the teaching and learning of statistics in high school Advanced Placement (AP) Statistics courses (e.g., Franklin et al., 2011; Haines, 2015; Lee & Harrison, 2021), these courses are typically elective and enroll a relatively limited population of students. Comparatively little research has investigated statistics instruction within Intermediate Algebra courses (e.g., Arnold & Green, 2022), despite their broader reach and central role within high school mathematics pathways. Understanding whether and how statistics is included in Intermediate Algebra is important to ensure that opportunities to develop statistical thinking are not limited only to students who advance to AP Statistics courses (Usiskin & Hall, 2015). In this multiple case study, we aim to address this need by exploring the ways high school mathematics teachers across the U.S. include statistics within Intermediate Algebra courses.

2. LITERATURE REVIEW

To situate this work, we synthesize research related to teachers' inclusion of statistics within high school mathematics courses. First, we examine the historical and policy-driven integration of statistics content standards within K–12 mathematics curricula in the U.S. and highlight key differences between mathematics instruction and statistics instruction. Second, we review research on the preparation of prospective high school mathematics teachers for teaching statistics. Third, we consider studies of ongoing professional learning for practicing teachers' statistics instruction, with attention to emerging research on the integration of statistics into core high school mathematics courses, especially Intermediate Algebra, the context of this study. Together, these strands of literature situate this work within a growing body of scholarship that seeks to understand how high school mathematics teachers include statistics within existing mathematics curricular structures.

2.1. INTEGRATING STATISTICS WITHIN K–12 MATHEMATICS

In the U.S., statistics emerged as a formal school subject with the 1989 National Council of Teachers of Mathematics (NCTM) standards, which introduced informal statistical inference into grades 5–12 for the first time (Shaughnessy, 2019). These standards catalyzed the creation of data-focused curricula and, soon after, the AP Statistics course and exam in the 1990s (Scheaffer & Jacobbe, 2014). In the early 2000s, the *Pre-K–12 Guidelines for Assessment and Instruction in Statistics Education* (GAISE) I report (Franklin et al., 2007) articulated goals for statistical literacy and influenced the statistics and probability strand of the 2010 CCSSM (NGA & CCSSO, 2010a). The adoption of the CCSSM subsequently prompted 43 U.S. states to add new statistics benchmarks into their mathematics curricula (Franklin, 2013). More recently, the Pre-K–12 GAISE II report (Bargagliotti et al., 2020) and the *Statistical Education of Teachers* (SET) II report (Franklin et al., in press) have expanded this vision by emphasizing statistical literacy, data science, and effective teacher preparation to support students' development of statistical literacy across Pre-K–12 education. Together, these documents and recommendations reflect a sustained effort to position statistics as an integral component of school mathematics while also underscoring the importance of understanding how teachers interpret these content standards and recommendations into day-to-day classroom practice.

Although statistics content standards have become increasingly embedded within high school mathematics curricula (Usiskin & Hall, 2015), the teaching of statistics requires forms of reasoning that differ in important ways from traditional mathematics instruction. Mathematics instruction has

historically emphasized abstraction, deductive reasoning, and deterministic relationships, whereas the teaching of statistics is rooted in context, variability, and the interpretation of data under uncertainty (Schreiter et al., 2024; Watson & Smith, 2022). Despite these distinctions, statistics instruction remains narrowly procedural, often reduced to formulaic computation using contrived datasets (Batanero & Díaz, 2010). This mismatch between the nature of statistics and prevailing instructional practices highlights the need to reconceptualize how statistics is addressed within teacher education. Rather than positioning statistics as an add-on to mathematics, teacher preparation programs must intentionally support prospective teachers in developing statistical reasoning alongside mathematical reasoning (Bargagliotti et al., 2020; Franklin et al., in press). Without such preparation, even well-prepared mathematics teachers may find it challenging to recognize and convey the distinctive nature of statistical inquiry, particularly when statistics is embedded within required mathematics courses that are not designed to explicitly foreground statistical thinking. Ensuring that teacher preparation addresses the epistemological foundations of statistics is therefore essential for supporting teachers to incorporate current recommendations for statistics instruction and support students' statistical learning.

2.2. STATISTICS PREPARATION IN TEACHER EDUCATION PROGRAMS

Although statistics content standards are now recommended to integrate across high school mathematics courses, teachers often enter the classroom with uneven exposure to both statistics content and pedagogy, not due to lack of ability, but because of structural gaps in their preparation (Franklin et al., 2011; Güven et al., 2021). Research highlights the persistence of this challenge. For example, Lovett and Lee (2017) found that many high school mathematics teacher preparation programs did not adequately prepare prospective teachers to teach statistics and called for more intentional alignment between coursework, current content standards, and data-centric instructional goals. Similarly, Lee and Hollebrands (2023) reported that high school mathematics teachers often rely on procedural approaches to statistics instruction, not because they undervalue conceptual understanding, but because they have had limited opportunities to engage with inquiry-oriented models of teaching statistics.

Some teacher preparation programs have begun to address this well-documented gap in preparation through dedicated methods courses focused specifically on the teaching of statistics. Research suggests that these courses can strengthen prospective teachers' instructional practices by providing pedagogical approaches tailored to the distinctive nature of statistics education (da Ponte, 2011). In particular, methods courses that emphasize big statistical ideas such as variability, inference, and data exploration, rather than isolated procedures and formulas, have been shown to deepen prospective teachers' statistical understanding and improve their readiness to teach statistics (Shaughnessy, 2019). By prioritizing conceptual reasoning over procedural competence alone, these approaches align with national recommendations for statistics education and support more robust learning opportunities for both prospective teachers and their future students (Gattuso & Ottaviani, 2011).

2.3. PROFESSIONAL LEARNING FOR PRACTICING TEACHERS' STATISTICS INSTRUCTION

Strengthening prospective teachers' statistical preparation is important, as is supporting practicing teachers—many of whom are already navigating the demands of teaching statistics, often without robust preparation. Teachers' statistical content knowledge is closely linked to their ability to identify and address students' conceptions and reasoning (Callingham et al., 2016). Yet, because statistics is a relatively new component of many high school mathematics curricula, many practicing teachers received limited exposure to statistics during their own preparation programs (Batanero et al., 2011; Güven et al., 2021; Lovett & Lee, 2017). Research has documented persistent misconceptions among teachers in areas such as variability (Lovett & Lee, 2018), measures of center (Thanheiser et al., 2011), and inferential reasoning (Lovett & Lee, 2018). These findings reflect the rapidly evolving expectations for statistics instruction and highlight the need for ongoing professional learning that builds on teachers' mathematical strengths while supporting their understanding of the distinctive nature of statistical reasoning through inquiry, data exploration, and technology integration (Schoen et al., 2025).

In response to these evolving expectations, researchers and teacher educators have developed innovative curricular tools and professional learning frameworks designed to support both prospective and practicing teachers in teaching statistics. For example, the *Enhancing Statistics Teacher Education through E-Modules* (ESTEEM) project provides adaptable, online curriculum materials intended to help secondary mathematics teachers learn to teach statistics through data investigations and technological tools (Lee et al., 2021). Feedback from mathematics teacher educators and practicing teachers highlighted increased confidence in teaching statistics, improved understanding of students' statistical thinking, and deeper engagement with the statistical problem-solving process. Similarly, annotated lesson notes embedded within lesson plans have helped teachers in aligning instruction with statistical goals while allowing flexibility across varied classroom contexts (Arnold & Green, 2022). Interdisciplinary collaboration and professional learning communities have also been identified as important supports for teachers, enabling less experienced teachers to learn from colleagues with stronger statistical backgrounds and collaboratively explore classroom applications (Schreiter et al., 2024). However, such collaborative opportunities vary considerably, particularly in schools with limited numbers of teachers responsible for teaching statistics (Kwasny, 2015). Collectively, this body of research emphasizes the importance of adaptable, context-aware professional learning opportunities and instructional resources that attend to the unique pedagogical demands of statistics education.

3. RESEARCH QUESTION

Recommendations in both teacher preparation and professional learning increasingly emphasize statistics instruction and statistical thinking, but less is known about how these recommendations are integrated when statistics is embedded within core high school mathematics courses such as Intermediate Algebra, rather than taught in stand-alone classes such as AP Statistics. As statistics content standards become more prevalent in Intermediate Algebra, a course taken by nearly all high school students and often correlated with postsecondary success (Gaertner et al., 2014), it is essential to explore how statistics is included within this context. Accordingly, this study addresses the following research question: **In what ways do high school mathematics teachers include statistics within Intermediate Algebra courses, and why?** For this study, we specifically focus on teachers' rationales for including statistics, their curricular decisions, and the statistical topics they choose to incorporate.

4. THEORETICAL FRAMING OF STATISTICS INSTRUCTION

To conceptualize statistics instruction in Intermediate Algebra, this study adapts Cohen et al.'s (2003) framework of instruction to examine teachers' curricular decision-making. Cohen et al. (2003) conceptualize instruction as interaction among teachers, students, and content, shaped by teachers' ongoing decisions about what and how to teach. Building on this perspective, we adapt the framework to foreground content selection as a facet of teachers' instructional decision-making and to align with the purpose and data of this study. Specifically, because our interview and survey data capture teachers' perspectives rather than observations of classroom enactment, we focus on how teachers reason about and justify curricular choices, particularly decisions about whether and what statistics content to include in Intermediate Algebra. Thus, the Cohen et al. (2003) framework serves as a conceptual foundation for examining teachers' curricular decision-making, which we then contextualize within the statistics education literature.

4.1. FRAMING INSTRUCTION

Instruction in this study is conceptualized through Cohen et al.'s (2003) framework of instruction, which positions instruction as the interaction among multiple facets that collectively shape classroom practice, including teachers' decisions about *what* to teach and *why*—that is, the selection, prioritization, and framing of content. From this perspective, instruction extends beyond observable classroom practices to include ongoing decisions teachers make about what content to teach, how to frame and adapt that content, and why particular instructional goals are prioritized.

Within this perspective, curricular decision-making is understood not as peripheral to instruction, but as integral to it. Teachers' rationales and curricular decisions about which content to include, what to emphasize, and how to adapt materials mediate the relationship between available resources, teacher expertise, and students' learning needs (Cohen et al., 2003). Building on this perspective, this study focuses specifically on one dimension of instruction: teachers' decisions about the inclusion of statistics in Intermediate Algebra and the reasoning underlying those decisions. Examining these decisions represents an adaptation of Cohen et al.'s (2003) framework that narrows its focus to a foundational layer of instructional practice preceding classroom enactment, centering on teachers' curricular decision making rather than the interactions among teachers, students, and content during instruction.

In this study we attend to both *proximal* and *distal* influences on teachers' curricular decision-making regarding statistics instruction (Cohen et al., 2003). Proximal classroom resources include teachers' experiences in preparation programs, experiences of teaching statistics in other courses, and collaboration with colleagues. Distal supports and constraints include state and national assessments, school and district curricula and standards, policies, and broader historical contexts such as evolving state-level statistics content standards. Examining how these proximal and distal influences enable or constrain teachers' decisions regarding what statistics content to include and why offers a lens for understanding how teachers' knowledge, experiences, and professional contexts shape statistics instruction in Intermediate Algebra. Additionally, attending to both proximal and distal influences situates teachers' curricular decision-making within the broader landscape of high school mathematics education.

4.2. FRAMING STATISTICS INSTRUCTION

Cohen et al.'s (2003) framework establishes that instruction is shaped by teachers' ongoing decisions, including the selection and prioritization of content; however, it does not specify how those decisions should be understood within subject areas, including statistics. We therefore extend our adaptation of this framework to address content-selection decisions within the context of statistics instruction in Intermediate Algebra, drawing on statistics education literature to characterize what statistics instruction looks like in this context.

Central to this framing is the Pre-K–12 GAISE II report (Bargagliotti et al., 2020), which pairs the four phases of the statistical problem-solving process—(I) formulating investigative questions, (II) collecting and considering data, (III) analyzing data, and (IV) interpreting results—with three developmental levels spanning elementary, middle school, and high school levels. Aligning instruction with the statistical problem-solving process entails designing learning opportunities that engage students in posing and refining statistical investigative questions, working with diverse data and variable types, moving seamlessly between exploratory graphics and formal analyses, and interpreting results in ways that naturally generate new questions.

Across these phases, the Pre-K–12 GAISE II report emphasizes several interrelated instructional elements. Questioning is positioned as central to statistical inquiry throughout the entire statistical problem-solving process. Multivariable thinking permeates every phase by prompting students to explore relationships and interactions among variables, and probabilistic reasoning is cultivated through hands-on simulations and the design of randomized sampling or experimental studies that illustrate chance outcomes. Technology serves as a scaffold for data handling, visualization, and simulation, and communication serves as an anchor for interpreting and justifying conclusions. Assessments are crafted to measure students' conceptual understanding and reasoning across the entire statistical problem-solving process. Collectively, these elements support the development of students as “data problem solvers who interrogate the data and utilize questioning throughout the statistical problem-solving process to make decisions with confidence, understanding that the art of communication with data is essential” (Bargagliotti et al., 2021, p. 16).

This vision of statistics instruction extends the goals articulated in the original Pre-K–12 GAISE I report (Franklin et al., 2007) that all students develop statistical literacy for personal, professional, and academic success, regardless of their postsecondary trajectory. Consistent with this goal, the theoretical framing of statistics instruction guiding this study characterizes statistical literacy as the ability to

critically evaluate statistical claims, formulate and conduct appropriate analyses, and effectively communicate findings (Bargagliotti et al., 2020; Franklin et al., 2007).

Grounded in these goals, the second dimension of this study's framing of instruction focuses on the statistical content standards that identify what is appropriate for inclusion in Intermediate Algebra. In particular, the goals of the Pre-K–12 GAISE II report align closely with the CCSSM, which together emphasize deep conceptual understanding as central to both the statistical problem-solving process and the development of statistical literacy. Reflecting this emphasis, the CCSSM positions *Statistics and Probability* as a strand of equal importance to *Algebra and Geometry* within high school mathematics. The CCSSM content standards related to statistics in Intermediate Algebra are listed in Table 1.

Although the CCSSM underscores the importance of statistics in Intermediate Algebra, content standards alone are insufficient to ensure meaningful instruction. The effective integration of statistics content standards depends largely on teachers' capacity to interpret and include those expectations into their curricular decision-making and classroom practice (Franklin et al., 2015). Thus, these content standards and recommendations serve not only as content benchmarks, but also as a framework for interpreting the decisions teachers make about what statistical topics to prioritize in Intermediate Algebra.

Table 1. *Statistics content standards in Intermediate Algebra, as organized in Appendix A of the Common Core State Standards for Mathematics (NGA & CCSSO, 2010b)*

Domains	Statistics Content Standards
Interpreting categorical and quantitative data	Summarize, represent, and interpret data on a single count or measurement variable. <i>S.ID.4</i>
Making inferences and justifying conclusions	Understand and evaluate random processes underlying statistical experiments. <i>S.IC.1, 2</i> Make inferences and justify conclusions from sample surveys, experiments, and observational studies. <i>S.IC.3, 4, 5, 6</i>
Using probability to make decisions	Use probability to evaluate outcomes of decisions. <i>S.MD.6, 7</i>

Since current teachers' preparation directly shapes the proximal classroom resources that influence curricular decision-making (Cohen et al., 2003), we frame teachers' preparation for teaching statistics through the lens of the SET I and II reports (Franklin et al., 2015; Franklin et al., in press). The SET report recommends that secondary mathematics teacher preparation programs require at least two dedicated statistics courses that integrate both content and pedagogy, with attention to core statistical ideas such as variability, randomness, and statistical reasoning in relation to broader mathematical concepts. These experiences should engage prospective teachers in data investigations and technology-supported simulations that promote deep conceptual understanding while modeling effective instructional practices. Beyond prospective teacher preparation, the SET I and II reports also emphasize the importance of sustained professional learning opportunities for practicing teachers focused on statistical reasoning, technology integration, and assessment for statistical literacy.

Taken together, adaptations of Cohen et al.'s (2003) framework of instruction, the Pre-K–12 GAISE I and II reports, the CCSSM, and the SET I and II reports collectively inform this study's framing of statistics instruction in Intermediate Algebra. This framing focuses on both the statistics content teachers select and prioritize, and the reasoning that shapes those decisions. By positioning teacher preparation and ongoing professional learning as proximal resources, this framework also attends to how teachers' knowledge and experiences influence curricular decision-making, even though examining teacher preparation and professional learning is not a primary focus of this study. Overall, this theoretical framing guides data collection and analysis by establishing a theoretically grounded basis for examining which statistical content teachers include in Intermediate Algebra and why.

5. METHODOLOGY

This study employs a multiple case study design (Yin, 2014), with each participating Intermediate Algebra teacher representing a distinct unit of analysis, resulting in 10 individual cases. Each case is bounded by the teacher's curricular decisions about what statistical content to include in their Intermediate Algebra course and the reasoning behind those decisions, as defined by the theoretical framing of statistics instruction guiding this study.

5.1. CONTEXT AND DATA COLLECTION

The multiple case study draws on data from a larger project that included a national survey of Intermediate Algebra teachers. The survey was adapted from Lee and Harrison's (2021) survey, which was based on several sources (e.g., Zieffler et al., 2012) and originally developed in the context of AP Statistics courses. We reviewed the survey items, revising and deleting existing ones, and adding additional ones as needed to better align with Intermediate Algebra courses. For example, course-specific wording was modified by replacing "AP Statistics" with "Intermediate Algebra" (e.g., "How many students are typically enrolled in [AP Statistics/Intermediate Algebra] at your school each year?"), and items not applicable to the Intermediate Algebra context were removed (e.g., "What percent of your students take the AP exam?"). We also added new items to capture features unique to Intermediate Algebra settings, such as "Does your state's mathematical assessments for Intermediate Algebra students include statistics content?", followed by prompts eliciting teachers' rationales and curricular decisions. In addition, we adapted other existing items and their response options (e.g., "What statistics content do you teach in your Intermediate Algebra course? Select all that apply.") to reflect that Intermediate Algebra courses do not have a standard statistics curriculum, like AP Statistics, and Intermediate Algebra teachers may choose not to include any statistics content. After expert review and piloting, the final version of our survey included Likert-scale and open-ended items about teachers' self-reported experiences, beliefs, curricular decisions and rationales related to the teaching, learning, and assessment of statistics in Intermediate Algebra. The survey also included demographic questions about teachers' backgrounds, experiences, and teaching contexts. Between April and September 2024, we used this survey to collect data from high school mathematics teachers across the U.S. who taught Intermediate Algebra during the 2023-2024 school year. We received 53 complete responses, 30 of which indicated interest in participating in a follow-up interview.

Interviews employed purposeful sampling (Palinkas et al., 2015) to capture varied teaching contexts: (1) teachers teaching statistics in Intermediate Algebra *and* also teaching AP Statistics or a standalone statistics course, (2) teachers teaching statistics in Intermediate Algebra but not teaching AP Statistics or a standalone statistics course, and (3) teachers not teaching statistics in Intermediate Algebra. Due to low response rates, all 30 interested teachers were contacted, yielding 11 interviews: four in Category 1, six in Category 2, and one in Category 3. A semi-structured interview protocol (Creswell & Plano Clark, 2007) guided the interviews. Questions addressed facets of instruction based on our framing of statistics instruction, including statistics content selection, pedagogical decisions, and preparation or ongoing support. For teachers not teaching statistics, follow-up questions explored factors influencing their decisions not to include statistics in Intermediate Algebra. Representative questions included: "What do you consider to be the most important statistics topics (if any) to teach in your Intermediate Algebra course and why?" and "Broadly, what have been your experiences teaching statistics content in an Intermediate Algebra course?" Questions also addressed teacher preparation and support, such as "In what ways do you feel you were prepared to teach statistics content?" and "What support do you need as a current teacher to teach statistics content in Intermediate Algebra courses?" Because only one teacher fell into Category 3 and was therefore not teaching statistics in Intermediate Algebra, her interview was excluded from analysis, leaving 10 interviews as the data for this study. The 10 interviews, together with corresponding survey responses, constitute the study's data.

5.2. PARTICIPANTS

The study included 10 high school teachers from seven U.S. states who taught Intermediate Algebra during the 2023-2024 school year (see Table 2). Participants had between 8 and 25 years of teaching

experience, with a median of 18.5 years. Nearly all taught in public schools, including one teacher in an alternative public setting, while one taught in a private school. Six participants held master's degrees and four held bachelor's degrees. Seven participants had previously taught AP Statistics or a standalone statistics course. Self-reported preparedness to teach statistics varied, with four participants describing themselves as completely prepared, three as sufficiently prepared, and three as somewhat prepared. Participants also differed in the degree of autonomy they reported having over their Intermediate Algebra courses, reflecting variation in the extent to which they controlled the content of their Intermediate Algebra curriculum. Collectively, this diversity in experience, educational background, classroom autonomy for decision making, and statistical preparedness offers a nuanced lens for examining how teachers include statistics into Intermediate Algebra and the supports and challenges shaping their curricular decisions.

Table 2. *Participating teacher demographics*

Pseudonym	Years Teaching	Previously Taught AP Statistics or a Standalone Statistics Course	Preparedness to Teach Statistics	Highest Level of Education	School Setting	Course Content Autonomy
1. Megan	10	No	Somewhat prepared	Master's degree	Public	Shared with colleagues
2. Lewis	23	Yes	Completely prepared	Master's degree	Public	Nearly complete autonomy
3. Melissa	25	Yes	Sufficiently prepared	Bachelor's degree	Alternative public	Shared with colleagues
4. Brandon	20	Yes	Sufficiently prepared	Master's degree	Public	Shared with colleagues
5. Ryan	9	Yes	Completely prepared	Bachelor's degree	Public	Course set up by others, no input
6. Eliza	19	Yes	Completely prepared	Master's degree	Public	Nearly complete autonomy
7. Grant	8	No	Somewhat prepared	Bachelor's degree	Public	Shared with colleagues
8. Amanda	24	Yes	Somewhat prepared	Bachelor's degree	Private	Nearly complete autonomy
9. Jason	15	Yes	Completely prepared	Master's degree	Public	Nearly complete autonomy
10. Nicole	18	No	Sufficiently prepared	Master's degree	Public	Shared with colleagues

5.3. ANALYSIS

Guided by our theoretical framing of statistics instruction, which conceptualizes instruction through teachers' decisions about including statistics in Intermediate Algebra and the reasoning that shapes

those decisions, we conducted a thematic analysis to examine patterns within and across cases. We focused on the statistical content teachers reported teaching in their Intermediate Algebra courses, as well as the rationales underlying those curricular choices. This approach enabled us to identify themes that illuminate teachers' content-selection decisions in Intermediate Algebra courses.

Interviews were transcribed using Otter.ai and cleaned by the research team. Survey responses for all 10 participants were complete and required no further cleaning. We then systematically narrowed the data by identifying transcript segments relevant to the research question and theoretical framing. Specifically, we retained data related to participants' descriptions of the statistical content included in their Intermediate Algebra courses, their rationales for including that content, and references to proximal classroom resources, distal supports, and contextual constraints influencing those decisions. Using Saldaña's (2016) approach to open coding, we conducted iterative close readings of the narrowed dataset to identify conceptual units and patterns relevant to the research question. Codes were refined through constant comparison, with memos documenting analytic decisions and theoretical connections to ensure the coding schema (Table 3) remained grounded in the data while aligned with the study's theoretical framing.

Table 3. Coding schema for teachers' rationales and curricular decisions about including statistics in Intermediate Algebra

Code	Description	Interview Excerpt (italics added for emphasis)
Statistical Literacy	Foster statistical literacy by helping students reason with data, explore variability, question assumptions, critique claims, interpret data, and make informed decisions.	"Seems like <i>data is everywhere</i> , and [students] don't necessarily have any concept for what makes data worth looking at...just getting <i>context</i> in there and then that at least lets them <i>analyze situations</i> outside of the math classroom." (Jason)
Alternative Opportunities	Statistics positioned as an alternative to the traditional calculus pathway in high school.	"I think it would be great if high school students could be exposed to [statistics]... <i>this fast-moving train to calculus that guidance counselors and current math teachers have bought into and continue to buy into is something that we just have to fight against</i> . It's a big challenge to get them to realize that <i>statistics is as important</i> , and for a lot of students, much more important for what they're going to do down the line." (Lewis)
Prior Statistics Teaching	Drawing on prior experience teaching AP Statistics or a standalone statistics course, which deepened their appreciation for statistics and motivated its inclusion.	"And so, I tried to incorporate more [statistics], <i>based on the stats classes that I've been teaching</i> , which are more college bound. I felt that it was important that [Intermediate Algebra] students also have more statistical understanding in their coursework, so I was able to do that with them." (Eliza)
Interdisciplinary	Including statistics due to its relevance across diverse disciplines and its role in supporting student success in other high school courses.	"I would say that statistics is something that one opens the door to lots of different career paths, and it's really likely to be required in college if students go that route, since its <i>applicable in so many subjects</i> ." (Ryan)
Standardized Exams	Including statistics to support student preparation for standardized exams, including state exams and college entrance tests.	"We have quite a bit of autonomy within our department and so adding in stats [to Intermediate Algebra], was a departmental choice within the math department. And really, <i>the biggest factor was the SAT</i> ." (Nicole)

Statistical Thinking	Develop students' engagement with variation, randomness, multiple solutions, and data-based reasoning that differs from traditional deterministic mathematical thinking.	"I would want students to have a sense of, you know, when you're looking at something and there's <i>variation and randomness</i> ... when we are answering a question, there's not one answer like when you're solving an equation. There could be many answers, and when we try to look at all those many answers, <i>there's variation, which is not wrong</i> . People are allowed to be really tall and allowed to be really short." (Grant)
Conceptual Understanding	Emphasis on conceptual understanding and interpretation over procedures, supporting deeper engagement with statistical ideas.	"I've tried to <i>focus less on the calculations</i> . You know, we used spreadsheets, or we used the calculators to do a lot of the calculations, so they didn't maybe get hung up on the calculations. And then we <i>could focus more of our time and energy on what does that mean?</i> " (Eliza)

The resulting coding schema captures the primary rationales and curricular decisions that shaped teachers' decisions about including statistics in Intermediate Algebra.

After the final iteration of open coding, we examined whether each code appeared in participants' interview responses within the narrowed dataset. Consistent with our conceptualization of instruction, we prioritized code presence over frequency, documenting whether each participant engaged with a code from Table 3 at least once. Even a single instance can represent a meaningful aspect of instructional decision-making. Emphasizing presence therefore allowed us to highlight instructional richness without implying deficit comparisons.

Although the number of distinct codes present varied across participants, *statistical literacy* was the only code identified in every interview. To further examine variation in how participants discussed statistical literacy, we conducted a second round of coding using secondary codes informed by the Pre-K–12 GAISE I and II reports (Table 4).

This analysis produced a set of thematic groupings that were subsequently used to organize and interpret the findings of this study. Although the number of distinct codes present varied across participants, statistical literacy was the only code identified in every interview. To further examine variation in how participants discussed statistical literacy, we conducted a second round of coding using secondary codes informed by the Pre-K–12 GAISE I and II reports (Table 4). This analysis produced a set of thematic groupings that were subsequently used to organize and interpret the findings of this study.

Table 4. Secondary codes developed for the initial code of statistical literacy, representing teachers' rationales for fostering statistical literacy

Secondary Code	Description	Interview Excerpt (italics added for emphasis)
The Workplace and Professions	Developing statistical literacy prepares students to succeed in future academic and career pursuits, empowering them to interpret data and remain competitive in a rapidly evolving, data-rich world.	"Most will <i>use statistics in college</i> and then their <i>profession</i> ." (Lewis)
Citizenship and Personal Choices	To participate meaningfully in society, students must develop statistical literacy, enabling them to critically interpret data, articulate statistical insights, and make informed decisions in everyday and professional contexts.	"The more I've taught statistics, the more I've seen the value in just <i>the amount of data that students or people are presented with on a daily basis</i> . And how do they determine if something is a valid piece of information or not... or <i>how to deal with the data that might be presented to them</i> ." (Eliza)

The Workplace and Professions and Citizenship and Personal Choices	Statistical literacy is essential for students to thrive as informed citizens and capable professionals. Teachers must prepare students to make thoughtful decisions in everyday life, contribute meaningfully to society, and succeed in an increasingly data-driven academic and professional landscape.	<i>“It depends on my motivation. If I’m motivated by the SAT then I’m looking at... inferences from samples....If I’m thinking about my students as future members of my community, I am more interested in...sample bias, because...we’ve got a lot of people being duped by bad statistics.” (Nicole)</i>
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6. RESULTS

Analysis of participants’ rationales for including statistics in Intermediate Algebra revealed statistical literacy as an overarching theme across all cases. Although all participants identified statistical literacy as an important goal, they differed in how they described its purpose. Three thematic groupings emerged from the data: (1) statistical literacy for the workplace and professions, (2) statistical literacy for citizenship and personal choices, and (3) statistical literacy for both workplace and professions *and* citizenship and personal choices. Participants’ alignment with these thematic groupings is illustrated in Figure 1. The Venn diagram represents the *rationale most strongly emphasized* in each participant’s interview and is not intended to suggest the participants held mutually exclusive or exhaustive views regarding the purposes of statistical literacy.

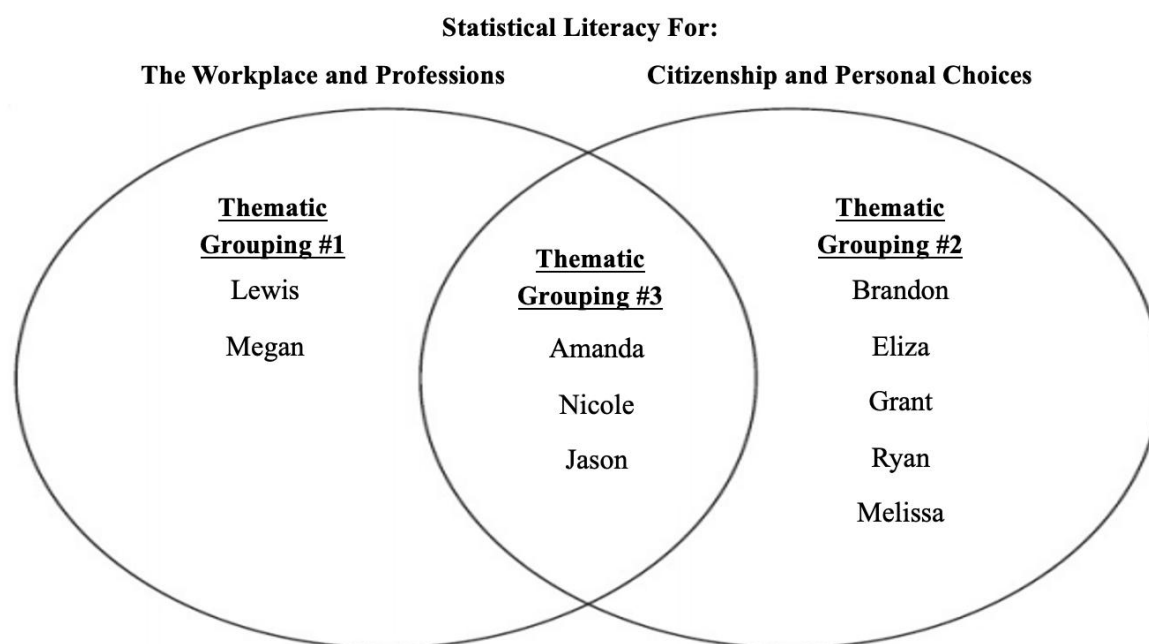


Figure 1. Teacher’s rationales for including statistics in Intermediate Algebra as a means of fostering statistical literacy

After establishing participants within these three thematic groupings, we returned to the full set of initial codes (Table 3) to identify any patterns. Figure 2 illustrates the distribution of codes within and across the thematic groupings, highlighting similarities and differences in teachers’ rationales and curricular decisions for including statistics in Intermediate Algebra. In the sections that follow, we first present results across all three thematic groupings, highlighting the shared emphasis of statistical literacy. We then report findings within each of the three thematic groupings. Together, these analyses capture a holistic account of participants’ rationales for including statistics in Intermediate Algebra.

	Code					
	Interdisciplinary	Prior Statistics Teaching	Alternative Opportunities	Standardized Exams	Statistical Thinking	Conceptual Understanding
Thematic Grouping 1: Workplace and Professions (Section 6.2)						
Lewis	✓	✓	✓	✓		
Megan			✓			
Thematic Grouping 2: Citizenship and Personal Choices (Section 6.3)						
Brandon	✓					✓
Eliza		✓				✓
Grant	✓				✓	
Ryan	✓	✓			✓	✓
Melissa					✓	✓
Thematic Grouping 3: Workplace and Professions & Citizenship and Personal Choices (Section 6.4)						
Amanda	✓	✓	✓	✓		
Nicole	✓			✓	✓	✓
Jason	✓	✓		✓		✓

Figure 2. Distribution of codes from Table 3 across participants and thematic groupings

6.1. ACROSS THEMATIC GROUPINGS: A COMMON GOAL OF STATISTICAL LITERACY

Across all 10 cases, participants reported including statistics in Intermediate Algebra (Figure 3). When considering the specific statistics topics teachers reported teaching in Intermediate Algebra, there were no substantial differences across the three thematic groupings. According to the Pre-K–12 GAISE II recommendations (Bargagliotti et al., 2020) and the CCSSM (NGA & CCSSO, 2010a), a comprehensive Intermediate Algebra course would include descriptive statistics, probability, statistical association, study design, and statistical inference. Among participants, only Lewis and Brandon reported teaching the full set of these topics in their Intermediate Algebra courses. Most participants reported teaching descriptive statistics, probability, and statistical association, while fewer included study design and statistical inference.

	Statistics Topics				
	Descriptive Statistics	Probability	Statistical Association	Study Design	Statistical Inference
Thematic Grouping 1: Workplace and Professions (Section 6.2)					
Lewis	✓	✓	✓	✓	✓
Megan	✓	✓			
Thematic Grouping 2: Citizenship and Personal Choices (Section 6.3)					
Brandon	✓	✓	✓	✓	✓
Eliza	✓	✓	✓	✓	
Grant	✓	✓	✓		✓
Ryan	✓			✓	✓
Melissa	✓	✓	✓		
Thematic Grouping 3: Workplace and Professions & Citizenship and Personal Choices (Section 6.4)					
Amanda	✓	✓	✓		
Nicole	✓	✓	✓	✓	
Jason	✓	✓	✓		

Figure 3. Distribution of statistics topics taught in Intermediate Algebra across participants and thematic groupings

Participants also consistently reported incorporating statistics in Intermediate Algebra to promote students' development of statistical literacy. Although statistical literacy was a unifying rationale,

teachers differed in how they framed its purpose, as illustrated above in Figure 1. To visually compare rationales and curricular decisions across the three thematic groupings, Figure 4 displays the presence of codes within each group, indicating whether at least one participant in a group exhibited a given code. “*Interdisciplinary*” and “*Prior Statistics Teaching*” appeared across all thematic groupings, whereas “*Alternative Opportunities*” and “*Standardized Exams*” were present only in the groups that emphasized statistical literacy for the workplace and professions. In contrast, “*Statistical Thinking*” and “*Conceptual Understanding*” appeared only in the groups that emphasized statistical literacy for citizenship and personal choices.

	Code					
	Interdisciplinary	Prior Statistics Teaching	Alternative Opportunities	Standardized Exams	Statistical Thinking	Conceptual Understanding
Thematic Grouping 1: Workplace and Professions (Section 6.2)	✓	✓	✓	✓		
Thematic Grouping 2: Citizenship and Personal Choices (Section 6.3)	✓	✓			✓	✓
Thematic Grouping 3: Workplace and Professions & Citizenship and Personal Choices (Section 6.4)	✓	✓	✓	✓	✓	✓

Figure 4. Codes present within each thematic grouping

Across all three thematic groupings, participants consistently emphasized the value of helping students recognize how statistics extends beyond mathematics into other disciplines and real-world contexts. The “*Interdisciplinary*” code captures rationales for including statistics in Intermediate Algebra based on its broad applicability across fields, as illustrated by Lewis:

All I know is that statistics, the benefit of it, is wide ranging, and even for those AP calculus, physics, STEM majors, engineering, they’re using statistics too. So, it’s not like they’re never seeing it. They’re going to benefit, but it’s really the ones that aren’t going into STEM and aren’t going into engineering, your lawyers, your business folk, your psychology majors, they’re definitely seeing it, and the more we can expose to them, the better I find that.

Similarly, “*Prior Statistics Teaching*” was present across all three thematic groupings, with several teachers noting prior experience teaching AP Statistics or a standalone statistics course as influencing their inclusion of statistics in Intermediate Algebra. While this prior experience informed curricular decisions (e.g., “[Statistics content standards] are part of our [Intermediate Algebra] curriculum, but I’ve tried to dive into [the content standards] a little bit more because of where I see that as helpful in AP Stats.” (Jason)), it did not appear to shape participants’ underlying rationales for promoting statistical literacy.

Our framing of statistics instruction also attends to the proximal classroom resources and distal supports and constraints that may shape teachers’ decisions to include statistics in Intermediate Algebra. Among the 10 participants, there was no meaningful variation in formal statistics preparation during undergraduate or graduate coursework; all had completed one to two statistics courses as part of their education. All participants also reported engaging in some form of professional learning related to statistics instruction, often at the AP Statistics level. Years of teaching experience and prior experience teaching AP Statistics or a standalone statistics course were similarly interspersed across the thematic groupings. Collectively, these patterns suggest a relatively common foundation of preparation and experience rather than systematic differences between groups.

6.2. WITHIN THEMATIC GROUPING 1: STATISTICAL LITERACY FOR ONLY THE WORKPLACE AND PROFESSIONS

This thematic grouping included two participants (Lewis and Megan, whose backgrounds are summarized in rows 1-2 in Table 2) who framed the inclusion of statistics in Intermediate Algebra as a way to help students develop statistical literacy in preparation for future academic and career pursuits. Their rationales centered on equipping students with transferable, practical skills that are applicable in

academic and professional settings where data-driven decision-making is common. As Lewis explained:

You know it leads to that whole high school being a building block place...[you want to] give [students] all the tools that will help them succeed.... So, the question is, how do you get all those building blocks in statistics...How do you get that all in, so that [students] are prepared to be successful and see [statistics] later in college?

Participants in this grouping also described using statistics to expand academic opportunities. The “*Alternative Opportunities*” code appeared in both Lewis and Megan’s data, reflecting their emphasis on providing a credible alternative to calculus. They reasoned that while most students will neither require advanced calculus in college nor in their careers, they are almost certain to encounter statistics. As Megan explained:

We were teaching like unit circle trig, which wasn’t then needed until, like, Pre-calculus. And we’re like, ‘Does every kid need to understand the unit circle?’ Probably not, probably just the kids, you know, going into the upper level [Calculus]. So, we took out teaching the unit circle and replaced it with a statistics unit.

Participants in this thematic grouping argued that neglecting statistics at the high school level leaves students without the critical skills necessary for academic success and professional competence after graduation.

This thematic grouping also included the “*Standardized Exams*” code, reflecting attention to aligning instruction with expectations from state assessments and college entrance exams. Participants with this code described having some level of autonomy within their departments but noted that the decision to include statistics in Intermediate Algebra was also driven by the presence of statistics on state-level standardized exams and college entrance tests. This alignment, in turn, shaped their curricular decisions about what statistics topics to include in Intermediate Algebra.

Taken together, this thematic grouping reflected a pragmatic, future-oriented perspective toward statistical literacy, characterized by an emphasis on college and career readiness. The dominant codes of “*Alternative Opportunities*” and “*Standardized Exams*” reflect a shared commitment to equipping students with statistical reasoning skills that extend beyond the classroom, a desire to provide meaningful curricular alternatives to calculus, and to ensure students are prepared for the statistical demands of postsecondary education, professional contexts, and standardized assessments.

6.3. WITHIN THEMATIC GROUPING 2: STATISTICAL LITERACY FOR ONLY CITIZENSHIP AND PERSONAL CHOICES

The five participants in this thematic group (Brandon, Eliza, Grant, Ryan, and Melissa, whose backgrounds are summarized in rows 3-7 in Table 2) emphasized the civic and personal relevance of statistical literacy. As Eliza stated, “I think all students should have some statistics literacy, especially in our day of fake news and real news and who knows what, just to have them be good consumers of information.” For these teachers, statistical literacy extended beyond an academic skill to a necessary competency for navigating a data-saturated world. They described including statistics in Intermediate Algebra as a way of empowering students to evaluate media claims, interrogate data, and make informed personal decisions.

Many participants in this thematic grouping also described rationales for including statistics in Intermediate Algebra that were coded as “*Statistical Thinking*” and “*Conceptual Understanding*.” Participants highlighted how statistical thinking differs from mathematical thinking by foregrounding variation and randomness. They emphasized the importance of engaging students with problems that reject a single numerical answer in favor of open-ended, context-rich scenarios. As Grant explained:

I would want students to have a sense of, you know, when you’re looking at something and there’s variation and randomness. The rules of statistics is, like, it’s a different game. The idea that, okay, when we are answering a question, there’s not one answer, like when you’re solving an equation. There could be many answers, and when we try to look at all those many answers, there’s variation, which is, not wrong. People are allowed to be really tall and allowed to be really short.

Participants also explicitly prioritized students’ conceptual understanding of statistical ideas, emphasizing that students should develop meaning for statistical concepts and be able to interpret data

in context rather than focus on procedural computations alone. In their descriptions, conceptual understanding was closely tied to students' ability to make sense of statistics topics. As Eliza explained:

I think that skipping [statistics] is kind of a problem, because I think the most important thing [students] should be getting from that is the organization of data. How do I organize and understand the data, finding the measures of center and what do they mean? What are the best descriptions of data? How do I use these different measures to say what's happening in the data? I also think probability is a really good one for students to consider, even at the most basic level, just thinking about what is probability, what does it mean, and what types of situations might I be considering when I'm thinking about probability, the idea of randomness and that tie to probability.

Ultimately, this thematic grouping was distinguished by an emphasis on conceptual depth, interpretive reasoning, and real-world relevance. The dominant code of "*Statistical Thinking*," taken with the shared emphasis on "*Conceptual Understanding*," reflects a shared commitment to helping students navigate uncertainty, contextualize data, and develop statistical literacy as a tool for informed personal and civic decision-making. Rather than centering on correctness or procedural fluency, participants in this grouping prioritized experiences that foreground variation, ambiguity, and authentic data use, positioning statistics as an empowering lens for engaging with the world.

6.4. WITHIN THEMATIC GROUPING 3: STATISTICAL LITERACY FOR BOTH THE WORKPLACE AND PROFESSIONS AND CITIZENSHIP AND PERSONAL CHOICES

The final thematic grouping included three participants (Amanda, Nicole, and Jason, whose backgrounds are summarized in rows 8-10 in Table 2) who emphasized both the workplace and professional preparation *and* the civic and personal relevance of statistical literacy. Participants in this thematic grouping recognized that statistical literacy serves multiple purposes, highlighting its role in supporting both academic and professional success as well as informed participation in everyday life and civic decision-making. In describing these purposes, participants emphasized the importance of helping students apply statistical reasoning across contexts and recognize its value beyond the mathematics classroom. As Jason explained:

If I had to pick one thing that my [Intermediate Algebra] kids got out of [statistics], even if it wasn't just like for the state test...I think that the ability to describe using center, spread, outliers, and shape with context is huge. Just getting that context in there, and that at least lets them analyze situations outside of the math classroom and see what they will use in real life.

For these participants, statistical literacy functioned as a foundational skill for critically interpreting data across a range of settings, including standardized exams, media sources, and personal decision-making contexts. This flexibility was reflected in how teachers described shifting emphasis depending on instructional goals and perceived student needs. As Nicole noted:

[What I am teaching] depends on my motivation. If I'm motivated by the SAT, then I'm looking at...inferences from samples....If I'm thinking about my students as future members of my community, I am more interested in...sample bias, because...we've got a lot of people being duped by bad statistics.

As shown in Figure 4, this thematic grouping included instances of all codes in Table 3, reflecting the breadth of rationales for including statistics in Intermediate Algebra. Collectively, participants in this grouping balanced civic, personal, and workplace-oriented framings of statistical literacy, demonstrating a dual commitment to preparing students for postsecondary pathways and informed participation in society.

7. DISCUSSION

All participants in this study described statistics as an important component of Intermediate Algebra and described including statistics content to support students' development of statistical literacy. This finding reinforces calls for sustained opportunities to develop statistical literacy across K-12 education (Bargagliotti et al., 2020; Franklin et al., 2007; Franklin et al., in press; Kurnia et al., 2024) and suggests that some teachers view Intermediate Algebra as an important venue for advancing this goal. While statistical literacy served as a shared rationale across all cases, participants differed in how they framed its importance. Some emphasized preparing students to critically engage with data in civic and personal

contexts, whereas others emphasized preparation for postsecondary education and careers that increasingly require statistical thinking. Still others articulated both purposes, viewing statistical literacy as essential for students' success as informed citizens and future professionals. These differing rationales suggest that teachers may prioritize different purposes for statistics instruction, even when they share a common commitment to developing students' statistical literacy.

The distinction between the three thematic groupings in this study reflects broader conversations within statistics education regarding the purposes of statistical literacy. Participants who emphasized statistical literacy for citizenship and personal choices echoed recent calls for civic statistics education that prepares students to critically evaluate data-based claims and participate thoughtfully in society (Engel, 2017; Ridgway, 2022). In contrast, participants who emphasized statistical literacy for the workplace and professions framed statistics as a tool for expanding students' future opportunities and equipping them with skills increasingly valued in postsecondary education and the workforce. Rather than representing competing visions of statistics instruction, these perspectives may be understood as emphasizing different dimensions of statistical literacy that are both reflected in national recommendations for statistics education (e.g., Bargagliotti et al., 2020).

Across thematic groupings, participants also described prior experience teaching statistics and the interdisciplinary nature of statistics as influential in their decisions to include statistics in Intermediate Algebra. These findings highlight the importance of teacher knowledge and experience as proximal resources shaping curricular decision-making, consistent with Cohen et al.'s (2003) framework of instruction. Participants frequently described statistics as broadly applicable across disciplines, suggesting they viewed statistics as positioned to help students recognize the relevance of statistics beyond the mathematics classroom. This emphasis aligns with recommendations in the SET I and II reports (Franklin et al., 2015; Franklin et al., in press), which advocate for helping students develop deep and flexible understanding of statistics across disciplinary settings.

Differences between thematic groupings also reveal how teachers' purposes for statistical literacy may influence their curricular priorities. Participants emphasizing statistical literacy for the workplace and professions frequently discussed statistics as an alternative pathway for students whose mathematical trajectories may not culminate in calculus. This reflects ongoing conversations about broadening conceptions of advanced mathematics and questioning calculus as the default endpoint of high school mathematics (Giani et al., 2025). In contrast, participants emphasizing statistical literacy for citizenship and personal choices more often discussed the importance of fostering students' statistical thinking and a deep conceptual understanding, highlighting variability, uncertainty, and context as essential features of statistical thinking. This finding aligns with research advocating that statistical thinking represents a distinct but complementary form of thinking that should be integrated within K–12 mathematics education rather than treated as separate from it (Gattuso & Ottaviani, 2011; Marshman & Dunn, 2024).

Importantly, the two thematic groupings (statistical literacy for the workplace and professions and statistical literacy for citizenship and personal choices) should not be interpreted as oppositional or mutually exclusive. Some participants articulated both civic- and workplace-oriented goals for statistical literacy, and the presence of a third thematic grouping encompassing both perspectives suggests that teachers often view these purposes as interconnected. From the perspective of our theoretical framing, this finding highlights how teachers' curricular decisions about including statistics in Intermediate Algebra are shaped by multiple goals, rather than a single purpose. Moreover, it aligns with the vision of the Pre-K–12 GAISE I and II reports, which call for instruction that integrates and balances procedural fluency with critical, real-world statistical thinking (Bargagliotti et al., 2020; Franklin et al., in press).

Despite differences in teachers' rationales, the statistical topics participants reported including in Intermediate Algebra (see Figure 3) did not appear to vary substantially across thematic groupings. Most participants reported teaching descriptive statistics, probability, and statistical association, whereas very few incorporated inferential reasoning. The limited attention to inferential reasoning is particularly notable given its central role in the statistical problem-solving process and its importance for developing statistical literacy (Zieffler et al., 2008). Because this pattern appeared across all thematic groupings, it appears unlikely that the omission of statistical literacy stems from differing

framings of the purpose of statistical literacy. Instead, it may reflect broader systemic influences, including curricular constraints, pressures related to standardized exams, or gaps in teacher preparation and professional support.

The limited inclusion of inferential statistics in Intermediate Algebra raises important questions about the opportunities students have to engage with the kinds of data-based decision-making that participants themselves described as important outcomes of statistics instruction. Whether the goal is preparing students for future careers, postsecondary study, or informed citizenship, inferential reasoning provides tools for evaluating statistical claims and drawing conclusions from data. Given that many students may never take a dedicated statistics course like AP Statistics, Intermediate Algebra may represent one of the few opportunities for students to engage with these ideas. Prior research suggests that students are capable of engaging with statistical inference early on (Paparistodemou & Meletiou-Mavrotheris, 2008) and can benefit from opportunities for statistical inference within mathematics courses (Zieffler et al., 2008). Thus, increasing attention to inferential reasoning within Intermediate Algebra may represent an important avenue for strengthening students' statistical literacy and better aligning classroom experience with national recommendations for K–12 statistics education.

8. LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

While this study offers valuable insights into teachers' rationales and curricular decisions for including statistics in Intermediate Algebra, it is limited by its reliance on self-reported survey and interview data and by the use of a single interview with each participant. As a result, this study captures teachers' perspectives on statistics instruction rather than how those perspectives are enacted in classroom practice. Although participants described the statistical topics they included and the reasoning underlying those choices, the data presented in this study do not reveal how those decisions shape instruction over time, how those topics are taught, or how students experience opportunities to develop statistical literacy.

Future research can examine how teachers' stated rationales for including statistics in Intermediate Algebra are enacted in classroom practice. Longitudinal studies that combine classroom observations, multiple teacher interviews, student work, and curriculum materials could provide additional and deeper insight into how teachers' goals for developing statistical literacy translate into instruction, classroom experiences, and students' opportunities to engage with statistics.

9. CONCLUSION

Franklin et al. (2007) powerfully stated, "Every high school graduate should be able to use sound statistical reasoning to intelligently cope with the requirements of citizenship, employment, and family and to be prepared for a healthy, happy, and productive life" (p. 1). The findings of this study suggest that Intermediate Algebra represents one important setting in which teachers are working toward this goal. Across all cases, participants described including statistics to support students' development of statistical literacy, although they differed in how they framed its purpose. Some emphasized preparing students for future academic and professional pursuits, others highlighted informed citizenship and personal choices, and some integrated both perspectives. Despite these differences, participants consistently described statistics as a valuable component of Intermediate Algebra and reported incorporating statistical content not only to meet curricular expectations, but also to foster students' ability to think critically with data. These findings corroborate the field's emphasis on statistical literacy in mathematics education and highlight the potential of Intermediate Algebra as an important context for supporting students in learning to interpret and reason with data in an increasingly data-driven world.

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