ISSN: 2470-850X
Online

JSARD

JOURNAL OF SCHOOL ADMINISTRATION RESEARCH AND DEVELOPMENT

Vol. 10, Issue 2
Fall 2025

ojed.org/JSARD

Research Article

OJED
OPEN JOURNALS IN EDUCATION
Volume 10, Issue 2 (2025), pp. 49-61
Journal of School Administration Research and Development
ISSN: 2470-8496 Print/2470-850X Online
ojed.org/JSARD

Culture and Collective Teacher Efficacy: A Case Study Through a Social Cognitive Theory Lens

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ABSTRACT

The concept of collective teacher efficacy was first introduced by Bandura (1997) in the 1990s. Hattie's (2016) identification of collective teacher efficacy as the number one influence on student achievement has led to the idea that educators within a school can positively impact student achievement. In his research, Bandura identified four sources of both individual and collective teacher efficacy: mastery experience, vicarious experiences, social persuasion, and affective state. The purpose of this qualitative research study is to identify aspects of school culture that support collective teacher efficacy. This purpose was accomplished by interviewing 32 faculty and staff members at a K-8 school in New Zealand through a social cognitive theory lens. Data were analyzed using NVivo software and multiple coding cycles grounded in principles of grounded theory. Qualitative analysis of these interviews identified five core aspects of school culture that contribute to collective teacher efficacy: shared vision for learning, school systems, relationships, well-being, and collaboration. Based on the assumption that collective teacher efficacy can positively affect student achievement, we assert that understanding and applying these five aspects of school culture could have a significant, positive impact on student achievement.

***Keywords*:** collective teacher efficacy, school leadership, school culture, sources of efficacy, qualitative methods

Collective teacher efficacy (CTE) has recently emerged as a significant factor influencing student achievement, prompting school leaders to seek strategies to cultivate and strengthen CTE within their institutions. Research suggests that effective school leadership plays a crucial role in shaping collective efficacy by fostering instructional knowledge and skills, facilitating collaboration, providing meaningful feedback, and involving teachers in decision-making processes (Brinson & Steiner, 2007). Despite a growing familiarity with the concept of CTE and its connection to Bandura's four sources of efficacy—mastery experiences, vicarious experiences, verbal persuasion, and physiological states—many school leaders lack a clear understanding of how to apply these principles within their own schools. Without a structured approach to CTE, school leaders may struggle to fully leverage its benefits.

This study examines the role of school culture in supporting collective teacher efficacy. While previous research has explored potential antecedents of CTE (Loughland & Ryan, 2020; Ross, 1994; Tschannen-Moran & Woolfolk Hoy, 2007), a deeper understanding of the factors that influence CTE is necessary to sustain school improvement. Additionally, because most studies on CTE have been conducted in the United States (Minnet, 2016), expanding research to international contexts is crucial for identifying factors that contribute to CTE globally. Furthermore, much of the existing research relies on quantitative methodologies that do not provide a detailed, context-driven exploration of how CTE manifests in schools. A

qualitative approach is needed to capture educators' firsthand experiences and provide school leaders with practical insights into how school culture influences CTE.

This study focuses on School ABC (pseudonym), a renowned K-8 institution in Auckland, New Zealand, where previous research (Hallam et al., 2022) found that faculty and staff demonstrated significantly higher levels of CTE than other schools. Using Tschannen-Moran's Collective Teacher Efficacy Scale in faculty interviews, the 2018 study reported that School ABC had an average collective efficacy score of 7.47 [95% confidence interval: 7.14-7.80], making it slightly above average. A two-tailed *t*-test comparing the School ABC score to the mean and standard deviation of the 66 schools in the Tschannen-Moran and Barr (2004) study showed a significant difference. Building on these findings, this research applies social cognitive theory to conduct a qualitative case study, seeking to answer the central research question: *What aspects of culture support collective teacher efficacy?*

Again, given the growing focus on collective teacher efficacy as a driver of student success, this study offers valuable insights for school leaders seeking to enhance CTE in their schools. By identifying the cultural elements and collaborative structures that contribute to strong CTE, this study provides practical strategies for educational leaders to foster and sustain collective efficacy, ultimately improving teaching effectiveness and student outcomes. Further, this study contributes to the existing body of research by offering a qualitative perspective on how school leaders can establish and reinforce CTE through intentional school culture development and purposeful collaboration with all stakeholders. With a stronger understanding of the connection between school culture and collective teacher efficacy, educational leaders will be better equipped to implement strategies that maximize teacher effectiveness and drive meaningful improvements in student achievement.

REVIEW OF LITERATURE

Bandura defined self-efficacy as an individual's belief in their capacity to organize and execute the necessary actions to achieve specific goals. Bandura posited that "expectations of personal efficacy are derived from four principal sources of information: performance accomplishments, vicarious experiences, verbal persuasion, and physiological states" (Bandura, 1977, p. 195). The following paragraphs outline these four sources of Bandura's theory in greater detail.

Sources of Efficacy Information in Social Learning Theory

The first source of efficacy information is mastery experiences, in which people succeed or fail at a specific task. Bandura sees these as indicators of capability (1977, 1997). Goddard (1998) further states, "Of the four sources, enactive mastery experiences are the most powerful because they directly convey information about a person's ability to succeed under a given set of conditions" (p. 18). Thus, foundational researchers in this field view mastery experiences as among the most important sources of efficacy.

The second source of efficacy information, vicarious experiences, occurs when someone observes others performing a specific task. Such moments largely depend on the credibility and expertise of those seen as potential role models (Bandura, 1977, 1997). Eells explains, "Efficacy that is gained by observation is acquired vicariously." She adds, "Observing another person perform a task successfully can influence personal beliefs about their ability to do the same" (2011, p. 28). Goddard (1998) further stipulates that opportunities to observe others modeling best practice are crucial in developing efficacy.

The third source, verbal persuasion, focuses on a school's social influences and "is dependent on the beliefs that others have in our abilities" (Goddard, 1998, p. 20). "It is easier to sustain a sense of efficacy," said Bandura, "…if significant others express faith in one's capabilities" (1997, p. 101). Social persuasion's impact also depends on the credibility of the person providing it (Bandura, 1997; Goddard, 1998; Tschannen-Moran & Hoy, 2007).

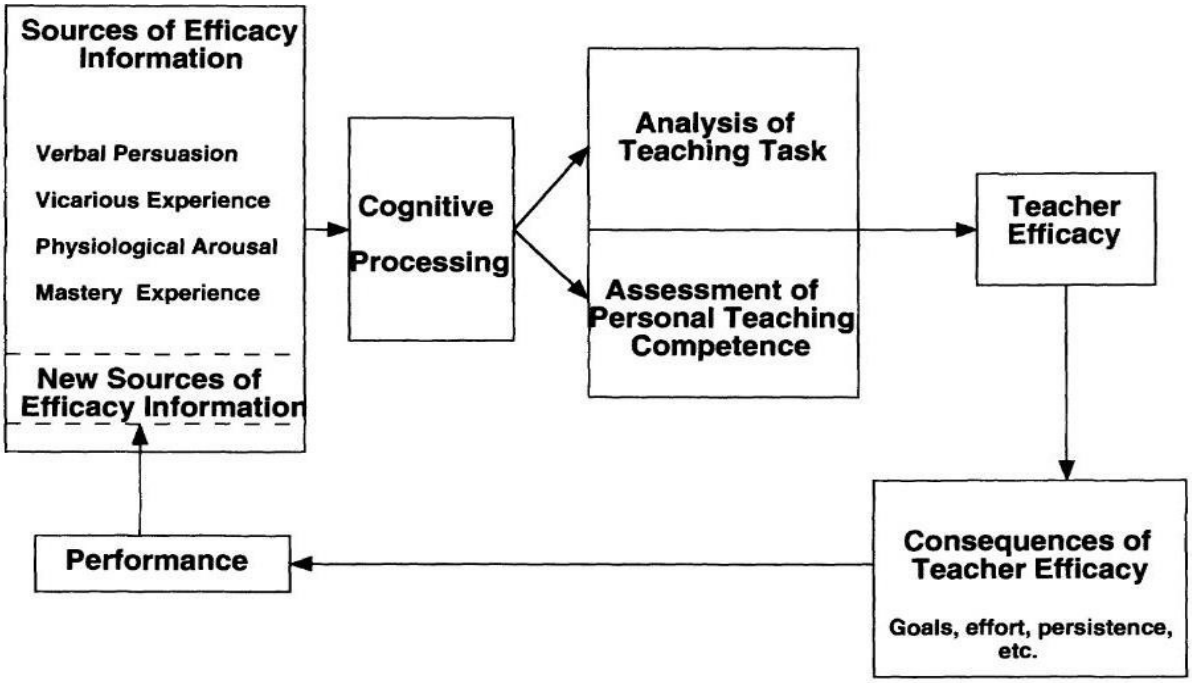
The fourth source outlines the affective and physiological states that impact the exercise of personal control (Bandura, 1977, 1997). Tschannen-Moran and Hoy (2007) stipulate that "the feelings of joy or pleasure a teacher experiences . . . may increase her sense of efficacy, yet high levels of stress or anxiety" may do the opposite (p. 945). These four sources play a critical role in developing an individual's belief in her ability to accomplish personal and professional goals.

While the RAND Corporation preceded Bandura in identifying teacher efficacy (Weber & Omotani, 1994), Bandura's concept of collective self-efficacy has been more influential for teachers generally. Importantly, Bandura noticed that "teachers operate collectively within an interactive social system rather than as isolates" (Bandura, 1993, p. 141). "Rooted deeply in . . . social cognitive theory and his concepts of self-efficacy" (Zhou, 2019, p. 71), collective teacher efficacy can impact student achievement when schools have "staffs who firmly believe that, by their determined efforts, students are motivatable and teachable whatever their backgrounds" (Bandura, 1993, p. 143).

Building on Bandura, Tschannen-Moran et al. (1998) presented a cyclical model of teacher efficacy, which is shown in Figure 1.

Figure 1

Model of Teacher Efficacy



Note. From "Teacher Efficacy: Its Meaning and Measure," by M. Tschannen-Moran et al., 1998, *Review of Educational Research, 68*(2), 202–248. Reprinted with permission.

Goddard (1998) then noted, "Collective teacher efficacy has received relatively little research attention" (p. 2). In answer, Goddard (1998) confirmed that collective teacher efficacy positively affects student achievement and presented one of education's first conceptual models of collective teacher efficacy, displayed in Figure 2. Importantly, Goddard et al. (2000) based their definition of collective teacher efficacy on "the self-efficacy formulation of Bandura (1997) and the model of teacher efficacy . . . developed by Tschannen-Moran et al. (1998)" (p. 482).

Understanding Efficacy

To improve student achievement, education researchers have used survey instruments such as the Gibson and Dembo's (1984) teacher efficacy scale, Tschannen-Moran and Hoy's (2001) teachers' sense of efficacy scale, and the Norwegian teacher self-efficacy scale (Skaalvik & Skaalvik, 2007). In addition, Goddard et al. (2000) created a collective teacher efficacy scale. To this, Tschannen-Moran and Barr (2004) added their collective teacher beliefs scale.

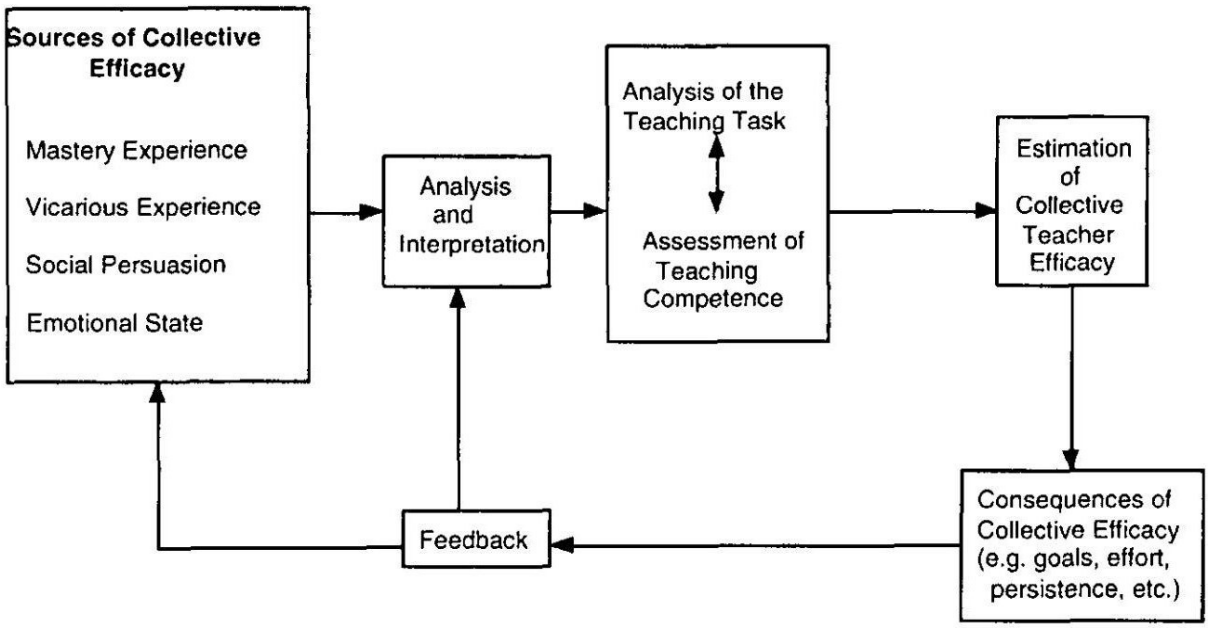
Importantly, Goddard et al. (2000) state that "teacher efficacy is context specific" because "teachers do not feel equally efficacious for all teaching situations" (p. 482). Linguistically, collective teacher efficacy can be measured either as the aggregate of teacher self-efficacy (I-referent statements) or as the aggregate measures of individual perceptions of group-referent capabilities (we-referent statements; Bandura, 1993; Goddard et al., 2004). Bandura (1993) and Goddard et al. (2004) both suggest to "conceive and assess perceived collective efficacy as the aggregate of individual perceptions of group capability" or as "we-referent statements" (Goddard et al., 2004, p. 7). Third, most research on collective teacher efficacy has utilized quantitative methods (Klassen et al., 2011; Salas-Rodriguez & Lara, 2023). Salloum (2022) reasoned that qualitative research might provide deeper insight into collective teacher efficacy.

Collective Teacher Efficacy

Hattie identified CTE as having the largest effect size on student learning (Visible Learning, n.d.). Hattie's meta-analyses found that collective teacher efficacy has an effect size $d = 1.57$,[1] almost twice that of feedback ($d = 0.72$) and nearly three times that of classroom management ($d = 0.52$). Eells' meta-analyses additionally found that "collective teacher efficacy is strongly related to achievement in schools" (2011, p. 129). Simply stated, CTE is directly related to student academic performance (Ramos et al., 2014; Bozkurt et al., 2021; Goddard et al., 2021; Salas-Rodriguez & Lara, 2023; Salloum, 2022). Education researchers have also established a positive relationship between school leadership and CTE (Brinson & Steiner, 2007; Cogaltay & Boz, 2022; Yada & Savlainen, 2023; Salloum, 2022).

Figure 2

Simplified Model of Collective Teacher Efficacy



Note. From "Collective Teacher Efficacy: Its Meaning, Measure, and Impact on Student Achievement," by R. D. Goddard et al., 2000, *American Educational Research Journal, 37*(2), 479–507. Reprinted with permission.

METHODS

The purpose of this study was to examine culture and collective teacher efficacy within School ABC, a K-8 grade school located in Auckland, New Zealand. We chose School ABC, founded in 2011, because of its influence on educational practices worldwide. The principal presents for influential education organizations and serves as the director of a powerful education organization and education trust.

Drawing on social cognitive theory as a foundation, our research team conducted a qualitative case study of collective teacher efficacy beliefs through interviews with educators at School ABC. A case study design was chosen because it provides deep, nuanced insights into a specific real-world subject by thoroughly examining it in its actual context. Specifically, we sought to answer the research question *What aspects of culture at School ABC support collective teacher efficacy?*

Given the attention collective teacher efficacy has received among educators, the findings from this study have implications for school leaders seeking to increase student achievement by building the collective efficacy of their faculty and staff. This study contributes to education research by outlining how school leaders can facilitate collective teacher efficacy beliefs by establishing key components of school culture.

Research Process

After receiving Institutional Review Board (IRB) approval, our research team conducted semi-structured interviews with faculty and staff at School ABC. We first contacted the principal to coordinate and receive permission for our study. We conducted interviews in an individual, open-ended question format with one member of our four-member research team. Using a series of questions from Tschannen-Moran and Hoy's (2001) and Goddard et al.'s (2000) teacher sense of efficacy scales as a guide, interviewers met with individual faculty and staff for 25-30 minutes.

Participants

We conducted these interviews with faculty and staff at School ABC whom the principal approached and invited to participate. In total, these interviews included 32 of 39 faculty and staff members, including administration, teachers, and some classified personnel. Among these were four men and 28 women. Table 1 summarizes the participants and the interviews conducted.

Table 1

Respondents by Type

Type	Interviews	Number of Respondents
Principal	In-depth (90 minutes)	1
School Administration	Intermediate (25-30 minutes)	3
Classified Personnel	Intermediate (25-30 minutes)	2
Teachers	Intermediate (25-30 minutes)	26

Procedure

While we attempted to conduct a census sample, due to the voluntary nature and timing of the interviews, we ended with a voluntary convenience sample of 82% of the faculty and staff. Our four-member research team conducted and later transcribed one-on-one interviews in the school. We established inter-rater reliability protocols to maintain consistency across interviews and among team members.

Interview Questions

We based interview questions on Tschannen-Moran and Hoy's (2001) teacher sense of efficacy scale and Goddard et al.'s (2000) collective teacher efficacy scale. Interviews consisted of eight questions about participants' experiences, work life at School ABC, and beliefs about their impact there.

Data Analysis

The research team recorded and transcribed each interview, during which we took notes to supplement interview data. After completing interviews, we discussed initial thoughts and identified potential themes. We used a transcription of this meeting to triangulate the axial coding phase of our data analysis.

We used a grounded theory approach, which focuses "on inductively generating novel theoretical ideas or hypotheses from the data as opposed to testing theories specified beforehand" (Gibbs, 2007, p. 49). As suggested by Corbin and Strauss (1990), data analysis included cycles of open coding, axial coding, and selective coding using NVivo. Due to the large number of categories generated during the coding process, we distinguished between significant themes ($\geq 60\%$) and notable themes (30% to 59%) (Greckhamer et al., 2018). We employed a systematic approach to qualitative data analysis, beginning with open coding of individual interviews to identify patterns and themes. Utilizing the constant comparison method (Corbin & Strauss, 1990; Gibbs, 2007), we further categorized and subcategorized similar themes.

We conducted a subsequent round of coding, adhering to the same categorization and constant comparison principles, this time framed by the research questions. Axial coding followed, examining relationships and patterns between categorized themes and potential connections to sources of efficacy and focusing on discovering connections through Corbin and

Strauss's (1990) lens of "conditions, context, strategies (action/interaction), and consequences" (p. 423). The selective coding cycle involved creating memos for each theme to develop concise definitions and deepen understanding of the categories (Corbin & Strauss, 1990). These memos facilitated the consolidation and prioritization of categories into central themes. The analysis concluded with the implementation of Lincoln and Guba's (1985) four-dimensional criteria (credibility, dependability, confirmability, and transferability) to assess the study's robustness. Through this rigorous process, we synthesized findings by contextualizing each core category within relevant theory, research, and literature.

RESULTS

Educators at School ABC reported that intentional cultural practices supported a belief in their ability to meet student needs. This section presents themes from interviews with the school's faculty and staff. First, we will provide a brief definition of culture and discuss its role at School ABC. We will then describe five critical themes regarding School ABC's culture: shared vision for learning, school systems and structures, relationships, collaboration, and well-being. Since we used the cultural context of School ABC as the basis for our findings, the specific placement of themes and sub-themes is grounded in the actual interview texts. For example, while the theme of trust could also have been categorized under relationships, educators at School ABC felt that the school's systems and structures fostered trust through grade-level hubs, peer modeling, and feedback. When considering the findings from Hallam et al. (2022) and our research on collective teacher efficacy at School ABC, we propose that their strong culture, characterized by a shared vision for learning, combined with school systems and structures, relationships, collaboration, and their focus on the well-being of their faculty and staff, fostered a more profound sense of collective teacher efficacy within their school.

Culture

We defined culture here as the values, beliefs, and attitudes that guide how a school functions and are evident in its expected behaviors and everyday operations. As we interviewed the faculty and staff, it became apparent that the nurturing, connected culture of School ABC was an important part of how they saw themselves as educators and "learners." For educators at School ABC, the vision for learning was a crucial aspect of their school culture and established expectations for both educators and students. School ABC's culture also served as the foundation for how educators interacted with and treated one another. This fostered positive relationships and well-being and provided opportunities for effective collaboration.

Shared Vision for Learning

A vision for learning provides stakeholders with a clear understanding of what learning will look like within a school. It includes school-wide beliefs and values, then connects them to expected student and educator behaviors. At School ABC, their purpose is to cause learning, serve each learner, and create curious individuals who think and relate well to others. In interviews with faculty and staff, 75% (n = 24) said that School ABC's shared vision for learning was their driving force and gave them a common identity. One teacher said that their strong shared vision for learning was promoted through their language of learning and that this vision gave them strength as practitioners. She explained, "It gives us a strong framework in terms of supporting learners and learning how to learn."

One teacher noted that she participated firsthand in the development of this shared vision of learning. Instead of just handing the faculty and staff an already-created vision for learning, the school administration team pulled everyone together before the school even opened and worked collaboratively to create a vision they were all invested in. She stated, "When the vision came out, I was more invested because we had been a part of it . . . It is not happening to us. We are part of it."

When asked about how they maintained such a strong, shared vision for learning with their faculty and staff, the principal said, "Leadership works being guardian to that vision, and living and role modeling the values and the way we do things around here." To guard and promote their shared vision, School ABC's administration created a VIBES (Vision Instigators, Belief Enablers) team. The VIBES team worked closely with grade-level hubs and individual teachers, and as one teacher said, "They are always providing support and solutions." In describing the impact of the VIBES team, one first-year teacher said, "You can't even put a price on that." Another educator stated that the VIBES team spreads their vision, "Because it is momentum, positivity, go get 'em. It comes from the top down."

An assistant principal explained that they have developed a vision presentation and a learning journey that helps potential faculty members experience firsthand "what we value." She stated, "We are very transparent in who we are . . . We share our learning journey. We share this is what we do here, and this is what we value." This transparency helped

establish clear expectations for working at School ABC. This same assistant principal explained that having conversations with each potential teacher allowed them to stress, "This is what we believe and if doesn't align with you, we may not be the right school for you." She emphasized, "This is part of how we grow our culture here."

Our study found that School ABC deliberately placed faculty and staff in positions and provided experiences that allowed them to learn and grow as educators. At School ABC, educators are viewed, and view themselves, as "learners and not knowers" (n = 26). They are encouraged to speak up, take risks, try new things, and to "leave their ego at the door." Throughout our interviews, it was common to hear educators make comments such as "I am a teacher, but I am also a learner still," or "There's always something to learn." As one teacher said, "If you fail, you are going to learn from it. If you don't try and you always do the same, then it is not having a good impact on your learners." In discussing this mentality with the school principal, she asked us, "So how do we make the teachers' jobs joyful, doable, and reasonable while serving our young people for their future?" She answered that you "provide the conditions, the capabilities, the tools that enable us to travel the undulating bumpy unknown pathway."

Systems and Structures

In considering the culture at School ABC, our data identified important systems and structures that helped them achieve their common purpose and vision. 97% of the faculty and staff (n = 31) reported that a variety of systems and structures had a significant impact on their teaching capacity. They discussed how grade-level hubs (n = 25) and a collaborative system that promoted student academic progress (n = 23) allowed them to grow as educators through intentional school design.

Unlike traditional elementary schools, where students are assigned to a single grade-level teacher, School ABC's students were placed in grade-level learning hubs. Each hub consisted of two to four teachers who collaboratively taught grade-level students. Depending on experience and expertise, teachers divide teaching responsibilities that would typically fall to one teacher in a "singleton" classroom. For example, math was generally taught to all the students in the hub by one teacher, while students learned about language arts from another. This allowed teachers to take responsibility for the entire hub and cultivate a sense of ownership within the team. 78% of teachers (n = 25) mentioned that this grade-level structure was one of the most important factors in building collective teacher efficacy at School ABC. By removing the barriers that often accompanied "single cell" teachers, educators at School ABC were constantly surrounded by opportunities to learn.

Further, educators at School ABC explained that peer modeling (n = 12) increased their ability to meet the needs of all students within the school. A new teacher described the impact that this has had on her during her first year at School ABC. She said, "You've always got a role model there to show you what's going on, and if things turn to custard, then someone's there." A veteran teacher new to School ABC discussed the differences between her previous experience at a traditional school and her time at School ABC. She explained that, even though she had only been at School ABC for a short time, this type of environment had fostered vicarious learning. She said, "You might see something else in action and you might see the results that that teacher has gotten and say, 'I am going to change my practice to that.'" Due to the systems and structures in place, educators reported being able to build trust within their teams (n = 14) more authentically. This allowed them to learn from each other in an environment designed to build teacher capacity. A veteran teacher said, "You're not alone and you're not expected to be the expert in everything." Another more novice teacher explained, "You have that opportunity to observe more and you have somebody slowly scaffolding you into taking the reins."

The culture at School ABC played an important role in increasing teacher capacity, as administrators intentionally created grade-level hubs and teams. An assistant principal described that the administrative team focused on understanding each teacher's strengths and struggles. They always ask, "Who can we place around this person's being so [John] can be the best [John] can be?" These grade-level hubs are cultural centers that prioritize vision for learning and actualize efficacy. For example, mentors are placed in the same hub as newer teachers. One newer teacher explained, "Because I was seeing it modeled every day, and we had shared expectations, it really brought my confidence up." Another mentored teacher said, "Sometimes you do need someone to say, hey, this is how you do it. You don't learn everything on your own."

Additionally, 11 out of 32 faculty and staff reported that "feedback from leadership, feedback from the students, feedback from teachers" not only helps them improve their own teaching but also helps them be more effective team members. One educator explained that the best feedback for her came not from pointing out what she was doing but from asking questions, such as, "Why do you want it that way?" or "Why do you need it that way?" In her opinion, "It is the best way to get yourself to metacognitively think about what you are doing yourself." Another teacher, referring to the entire school, said, "We are all really good at giving feedback about what is working and what is not working. It's about the culture and how happy we are."

Often called a "sense-making" conversation, this feedback, one of the school assistant principals said, begins with seeking to understand the situation and asking good questions. Feedback, she explained, is meant to make teachers feel empowered and valued, not just telling someone what they need to improve on. One teacher confirmed this philosophy when she said, "It is all about growing your awareness, I think. Helping you notice rather than telling you what you have to do. It is quite powerful actually when you notice it for yourself." In describing the role that trust and respect play in receiving feedback from her team, one teacher stated, "With the feedback they put in, because I respect them, I can take it onboard and then put it into practice."

Relationships

Thirty-one (97%) faculty and staff discussed the important role that personal connections played at School ABC. Interviewees mentioned such connections with students, colleagues, and administration. For many at School ABC, relationships with students were a top priority that led students to learn more effectively. One educator said, "If you can show the children that you believe in them, then they will want to do the work." Another explained, "I think that if I make the time to continually build the relationships, then the learning piece is going to be able to take off." To build such a relationship, a veteran teacher said you need to show that "you actually like the kids, and you appreciate them, and you respect them." As the relationships between students and educators at School ABC grew, educators felt that they could begin to meet their individual needs. As one educator said, "If you know them well, then you can design learning that you know is going to engage them."

Faculty and staff at School ABC identified relationships between teachers, teams, and grade-level hubs as key to their success. Educators mentioned, "Parents can walk in and they can see that positive attitude that we have towards each other," and that "you are not going to get anywhere with anyone if you don't build [relationships] first." A newer teacher mentioned how relationships with the adults in the building helped her through a challenging experience: "As soon as one adult gave me just a little bit of love and extra care at school," and she added, "I felt like I was successful, even if I wasn't." Faculty and staff also mentioned that the important relationships they had with school administration began when the administrative team demonstrated their belief that the educators and teams were "on the right track and doing the right thing." This led to more positive relationships as faculty and staff viewed themselves as valued members of the school.

Significantly, more than 57% of interviewees (n = 18) indicated that they were more invested and dedicated to the school's culture because they knew their voices, opinions, and thoughts mattered to the school administration. For many (n = 15), knowing that their voice mattered led them to take ownership of both their grade-level hubs and the entire school. One educator explained that School ABC doesn't have an unwritten "hierarchical system" which allows them to "see the value of everyone owning what we do." An assistant principal explained that she felt that the school administration genuinely wanted to know teachers' opinions. Whether it was in formal meetings or morning tea, she said, "We have a variety of leaders across the school that, I think, were very much in gathering voice from all teachers."

One educator described having time to dialogue directly with the principal as "invaluable," as she had "never had a principal like [this one] before." "If you go to her with a problem," she continued, "she will sit down with you and make time with you." This accessibility to the principal and other administrators has fostered trusting relationships among School ABC's educators, such that one teacher remarked, "We are all in this together."

Collaboration

75% of respondents (n = 24) mentioned collaboration as among the strongest components of their school culture. Collaboration, the principal said, "Boils down to communication, commitment, and availability to meet together." Teachers collaborate in grade-level hubs and committees. One teacher described feeling "massively supported" at School ABC, saying that it is an "organization where you are heard and helped" because "someone is always working with you to do something." Another educator described School ABC as a place where they "truly collaborate in a sincere way."

Student learning is at the heart of such collaboration. A veteran teacher explained that if anyone has a struggling student, "We try and see what can do to help the learner." If the student isn't learning, she continued, "We need to change our ways to help them." One teacher explained that it "is better for students" because, through collaboration, "you yourself will be introduced to ideas you would have never thought about," which will help educators better meet student needs.

To support teacher learning, School ABC has also built collaborative coaching (n=15) into its daily and weekly schedules. Collaborative coaching focuses on coaching the entire grade-level hub on a common need, such as collaborating more effectively, looking at the hub's learning design, or using data and evidence. These coaching sessions consisted of

structured, semi-structured, and even informal conversations conducted by the school leadership team, mentor teachers, evidence assurance coaches, or other teachers.

Well-Being

When considering the impact of stress on individual and collective teacher efficacy, School ABC was intentional about addressing what it called faculty and staff well-being. Overall, 81% of participants (n = 26) mentioned intentional practices and resources at School ABC that promoted higher levels of a person's health, happiness, and well-being. This focus aligns with School ABC's culture. For example, their wellness committee regularly hosts outside experts to provide professional development around well-being. One teacher commented, "They really deeply care about us as teachers and us as the educators, and they really want to work in partnership with us, which is really nice." Importantly, the effectiveness of collaboration within a grade-level team is often interrelated to the personal connections that team members have with each other. Knowing this, ABC administrators offer opportunities for teams to build relationships outside of school, which, in turn, enrich school culture.

DISCUSSION

This research study investigated a school known for its innovative practices and collaborative culture. By interviewing educators at School ABC, our goal was to identify links between their culture and the school's collective teacher efficacy by exploring the question, "What aspects of culture support collective teacher efficacy?" Our hope was to provide school leaders with specific cultural practices to support collective teacher efficacy in their schools. In this section, we will discuss how our findings connect to educational best practices, especially Bandura's efficacy frameworks.

According to the Association for Supervision and Curriculum Development (ASCD), school culture is defined as "the way teachers and other staff members work together and the set of beliefs, values, and assumptions they share" (n.d., para. 2). School ABC developed a shared vision for learning that leveraged its systems, structures, relationships, well-being, and collaboration to build self-efficacy beliefs.

Goddard et al. (2000) stated, "Because collective teacher efficacy beliefs shape the normative environment of a school, they have a strong influence over teacher behavior, and consequently, student achievement" (p. 497). School ABC's environment provides experiences that contribute to a shared vision for learning. DuFour and Eaker (1998) state that a vision "instills an organization with a sense of direction" (p. 62), and Roberts and Pruitt (2008) explain that a collaborative vision is a "shared image of what you desire your school to look like in the future" (p. 30). Said differently, the shared vision connects beliefs, values, and expectations to desired behaviors, which in turn influence the effectiveness and efficiency of school-wide experiences. Fullan and Quinn (2015) state, "What we need is consistency of purpose, policy and practice" and that "the solution requires individual and collective ability to build shared meaning, capacity, and commitment to action" (p. 1).

Such experiences are made possible through school systems and structures such as grade-level hubs. Within School ABC's grade-level hubs, educators must rely on each other. One teacher described how this structure enabled them to create their own "little systems" that provided them with "extra teachable moments" for their students. She said that one teacher might be reading a book to the entire hub and that it "leaves two of us free then to pull two students aside and do extra dose in density work to get them up to speed." Bandura called these mastery and vicarious experiences. Mastery experiences, which stem from one's own performance accomplishments, build confidence. In contrast, vicarious experiences involve observing others achieve success, which helps one believe she can do the same (Bandura, 1977, 1997).

Bolstering individual teacher efficacy through established systems and relationships is more natural and can have a more immediate impact on collective teacher efficacy. Goddard et al. (2000) describe feedback as a key component of their collective efficacy model (see figure 2). We found that at School ABC, feedback can influence social persuasion directly. A veteran teacher new to the school described this process as intimidating at first because school culture promotes an "open door policy" within each hub. Once she realized that the purpose was to make her a better teacher, she said, "It is always continually happening . . . so you can get feedback that way." Educators at School ABC were also actively involved in the feedback process. Whether in working with their evidence assurance coach or their mentor teacher, educators viewed feedback as a way to move forward. Teachers mentioned that they often invite others into their hubs as they progress along their "inquiry journey." When trusted and credible individuals make compelling arguments, they can boost a group's belief in its collective ability to succeed and innovate. Groups that have strong internal connections are particularly receptive to persuasive reasoning that encourages them to tackle complex problems and develop new solutions (Donohoo, 2016).

By promoting work-life balance, encouraging regular exercise, and creating a wellness committee, School ABC encouraged its educators to take control of their affective state. This supports Bandura's (1977, 1997) findings that affective state impacts one's sense of self-efficacy. One educator mentioned that his team helped him realize the importance of his well-being. He said, "I couldn't see it. Because I'm like, 'I can work, I can work, I can do it.' They said, 'No you can't. You need a break.' They have taught me those things. It's really important." Another teacher said, "You are not good to anyone" when you are overly stressed. Emotional experiences include how individuals perceive and make sense of their feelings. People with strong self-efficacy tend to interpret their emotional states as motivating and empowering. In contrast, those with lower self-efficacy often allow their emotional responses to undermine their determination and create barriers to continued effort (Goddard et al., 2004).

As school leaders seek to build collective teacher efficacy, they must understand that not all sources of efficacy information have the same influence on it (Bandura, 1997). Data from our research supported Bandura's proposed differentiated influence for mastery experiences, vicarious experiences, and social persuasion, but we found that the focus on well-being at School ABC significantly affected the affective states of faculty and staff. Bandura posited that mastery and vicarious experiences have greater influence on efficacy, while social persuasion and affective state have less significant and lasting impacts (Bandura, 1997).

Three out of the five significant cultural themes (vision for learning, collaboration, and relationships) from our research have strong connections to the firsthand experiences educators had at School ABC. Educators can also have more efficacious mastery experiences when they view themselves as learners who feel that they have administrative support to try new things, as the educators at School ABC do. Vicarious experiences at the school, on the other hand, were almost exclusively related to the systems and structures in place there. Grade-level hubs and purposeful teams fostered a greater sense of trust and learning through peer modeling and opportunities for teacher observations.

Bandura (1997) explains that social persuasion is encouraged by the faith others have in our abilities, and that the reception of feedback depends on the credibility, trustworthiness, and expertise of those providing it. The systems and structures at School ABC promoted more authentic feedback, or social persuasion, through an organized, timely, and schoolwide feedback system. School ABC's educators, however, did not recognize social persuasion as having as strong an impact on their capacity as other sources of efficacy. Our research further revealed that, while Bandura suggested that affective state has a weaker effect on efficacy, the focus on well-being at School ABC had a significant impact on teachers and their ability to teach. However, Bandura (1977) did affirm that an individual's emotional and physiological state significantly impacts their perception of self-efficacy. When teachers experience emotional challenges or health issues, their professional performance can be compromised, potentially affecting the quality of their instruction. We assert that by prioritizing teachers' well-being and providing supportive environments that foster a sense of safety and care, educational institutions can help educators recover from stress, manage anxiety, and maintain professional effectiveness. Such supportive approaches are fundamental to building trust and strengthening collective efficacy and a sense of professional capability.

It appears that nearly every facet of School ABC's structure has been intentionally designed to foster a more effective and lifelong learning experience, thereby promoting collective teacher efficacy. School ABC focused on the firsthand "experience" of learning. Educators learned through ongoing vicarious experiences, observing peers and colleagues model best practices and proper curriculum implementation. This increased educator capacity to meet the needs of every student through a school model that embraced collaboration and well-being. Further research into intentional, focused well-being strategies in schools would help determine whether educators' affective states can consistently and positively impact teacher efficacy when such methods are used. We recommend longitudinal studies that track how collective efficacy develops and changes over time, along with the long-term impact of collective efficacy on student outcomes across different school contexts.

IMPLICATIONS

School leaders face diverse challenges within their institutions; however, they should foster collective teacher efficacy. The core of collective teacher efficacy lies in educators' belief in their capacity to impact students' lives. Research has consistently demonstrated that collective teacher efficacy substantially influences student achievement and is directly correlated with educators' beliefs (Bandura, 1993, 1997; Goddard & Goddard, 2001; Tschannen-Moran et al., 1998). Donohoo (2016) emphasized that "fostering collective teacher efficacy should be at the forefront of a planned strategic effort in all schools" (p. 1). She further asserted, "Given its effect on student achievement, strengthening collective teacher efficacy should be a top priority relevant to everyone in the field of education" (p. 1). While principals do not directly

determine student academic success, their leadership plays a crucial role in shaping school outcomes. School leaders must strategically work to cultivate a positive institutional culture and articulate a collective vision that prioritizes student achievement. Based on the premise that collective teacher efficacy can positively influence student achievement, we posit that understanding and implementing the five aspects of school culture could yield significant improvements in student performance.

CONCLUSION

Collective teacher efficacy flourishes when educational institutions have a strong and purposeful culture guided by a clear and collaborative vision for learning that all stakeholders can trust. Goddard et al. (2015) stated, "Teacher collaboration is a key to the pathway from leadership to collective efficacy beliefs because it is the shared interactions among group members that serve as the building blocks of collective efficacy" (p. 504). Through deliberate cultural design, school leaders can leverage their shared vision for learning, relationships, well-being, collaboration, and school systems and structures to increase collective teacher efficacy, thereby enabling all faculty and staff to meet the needs of every student. The principal at School ABC offered this encouragement: "I do believe through really good leadership and the right culture, it can be the best job to come to every single day." This sentiment encapsulates the transformative potential of collective teacher efficacy when nurtured in a supportive, visionary educational environment.

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Manuscript submitted: ***June 21, 2024***
Manuscript revised: ***January 15, 2025***
Manuscript revised: ***March 26, 2025***
Accepted for publication: ***May 21, 2025***

Research Article

OJED
OPEN JOURNALS IN EDUCATION

Volume 10, Issue 2 (2025), pp. 62-74
Journal of School Administration Research and Development
ISSN: 2470-8496 Print/2470-850X Online
ojed.org/JSARD

Evaluating Learner Feedback as a Leadership Tool for School Improvement in Ghana

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ABSTRACT

Despite growing interest in feedback strategies for school improvement in Ghana, learner perspectives—especially at the senior high school level—remain underexplored. This gap limits understanding of the effectiveness of learner feedback in driving meaningful change. Guided by contingency theory, which underscores the need for context-responsive leadership, this qualitative case study examined how principals in Ghana's most cosmopolitan city perceived learner feedback as a school improvement strategy. Twelve principals—the entire cohort within the study area—were purposively selected and interviewed, and the data were analyzed thematically. Findings revealed that participants acknowledged the value of learner feedback in enhancing student engagement, fostering continuous improvement, and promoting responsible citizenship. However, they also raised significant concerns. Key challenges included perceived unreliability of student input, time and financial constraints, and resistance from both staff and students. These findings highlight the complex leadership decisions involved in implementing learner feedback systems in resource-constrained environments. The study offers context-specific insights for school leaders and policymakers seeking to integrate learner voice in school governance. It underscores the need for leadership development, policy support, and resource allocation to strengthen the role of learner feedback in enhancing school practices and improving student outcomes.

***Keywords*:** Ghana; leadership; learner feedback; principals; school improvement strategy

In today's constantly evolving world, schools need to play a pivotal role in nurturing learners to reach their full potential and meet society's complex demands. Achieving this goal necessitates continuous improvement efforts by school leaders, covering enhancements in human resources, infrastructure, and teaching methodologies (Farrell, 2015; Koh et al., 2023; Marsh & Farrell, 2015; Zumpe, 2024). Among the diverse improvement strategies, the feedback approach stands out for its capacity to refine school visions, evaluate progress, and foster meaningful change (Adolfsson, 2024; Hopkins, 2022). Feedback encompasses insights from various stakeholders, such as principals, teachers, parents, learners, and support staff, on different facets of school life, including the outputs of principals, teachers, and students (Ahea et al., 2016; Ampofo, 2020; Brown & McGill, 2024).

While scholarly interest in feedback approaches has increased lately, the existing body of research has mainly focused on feedback from principals, teachers (Cole et al., 2017; Peterson & Portier, 2014), and parents (Eady & Moreau, 2018; Miller, 1995), overlooking learner feedback. Despite extensive exploration of feedback strategies for school improvement in Ghana, prior studies (e.g., Ampofo, 2020; Awinyam et al., 2022; Eshun, 2019; Liu & Gumah, 2020) have notably omitted the vital perspective of learners themselves, particularly within the secondary education sector, where student concerns have been evident (Ampofo, 2020). Consequently, the effectiveness of learner feedback in improving secondary schools is unclear. This study aims to bridge this gap by exploring how principals, as managers of senior high schools (SHS) in the country, perceive the effectiveness of learner feedback as a school improvement strategy, and the reasons they like or dislike its implementation. To achieve this objective, we posed the question: How do SHS principals in Ghana perceive the

effectiveness of learner feedback as a school improvement strategy, and how do their perceptions of its implementation align with the contingent factors influencing their leadership decisions? The word effectiveness, in this context, refers to the extent to which learner feedback assists principals' ongoing planning, monitoring, and evaluation processes to advance the school toward its vision and mission, as noted by Han (2017) and Sigurðardóttir and Sigþórsson (2016).

The study holds significant implications for educational practice and policy. By examining the role of learner feedback in enhancing school performance, this study aims to shed light on an often-overlooked aspect of school improvement strategies. Incorporating learner feedback into school improvement plans in Ghana can lead to more effective outcomes, aligning with global efforts towards achieving Sustainable Development Goal 4 on quality education.

Overview of the Ghanaian Education System

The Ghanaian education system consists of three levels: Basic education, secondary education, and tertiary education. Basic education follows a nine-year cycle, comprising one year of kindergarten, six years of primary school, and three years of junior high school. At the end of junior high, students take the Basic Education Certificate Examinations (BECE) administered by the West African Examinations Council (WAEC). However, this examination is procedural, as students proceed to secondary education regardless of their performance (Acheampong, 2010; Anamuah-Mensah, 2002; Armah, 2017; Asiedu-Akrofi, 1982).

Secondary education comprises a three-year cycle of senior high school or technical school. In the final year, students sit for the West African Senior School Certificate Examination (WASSCE), also conducted by the WAEC. Unlike the BECE, passing the WASSCE is essential for students aspiring to tertiary education. They must also meet specific entry requirements for their preferred programs in universities, polytechnics, colleges of education, nurses' colleges, and vocational training institutions. Tertiary education typically takes four years to complete (Akyeampong, 2010; Anamuah-Mensah, 2002; Armah, 2017; Asiedu-Akrofi, 1982).

LITERATURE REVIEW

While global trends emphasize inclusive feedback mechanisms that involve students in the process, Ghana's approach remains relatively underdeveloped. Internationally, research often highlights the role of learner feedback in enhancing educational quality and leadership practices, with a focus on systematic, inclusive, and iterative processes (e.g., feedback loops in Western educational systems). In contrast, Ghanaian research primarily focuses on teacher feedback and school performance. Yet, it lacks a comprehensive integration of learner perspectives, thereby limiting the scope for more holistic school improvement strategies. This gap underscores the need for context-specific studies on learner feedback in Ghana, particularly given the unique challenges faced by school leaders.

Theoretical Framework: The Contingency Theory

This study is grounded in contingency theory (CT), which asserts that effective leadership depends on aligning decisions with the specific context, such as resource availability, institutional culture, and accountability demands (McAdam & McSorley, 2019; Mikes & Kaplan, 2014; Otley, 2016). CT provides a framework for understanding how school leaders adapt their strategies in response to these contextual factors. It assumes there is no single best way to lead; instead, leadership must be responsive to specific circumstances. In the context of Ghanaian senior high schools, this study provides insight into how principals adapt their approaches to using structured student feedback—input on teaching and school practices—as a tool for school improvement. The theory emphasizes that leadership practices are not one-size-fits-all but must be responsive to each school's unique circumstances. For example, a principal at a resource-constrained school may limit feedback mechanisms due to insufficient staffing or time. In contrast, a principal in a better-resourced school might actively integrate feedback into decision-making processes.

By applying CT, this study highlights how their school's environment shapes principals' decisions about feedback mechanisms. This adaptability ensures that feedback is utilized effectively, even if its implementation varies across schools. In this way, CT offers a valuable lens for understanding how learner feedback can drive school improvement across diverse contexts.

Learner Feedback as a School Improvement Strategy

Importance of the Strategy

In nurturing learners, schools must prioritize giving students a voice in decisions that impact their academic, emotional, and social well-being (Marsh & Farrell, 2015). This is achieved through soliciting and acting upon their feedback to drive school improvement, a fundamental responsibility of school principals (Koh et al., 2023; Quesel et al., 2021).

Utilizing learner feedback as a tool for school improvement is indispensable, as it yields numerous benefits. Firstly, it empowers students to share their perspectives openly (Ahea et al., 2016) and enriches their learning experiences (Bajaj et al., 2018). Secondly, it enhances the school's credibility (Henderson et al., 2021) and supports the formulation of strategic timelines for school activities, thereby facilitating effective decision-making by school leaders (Huberman & Miles, 2013; Nehez & Håkansson Lindqvist, 2024).

Implementation Challenges

The challenges principals encounter when implementing learner feedback as a school improvement strategy are multifaceted. The literature has identified several of them. First, accessing comprehensive feedback can be difficult, as not all students can provide input due to limited access to the necessary platforms (Adolfsson, 2024; Huberman & Miles, 2013; Koh et al., 2023). Additionally, analyzing and interpreting large volumes of feedback is time-consuming and costly, requiring principals to possess strong analytical skills to identify trends and derive actionable insights (Eady & Moreau, 2018; Goffin et al., 2022; Quesel et al., 2021).

Another significant challenge is the potential bias and subjectivity inherent in learner feedback, which may be influenced by factors such as peer pressure, personal preferences, and cultural backgrounds. Principals must be vigilant in recognizing these biases to ensure that the feedback collected is objective and truly reflective of the students' opinions (Liu & Gumah, 2020).

Moreover, some principals struggle to manage both quantitative and qualitative feedback effectively. To gain a comprehensive understanding of educational programs, they must balance numerical metrics with qualitative insights, a skill that not all principals possess (Acton, 2021; Sigurðardóttir & Sigþórsson, 2016). Communicating learner feedback effectively to stakeholders is also essential for fostering trust and collaboration within the school community, but not all principals are adept at this task (Ampofo, 2020; Harris et al., 2013; Sadler, 2014).

Implementation Action Steps

While the learner feedback approach to school improvement offers numerous benefits, Marsh and Farrell (2015) contend that, for learners' feedback to enhance schools, the challenges that bedevil its implementation must be addressed. One strategy for doing so is carefully designing the feedback process to ensure anonymity. Thus, students must have easy access to digital platforms for surveys, fill out printed questionnaires, provide one-on-one interview responses, or use suggestion boxes to express their anonymous views on various aspects of the school experience, including teaching quality, resources, policies and procedures, extracurricular activities, and overall culture and climate. Students are more likely to provide honest and constructive feedback when they feel free to express their opinions and concerns without fear of retaliation or victimization in the school environment (Eady & Moreau, 2018).

METHODS

Research Design

This study employed a qualitative single-case study design to assess the effectiveness of learner feedback as a school-improvement strategy in Ghana. According to Yin (2003), a case study design is particularly suitable for exploring complex social phenomena within their real-life context. In this case, it enables an in-depth understanding of the unique dynamics within Ghanaian senior high schools, where learner feedback is an emerging school improvement strategy. A case study is well-suited for this research as it facilitates the examination of how various contextual factors—such as school leadership, resources, and local educational policies—interact and influence the implementation and effectiveness of learner feedback.

Aligned with a social constructivist research philosophy, this study views research as a process of exploring multiple realities. It emphasizes interpreting participants' perspectives with an understanding of subjectivity and context (Patton, 2015), while also identifying commonalities (Creswell, 2013). In this regard, the case study design allows for a rich exploration of school principals' perceptions, which are deeply embedded in Ghana's unique educational setting. By focusing on a single case, this approach enables a nuanced understanding of the complexities involved, particularly amid

challenges such as reliability, time constraints, and resistance from staff and students. Thus, the case study design is justified, as it provides the necessary depth and context-specific insights to fully understand senior high school principals' perceptions of learner feedback as a school improvement strategy in Ghana.

Case Profile

The geographical area used as a case study in this research is Ghana's largest and most cosmopolitan city. Located on the coast of the Gulf of Guinea in West Africa, this area includes three of Ghana's 29 districts in the Greater Accra Region, each overseen by a mayor appointed by the President (Ghana Statistical Service, 2021). As the economic and administrative center of the Greater Accra Region, the city is home to the Office of the President, government ministries, and the headquarters of many governmental and non-governmental organizations.

Participant Selection

We employed two purposive sampling techniques—modal and expert (Creswell, 2013)—to select participants. We used the modal technique to select Ghana's most cosmopolitan city as a case study (see case profile) because, by its nature, it was likely to include school principals with diverse cultural experiences relevant to our research. The purposive expert sampling technique guided the selection of participants, including 12 SHS principals in the study area, chosen for their relevance and expertise and because they constituted the entire cohort in that area. We specifically included only SHS principals or their deputies, as they were responsible for their schools' overall management and were key stakeholders in decisions regarding school improvement practices, including learner feedback. This technique ensured participants had direct experience implementing learner feedback, enriching our insights into their perceptions and experiences.

The participants varied in age, gender, type of school (public or private), years of experience as principals, teacher population, supporting staff population, and student population (see Table 1). This diversity added depth to our findings and provided a comprehensive understanding of learner feedback practices across different contexts within Ghanaian SHSs. While we tried to ensure diversity, there may still have been some biases in our selection. However, we were transparent about our sampling methods, which helped to minimize these biases and improve the study's credibility.

Table 1

Details of Participants

Participant	Age	Gender	Nature of School	Duration of Principalship	Number of Teaching Staff	Number of Supporting Staff	Number of Students
P1	51	Male	Private	12 years	12	5	98
P2	51	Male	Public	4 years	152	56	2032
P3	48	Female	Public	7 years	87	42	1500
P4	58	Male	Private	6 years	26	3	149
P5	52	Female	Public	3 years	159	21	3723
P6	59	Female	Public	6 years	40	16	255
P7	55	Male	Public	4 months	77	11	1408
P8	55	Male	Public	5 years	223	105	5800
P9	55	male	Public	8 years	130	93	2145
P10	55	Female	Public	1year	111	59	2418
P11	56	Male	Public	8 years	111	63	2325
P12	42	Female	Private	3 years	34	7	235

Data Collection and Analysis

We collected data using semi-structured interviews. The tool consisted of 21 initial questions. While the first six questions gathered demographic information and were closed-ended, the rest were open-ended. Examples included the following:

1. Please, what gender do you prefer for yourself?
2. How old are you?
3. Is your institution a public or private school?
4. How many teachers do you have in the school?
5. How many supporting staff do you have in the school?
6. What is the population of students in your school?
7. May I know how long you have been serving as principal of the school?
8. Can you describe your role and responsibilities as a principal in a senior high school in Ghana?
9. How familiar are you with the concept of learner feedback as a school improvement strategy?
10. In your opinion, how important is learner feedback in the context of senior high schools in Ghana?
11. Can you share any experiences or examples of how learner feedback has been utilized in your school?
12. What do you perceive as the primary benefits of implementing learner feedback as a school improvement strategy?

We conducted the interviews face-to-face, lasting approximately 45 minutes each. With participants' permission, we recorded and transcribed them using Turboscribe.ai. We saved the recordings on the lead author's computer and reconciled the transcriptions with the audio to correct errors caused by unfamiliar accents.

We coded the data inductively using NVivo software, conducting repeated coding exercises until saturation was achieved. We identified several codes reflecting principals' perceptions of learner feedback. Positive perceptions included codes such as *enhancing student engagement*, *fostering a culture of continuous improvement*, and *developing responsible citizens*. Concerns were captured using codes such as *unreliable feedback*, *time and financial constraints*, and *subordinates' resistance*. We subsequently organized the codes into two major themes: the perceived usefulness of learner feedback and concerns about implementing it. This thematic analysis provided detailed insights into the reasons for and concerns about using learner feedback as a school-improvement strategy.

Rigor and Trustworthiness

To ensure the rigor and trustworthiness of the study, we employed several strategies. We achieved **reliability** by having multiple coders independently analyze segments of the data, then comparing and resolving discrepancies through discussion and consensus. We also maintained an **audit trail** throughout the process, documenting coding decisions, thematic development, and changes made during data analysis. We further conducted **member checking** by sharing the findings with a select group of participants to verify the accuracy and relevance of interpretations. Additionally, we used **peer debriefing**, involving colleagues to review the research process and findings, ensuring that interpretations were consistent and well-supported.

We acknowledge that researchers' backgrounds and biases influence their studies, so we ensured reflexivity and adopted an 'outsider position' to approach the data from the participants' perspectives rather than our presumptions. These practices collectively contributed to the credibility, dependability, and confirmability of the study's results (Johnson et al., 2020).

Ethics

Before the study commenced, we obtained ethical clearance from the Humanities Ethics Committee of the lead author's university and approval from the Regional Directorate of Education of the Greater Accra Region. We briefed participants on the research and obtained their verbal consent rather than written consent because that was their preferred option. We thus audio-recorded their consent as proof and kept a consent form outlining the key issues discussed during the verbal consent process. We informed participants that their involvement was voluntary and that they could withdraw at any stage without consequences. We also maintained confidentiality by anonymizing participants and their schools during coding and reporting the findings. For example, we used codes like P1 for the principal of the first school, P2 for the second school, and so on, up to P12 for the twelfth school.

FINDINGS

This section presents the findings from interviews of 12 Ghanaian senior high school (SHS) principals on their perceptions of the effectiveness of learner feedback as a school improvement strategy. The principals shared their views on the benefits and challenges of implementing learner feedback, explaining why they liked or disliked its use. After analyzing the data, two themes emerged:

1. The perceived usefulness of learner feedback
2. The concerns with implementing learner feedback

These themes guide the presentation of findings. For ethical reasons, we anonymised the narrative quotes within the themes by assigning each participant a unique code. For example, we refer to the principal of the first school as P1, the second as P2, and so on, up to P12 for the twelfth school.

The Perceived Usefulness of Learner Feedback

This theme explores the principals' positive perceptions of learner feedback as a tool for school improvement. The leaders highlighted several benefits of learner feedback, which are organized into the following subthemes:

- Enhancing Student Engagement
- Fostering a Culture of Continuous Improvement
- Churning out Responsible Citizens

Enhancing Student Engagement

Student engagement in this context refers to students' involvement in decision-making processes to promote their level of interest in and commitment to learning and school activities (Ahea et al., 2016; Quesel et al., 2021). The data reveal that participants preferred learner feedback as a school improvement strategy because it promoted student engagement necessary to "drive students' interest in academic work" (P4), "build trust" (P6), "minimize school attrition" (P10), and "boost institutional success" (P4).

The school leaders utilized the student engagement approach at three levels: school, program, and classroom. At the school level**,** they created an enabling environment that provided easy access to academic materials and encouraged student participation in discussions to promote active learning. For example, one participant mentioned efforts to introduce "… digital online learning platforms in my school's library" (P6). Additionally, learner feedback was used to implement significant reforms, such as "revising the boarding students' menu to improve dining hall food quality" (P9) and "undertaking major maintenance on physical facilities, including dormitories and classrooms" (P11).

At the program level**,** learner feedback was used to guide students who wished to "change their program selections, with counselling units assisting them in making informed choices" (P4). It was also used as a guide to "select supplementary textbooks to meet students' needs" (P12). Further, the learner feedback approach played a major role in the decision to enhance extracurricular and co-curricular activities, such as "organizing games and reintroducing drama and debating clubs" (P10).

At the classroom level**,** student feedback informed the leaders' decision to encourage their teachers to use student engagement to improve teaching strategies. One principal explained,

> My teachers engage with students to identify their specific learning needs and take urgent steps to address them. For example, honest discussions with students sometimes inform teachers' decisions to change questioning techniques and vary instructional delivery to better meet students' needs (P2).

Fostering a Culture of Continuous Improvement

The data indicate that principals valued the learner feedback approach not only for increasing student engagement but also for fostering a culture of continuous improvement. One principal described it as, "… an ongoing process of examining the school's performance, identifying challenges and opportunities, and making gradual changes based on priorities" (P1).

To support this approach, the principals implemented several strategies. For example, regular meetings were held between students and their assigned teacher-advisors, known as form masters or form mistresses. A principal explained,

> I've assigned every class a teacher-advisor, known as form master or form mistress. The school requires all advisors to organize regular class meetings with their students to listen and address their issues. If the advisors can't handle the grievances, they refer the matter to me or any of my assistants for redress. Where necessary, we implement changes that address students' grievances (P5).

Additionally, the principals allowed student leaders to meet with their peers and report feedback to school management. One of them said,

> The school has a leadership forum called the prefectorial board, comprising senior and house prefects, class prefects, and the dispensary prefect. The board meets fortnightly. During these meetings, every prefect reports on challenges faced based on students' complaints. The issues are documented and discussed in senior management meetings (P9).

Furthermore, the leaders engaged directly with students, showing visible signs of distress. One principal noted,

I often visit common areas in the school unannounced, observing students who appear anxious or sorrowful. I meet such students privately on a one-on-one basis to discuss their issues in a fear-free environment, often revealing problems at home or school. I then contact their parents or address school-related issues directly (P1).

*The leaders also instituted measures allowing students to anonymously report their challenges: "*We have suggestion boxes installed around the school, allowing students to report issues and suggest solutions without revealing their identities" (P5).

Churning out Responsible Citizens

Responsible citizenship involves taking responsibility for one's actions, understanding one's role in the community, participating actively in community activities, and working collaboratively to promote communal welfare (Cole et al. 2017). In addition to the previously noted benefits of learner feedback, the principals identified its role in developing responsible citizenship among students. They viewed the feedback approach as an opportunity for students to contribute to school management and thereby cultivate the qualities of responsible citizenship before graduation. A principal highlighted the connection between feedback and responsible citizenship:

> I encourage students to give feedback based on their opinions on issues. This initiative helps to empower them. Empowering students prepares them to be good citizens who can share their thoughts and views on national issues without prejudice or fear (P3).

This perspective underscores the belief that engaging students in providing feedback not only improves school management but also fosters their development into responsible and proactive members of society.

The Concerns with Implementing Learner Feedback

This theme covers the challenges the principals claimed they encountered when implementing learner feedback. It delves into the barriers that frustrate the leaders' effective use of learner feedback in their schools. The emergent subthemes included:

- Reliability of Feedback
- Time and Financial Constraints

Reliability of Feedback

The data highlight many concerns among the principals regarding the reliability of learner feedback in guiding school reform policies and programs. They expressed skepticism about the accuracy of learner feedback, citing potential biases. One principal noted, "Students sometimes provide inaccurate information" (P7). At the same time, another observed that student feedback could be exaggerated because "students may not be satisfied with our efforts and might highlight issues disproportionately" (P2). Additionally, concerns were raised that learner feedback might "allow room for unnecessary criticism and excessive demands that may not benefit the school overall" (P8).

Time and Financial Constraints

According to the data, time and financial constraints were significant obstacles to effectively implementing learner feedback to improve schools, aside from feedback reliability. The principals were worried about splitting time between their administrative duties and handling student feedback. For example, a principal elaborated,

> While I acknowledge that learner feedback is beneficial, dealing with a large volume of feedback during my limited administrative hours is a significant challenge. It's hard for me to find the time to thoroughly review and act on each piece of feedback (P7).

When we asked why he did not delegate his staff to perform the task on his behalf, he added,

> My staff is already overwhelmed with their heavily packed daily duties, and finding time to handle student feedback implies relegating to the background equally necessary issues. We're, however, trying to find time for the feedback we receive from students (P7).

These quotes underscore how time constraints may hinder schools from fully utilizing feedback to make meaningful improvements. A related issue was financial constraint, which the principals believed significantly limited their ability to act on students' valuable input: "School heads in Ghana have limited budgetary allocation. This situation thwarts our good intention to process and act on all the suggestions from students to fully address their concerns due to the lack of available

resources" (P 4). This quote highlights the challenge of aligning financial capabilities with the need to make meaningful improvements based on learner feedback.

Subordinate Resistance

Many participants highlighted significant resistance from both staff and students as a major concern. This resistance manifested in different ways. Principal 2 explained teachers' resistance to change related to power and control: "Some teachers and ancillary staff are hesitant to accept change based on students' perspectives because they believe so much in their competence to know everything expected of them. This situation is worrying! (P2)." Principal 6 shared similar ideas: "The teachers who oppose the implementation of recommendations borne out of students' grievances do so because they are supercilious, believing that changing their detrimental attitudes to suit students' needs is an affront to their authority (P6).

Principal 8 described teacher resistance coming from a lack of knowledge and skill:

As for me, I'm not so much surprised because I think some teachers' failure to implement new ideas emanating from students' feedback in their teaching is due to their lack of knowledge on how to effectively incorporate feedback into their teaching practices, which creates resistance and delays in implementing improvements (P8).

Meanwhile, Principal 10 shared students' resistance based on a lack of trust: "Many students are reluctant to participate in feedback exercises because they don't trust the school to implement their suggestions. But we're doing our best to encourage them" (P10). All of these quotes emphasize the need for professional development tailored to each school's unique circumstances.

DISCUSSION

Informed by contingency theory (CT), this study aimed to explore how principals of senior high schools (SHSs) in Ghana's most cosmopolitan city perceived the effectiveness of learner feedback as a school-improvement strategy. The findings underscore the dual nature of learner feedback as both a powerful tool for school improvement and a complex challenge requiring careful management. The principals in this study recognized the potential benefits of learner feedback, such as enhanced student engagement, continuous improvement, and responsible citizenship. From a CT perspective, these benefits materialize only when the input is aligned with the specific context of each school, including its culture, resources, and external pressures (McAdam & McSorley, 2019). These insights are consistent with findings in studies from other African contexts, such as those by Cohen and Singh (2020) and Olatunji et al. (2023), which have identified the importance of contextual factors, such as school culture and available resources, in the successful implementation of feedback systems in educational settings across Ghana and Sub-Saharan Africa. However, the challenges identified in the present study, such as staff resistance and unreliable student input, further highlight a divergence from some of the more optimistic findings in other Ghanaian studies, where contextual adaptation was seen as slightly more successful in overcoming such barriers.

The findings further corroborate existing literature, particularly studies by Bajaj et al. (2018), Henderson et al. (2021), Koh et al. (2023), and Zumpe (2024), which have shown that engaging students in contributing to school improvement initiatives can enhance their sense of ownership and commitment to changes. However, school leadership needs to foster a culture where students feel empowered to share their perspectives openly, in an atmosphere of trust, with anonymity in feedback processes, and with value placed on student input. Analyzing and acting upon student input is crucial, and school leadership must establish structured processes for reviewing feedback, identifying common themes, and developing action plans to address them (Cole et al., 2017; Eady & Moreau, 2018). In this study, the creation of a student-led committee—a prefectorial board that met fortnightly to discuss school issues—reflects Sigurðardóttir and Sigþórsson's (2016) view that regular engagement of student leaders is essential for monitoring and evaluating improvements, ensuring their effectiveness and sustainability. This approach aligns with similar strategies in other Ghanaian schools, where student committees have been key to engaging learners in decision-making. However, the challenges principals face in maintaining consistent student input underscore that such models are not always universally applicable, especially in contexts with greater resistance or resource constraints.

Moreover, the principals engaged students at various levels—school, program, and classroom—depending on contextual factors such as school culture and external demands. This multi-level engagement strategy illustrates the contingency approach, demonstrating that different levels of student involvement are necessary depending on the challenges and opportunities of each school. The success of the principals in creating a holistic educational environment that supports students academically, emotionally, and behaviorally further highlights the importance of adapting strategies to fit specific situational needs. While the multi-level engagement has been shown to work well in other African settings, such as those

discussed by Han (2017), this study's findings suggest that cultural and resource constraints in Ghana sometimes prevent the successful implementation of such strategies. For example, some schools reported challenges in achieving high levels of engagement across all three levels due to time and staffing limitations.

At the school level, the engagement strategy allowed research participants to involve students actively in decision-making processes, which is essential for developing critical thinking skills and motivating participation in both academic and extracurricular activities (Ahea et al., 2016; Hopkins, 2022). For example, "Revising the boarding students' menu to improve dining hall food quality" (P9) and "undertaking major maintenance on physical facilities, including dormitories and classrooms" (P11) are necessary initiatives for student emotional and behavioral development. Again, "Change their program selections, with counselling units assisting them in making informed choices" (P4) was also imperative for student academic development. In many educational settings, student voices are underrepresented in decision-making processes (Acton, 2021; Marsh & Farrell, 2015). However, engaging students in providing feedback can lead to more effective, student-centered improvements (Quesel et al., 2021). These examples show similarities to initiatives in other Ghanaian schools, but the varying success across schools suggests that the impact of such initiatives may be contingent on specific leadership practices and available resources, consistent with Liu and Gumah's (2020) findings.

Turning to the concerns raised by participants about implementation challenges —such as unreliable student input, time and financial constraints, and resistance from staff and students—these align with the tenets of CT. The theory posits that no single management strategy is universally effective, and measures must be adapted to address specific challenges within a given context (Mikes & Kaplan, 2014; Otley, 2016). For example, the difficulty in obtaining reliable feedback due to peer pressure, personal preferences, and cultural backgrounds underscores the importance of school leaders' ability to implement validation measures to ensure the effectiveness of learner feedback. Resistance from staff and students underscores the need for professional development tailored to each school's unique circumstances, a core principle of CT. This resonates with findings from other Ghanaian studies (e.g., Ampofo, 2020; Awinyam), which similarly attributed resistance to feedback implementation to cultural factors and insufficient training. However, the study suggests that these challenges may be exacerbated in urban schools where diverse student populations and external pressures complicate consensus-building efforts.

The findings also echo those of Liu and Gumah (2020), who noted that obtaining comprehensive student feedback is difficult because not all students can provide honest input due to peer pressure, personal preferences, and cultural influences. As such, principals must implement strategies to ensure the feedback reflects students' true opinions. Furthermore, Marsh and Farrell (2015) found that educational leaders often hesitate to collect feedback due to time constraints and financial limitations. While this aligns with the current study, the additional challenge of managing high expectations from both parents and external stakeholders in urban settings adds another layer of complexity that may not be as pronounced in rural Ghanaian schools.

The application of CT to the study underscores the need for a flexible, adaptive approach to using learner feedback in school improvement strategies. The theory emphasizes that learner feedback effectiveness is not inherent but depends on how well it aligns with each school's specific context, culture, and external environment. Therefore, school leaders must continuously evaluate and adjust their strategies to ensure that learner feedback effectively contributes to school improvement, considering the dynamic and contingent nature of educational environments. This aligns with the broader literature on African education systems, which calls for strategies that are both locally responsive and adaptable to the diverse needs of students and teachers, especially in urban contexts with rapidly changing demographics and external pressures. Figure 1 displays a model for interpreting the process flow for learner feedback collection and use in SHSs, as explained above.

CONCLUSION AND IMPLICATIONS FOR FUTURE RESEARCH

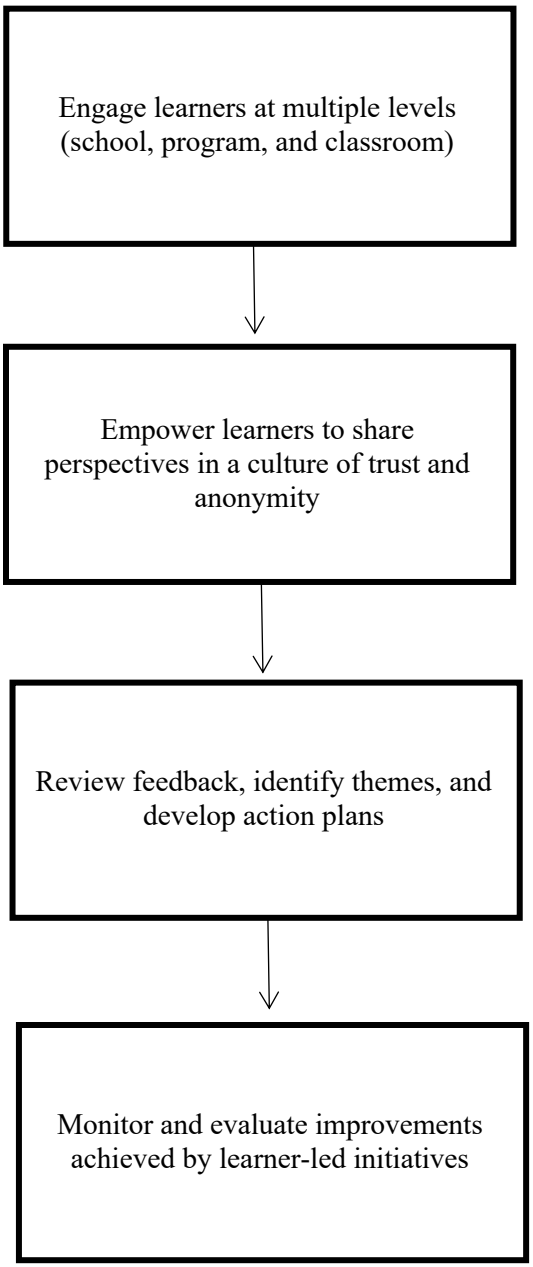
Grounded in contingency theory, this study sheds light on SHS principals' perceptions in Ghana's most cosmopolitan city regarding the use of learner feedback as a school improvement strategy. The findings reveal that while participants acknowledged the potential benefits of learner feedback—such as enhancing student engagement and fostering a culture of continuous improvement—they also expressed concerns about its implementation. These included doubts about the reliability of student input, time and financial constraints, and resistance from both staff and students.

The study underscores the importance of contextual factors in determining the effectiveness of learner feedback systems. Contingency theory posits that the success of a practice depends on how well it fits within its specific environment. In this regard, the cosmopolitan high schools studied presented both unique opportunities and implementation challenges. To maximize the potential of learner feedback, policymakers and school leaders must proactively address these challenges.

This may involve strategies such as triangulating student feedback with other data sources (e.g., direct observations, interviews), allocating sufficient resources, and nurturing a school culture that values openness, responsiveness, and continuous improvement.

Figure 1

Process Flow of Learner Feedback Collection and Use in Senior High Schools



Looking ahead, further research is needed to deepen the understanding of how learner feedback can be effectively used across diverse educational settings. Longitudinal studies that track the impact of feedback on school outcomes—such as academic performance, student satisfaction, and school culture—over time would be especially valuable. Such studies can offer insights into the sustainability and long-term effects of feedback-driven improvement efforts. Additionally, comparative research across different regions of Ghana or other African countries could illuminate how varied contexts

shape the implementation and outcomes of learner feedback. These efforts would help identify the conditions under which learner feedback catalyzes meaningful and enduring school improvement.

DECLARATION OF CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

FUNDING INFORMATION

The author received no financial support for the research, authorship, and/or publication of this article.

Acknowledgements

The researchers acknowledge the immense contributions of colleagues who provided the necessary feedback to improve the research.

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Manuscript submitted: ***October 14, 2024***
Manuscript revised: ***December 30, 2024***
Manuscript revised: ***April 7, 2025***
Accepted for publication: ***June 4, 2025***

Research Article

OJED
OPEN JOURNALS IN EDUCATION

Volume 10, Issue 2 (2025), pp. 75-90
Journal of School Administration Research and Development
ISSN: 2470-8496 Print/2470-850X Online
ojed.org/JSARD

Immersive Virtual Learning Experiences of Senior Secondary School Students from India and Russia: A Mixed Method Study

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ABSTRACT

Virtual Reality (VR) provides an immersive learning (IL) experience by simulating real-world scenarios that bridge the gap between theory and application. VR simulations are interactive and enhance student engagement across a range of concepts, from simple to complex. India and Russia share similar cultural and historical backgrounds, and both are committed to creating a multipolar world. Both are large developing countries with several strategic partnerships and international cooperation. Hence, this study aims to capture the learning experiences of internationally paired students in an IL environment and their attitudes towards IL environments, to mutually contribute to teaching and learn in these countries. Students experienced immersive learning through stand-alone head-mounted virtual reality cameras with a controller. The study employed a mixed-methods research design involving a quantitative and qualitative explanatory approach. Researchers paired 100 senior secondary school students from Russia (n = 50) and India (n = 50) and exposed them to virtual IL experiences. Researchers used the user-experience IL environment scale, the VR-IL environment attitude scale, and an interview guide to collect the data of the study. Quantitative data were analyzed using descriptive statistics, a correlation test, and regression. Qualitative data were analyzed through narrative thematic analysis. Researchers triangulated the IL experiences measured through quantitative and qualitative methods. The study found a positive correlation between IL experiences and attitude towards the IL environment. Further, IL experiences accounted for 43.5% of positive attitudes towards the IL environment. The qualitative analysis revealed both positive and negative aspects of VR-IL environment experiences. The study's findings add value to the cognitive-affective theory of learning with media, as it includes knowledge construction, emotional connection, and motivation for learning. Future studies may explore the benefits of the IL environment with artificial intelligence (AI) and generative AI towards teaching and learning.

***Keywords*:** Metaverse, virtual reality, virtual learning, immersive learning, mixed reality

In today's society, technology plays a vital role, radically transforming the way we approach teaching and learning for our students (Lorenzo et al., 2022; Radianti et al., 2020; Wu et al., 2021). A glance at recent educational technologies includes online learning, mobile learning, blended learning, gamification, learning applications, robotics, and immersive learning (IL; Aristek Systems, 2022). Immersive virtual reality is an increasingly popular approach to support learning in current education environments (Wu et al., 2020). Recent technological developments are using virtual reality (VR) in various areas

of education and training in the educational setting (Dengel et al. 2019). Digital learning advancements, such as IL through VR, may promote not only technological literacy but also innovative thinking, interaction, engagement, and problem-solving capacity (Beck et al., 2020). Therefore, the paradigm shift in education involves incorporating innovative, tech-integrated pedagogical approaches that leverage e-resources, gamification, and IL technologies. Unfortunately, the teaching methods in schools have remained essentially unchanged, with little innovation, especially in low-income countries like India (Bhattacharjee et al., 2018). Simultaneously, the information and communication technology (ICT) fields have expanded rapidly over the past decade, offering application software, digital devices, and an efficient learning management system to the field of education. Consequently, teachers around the world are struggling to keep up with such rapid developments. Although technological developments offer new opportunities to engage learners, there is a knowledge gap about what, when, and how to use them for teaching and learning. Although anyone can access VR, there is little evidence of collaborative projects involving students from different countries.

Furthermore, the researchers found little or no empirical research using a mixed-methods approach to explore the effects of an IL environment intervention on learning. This is especially true for the lower and middle-income countries, including India, where technology use remains underutilized across the public education sector. A lack of funding, austerity measures, and inadequate professional training are among the reasons for these circumstances. Yet, lecture-based and rote methods of teaching and learning dominate Indian classrooms. However, recent studies emphasize the use of a technology-integrated learner-centered approach in teaching (Scholtz et al. 2019). Although computer-assisted teaching was prevalent, VR, augmented reality (AR), mixed reality (MR), and the application of artificial intelligence (AI) warrant further exploration in the context of teaching and learning.

VR is the immersion effect in an interactive virtual environment created by 3D graphics and other computer interfaces (Pan et al., 2006). AR is a technology-enabled system in which computer-generated content is added to the real world in real time (Milgram & Kishino, 1994). MR is a technology-enabled system in which computer-generated content is merged with the real world in real time and interacts with it (Park et al., 2020). Immersive learning (IL) is a method of learning in which learners are immersed in learning either through a technology-supported virtual learning environment or any other learning material (Zhi & Wu, 2023). A VR learning environment is a learning experience that enables a learner to watch a 360° (3D) VR video in an interactive environment on a VR camera device. Here, the learner is immersed in a realistic computer-generated artificial world to learn (Burdea, 1999). The Metaverse is a place that combines high-fidelity communication with an innovative way to tell stories, borrowing from the entertainment and mobile gaming industries (Jeon, 2021). Gamification is a learner-centered pedagogical approach that integrates game-based elements and mechanics to make learning more engaging, motivating, joyful, and dynamic (Pozo-Sanchez et al., 2022). A review of the literature warrants more empirical studies to confirm the effects of these new trends, especially across different classroom setups such as collaborative, active learning, and flipped classroom approaches. An IL environment is a learner experience in which learning in a simulated environment includes real-world scenarios and contexts, using technologies such as AR, VR, and MR (Mystakidis & Lympouridis, 2023).

Virtual Immersive Learning Environment

The virtual learning environment (VLE) is a three-dimensional extension of VR that allows users or learners to interact and share a virtual space where learning occurs. The VLE is said to provide learners with a highly effective artificial experiential learning environment (Beck, 2019; Bhattacharjee et al., 2018). VR, AR, and MR are enhancing learning experiences for higher education learners through digital tools (Gaspar et al., 2020). Immersive digital reality experiences actively engage learners in a digital realm through their sensory experiences. Virtual reality has the potential to improve learning outcomes by presenting concepts in a three-dimensional space and providing IL experiences (Fabris et al., 2019). VR tools offer advanced methods of human-computer interaction (Papanastasiou et al., 2019) and facilitate experiential learning driven by spatial cues. IEL promotes a range of learner skills, including collaboration, cooperation, self-reflection, and spatial abilities. It further supports game-based and student-centric learning through a multisensory experience (Papanastasiou et al., 2019). The development of an immersive learning tool is digital, intuitive, collaborative, and prototypic in nature (Weyhe et al., 2018). In medical education, without prior understanding of VR, the "immersive-anatomy atlas" actively and intuitively assisted in performing specific activities, thereby enhancing understanding. Immersive learning appears to improve performance across various knowledge domains (Beck, 2019; Liu et al., 2020). Additionally, IL provides a highly interactive virtual setting that closely matches the real world, thereby enhancing learner engagement (Beck, 2019).

Virtual Reality Experience

In the VR environment, an enhanced immersive effect can be achieved by reflecting natural body motions into the experience. Immersive VR is most experienced with VR headsets; the display is contained inside a device worn by the viewer (De Back et al., 2021). A review of the literature shows that, to date, most research has used VR as a training interface or skill application, a tool to clarify concepts or knowledge, or a communication facilitator (Liu et al., 2020). VR and AR overlay virtual objects onto the real world, offering interesting and widespread opportunities to study various components of human behavior and cognitive processes (Dünser et al., 2006). VR can provide "here-and-now" experiences to test theories and offer instant feedback to refine them. Immersive environments can support experiential learning, solidifying ideas and making real what is otherwise unthinkable and unimaginable (Fabris et al., 2019; Yilmaz et al., 2015). In fact, VR has revolutionized how people of all ages learn and work. VR environments provide users with the opportunity for deeper interaction, leading to the creation of communities, decreased social anxiety, enhanced motivation, and increased engagement (Yilmaz et al., 2015). Further, VR may facilitate the development of higher-order thinking and problem-solving abilities (Yilmaz et al., 2015). The review of previous findings indicates that VR IL environments, viewed through the constructivist lens, may be a more instinctive and practical approach to gain information beyond the academic curriculum (Beck, 2019; Liu et al., 2022; Makransky et al., 2021; Pirker et al., 2020; Winkelmann et al., 2020). For example, Chu et al. (2019) found that an immersive, interactive, real-time, real-scale spatial relativity simulation in virtual reality provides a high level of immersion and enjoyment and yields a significant positive learning outcome.

Purpose of the study

While several researchers have explored VR learning environments in the past two decades, their research was primarily conducted in high-income countries and developed countries with sufficient financial resources, with only a few in countries with emerging economies. However, there is a dearth of research on VR and IL environments in low and middle-income countries. In a recent study, a teacher reported a few challenges while exploring virtual learning environment, such as a lack of teachers' competency in using VLE, lack of class preparation competency among teachers, lack of expertise on trouble shooting technical glitches, lack of technological and pedagogical content (TPACK) knowledge, and resistance to change or adapting to the newer ways of tech-integrated teaching (Serrano-Ausejo & Mårell-Olsson, 2024). A recent study reported challenges among international students learning in VR-IL environments, namely cultural adaptation, communication barriers, variations in hardware and software components, access to technology, and academic engagement styles (Lodis Inggridvara Ivada et al., 2024). Further, there are issues in language, student learning competency, education systems, and instructor knowledge (Yassin et al., 2020). A study conducted by Luaran et al. (2025) revealed additional challenges in IL environments, including high costs of setting up IL environments, creating content compatible with immersive learning, and developing detailed technical support materials. Similarly, Ahmadi and Gilardi (2024) reported affordability and content creation as the main challenges of IL environments. Another study on the IVR application in online learning identified issues with hardware, software, internet bandwidth, organization, and methodology (Abadia et al., 2024).

At the same time, some studies reported the merits of VR-IL environments. A study by Chen (2024) reported the benefits of immersive learning in cross-cultural contexts, including increased cognitive adaptability, enhanced cross-cultural cooperation, and improved cross-cultural sensitivity. A recent study revealed that immersive virtual reality simulation can bridge the cultural competence-related issues in education (Chae et al., 2023). A study conducted by Torres and Statti (2022) on learning through IL environments across borders found benefits in developing international-mindedness, motivating students, and achieving cognitive gains. Similarly, Knutzen (2025) found that VR-ILR develops intercultural communication competence in a study on intercultural communication via social VR rooms.

A systematic review by Liu et al. (2025) on IL environments emphasized the need to understand the VR context, the variety of implementation models, and students' behavioral patterns when using IL environments. Nevertheless, innovation in education these days emphasizes international collaboration, even at the school level. Therefore, it is worth exploring students' understanding of IL experiences in cross-cultural contexts, as well as the challenges they face when learning alongside students from other nationalities. Thus, the researchers planned this unique study to understand the nuances of VR immersive learning in a large and densely populated country like India and selected the Russian Federation as a cooperative sample to explore the benefits and challenges of VR learning.

The present study is unique in that it facilitated the collaboration of higher-level secondary students in India and Russia in an IL environment. Specifically, it explored learners' attitudes towards VLEs and their personal experiences with

immersive virtual learning environments within an internationally paired student group. Furthermore, the study draws insights into how VR can bridge cultural and geographical gaps in learning.

Objectives of the Study

1. To measure the learning experiences and attitudes towards IL environments of internationally paired senior secondary school students.
2. To determine whether there is any relationship between IL environments and learners' attitude towards an IL environment.
3. To determine whether IL experiences predict learners' attitudes towards IL environments.
4. To explore the benefits, drawbacks, and ways to improve students' IL experiences.

Theoretical Frameworks

The technology acceptance theory (TAT) guided the present research (Davis, 1987). TAT is an information processing system that explains how the user agrees to a technology and can use it. The successful introduction of any new technology largely depends on end users' ability and behavioral intention. Immersive learning through a head-mounted virtual camera provides internationally paired senior secondary school students with a technology-integrated learning experience. Several factors affect the IL experience, including learners' perceived ease of use of the IL environment platform and their perceived usefulness of the overall setup for effective learning of concepts (Silva, 2015). Vygotsky's cognitive constructivist learning theory explains how the IL environment scaffolds learners' knowledge construction. The zone of proximal development (ZPD) theory informs the present study, which aims to identify learning differences between IL environments and non-IL environment conditions during the learning process (Vygotsky & Cole, 1978).

Context of the Study

VLEs have increased dramatically in the last decade, especially during the pandemic and post-pandemic periods. Although teachers' technological, pedagogical, and content knowledge has increased, its implementation remains slow. Studies show that integrating technology into teaching has enhanced learning, learners' curiosity, interest, academic performance, and attitudes towards learning (Papanastasiou et al., 2019). Therefore, adopting newer technologies as a pedagogical practice is becoming increasingly important, especially for the younger generation, many of whom have been frequently exposed to them. However, this is primarily true for students in developed countries, who are reaping the benefits of technology-integrated learning, whereas students in low-income countries lag behind. Thus, the digital gap is widening internationally between wealthy and less well-off countries. Moreover, senior secondary school is an essential stage in a student's life, as it marks the decision point for their future academic journey (Prakasha & Kenneth, 2022). International exposure and international collaboration in K-12 education are gaining popularity. Students from developing and low-income countries aspire to pursue higher education in developed countries or top universities worldwide. Thus, providing them with the best learning environment is significant for all academic stakeholders. This specific collaboration model fosters confidence and exposure through engagement with an international peer group. Therefore, the present study aims to provide an opportunity for global collaboration, at least on a virtual platform. It aims to understand the learning experiences of senior secondary school students when paired with international students in an online IL environment.

METHODS

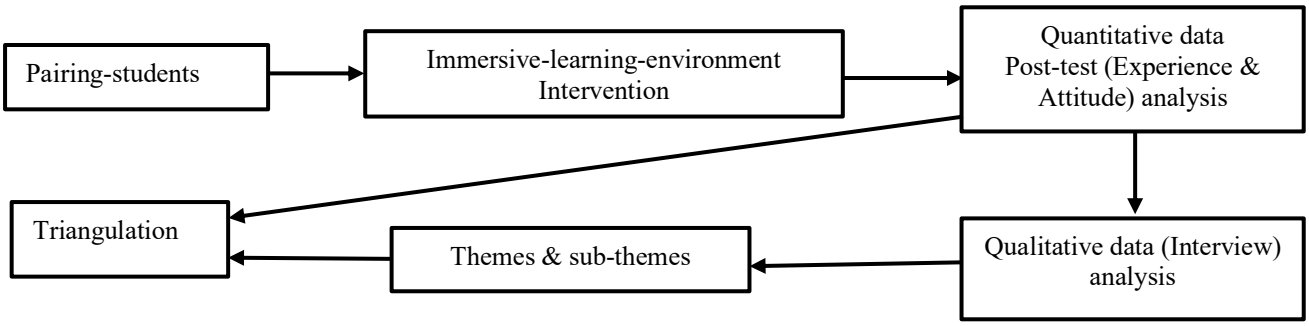
The present study employed an explanatory sequential mixed-method design (Edmonds & Kennedy, 2017), which first included quantitative measurements, including (a) user experiences of IL environments and (b) the attitude towards IL experiences–both of which were collected with survey questionnaires on a Google form. Two standardized instruments were used to measure IL experiences and attitudes towards IL among 100 internationally paired senior secondary school students from Russia (n = 50) and India (n = 50). The first instrument was the User Experience in Immersive Virtual Environments Scale (Tcha-Tokey et al., 2016), which had 75 items for participants to respond to on a 10-point Likert scale (*strongly disagree* to *strongly agree*). The second instrument was the attitude towards virtual reality learning environment (Huang et al., 2010), which comprised 25 items, each measured on a 7-point Likert scale (*strongly disagree* to *strongly agree*).

Based on the initial quantitative analysis results and to deepen their understanding of the quantitative findings, researchers incorporated qualitative methods. Researchers developed the interview items based on the quantitative results,

aligning with a quantitative-qualitative sequential explanatory research design. Researchers used descriptive statistical results, including response percentages across various items, to develop the interview items. Although most interview items focused on positive aspects, negative aspects, and improvements in IL experiences, researchers also prompted participants with follow-up sub-questions to elicit in-depth responses. The data collected from the semi-structured interviews were transcribed for narrative thematic analysis (Ahmed et al., 2025; Braun & Clarke, 2006). Eventually, researchers interpreted the quantitative and qualitative results through triangulation. The triangulation procedures helped analyze the points of convergence and divergence between quantitative and qualitative results (Flick, 2018). Figure 1 below presents the design flowchart of the present study.

Figure 1

Flow Chart of the Study Design



Study Sample

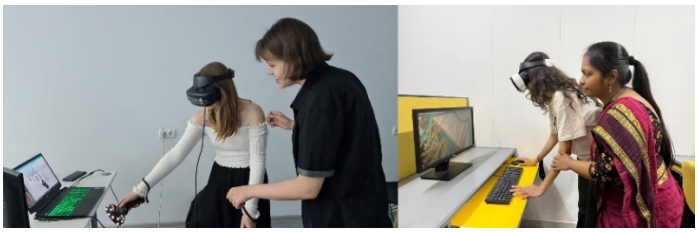
The study samples were from India and the Russian Federation. They were selected as a precursor to develop a memorandum of understanding to strengthen international cooperation between the universities of these countries. Furthermore, their cultural and linguistic backgrounds are similar, and both countries support a multipolar world order. The study employed a purposive sampling technique to select students who expressed a willingness to participate and were conversant in English. Researchers recruited 50 grade 12 students from India and 50 grade 11 students from Russia. Their ages ranged from 17 to 18 years. In India, grade 12 is the final stage in public education, after which students may pursue higher education studies if they choose to do so. In Russia, grade 11 is the last in public education, after which students move on to higher education if they choose to do so. These grade levels were selected to match the level of content knowledge and to establish equivalency by age and readiness for higher education. As participants were internationally paired, their equivalency was established based on grade level, age level, and the subject content under consideration. Both groups had a lecturer with experience in using IL technology to guide their respective cohorts. The collaborating institutes ensured the availability of necessary infrastructure, including stand-alone head-mounted VR cameras, controllers, and other essential accessories.

Immersive Learning Environment Intervention

The cooperating institutes provided the head-mounted stand-alone VR cameras, navigation controllers, 360° 3D VR videos, and other necessary accessories to the study participants in their respective educational technology labs. The lecturer gave an orientation demonstration to the students on using the stand-alone VR camera and controller, as well as other expected tasks. Figure 2 presents a picture of laboratory experiences with a VR setup. In the figure, the computer mirrors the student's view in the stand-alone VR headset, allowing other students to see and understand how the student is exploring the 3D 360° VR video content during the tutor's initial demonstration. Connecting to a computer provides the VR headset with battery backup, ensuring safety. The study did not utilize a mobile-based VR headset, as it is not practical in a school setting. The labs utilized Meta Quest or Oculus Quest stand-alone VR headsets, with all lab computers equipped with seamless video streaming software or an app to support 360° 3D VR video playback throughout the experiment.

Figure 2

The Immersive Learning Experiences of Internationally Paired Students



The lecturers coordinated the lab activities, which lasted almost a month, and consisted of various assignments that the students had to complete. The cooperating lecturers analyzed the subject contents of grade 12 (India) and grade 11 (Russia) and selected 15 common topics about general environmental sciences (deep-sea, climate change, etc.) across various subjects. Lecturers then mapped 50 readily available VR resources (e.g., YouTube, RT 360 VR app videos, and New York Times VR app videos) on the internet to the selected topics. Next, lecturers provided links or downloaded files for these 360° 3D VR videos to each pair, so that two students—one from India and one from Russia—watched the same content. Students discussed their experiences and solved worksheets on the topic they watched through a VR headset with their partner student, who was connected via an online video conferencing platform for discussion. Each pair had to engage with all 15 topics, and each lab session lasted 1 hour, including watching a video, peer discussion, and solving worksheets. The times were 12 to 1 PM in Russia and 3:30 to 4:30 PM in India, as Russia is 2 hours and 30 minutes ahead of India. The lab schedule was conducted every other day. It took almost a month to complete the intervention, including Sundays and other general holidays. The researchers administered the standardized instruments to measure the IL experiences and attitudes towards IL after the intervention. The study followed a quasi-experimental single-group post-test-only design. Researchers selected a single-group post-test-only design because participants lacked the necessary knowledge and attitudes regarding the IL environment prior to the intervention. Researchers stored the data safely in an encrypted file accessible only to them. They then imported the data to SPSS version 24 for statistical analysis.

Qualitative Interviews

The interview sample included 10 students (five pairs; each pair consisted of one Indian and one Russian student). Researchers selected the five pairs based on their performance on the IL experience survey. One pair each from the lower and upper quartiles of the distribution and three pairs from the inter-quartile range. Researchers conducted interviews with the selected five pairs of students to gain an in-depth understanding of their immersive learning environment experiences. Table 1 presents the demographic details of the participants and interview questions. Interviews were conducted online via the Webex video conferencing tool. Researchers followed all interview protocols and recorded the interviews with participants' consent. The recorded interviews were transcribed, and the transcripts were stored safely in a password-protected file accessible only to the researchers.

The interviews were analyzed using narrative thematic analysis, with manual coding. The steps used in the analysis were,

- reading the interview transcripts multiple times to understand the narratives and be familiar with the data thoroughly
- taking notes of the initial patterns and significant points
- identifying key themes, repeated ideas, and any typical points
- grouping the similar ideas into categories
- coding the data or narratives into main themes
- analyzing the main themes to see relationships, combining, splitting, mapping connections, and developing into subordinate themes
- interpreting the themes and subthemes along with quotations.

Researchers presented the emergent themes and sub-themes in Table 4 of the results section.

Validity and Reliability of the Instruments

The study used multiple tools: the user experience scale, the attitude towards VRLE scale, and the interview guide. However, the VR intervention included video resources and worksheets. All the tools were thoroughly examined by a panel

of experts for face and content validity; the experts' suggestions were incorporated into the final versions of the tools. To assess the reliability of the user experience scale and attitude scale, the researcher employed Cronbach's alpha internal consistency test in SPSS version 24 and found reliability coefficients of 0.86 and 0.81, respectively. Thus, the tools used were found highly reliable (Nunnally, 1978). The major interview items were also presented to the panel of experts for their relevance, face, and content validation.

Ethical considerations

The study obtained Institutional Review Board approval to conduct this collaborative project. Further obtained consents from all participating lecturers who helped at the VR lab. The study obtained signed assent forms from all participants, both during survey-level data collection and during semi-structured interviews. Researchers gave interview participants the option to withdraw from the study at any time if they did not feel comfortable.

Table 1

Participant Demographics

Pair no.	Pseudonym	Gender	Age	Class	Country
1	P 1	Male	18	Senior secondary school	Russia
	P 2	Female	17	Senior secondary school	India
2	P 3	Male	18	Senior secondary school	Russia
	P 4	Male	17	Senior secondary school	India
3	P 5	Female	17	Senior secondary school	Russia
	P 6	Female	18	Senior secondary school	India
4	P 7	Female	17	Senior secondary school	Russia
	P 8	Male	18	Senior secondary school	India
5	P 9	Male	18	Senior secondary school	Russia
	P 10	Female	18	Senior secondary school	India

Semi-structured interview questions

- In your opinion, what were the positive points about your VRIL experience? Elaborate
- In your opinion, what were the negative points about your VRIL experience? Elaborate
- Do you have suggestions to improve this virtual reality IL environment? Explain

RESULTS

Researchers have presented the results of the present study in two parts. Part one presented the results of quantitative analysis, and part two presented the results of qualitative analysis. Following these results, researchers discussed data triangulation in the mixed-method design, and recent studies support their discussion.

Part 1: Quantitative Analysis

Study Objective 1: *To measure the learning experiences and attitudes towards immersive learning environments of internationally paired senior secondary school students.*

To address Study Objective 1, researchers employed descriptive statistics, and the results of which are presented in Table 2 below.

Table 2

Study Descriptive Statistics

	N	Minimum	Maximum	*M*	Std. Deviation	Q1	Q2	Q3
IL Experience	100	160	700	477.40	127.910	385	470	580
Attitude towards IL Environment	100	32	112	78.18	18.513	68	80	92

As shown in Table 2, students had a high level of IL experiences, with an average score of 68% of the total score (M = 477.40, maximum score = 700). Nevertheless, students had an average score of 69.8% on the measurement of attitude towards IL environments (M = 78.18, Maximum score = 112). Overall, participants had positive IL experiences and a

positive attitude towards the IL environment. This implies users' acceptance of VR technology, and a positive attitude indicates their readiness to use it, as per Davis's (1987) technology acceptance theory.

Study Objective 2: *To determine whether there is any relationship between IL experiences and learners' attitudes towards the IL environment.*

To address Study Objective 2, the study employed the Pearson correlation test and found a correlation coefficient of 0.664 ($r = 0.664$). The results are presented in Table 3 below. There is a strong positive correlation between IL experiences and attitudes towards the IL environment among internationally paired senior secondary school students. As the correlation was positive in the sample, the attitude towards VR technology developed by individuals results from their interactions with their partners and the immersive environment, as per Vygotsky's theory.

Table 3

Pearson Correlation Test Results

Correlations		IL Experience	Attitude towards IL Environment
IL Experience	Pearson Correlation	1	.664**
	Sig. (2-tailed)		.000
	N	100	100
Attitude towards IL Environment	Pearson Correlation	.664**	1
	Sig. (2-tailed)	.000	
	N	100	100

Note. **Correlation is significant at the 0.01 level (2-tailed).

Study Objective 3: *To determine whether learners' attitude towards the IL environment is predicted by IL experiences.*

To address Study Objective 3, the study employed a simple linear regression test. The results of the regression analysis are presented in Tables 4 and 5 below, along with the scatter plot in Figure 3.

Table 4

Regression Results Between IL Experience and Attitude Towards IL Environments

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate
1	.664[a]	.441	.435	13.911

Note. [a]Predictors: (Constant) IL Experience; Dependent Variable: Attitude towards IL environments.

Table 5

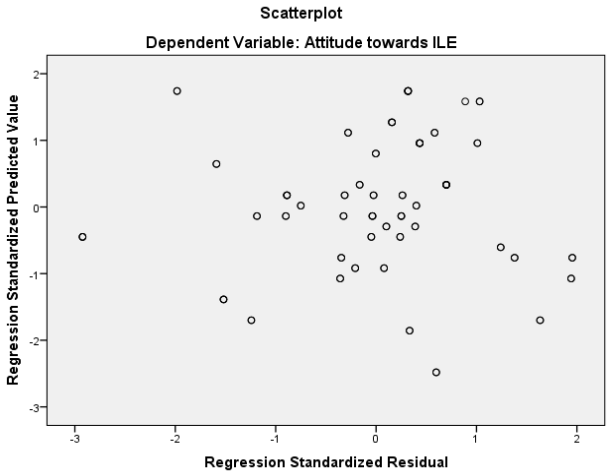
Regression Model Fit

Model	Sum of Squares	*df*	Mean Square	*F*	Sig.
Regression	14964.512	1	14964.512	77.331	.000[a]
Residual	18964.248	98	193.513		
Total	33928.760	99			

Note. [a]Predictors: (Constant), IL Experience; Dependent Variable: Attitude towards IL environments.

Figure 3

Scatterplot of the Regression Analysis



From Table 4, the regression statistics indicate that 44.1% (R^2) of the variation in attitude towards the IL environment is explained by the IL experiences of the study participants. The adjusted R^2 value of 43.5% (< R^2) indicated that additional predictors will not add any value to the model. From Table 5 (F = 77.331, p = 0.000), we see that the p-value is less than 0.05, indicating that the variance is significant and the model is a good fit. Figure 3 presents the scatterplot of residuals against predicted values. Thus, providing a user-friendly IL platform and interactive content design fosters a positive attitude towards learning in an immersive environment.

Part 2: Qualitative Analysis

Study Objective 4: *To explore the benefits, drawbacks, and ways to improve students' IL experiences.*

To address Study Objective 4, the study employed narrative thematic analysis through manual coding of the qualitative data. The results of the thematic analysis are presented in three sections: Section I discusses the benefits of IL environments; Section II discusses the drawbacks of using VR-IL environments; and Section III discusses ways to improve IL experiences for teaching and learning. Table 6 below presents the main themes and sub-themes that emerged from the narrative thematic analysis for each interview section.

Table 6

Themes and Sub-themes that Emerged from the Thematic Analysis

Immersive learning experience	Main themes	Sub-themes
I. Benefits	1. Inspirational and unique	1.1. Unparalleled interaction 1.2. Realistic experience and beyond imagination 1.3. Motivates to learn
II. Drawbacks	2. Addiction and health	2.1. Sensory strain 2.2. Addiction 2.3. Curtail social life
III. Ways to improve the experience	3. Collaborative features	3.1. Collaboration 3.2. Content aligned with curriculum 3.3. 3D navigation interface

Benefits

The first section of the interview discussed the benefits of IL experiences, and most students found them inspiring and unique. They had an engaging interaction with the content, and the simulation videos gave a realistic feel, helping them learn abstract concepts easily and the minute details. They also performed well on their assessments.

Main Theme 1: Inspirational and Unique. They expressed feelings of happiness and excitement when exposed to IL environments. The learning experiences provided through IL environments were considered so unique by the students that they said they cannot be compared to or achieved in traditional classroom setups.

***Subtheme 1.1: Unparalleled Interaction*.** The students reported actively learning throughout the IL environments and easily understanding several complex and abstract concepts. Further, the simulated videos had several opportunities to interact and engage deeply with the content. Participant 9 explained, **"**I could not trust how realistic everything there . . . I felt in the virtual reality immersive learning environment. I was able to visualize complex concepts on climatic changes and understand them better. For example, while exploring the planet Earth."

Subtheme 1.2: Realistic Experience and Beyond Imagination. Participants explained that when immersed in the virtual reality scenario, they were completely oblivious to external disturbances and what was going on around them. In addition, they expressed curiosity and a desire to know what comes next. Participant 2 stated, "This is simply unimaginable . . ."

Subtheme 1.3: Motivates to Learn. Participants felt highly motivated as they progressed through each stage of the IL environment. Students reported higher retention than in traditional learning settings. They revealed that IL environments enhanced their ability to think creatively and critically, as well as their attention span and comprehension. IL environments helped them visit places that are generally inaccessible, such as Mount Everest. Similar results are reported by other researchers as well (Pollard et al., 2020). Participant 10 exclaimed, "[it] was mind-blowing! I felt like I am exported to a very different world . . . was able to explore geographical nature of the places, interact with virtual objects, and even conduct experiments in a virtual laboratory."

Drawbacks

Students were apprehensive about using the VLE. They worried it would affect their eyes, ears, brain, body posture, etc. They found themselves less dependent on the device than in their self-study at a library or reading by themselves. Furthermore, students expressed that they may not be able to discuss with their friends while using a headset to learn. Students also felt that this setup is expensive for large-scale implementation and requires internet access, headsets, software, training materials, and trained teachers.

Main Theme 2: Addiction and health. Many students reported wanting to learn subjects such as social science, environmental science, and sciences (Physics, chemistry, biology), as well as geography. A few of them believed that regular use of VLE may strain their sensory organs, such as the eyes, ears, back, and brain. Some of them mentioned they were just overwhelmed and wanted to learn everything from it. Participant 10 asked, "Can we learn mathematics also in it?," and Participant 3 stated, **"**I wish to learn everything like this."

Subtheme 2.1: Sensory Strain. Students mentioned that some parts of the videos were blurred at times due to low bandwidth or other technical issues, which caused eye strain. Participant 8 stated, "I experienced low resolution videos…I don't know the reason." Furthermore, some of them reported that prolonged use of the headset screen caused dryness and fatigue. Participant 2 complained, "Even after I removed the headset, I felt I am hearing the humming sound." Some students even mentioned there were audio disturbances and a humming sound throughout, causing a slight headache. A few of the pairs mentioned that they needed to constantly focus, as there was no break unless they paused. Some even reported back pain from constant use of the device. Participant described, **"**I felt a neck discomfort and heaviness, it is like I am tied with something."

Subtheme 2.2: Addiction. Many students said they would learn almost all subject content very well using a VR camera. It was easier for them to watch and learn than to read a book or notes. Students mentioned that, as it gives a realistic view of the subject content, it is more engaging for them than regular classroom teaching. Participant 1 explained, "I am just enjoying learning out of it . . . time just flew by." The embedded reward system in certain gamified videos further captured their attention, as Participant 5 described: "I almost got all [the] rewarding points and prompts." A few even mentioned that they were somewhat dependent, psychologically and behaviorally, on learning through VR material; however, it sounded unrealistic to them. Participant 4 exclaimed, "Oh my god . . . I am almost addicted to learning from VR . . . I started feeling frustrated with other traditional classes, and was thinking why not all do it in virtual learning environments."

Subtheme 2.3: Curtail Social Life. Almost all students mentioned that if they used it for all classes, peer interaction would not happen, and they could not socialize. Participant 6 explained, "I am just lost in another world." Students also noted that striking a balance between VR-enabled classes and an after-class discussion hour could create more space for socializing and be academically rewarding. Participant 8 suggested, "teachers can create a collaborative assignment, though."

Participants suggested several ways to improve the experience: Students revealed that providing them with VR content aligned with their curriculum or syllabus would help them learn independently and share/discuss it with their classmates after class hours. Furthermore, schools could provide a VR lab facility, high-bandwidth internet, VR camera video materials, and ensure that teachers know how to use VR for seamless teaching and learning.

Main Theme 3: Collaborative Features. Some of the students mentioned that if multiple people could enter a shared 3D space at the same time for topic learning, it would be more fun. Some students even mentioned that more gamified content would include collaborative features, such as creating avatars with real-time voice and gestures. Participant 5 remarked, "I will be in my favorite Halloween costume." Some even said, just like a video game, real-time collaborative tools will be fun for learning. Participant 7 added, "My collaboration with [the] Russian chap was amazing." A few of the students even offered innovative ideas, like going on a simulated field trip and using graphs to show each participant's progress, just like in video games, which will bring more competitive spirit to learning.

Subtheme 3.1: Collaboration. Students felt that introducing peer collaboration might help improve learning, while it might also disrupt their attention span. In certain training courses, VR can provide psychosocial and emotional experiences if the simulated content creators capture them. Students shared that an assignment based on the VR content can bring more collaboration. A few of them said that working on a collaborative assignment will be challenging and, at the same time, motivating.

Subtheme 3.2: Content Aligned with Curriculum. Most students agreed that if the VR classes were aligned with the syllabus, they would be more productive and valuable. Participant 3 explained, "I just feel the whole world must have common syllabus and common learning material." Students said they were now learning a few common topics across the countries; however, the ways each country's students understand them are overwhelming, and adaptation must be at the forefront for quality academic engagement. Participant 7 remarked, "Give me a VR headset and the videos, I am done with learning."

Subtheme 3.3: 3D Navigation Interface. Some students found navigating 3D interfaces difficult and time-consuming, leaving little time for knowledge acquisition. Participant 7 explained, "I believe incorporating more interactive elements into virtual reality experiences would enhance the learning process. For example, including quizzes or challenges within the virtual environment that require active participation and problem-solving skills." Similarly, Participant 1 added, "It would be great to have more realistic simulations in virtual reality, such as realistic physics and accurate representations of objects and environments. This would make the learning experience more immersive and engaging." To add further, Participant 9 stated, "It was amazing, but sometimes the technology glitches (buffering time) are frustrating. It interrupts the flow of learning and makes it difficult to stay engaged...there is a need for seamless video content creation with 360° and 3D effect…

A recent study did make the same observation (Makransky, 2019). There is a need for good internet bandwidth for a seamless IL experience. Therefore, newer technologies could improve efficiency and reduce processing time.

Data Triangulation

To address data triangulation (Flick, 2018), as per the quant-qual sequential explanatory design, the researchers conducted qualitative interviews to provide more in-depth evidence to support the quantitative results. Accordingly, the study's qualitative outputs revealed that students who scored high on the positive IL experience scale expressed more favorable attitudes towards IL experiences. They cited multiple benefits during their intervention, such as learning abstract concepts becoming easier for them, learning experiences being realistic, and their attention and interest being captured throughout the intervention. They wanted to learn every subject in this mode. They also reported increased class participation and enjoyed interacting with video content, as evidenced by the narrative analysis results. The quantitative analysis revealed a correlation between IL experiences and attitudes toward the environment among internationally paired higher secondary students. The high positive correlation is evident in the theme and subthemes that emerged out of narrative analysis, such as (1) unparalleled interaction, (2) realistic experience and beyond imagination, and (3) motivation to learn.

Furthermore, the regression analysis accounted for 43.5% of the variation in attitude towards the IL environment among the study participants. This is again evident from the narrative thematic analysis theme and subthemes, with students even expressing how to improve this experience for the benefit of the student community in the future, and how it can be further strengthened creatively. These expressions have arisen from the reinforcing experiences they had during the intervention, and the quotations from the semi-structured interview further reinforce their accountability towards IL environments. Overall, the qualitative results explained the quantitative results in greater depth, as intended by the study.

DISCUSSION

As intended, the study found the immersive virtual learning experiences of internationally paired senior secondary school students from India and Russia. Students from both countries had a satisfying immersive learning intervention as revealed by the descriptive statistics. Furthermore, they even developed a favorable attitude towards immersive learning technologies and the environment. There existed a strong positive correlation between IL experiences and attitude towards the immersive learning environment. A recent study by Huang et al. (2023) found multiple relationships with psychological outcomes. The simple linear regression test revealed that there was almost a 43% variation in attitude towards IL from their IL experiences during the intervention.

Additionally, qualitative analysis complemented the quantitative results by identifying main themes and subthemes on the benefits and improvements of VR learning technologies to strengthen the IL experience. A systematic review study by Conrad et al. (2024) found that IVR has positively impacted learning and student engagement, as observed in the present study. The present study even detailed the possible drawbacks of learning from VR technologies as revealed by the participants. Apart from reporting a unique and unparalleled learning experience, participants also noted a few drawbacks, including eye fatigue, eye strain, ear strain, cognitive overload, issues with the technology's audio, nausea, and dizziness. A recent study by Ratan et al. (2025) reported fatigue associated with longer hours in VR classes. A study by Pollard et al. (2020) found that deeper immersion may affect learners' performance. Contrastingly, a recent study, like the first theme of the present study, reports that the immersive learning environment is inspiring, unique, and unparalleled by any other virtual experiences (Parong & Mayer, 2018). The present study reported that, as VLE demands immersion using a VR camera, the classroom social interaction among peer groups may gradually decline (Ratan et al., 2025).

Furthermore, reliance on IL environments for learning may lead to health issues. A recent study revealed that increasing social interaction may reduce cybersickness (Yang et al., 2023). Interestingly, a recent study reported that exaggerations and unrealistic content can mislead the conceptual understanding (Kavanagh et al., 2017). Thus, authentic content validation is essential in edutainment. It is difficult to produce compatible content packages that support all VR software in a rapidly changing digital world (Frazier et al., 2019). Students across the world have been drawn to mobile gaming and subscription to state-of-the-art technologies; Metaverse education may be another addition to this. More research in the health sciences is needed on the hazardous effects of edutainment. Therefore, balancing leisure-time activities using technological devices is crucial and should be done by both teachers and students.

Thus, the VR learning environment in an internationally collaborative context provided positive learning experiences. Students could construct their subject-specific knowledge as guided by Vygotsky's cognitive constructivism theory. The participants' experiences clearly indicated acceptance of VRL environments as a better learning pedagogy, as implied by Davis's technology acceptance theory. Overall, the results of the present study reinforce the idea of international collaborations in academia through a progressive education perspective.

A few limitations of the study are that we had to limit the sample size due to various barriers, such as the number of English-speaking students, willingness to participate, the infrastructure required, and the need for a manageable cohort size. The study had to limit itself to the selected grade level to match the course content.

CONCLUSION

The present study achieved its objectives. The study successfully measured the IL experiences and attitudes of internationally paired senior secondary school students towards the IL environment. Almost 75% of the student pairs had very positive IL experiences through the virtual reality IL intervention, and their attitudes towards the IL environment were positive. The study observed a high positive correlation ($r = 0.664$) between their IL experiences and attitudes towards IL environments. The regression analysis showed that 43.5% of the variation in attitude is due to the student's IL experiences. The study used triangulation of quantitative and qualitative outputs. Participants clearly agreed that the learning experience from the IL environment, especially in the internationally collaborative context, is truly unparalleled by traditional learning experiences. The limitations are the nature of the sample and its cultural background. The researchers recommend that future researchers develop indigenous Metaverse pedagogy, create teacher-training content on teaching through IL experiences, develop seamless 3D interfaces to support IL environments, and leverage the benefits of IL environments with artificial intelligence and generative AI for teaching and learning. In addition, research on motivational aspects, emotional changes that drive student engagement, behavioral patterns in IL environments, and adaptations brought about by students provides a rich source for future studies.

CONFLICT OF INTEREST

Authors and participating universities have no competing interests. The study is part of the first pilot collaborative research project, the success of which will lead to long-term collaboration between the universities. We sincerely thank all the participating students and teachers from Russia and India.

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Manuscript submitted: ***June 13, 2023***
Manuscript revised: ***March 30, 2024***
Manuscript revised: ***December 13, 2024***
Manuscript revised: ***June 16, 2025***
Accepted for publication: ***July 6, 2025***

OJED
OPEN JOURNALS IN EDUCATION
Volume 10, Issue 2 (2025), pp. 91-104
Journal of School Administration Research and Development
ISSN: 2470-8496 Print/2470-850X Online
ojed.org/JSARD

Integrating Empathy into Classroom Assessment Design

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ABSTRACT

Traditional assessment design focuses on outcomes and often disregards how students perceive their abilities, process emotions, or self-express. This indifference can undermine assessment outcomes and evaluation reliability (Hattie, 2023; Nilson, 2023; Reibel 2022). This paper introduces *empathetic assessment design* (EAD), a framework that reframes assessment as an event to simultaneously understand the student while evaluating their abilities to provide more precise grading and improved support. EAD integrates cognitive (self-evaluation), emotional (appraisal of emotional reactions and mindsets), and relational (self-expression) dimensions, enriching assessments with experiential insights. The information resulting from the EAD design provides context for outcomes and helps teachers assess the adequacy of student thinking, affective reactions, and needs. Despite concerns about workload and rigor, EAD builds on established theories—Bandura's *social cognitive theory* (1997), Joe Feldman's *Grading for Equity* (2018), and *funds of knowledge* and *culturally responsive pedagogy* (Ladson-Billings, 1995, 2021; Moll, 2015, 2019)—to create more insightful assessments. EAD complements equitable grading practices, gathering students' real-time experiential information (Blum, 2020; Colby, 2019; Clark & Talbert, 2023; Feldman, 2018). While experts (Hattie, 2023, 2018; Schimmer, 2016; Wiliam, 2011) advocate for self-assessment and reflection, they often position these outside the assessment itself. But EAD embeds them within assessments, capturing in-the-moment insights to make evaluation more meaningful and illuminating.

***Keywords*:** empathetic assessment, equity in education, agency, student agency, self-efficacy, alternative grading, grading for equity, relational assessment

Traditional assessments prioritize knowledge evaluation, often treating academic outcomes as separate from cognitive and affective development (Black & Wiliam, 1998; Guskey, 2014, 2022; Hasinoff et al., 2024; O'Connor, 2017). However, research shows that outcomes-focused assessments limit teachers' understanding of student learning (Adie et al., 2018; Black & Wiliam, 1998, 2018; Guskey, 2014, 2022; Reibel, 2022; Schimmer, 2016).

Stommel (2023) calls for overdue assessment reform: "Most important to the work of ungrading is that we start by asking hard questions of our traditional approaches to assessment" (p.16). The increasing demand for equitable assessment necessitates a shift toward prioritizing the whole student—abilities, agency, identity, and self-regulation (Feldman, 2018; Nilson, 2023; Reibel, 2022, 2024; Stommel, 2023).

A Shift Toward Empathy

Educators **often overlook empathy** in assessment design (Erkens et al., 2017). Without it, assessments prioritize results over understanding students—potentially leading to misconceptions and outcome assumptions (Chappius & Stiggins 2014; Reibel, 2022, 2025).

Empathetic assessment design (EAD) addresses this absence, integrating cognitive (adequacy of thinking), emotional (affective reactions), and relational (self-expression) dimensions directly into assessments. Rather than being peripheral, EAD incorporates self-evaluation, self-appraisal, and self-expression as elements *in* assessments. For example, prompts like, "How do you think you did on that last section?" or "Was that last question easy or hard?" capture real-time experiential

information, in-the-moment thinking, mindsets and emotions, and self-perspectives (Doménech-Betoret et al., 2017; Heath & Heath, 2017; Kahneman & Tversky, 1996), providing context for outcomes. In other words, EAD prevents misleading assumptions about students' abilities (Blum, 2020; Clark & Talbert, 2023).

Building on Existing Models

EAD builds on the work of Stommel (2023), Chappuis & Stiggins (2014), Wiliam (2011), and Hattie (2023) to improve assessment design and function. Table 1 illustrates how EAD builds on relevant grading and assessment models.

Table 1

How EAD Expands on Existing Alternative Assessment Models

Model	Primary Goal	Key Practices	EAD Elaboration
Ungrading (Blum, 2020)	Removing grades to promote intrinsic motivation.	Portfolio model, narrative feedback, no points/letters. Utilizes self-reflection during the learning process.	Includes self-reflection during assessments to gather experiential information to inform grading.
Equitable Grading (Feldman, 2018)	Ensuring grading is fair and not based on privilege and grades reflect actual student learning, not other factors like behavior.	No zeros, uses reassessment, only grades summative exams to minimize biases.	Adds segments where students record their emotional reactions to the assessment to provide context for outcomes and mitigate bias in grading.
Mastery Learning (Guskey, 2022)	Students must demonstrate proficiency in skills and standards.	Standards-based grading, reassessment cycles, and scoring on proficiency scales.	Includes empathetic elements during assessments to study if other factors may impact proficiency development.
Assessment for Learning Chappius & Stiggins (2014) and Wiliam (2011)	Advocates for student reflection and self-evaluation throughout the formative assessment process.	Formative assessments are a learning tool; students use a rubric to reflect on learning.	Self-reflections are **included in** the assessment, **which asks** students to rate their work and talk about their proficiency in **real time** to get a more realistic view of student self-perceptions (Kahneman, 2011, 2013).

EAD builds on these models' principles to enhance assessment of student ability, develop more reliable interventions, and increase student self-awareness (Wigfield & Eccles, 2000; Reibel, 2022, 2025).

EAD FRAMEWORK

There are several dimensions and elements to empathetic assessment design. The three EAD dimensions are:

1. *Cognitive Dimension*: Segments where students assess their abilities and review the adequacy of their thinking, fostering self-awareness and metacognition.
2. *Affective Dimension*: Segments where students record emotional reactions, such as confidence and mindset.

3. *Relational Dimension*: Segments where students demonstrate their knowledge freely while sharing about themselves.

Teachers incorporate these EAD dimensions into assessment by including specific design elements that gather students' experiential information to provide context for assessment results:

- Self-Evaluation (Cognitive): Students assess their levels of understanding and ability, developing the capability to perceive their competence realistically.
- Self-Appraisal (Affective): Students record their emotional reactions, helping teachers see their confidence levels and self-efficacy.
- Self-Expression (Relational): Students demonstrate their knowledge freely or express themselves.

Table 2 presents these EAD dimensions and elements with a sample prompt that describes each element's essence.

Table 2

Integrating Empathy into Assessment

Empathetic Assessment Design		
Dimension	Element	Sample Prompt
Cognitive	Self-Evaluation	"How well do I know or can do it?"
Affective	Self-Appraisal	"How do I feel about what I know and can do?"
Relational	Self-Expression	"How else can I show I know or can do it?"

In her book *Ungrading: Why Rating Students Undermines Learning (and What to Do Instead),* Susan Blum (2020) provides a student's assessment experience with an EAD design.

> So, going into the first test, I thought it was helpful to start by rating my confidence level in the question while I came up with the answer. This allowed me to go back over my test and quickly identify questions I knew I needed to think more carefully about and even use other questions I was sure about to help with questions I wasn't sure about (p. 157).

Teachers can create this same experience by using EAD. Table 3 summarizes the EAD framework.

Table 3

Summary of the EAD Framework

Explicit Knowledge	Experiential Information			
	Cognitive Element: Self-Evaluation	Affective Element: Self-Appraisal	Relational Element: Self-Expression	
Segments that verify rooted content knowledge and skill proficiency.	Segments that ask students to build perspective about the level of their skill proficiency and content knowledge.	Segments that ask students to investigate self-reactions during the assessment experience (thinking, mindsets, reactions, self-talk).	Segments that ask students to share lived experiences (non-academic related).	Segments that ask students to share openly about the assessed content or topic.

THEORETICAL FRAMEWORKS

EAD is grounded in theories that address traditional assessment design, emphasizing agency, efficacy, equity, and socio-emotional development. The following theoretical frameworks inform EAD.

Empathy

Empathy enhances engagement, motivation, and performance by creating attunement (Cuff et al., 2016; Hall & Schwartz, 2019; Maté & Maté). When students feel understood, they engage more in the classroom (Noddings, 2019). Empathetic teaching cultivates self-efficacy, motivation, and academic success (Godwin & Silk, 2022; Martin & Collie, 2019; Wolcott, 2019). However, traditional assessment design often neglects empathy (Erkens et al., 2017; Reibel, 2022). Clark and Talbert (2023) argue in Grading for Growth that "only in school . . . it seems, are individuals evaluated by

'traditional' assessments, even though these are rarely seen in the real world for which we supposedly prepare students" (pp. 26-27). Research shows empathy elements on assessments can reduce test anxiety, improve performance, and offer a more nuanced view of ability (Doménech-Betoret et al., 2017; Martin et al., 2019). EAD transforms assessment into a tool for learning and growth (Bailey & Jakicic, 2023; Black & Wiliam, 1998; Chappuis & Stiggins, 2014).

Equitable Grading Principles

EAD also supports equitable grading (Feldman, 2018; Blum, 2020; Vatterott, 2015; Wormeli, 2023), emphasizing fairness and that grading reform begins with rethinking assessment. Feldman (2018) underscores this point when he says, "We see the synergy between equitable grading and [a] new paradigm of assessment." (2018, p.152). EAD attempts to create this new paradigm by designing assessments for more than just academic outcomes—specifically by collecting experiential information to help teachers grade more equitably. (Berns & East, 2020; Feldman, 2018; Reibel, 2022, 2024, 2025).

Bias-resistance

Traditional assessments are susceptible to biases that can distort outcome evaluation (Brown & Robbins, 2023; Feldman, 2018; Grainger & Weir, 2016). Focusing solely on academic results overlooks other factors that influence performance, distorting an evaluation of students' abilities and reducing fairness (Brown & Robbins, 2023). Bandura (1997) highlights this issue: "Performance alone does not provide sufficient information to judge one's level of capability because many factors that have little to do with ability can affect performance." (p. 81). Integrating empathy into assessments allows students to reflect on their abilities and emotions during the assessment. The resulting experiential data helps teachers distinguish knowledge gaps from confidence issues, frustrations, or performance anxiety.

Psychological Insights

The peak-end rule (Heath & Heath, 2017; Kahneman et al., 1993) suggests that people recall experiences based on their most intense cognitive or emotional moment, often at the end (Kahneman, 2000; Kahneman & Tversky, 1996). To address this, EAD embeds reflective prompts within assessments, helping teachers differentiate between knowledge gaps and socio-emotional factors that influence performance. Pre- and post-assessment reflections are too far removed to provide reliable insights about assessment outcomes.

Additionally, expectancy-value theory (Loh, 2019; Wigfield & Eccles, 2000) and self-determination theory (Deci & Ryan, 2012) highlight that motivation stems from perceived competence and personal values. Traditional assessments, which focus on outcomes, miss these experiential insights and are limited in their ability to fully capture what students think about their performance and how they feel during the assessment.

Agency and Self-Efficacy

Agency, self-perceptions, and self-efficacy are factors in achievement (Bandura, 2023; Matusov et al., 2016; Waddington, 2023). Traditional assessments focus only on what students know, reducing assessment to an evaluation rather than a learning opportunity (Chappius et al., 2004). EAD transforms assessment into learning moments by prompting students to assess their abilities and record their affective reactions in real-time (Bandura et al., 1997; Martin et al., 2019; Nasir & Iqbal, 2019; Stenalt & Lassesen, 2022).

Constructivist and Sociocultural Theories

Constructivist theories (Vygotsky, 1978) prioritize active meaning-making over passive knowledge reception (Kushnir et al., 2012), aligning with the EAD approach. These theories emphasize assessing other components of meaning-making, such as thought processes, mental states, emotional reactions, and self-expression. EAD embeds its empathetic elements to capture these components and turn assessments into opportunities to actively create knowledge, not just evaluate it.

Alternative Grading Models

Alternative grading models incorporate various assessment practices, including formative assessment, student self-assessment, and portfolios, to evaluate learning (Clark & Talbert, 2023; Nilson, 2014, 2023; Stommel, 2023; Townsley,

2022). Stranford (2024) found that graduate courses that eliminated numeric grades in favor of reflective self-assessments saw students report enhanced creativity and reduced stress. Research by Hasinoff et al. (2024) found improved student relationships and engagement in "ungraded" courses. These models highlight the need for EAD.

Relational and Emotional Engagement

Nel Noddings' (1995, 2019) pedagogy of care highlights empathy's role in developing meaningful teacher-student relationships that enhance learning. Research shows that relationships improve motivation, performance, and well-being (Hickey & Riddle, 2024; Martin & Collie, 2019; Noddings, 1995, 2012, 2019). EAD strengthens these relationships by encouraging students to reflect on confidence, emotions, and thinking during the assessment. This helps teachers better attune to students (Reibel, 2022); greater attunement leads to increased trust, respect, and a sense of belonging (Maté & Maté, 2022).

Additionally, as students solve assessment problems, they are "emotionally evaluating whether each cognitive step is likely to bring [them] closer to a useful solution or whether it seems to be leading [them] astray" (Immordino-Yang, 2016, p. 86). EAD creates attention to this emotional processing and helps capture this information to improve teaching and supporting students.

Funds of Knowledge

Culturally responsive pedagogies (CRP) (Ladson-Billings, 1995, 2021) and funds of knowledge (FoK) (Moll, 2019) value students' cultural backgrounds and experiences in learning. Traditional assessments often dismiss this as irrelevant, leaving results without context (Rodriguez, 2013). Cultural knowledge can influence outcomes (Butler & Miretzky, 2020; Esteban-Guitart & Moll, 2014), and recognizing lived experiences affirms student identity and respect (Esteban-Guitart & Moll, 2014; Moll, 2015, 2019).

EAD embeds self-evaluation, self-appraisal, and self-expression into assessments, allowing students to contextualize performances with their funds of knowledge, leading to more equitable evaluations (McIntyre et al., 2001; Muhammad, 2020; Ramos & Kiyama, 2021). Simple prompts like "Before you turn in your assessment, I would love to hear about your day" demonstrate that students' lives matter as much as what they know (Cohen, 2022).

RELEVANT RESEARCH STUDIES

Research on similar approaches to EAD shows that when students reflect on performance and emotions in real time, they adjust and improve (Bandura, 2023; Karaman, 2021; Martin et al., 2019). The following case studies illustrate the impact of EAD principles.

The Impact of Self-Assessment on Academic Performance: A Meta-Analysis Study

A meta-analysis by Karaman (2021) found that self-assessment enhances academic outcomes, resilience, and knowledge retention. The analysis of over 40 effect sizes and 7,500 participants across education levels found a small but positive impact of self-assessment on academic performance, with self-assessment having a greater effect when conducted without external feedback (e.g., teacher input). EAD includes structured self-evaluation prompts directly into the assessments, making self-assessment an integral part of learning rather than an afterthought.

I Just Kind of Guessed": Student Constructions of Knowledge in AP Microeconomics

Gurleat et al. (2023) studied the alignment between instruction, assessment, and learning in an AP Microeconomics course. Their qualitative case study analyzed how an inquiry-based curriculum interacted with an AP-modeled exam, revealing that classroom performance did not translate to assessment results. The study calls for improved assessments that capture transferable competence—classroom learning translates to exam performance. EAD addresses this by gathering real-time experiential information during assessments, helping teachers identify any deficient ability carried over from instruction.

What Happens When Students Reflect on Their Self-Efficacy During a Test? Exploring Test Experience and Test Outcome in Science

Martin et al. (2019) investigated how real-time self-efficacy influences performance and achievement. 160 Australian high school science students were asked to rate their self-efficacy mid-assessment to see if mid-assessment reflection correlated with performance. Their findings were:

- Early success boosted mid-test self-efficacy (skill development dimension).
- Higher mid-test efficacy improved later performance (self-enhancement dimensions).
- A mutual reinforcement of confidence and achievement (self-sustaining dimension).

These findings reinforce EAD's emphasis on incorporating brief prompts to gauge self-perceptions, affect, and reflect on past performances, reinforcing confidence and metacognitive engagement to improve outcomes.

EXAMPLES OF EMPATHETIC ASSESSMENT DESIGN

EAD integrates empathetic self-evaluation, reflection, and personal expression segments alongside explicit knowledge segments into assessments. The following examples show how to embed them.

Explicit Knowledge

EAD seeks to determine whether proficient performance is as it appears. For instance, explicit knowledge questions in EAD include explicit or procedural prompts but are designed to uncover whether it is actual proficiency or just an illusion (see Figure 1).

Figure 1

Example Expanded Explicit Knowledge Question

Original Question
What is the definition of [x]?

A. [Answer 1]
B. [Answer 2]
C. [Answer 3]
D. [Answer 4]

Expanded Explicit Knowledge Question
Based on your chosen answer, explain why you did not choose the other answers.

Experiential Information

In addition to enhancing explicit knowledge questions, EAD embeds the following empathetic elements to capture what EAD calls experiential information.

Self-Evaluation

Students rate their proficiency during assessments to gain awareness of ability levels, which helps them align their self-perception with actual competence (Bandura, 2023; Karaman, 2021; Reibel, 2022, 2024). An example is shown in Figure 2.

Figure 2

Example Self-Evaluation Question

Original Question

How did the printing press change the world?

A. People could do crosswords together for the first time.
B. More information reached more people more efficiently.
C. The world started to have fewer trees.
D. Free speech began.

Self-Evaluation Addition

Rate your level of [proficiency] on the standard associated with [this question(s)].

Exceeds	Meets	Approaching	Developing

Seeing a student's perception of their abilities can help teachers provide more reliable evaluations, feedback, and support (Hattie, 2023; Reibel, 2022, 2025).

Self-Appraisal

Students record their mindsets and emotional reactions during assessments, helping teachers understand whether factors other than knowledge levels affect performance (see Figure 3).

Figure 3

Example Self-Appraisal Addition

Original Question

What are the parts of an atom?

A. Neutrons, protons, and electrons
B. Protons, negatrons, and electrons
C. Neutrons, protons, and megatrons
D. Glowtrons, neutrons, and electrons

Self-Appraisal Addition

Were you sure or unsure, or did you guess your answer to the previous question?

Without self-appraisal questions, the teacher must assume whether or not a student knows the material, but what if students answered correctly and said they guessed?

Self-Expression

Self-expression prompts encourage students to share their knowledge and themselves freely. Through these prompts, students might reveal unique perspectives about their learning beyond the confines of formatted questions (see Figure 4).

Figure 4

Example Self-Expression (Knowledge) Addition

Original Question
What is the central topic of [text]?
A. Deforestation
B. Greed
C. Manufacturing
D. Climate change

Self-Expression (Knowledge) Addition
What was your second choice and why?

Allowing students to share their knowledge freely might reveal that they know the material.

Another function of self-expression is that students share about themselves, their interests, and their lives. These prompts, rooted in funds of knowledge, can make students feel seen and acknowledged (see Figure 5).

Figure 5

Example Self-Expression (Personal) Addition

Original Question
How many sides does a hexagon have?
A. 9
B. 7
C. 6
D. 10

Self-Expression (Personal) Addition
Take a pause. I would like to know how your week is going. Write a few words.

EAD encourages self-expression, signaling to the student that assessment is not just the teacher measuring their knowledge, but also an opportunity to get to know them.

POTENTIAL BENEFITS

EAD offers several potential benefits worth discussing. They are explained further below.

Increasing Engagement and Motivation

Empathetic prompts make assessments feel like conversations by capturing experiential information (Doménech-Betoret et al., 2017). This "dialogue" fosters attunement, which has been shown to increase engagement and shift motivation from extrinsic to intrinsic (Bandura, 1997, 2023; Deci & Ryan, 2012). Motivation and performance improve when students feel heard and acknowledged (Bandura, 1997; Maté & Maté, 2022).

Increasing Awareness of Competence

The experiential information captured by EAD prompts is a key factor in motivation and achievement (Bandura, 1997, 2023). This information uncovers the adequacy of students' thinking and, if validated by the teacher, can strengthen belief in their abilities (Martin et al., 2019; Nasir & Iqbal, 2019). Through empathetic prompts, EAD provides regular opportunities for students to reflect on their understanding, confidence, and competence—and this consistent reflection can build agency and self-efficacy (Karaman, 2021).

Promoting Equity

EAD elements reduce grading inequities by providing teachers with deeper context on student performance—capturing thoughts, reflections, and self-expression (Brookhart, 2020; Hattie, 2008, 2023; Hibbs, 2023; Erkins et al., 2017; O'Connor, 2017; Reibel, 2022, 2025).

Empathetic prompts make the assessments more accessible by being more relational (Reibel, 2022). For example, asking, *Before you turn in the assessment, is there anything you want me to know that might affect my evaluation?* allows students to share their realities, acknowledging that other circumstances can impact performance. This insight leads to fairer and more informed evaluations (Kahneman et al., 2021; Kang & Furtak, 2021).

Strengthening Teacher-Student Relationships

Trust-based teacher-student relationships enhance learning (Danielson, 2022; Hickey & Riddle, 2024; Martin & Collie, 2019; Reibel, 2022). EAD builds trust by creating a space for expression and reflection on assessments (Martin & Collie, 2019; Reibel, 2022, 2024). Teachers can respond to students more authentically by embedding these self-expression moments into assessments, thereby improving classroom relationships.

Improved Student Supports

EAD gives educators insights into student learning, enabling more targeted, practical support. Without EAD's experiential information—self-evaluations, emotional reactions, mindsets, and self-concept (Bandura, 2023)—teachers may make assumptions about student deficits and provide ineffective interventions (Reibel et al., 2024, 2025; Schinske & Tanner, 2014).

ADDRESSING COMMON CONCERNS

Traditional assessment—knowledge-focused design, percentage-based scoring, and cumulative exams—is deeply ingrained in school culture, teacher beliefs, and policy. Grading is one of education's most contentious issues, and it often inhibits assessment reform. Educators often consider changes to assessment as threats to tradition, teaching identity, and accountability (Schimmer, 2016). EAD enhances traditional assessment models, but its implementation is challenging. The following concerns may impact EAD's adoption.

Time

Educators may fear that EAD increases grading time. Teachers can implement EAD with structured, efficient prompts to ease this concern. Instead of open-ended responses, teachers can use concise prompts. For example, they may provide a four-level self-evaluation scale for students to quickly assess their abilities or direct students to answer the self-expression prompts in a single sentence. This guidance can make assessments more insightful without increasing workload.

Maintaining Rigor

Some fear empathetic prompts weaken rigor, shifting focus from knowledge to socio-emotional development. However, EAD enhances evaluation without lowering performance standards. It maintains academic rigor while acknowledging the influence of self-concept, mindset, and emotions on performance. EAD balances rigorous assessment with a deeper understanding of students by integrating empathetic prompts alongside academic questions,

Scholars like Pondiscio (2019) and Lemov (2021) argue that helping students achieve high academic outcomes is an act of empathy. However, they do agree that empathetic, experiential information is needed to improve academic outcomes.

Usefulness of Experiential Information

Skeptics may question whether empathy dimensions provide meaningful information—seeing EAD as unnecessary, less rigorous, or overly subjective. However, teachers do not use the information from EAD prompts to determine scores; they use it to provide context to the score and determine support. Without the context of the student's experiences during an assessment, assumptions about abilities and misguided support are more likely.

IMPLEMENTATION

Addressing these concerns helps educators understand how EAD can enhance assessment design and evaluation rather than detract from them. The following actions aim to alleviate these concerns and support the implementation of EAD.

Enhancing Traditional and Standards-based Grading Models

Adopting EAD means understanding how EAD enhances grading models and how an empathetic assessment design can work within existing grading structures. Table 4 illustrates how EAD enhances standards-based and traditional grading models.

Table 4

Comparison of Traditional Grading, Standards-Based Grading (SBG), and EAD principles

Framework	Traditional Grading	Standards-Based Grading (SBG)	Empathetic Assessment Design (EAD)
Assessment Purpose	Measures outcomes through points/percentages.	Measures proficiency on learning standards.	Measures knowledge and proficiency while observing student self-evaluation, self-appraisal, and self-regulation capacities.
Focus of Evaluation	Knowledge acquisition and application	Proficiency in learning standards	Both knowledge proficiency and monitoring a student's cognitive, affective, and relational dimensions.
Bias Resistance	Focuses only on performance outcomes. No other factors that affect learning are investigated.	Focuses only on performance standards. No other factors that affect learning are investigated.	Focuses on performance outcomes but seeks a more nuanced understanding by integrating student self-evaluation and self-appraisal prompts to help students better understand their learning.
Student Agency	No student voice in assessment; grades are determined solely by the teacher.	No student voice in assessment; grades are determined solely by the teacher.	Students actively contribute to their assessment experience via empathetic dimensions such as self-evaluation and self-expression.
Emotional & Relational Engagement	Often neglected. Assessment is a detached process of knowledge verification.	Acknowledges they are important for growth, but remains focused on knowledge verification.	Includes prompts that collect affective data (confidence, anxiety, emotional reactions) to provide more context for performance outcomes.

Professional Development

Workshops on empathy and assessment literacy help teachers understand EAD's purpose. Professional development can highlight successful EAD implementations, demonstrating how empathetic elements seamlessly integrate into teachers' current assessments. Practical, incremental strategies allow educators to test EAD on a small scale, revealing its impact on student learning. Sample assessments with embedded EAD elements provide teachers with insight to refine their assessments collaboratively. Aligning EAD with a school's assessment policies emphasizing equity, transparency, and student agency can strengthen its adoption.

Piloting

Schools can identify early adopters to pilot EAD in specific assessments. This begins with embedding EAD prompts in a single formative assessment or unit test. Teachers can include short reflections after challenging segments, or summative assessments can feature prompts like, "What did you learn about yourself on this assessment?" or "How well do you know the material now that you have finished?" Collecting information from these questions can help teachers examine the function and value of EAD before adopting it more widely.

Effectiveness Data

Schools can use data to showcase EAD's effects on learning, grading, and intervention. Assessing its effectiveness requires quantitative (performance outcomes) and qualitative (experiential information) measures. Reviewing student assessment scores and responses to EAD prompts helps evaluate the impact of EAD. Teacher testimonials from pilot cadres can provide insight and address concerns. Regular analysis of student outcomes, teacher perceptions, and experiential information offers ongoing evidence of EAD's effectiveness.

Suggestions for Future Research

A challenge in adopting EAD is the lack of long-term research on outcomes. While case studies show that empathy-type practices around assessment boost engagement and self-efficacy, broader studies are needed to examine their direct impact when embedded in assessments. Future research should explore how self-evaluation, self-appraisal, and self-expression influence academic performance and motivation. Studies should examine how EAD affects instruction, intervention strategies, grading practices, and administrative barriers. Additionally, research should assess the impact of EAD on grading workload. Further investigations should test EAD across subjects, grade levels, and school systems, including its integration into technology-driven assessments.

CONCLUSION

Empathetic assessment design (EAD) improves traditional assessment design by integrating empathetic elements with academic evaluation. This design evaluates academic achievement while capturing other factors influencing performance, such as self-evaluation, self-concept, life situations, and affective reactions.

EAD aligns with assessment and grading models like ungrading (Blum, 2020), portfolio grading (O'Brien et al., 2016), competency-based grading (Colby, 2019), and mastery grading (Guskey, 2022). While these movements emphasize empathy-related practices, EAD blends cognitive, affective, and relational dimensions into assessments, providing real-time experiential information for more precise scoring, feedback, and intervention.

Despite its promise, EAD faces resistance due to limited research and entrenched assessment traditions—grading (and assessment) is a "third rail" in education, deeply tied to traditional notions (Feldman, 2018). This tradition makes widespread EAD adoption difficult. Implementation requires communicating its potential benefits to stakeholders, gradual integration, training, and collecting evidence of its impact. By integrating empathy into assessment design to gather experiential information, EAD offers a transformative approach to assessment—leading to more equitable grading, precise feedback, and improved interventions.

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Manuscript submitted: ***July 22, 2024***
Manuscript revised: ***January 10, 2025***
Manuscript revised: ***March 12, 2025***
Accepted for publication: ***May 15, 2025***

OJED
OPEN JOURNALS IN EDUCATION
Volume 10, Issue 2 (2025), pp. 105-111
Journal of School Administration Research and Development
ISSN: 2470-8496 Print/2470-850X Online
ojed.org/JSARD

Decolonizing Data: Moving Toward an Inclusive Count of American Indian/Alaska Native Students in a Pacific Northwest School District

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ABSTRACT

The prevalence of data use in education requires researchers to critically examine data-collection practices that could inform, obscure, or omit accurate representations of students. Thus, an innovative approach to accurate demographic collection and reporting can enable school districts to more accurately count and represent American Indian/Alaska Native (AI/AN) students. This approach, developed in partnership with Pacific Northwest Indigenous communities, centers the perspectives of Native peoples. Utilizing critical Native theories, research for uninterrogated biases advises on pathways for improved representation practices that maximize accurate identification of a diverse Native presence. Data accuracy in educational decision-making supports resource allocation and efficacy in academic practices and policies. Therefore, this best practice article emphasizes representation practices for a change-interpretation of AI/AN student enrollment and graduation rates through student district responses that best suit Native communities, student academic needs, and student developmental expectations.

***Keywords*:** American Indian/Alaska Native, decolonizing data, inclusive count, maximizing, identification, aligning with Native practices

Our school district, located in the Pacific Northwest, focuses on improving the educational experience for our American Indian/Alaska Native (AI/AN) students. By many standards, our work might be considered exemplary. We have a vibrant Native student support program that includes a partnership with the local sovereign Tribal Nation, providing high school dual-credited coursework for Native perspectives, Tribal language instruction, and revitalization. We have several AI/AN student clubs and teach the Washington State-required John McCoy (lulilaš) Since Time Immemorial curriculum, which is implemented in collaboration with our local sovereign Tribal partners. Our school board and the local Tribal council hold biennial formal government-to-government meetings. In 2019, our school board unanimously adopted an official land acknowledgment that is read whenever the pledge of allegiance is recited and during public events. We fly the Tribal flag at every school, along with the U.S. and Washington State flags. Annual professional development for administrators and teachers focuses on treaty histories such as the historic Boldt decision regarding Tribal fishing rights and Indigenous language.

However, despite our best intentions, we have recently become aware of a glaring problem. Through our growing Tribal collaboration and partnerships, we have realized that our data systems are flawed in measuring accurate demographic information. Specifically, traditional data collection methods were unintentionally inaccurate and failed to count all AI/AN students. More importantly, we have learned about settler-biased data systems and their negative impacts on outcomes for Native Peoples. Consequently, our discovery helped us to realize that these inaccuracies misalign existing data with our values and commitments. This realization led us to explore ways to decolonize our data systems (Magee et al., 2023) to intentionally identify all AI/AN students and to understand our students' experiences, thereby improving student outcomes. We hope that sharing our approach to redressing this wrong might provide other districts with a roadmap.

Federal and State Requirements: The Official Count

Research examining AI/AN students' challenges uncomfortably revealed that federally mandated race data, also referred to as the official count, erased some of our students as a result of a system designed to intentionally underreport the number of AI/AN individuals (Prewitt, 2013). Thus, legislative requirements in State Education Agencies (SEAs) now scrutinize data collection for demographic reporting according to state and federal rules. Consequently, federal regulations from the U.S. Office of Management and Budget (OMB) and the Statistical Policy Directive No. 15 (OMB, 1977) govern the disaggregation of Indigenous Populations. OMB initially issued requirements in 1977 and then revised them in 1997 to disaggregate Pacific Islanders and Hawaiians from the Asian category. The update also added a two-part question on ethnicity and race. The first question asks if the student is Hispanic or Latino. The second question asks about race, with choices of Asian, American Indian or Alaska Native, Black or African American, Native Hawaiian or Other Pacific Islander, and White (AIR, 2023). Since race and ethnicity are cultural rather than biological, self-identification is emphasized in this system. Students who identify as more than one race are grouped into a sixth racial category called two or more races.

In 2024, an additional category was added to support individuals with Middle Eastern or North African heritage. Furthermore, the current two-part question that separates ethnicity and race will be replaced by a single question, "What is your race or ethnicity?", by 2029. In addition, there will be minor changes to the definition of AI/AN, shifting from "A person having origins in any of the original peoples of North and South America (including Central America), and who maintains Tribal affiliation or community attachment" to "Individuals with origins in any of the original peoples of North, Central, and South America, including, for example, Navajo Nation, Blackfeet Tribe of the Blackfeet Indian Reservation of Montana, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community, Aztec, and Maya" (Revisions to OMB's Statistical Policy Directive No. 15: Standards for Maintaining, Collecting, and Presenting Federal Data on Race and Ethnicity, 2024).

These recent changes illustrate that the OMB, and the census before it, collects race information with dominant culture policy objectives rather than a rational or coherent approach (Prewitt, 2013). This system of categorizing race and ethnicity has served the purposes of the dominant culture because most non-Indigenous Americans identify as only one race. In 2020, the U.S. Census reported that AI/AN populations were in the two or more races category. However, 87% of white Americans, 88% of Black Americans, and 83% of Asian Americans are classified as one race alone. In contrast, just 39% of AI/ANs are classified as one race alone, which "is a legacy of the complex effects that hundreds of years of colonization have had on the identities of Native Americans" (Maxim et al., 2023, p. 5).

Further complexity arises in the Hispanic and Latino category, which is considered an ethnicity rather than a race. In federal education data, any student identified as Hispanic/Latino is not reported in a racial category and instead is included only as Hispanic/Latino. Nationally, AI/ANs identifying as one race identify as Hispanic or Latino more than any single race (Maxim et al., 2023). Thus, when racial and ethnic categories are connected, the majority of our AI/AN students are assigned labels that obscure their Indigenous identities. This official count contrasts with an inclusive count that identifies all students who are AI/AN, regardless of their Hispanic/Latino or multi-racial identities (AIR, 2023).

We Can Do Better: Why Districts Should Shift to an Inclusive Count Approach

Educators emphasize identifying inequities in our public schools. Examining achievement and opportunity gaps and differences in outcomes across various student groups reveals a disproportionate prevalence of incorrect data collection and erroneous conclusions. Currently, educators are challenged by the lack of visibility into AI/AN students in systems that fail to record their existence. These systems continue to engage in the practices of erasure and white/settler supremacy that harm our AI/AN students. The nation's historical and ongoing systemic inequities, including anti-Indigeneity, extend into public education data systems, including their management and collection (Magee et al., 2023). School administrators and educators are unknowingly complicit in perpetuating harmful practices and accepting misleading data. Therefore, critical knowledge required to achieve maximum levels of representation highlights Tribal Sovereignty in data education practices to reduce misinformation in educational policies and practices that disrupt AI/AN students' outcomes.

Washington State Context

In 2016, the Washington State Legislature recognized that relying on the federally mandated ethnicity and race categories was insufficient and mandated their expansion. In response, the Office of Superintendent of Public Instruction (OSPI) created the Race and Ethnicity Student Data Task Force (2017) to fulfill the legislative mandate. The legislature directed the task force to expand the disaggregation of Black, white, and multiracial students. While AI/AN students were

not included in the legislative directive, the task force chose to include expanded categories for them as well. The recommendation, implemented by OSPI, acknowledges 29 federally recognized tribes, 7 non-federally recognized tribes, and 2 write-in options, expanding the options from 1 to 38, as shown in Figure 1.

Figure 2

Student Survey Displaying Expanded AI/AN Categories

- **American Indian/Alaska Native (may check categories and use write-in)**
- **Washington State Federally Recognized Tribes**

Confederated Tribes of the Chehalis Reservation	Nisqually Indian Tribe	Spokane Tribe of the Spokane Reservation
Confederated Tribes of the Colville Reservation	Nooksack Indian Tribe of Washington	Squaxin Island Tribe of the Squaxin Island Reservation
Confederated Tribes and Bands of the Yakama Nation	Port Gamble S'Klallam Tribe	Stillaguamish Tribe of Indians of Washington
Cowlitz Indian Tribe	Puyallup Tribe of the Puyallup Reservation	Suquamish Indian Tribe of Port Madison Reservation
Hoh Indian Tribe	Quileute Tribe of the Quileute Reservation	Swinomish Indian Tribal Community
Jamestown S'Klallam Tribe	Quinault Indian Nation	Tulalip Tribes of Washington
Kalispel Indian Community of the Kalispel Reservation	Samish Indian Nation	Upper Skagit Indian Tribe of Washington
Lower Elwha Tribal Community	Sauk-Suiattle Indian Tribe of Washington	
Lummi Tribe of the Lummi Reservation	Shoalwater Bay Indian Tribe of the Shoalwater Bay Indian Reservation	
Makah Indian Tribe of the Makah Indian Reservation	Skokomish Indian Tribe	
Muckleshoot Indian Tribe	Snoqualmie Indian Tribe	

- **Washington State Non-Federally Recognized Tribes**

Chinook Tribe
Duwamish Tribe
Kikiallus Indian Nation
Marietta Band of Nooksack Tribe
Snohomish Tribe
Snoqualmoo Tribe
Steilacoom Tribe

Note. Adapted from Race & Ethnicity Student Data: Guidance for Washington's Public Education System, Office of Superintendent of Public Instruction, 2017.

LITERATURE REVIEW: TRIBAL CRITICAL RACE THEORY

Emphasizing tenets of Tribal Critical Race Theory (TriCRT), Bryan McKinley Jones Brayboy (2005), a scholarly and Tribal member of the Lumbee Nation Tribe of North Carolina, created a theoretical framework to examine AI/AN experiences of colonization and racism. Brayboy's second tenet, "U.S. policies are rooted in imperialism, White supremacy, and a desire for material gain" (2005, p. 429), is illustrated by the fact that initially, AI/AN were not counted in the census because they were not citizens, taxpayers, or property owners (Schor, 2020). However, in 1870, the census finally included a formal count using "I" for Indian in response to the question of color. In the same decade, U.S. Census reports foreshadowed the expected disappearance of Indians altogether; many mixed-race white and Indians were classified as Indians "as if at this time, when white domination over Indians was firmly established, Indians offered no threat to the purity of the white race" (Schor, 2020, p. 119).

Brayboy's fourth tenet, "Indigenous peoples have a desire to obtain and forge Tribal sovereignty, Tribal autonomy, self-determination, and self-identification" (p. 429), defines the liminal space occupied by Tribal members of legal and political groups and their racial identities. Through an inclusive examination of Indigenous Sovereignty, the determination of what it means to be Indian is standardized by Indian standards. Thus, connecting TriCrit tenets to district data projects, Tribal ability to distinguish among the diverse tribes for sovereign nations elevates sovereignty beyond the obscure AI/AN label. These terms include indigenous data sovereignty and the determination of what it means to be Indian by Indians. This tenet is connected to our data project because it is necessary to distinguish among the diverse tribes and sovereign nations currently included in the AI/AN label. Native Americans occupy a "liminal space" (Brayboy, 2005, p. 427) as both members of legal and political groups and as racial identities.

METHODOLOGY: INCLUSIVE COUNT EFFORTS FOR MAXIMUM REPRESENTATION

Our two research questions were, "Does applying an inclusive method of counting students who identify as AI/AN result in a different number of students than the official, federally mandated count?" and "Does using the inclusive method of counting result in different outcomes for AI/AN students on key educational metrics?" Applying Gene Kim and Arlyn Arquiza's (2010) inclusive method of counting students from the University of Washington Office of Minority Affairs and Diversity, this process conceptualizes individuals who identify with more than one ethnic or racial identity for maximum representation. In Fall 2023, our educational research study did not require Institutional Review Board approval because it excluded identifiable private information.

Data were reported for 191 of the 15,725 total students in the federally mandated AI/AN category. However, when we explored data for our district, we found a few patterns. A total of 830 students self-identified as AI/AN on our local race/ethnicity form. The discrepancy between the district and federal data occurred because 288 students were also identified as Hispanic/Latino, and 351 were also identified as another race in addition to AI/AN. In both cases, the AI/AN category was superseded due to federal counting guidelines. Therefore, our publicly available, federally mandated count made 77% of our AI/AN population, or 639 students, invisible. Our district data are similar to the Washington state undercount rate, estimated at 75% (AIR, 2023; Olden, 2023; Washington STEM, 2024), or approximately 49,134 indigenous students whose identities are not accurately classified (Indigenous Student Identification Project, 2023). Nationally, the rate is an estimated 70%, or more than 870,000 students (AIR, 2023).

This is significant at both the district and school level. We are calling our inclusive method of counting students "maximum representation," a term coined by Gene Kim and Arlyn Arquiza at the University of Washington Office of Minority Affairs and Diversity (2010). This concept reflects the reality that individuals can identify with more than one ethnic or racial identity, especially for our AI/AN students.

Aligning with Native Practices

Historically, research and data practices involving Native Peoples are fraught with colonialism, surveillance, extraction, and minimization; therefore, we aligned the values of the intended goals of our maximum representation with Native research practices and methodologies. More accurate data would better represent Native Peoples, students, families, and lands, and could impact sovereignty. Rigney (1999) and Martin and Booran Mirraboopa (2009) highlight alignment with Indigenous researchers for principles that recognize Native work as the "privileging of Indigenous voice and experience as situated in Indigenous lives and lands" (Kovach, 2022, p. 185). We commit to ensuring that our work remains Native-informed, reviewed, and in contribution to Native goals, outcomes, and futures. Thus we ground our approach in the key methodological principles set forth by Adam Gaudry's (2011) framework for respecting and validating Indigenous people, providing research for use by Indigenous people and communities, and ensuring that research is "action oriented and works as a motivating factor for practical and direct action among Indigenous peoples and Indigenous communities" (Gaudry, 2011, p. 117) for decolonized logic that elevates Native culture.

From the beginning, our work included the collaboration and guidance of our district's Native student specialist. This practice restored space for Native educational expertise, accountability, and oversight. The presence of that cultural and professional lens informed us about the complex "social, historical, and political contexts that shape Indigenous experience" (Kovach, 2022, p. 185) and the myriad ways that settler data systems and practices obscure and omit Native presence. The partnership has also meant that the systems we create could serve and anticipate the needs and goals of Native educators and Tribal leaders. The specialist's experience with Native students and communities also meant he could identify, through relational and professional experience, students who weren't properly identified as Native in federal race and ethnicity paperwork. For example, he helped us identify students in the Title VI program who had documented Tribal affiliation but

were not listed as Native. Additionally, as we strive for maximum representation, we increase Native student and family inclusivity, which helps more students identify as Native. In other words, good practice creates a system in which data continues to improve through positive community representation.

The partnership informed which data visualizations could be created to support school and Tribal leaders. For example, we can disaggregate our data to identify the distribution of Tribal affiliation in our district. These data can help Tribal Nations with student counts for their education programs, inform funding priorities and grants, and even honor graduates. Further, it can guide customized instruction when implementing the state Tribal history and sovereignty curriculum. To expand our accountability and oversight, our district presents our data work to Tribal leadership during our biannual work sessions. These opportunities also allow us to address data issues that are relevant and impactful for them.

EXPLORING THE DATA

In addition to noting that significantly more students identify as AI/AN than previously recognized, new findings emerged surrounding outcomes of interest for public K-12 schools. One of the most important outcomes of a public K-12 school district is ensuring that students graduate. When we examine our most recent AI/AN data using the official count, we find that 64% (7) of our AI/AN students graduated in 4 years, compared to 85% (898) in the all-students group (Table 1). However, using the maximum representation method, we see that 78% (42) of students graduated. This is important for two reasons. First, using the maximum representation method shows that the gap between AI/AN students and all students is reduced by two-thirds. In other words, our AI/AN students are graduating at much higher rates than previously recognized. Second, we can identify eight AI/AN students who are continuing into a fifth year of high school and who may need additional culturally relevant support to graduate.

Table 1

Graduation Rates for the Class of 2024

	# of students in the cohort	# of students dropping out	# of students continuing into 5th year	# of students graduating
Official AI/AN Count	11	1 (9%)	3 (27%)	7 (64%)
Maximum Identification	54	4 (7%)	8 (15%)	42 (78%)
All Students	1,055	82 (8%)	75 (7%)	898 (85%)

Another key metric is attendance, as shown in Table 2. In our district, we examine the number of classes missed due to excused or unexcused absences. We define *regular attenders* as students who miss fewer than 5% of class periods, *at-risk attenders* as those who miss 5% to 10% of class periods, and *chronically absent* as those who miss 10% or more of class periods (North Thurston Public Schools, 2021). When examining our second-semester data from 2023-2024, using the official count, we see that 60.7% (94) of our AI/AN students were chronically absent. However, using the maximum identification count, the rate drops to 48.9% (361). With more accurate counting, although our AI/AN students are still more often absent than the *All Students* group, the gap is much smaller.

Table 2

Attendance Rates in Semester 2, 2023-2024 School Year

	# of regular attenders	# of at-risk attenders	# of chronically absent attenders	Total
Official AI/AN Count	27 (17.4%)	34 (21.9%)	94 (60.7%)	155 (100%)
Maximum Identification	170 (22.9%)	211 (28.4%)	361 (48.9%)	742 (100%)
All Students	4,443 (33.1%)	4,088 (30.4%)	4,907 (36.5%)	13,438 (100%)

CONCLUSION

The influence of data in education requires practitioners to critically examine how data collection and practices inform, obscure, or omit student representation. Utilizing critical Native theories and research can illuminate uninterrogated biases and inform pathways to improved practices. Maximum representation practices can more accurately identify the diversity

of Native presence and provide more accurate data to inform educational decision-making, resource allocation, and evidence of the efficacy of educational practices and policies. Maximum representation likewise supports data sovereignty in the necessary equal collaboration and accountability with and to Native Peoples and the affirmation that Native identity is a racial and political reality. The work creates new opportunities and spaces to develop and grow mutually beneficial and reciprocal relationships with sovereign Tribal partners. The practices and criticality of our work continue to inform the creation of data systems that accurately represent and provide our district with the most accurate information possible to make decisions that can benefit all students.

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Manuscript submitted: ***September 16, 2024***
Manuscript revised: ***July 17, 2025***
Accepted for publication: ***August 2, 2025***

Best Practice Article

OJED
OPEN JOURNALS IN EDUCATION

Volume 10, Issue 2 (2025), pp. 112-117
Journal of School Administration Research and Development
ISSN: 2470-8496 Print/2470-850X Online
ojed.org/JSARD

The Four-Hour Grading Scale: Motivation, Self-Determination, and Academic Achievement in Raising Graduation Rates

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ABSTRACT

High school administrators desire a high graduation rate, and government actors and community members pressure administrators to raise this rate. In the context of this challenging dynamic, principals sometimes compel teachers to alter their grading practices. While amending grading practices may provide the impression of improvement, it is inauthentic and likely ineffective in producing achievement results. Although changing grading practices can increase graduation rates, it does not improve achievement; however, increasing motivation can. Self-determination theory (SDT) research has found that incorporating the principles of SDT can increase students' academic achievement. This essay reviews SDT and the seven autonomy-supportive instructional behaviors (ASIBs), arguing that they are a more achievement-focused alternative to increasing graduation rates.

***Keywords*:** educational policy, educational psychology, grading, graduation rate, high schools, motivation, principals

A high school in Indiana was facing a dilemma: its graduation rate. With a new principal and its lowest graduation rate in the county in years, it struggled to find solutions to pass more students. Despite the principal's plea to pass students who simply demonstrated effort, teachers stood firm in upholding their grading criteria. Consequently, the principal proposed changes to the grading scale in the middle of the semester. The traditional A–F scale would be replaced with a 1–4 scale. However, the new scale immediately received pushback from students, teachers, and the community for several reasons. Firstly, some students' GPAs would have dropped with the new grading scale. Furthermore, teachers felt the new scale compromised their morals, values, and ethics. Finally, the community thought it gave a false sense of what students really knew. Four hours after the scale was proposed, the principal reversed his decision.

This case of the four-hour grading scale highlights the struggle that high schools face with pressure from government actors (e.g., district administration, school board members, the state education agency, the federal government) and community members (e.g., parents) to raise the graduation rate. Campbell (1979) warned that when there is a single indicator being used for high-stakes decision-making, "the more subject it will be to corruption pressures and more apt it will be to distort and corrupt the social processes it is intended to monitor" (p. 85). In other words, relying on the graduation rate to measure educational success will likely lead to corrupt and distorting practices, making it an unreliable metric.

Grading has become an area of interest for reform, given that grades are a major factor in awarding a high school diploma (Brookhart et al., 2016; Rumberger, 2011). Indeed, research shows that grading influences (i.e., teachers' knowledge, beliefs, expectations, and values) and external factors (i.e., government actors and community members) often create tension, as government actors and the community impose various goals or demands on schools (Kunnath, 2017; McMillian & Nash, 2000; McMillian, 2003). Subsequently, teachers are forced to compromise their knowledge, beliefs, expectations, and values, which impacts their grading rationale and grading practices, contributing to what has been known as a "hodgepodge" (Brookhart, 1991), or mix, of academic and non-academic factors affecting the grade a student receives (Bowers, 2009, 2011, 2020; Brookhart et al., 2016; Brookhart, 1993, 1994; Chen & Bonner, 2017; Griffin & Townsley, 2021; Olsen & Buchanan, 2019; Randall & Engelhard, 2010).

Furthermore, data from the National Center for Education Statistics (2024) shows that the average adjusted cohort graduation rate (ACGR) in the US for the 2021–2022 school year was 87% among students in public high schools. Of the roughly 3 million students in the cohort, half a million did not earn a diploma within 4 years (U.S. Department of Education, 2023). Students who fail to graduate are more likely to be arrested, receive government assistance, and have poorer overall health than those who obtain a high school diploma (Lansford et al., 2016; McFarland et al., 2020). Therefore, supporting as many students as possible to learn and graduate from high school is a legitimate objective. The question becomes a matter of *how* to increase the graduation rate. Specifically, how can principals support teachers and students in improving academic achievement? This essay argues that principals should consider the students' psychological well-being in the classroom environment to improve academic achievement genuinely.

STUDENT MOTIVATION: SELF-DETERMINATION THEORY

Prioritizing motivation is beneficial due to its inherent ability to produce gains in various educationally meaningful outcomes, reduce problematic outcomes, and yield benefits for teachers (e.g., higher job satisfaction; Cheon et al., 2020; Furrer et al., 2014; Howard et al., 2021; Reeve & Cheon, 2021; Reeve et al., 2022; Vansteenkiste & Ryan, 2013). One particular motivation theory, self-determination theory (SDT), is a "broad theory of human development and wellness, with strong implications for education" (Ryan & Deci, 2020, p. 1).

The central premise of SDT is that humans have inherent motivational resources that drive human behavior. These resources include basic psychological needs and intrinsic motivation (Reeve et al., 2022). Psychological needs refer to autonomy, competence, and relatedness (Furrer et al., 2014; Reeve et al., 2022; Ryan & Deci, 2017, 2020). Autonomy is the need to start, regulate, and guide our behavior. A person has autonomy when they do not feel pressured to engage in a behavior (i.e., volition) and feel they have ownership over it (i.e., personal endorsement or internalization). Competence involves actively seeking optimal challenges, exerting effort, and thinking to progress toward mastery. When people interact effectively with the environment and feel they can handle the challenges they face both now and in the future (i.e., a sense of mastery), they have competence. Finally, relatedness refers to the need to bond with other people. People experience relatedness when they feel a sense of closeness and comfort while engaging with those who understand and accept them. These psychological needs are the source of intrinsic motivation (Reeve et al., 2022).

SDT also concludes that intrinsic motivation arises from a genuine interest and enjoyment in an activity. It embodies a natural inclination to pursue novelty, embrace challenges, explore new environments, engage in various activities, and expand one's horizons (Reeve et al., 2022; Reeve & Cheon, 2021). For instance, a person may garden because they have an interest and enjoyment in the activity. They do not feel pressured into gardening; they have ownership over their behavior; they find it optimally challenging; and they feel a bond with others (e.g., connecting with others who share their interest in gardening). Behaviors that support such basic psychological needs, as in the gardening example, also tend to be intrinsically motivating, enjoyable, and interesting to students in the classroom (Bureau et al., 2021).

APPLYING SDT IN THE CLASSROOM

Although it is unlikely that student motivation will be entirely intrinsic, as much classroom content is not inherently interesting to students, SDT is centered on a continuum of motivation. In addition to intrinsic motivation, extrinsic motivation consists of "behaviors done for reasons other than their inherent satisfactions" (Ryan & Deci, 2020, p. 2). One state of extrinsic motivation of focus here is *identified regulation*, which is when students engage in activities at school that they embrace and find personally significant and meaningful (Bureau et al., 2021). Specifically, students may not find the activity enjoyable, but they see and understand the value of the activity (Vansteenkiste & Ryan, 2013). While this state of motivation is not intrinsic, the behaviors here become internalized (Furrer et al., 2014), which can still promote meaningful educational outcomes while reducing problematic ones. This internalization plays a vital role in shaping students' engagement.

Students enter the classroom with different psychological needs, varying states of motivation, and differing goals and values. Teachers can neglect, suppress, or foster students' psychological needs, motivation, goals, and values based on their motivational style, which encompasses the teacher's tone and attitude (Reeve et al., 2022). When teachers support their students' basic psychological needs, the two groups are in sync. When teachers do not support students, students may resist the teacher's motivational style, and, as a result, teachers and students oppose each other.

Today, instead of autonomous teaching methods, teachers commonly use controlling methods in their classrooms (Ryan & Deci, 2017). This means they tend to use an "authoritarian attitude and interpersonal tone of pressure in which the teacher prescribes what students should think, feel, and do, irrespective of what students prefer" (Reeve et al., 2022, p. 34).

Controlling methods appear to be associated with maladaptive factors, such as absenteeism, anxiety, boredom, and students ultimately giving up (Furrer et al., 2014; Howard et al., 2021). One reason teachers use controlling methods is that the U.S. has been holding schools accountable with set objectives since the passage of the No Child Left Behind (NCLB) Act in 2001 and its revised successor, the Every Student Succeeds Act (ESSA) in 2015 (Furrer et al., 2014). The accountability pressure (e.g., graduation rates) that school administrators face is passed down to teachers, which has been shown to cause teachers to use controlling methods, reduced motivation in teachers and students, and poorer student-teacher relationships (Deci et al., 1982; Pelletier et al., 2002; Ryan & Deci, 2017).

Another reason for the use of controlling teaching methods is the way grades are utilized. They are used to determine if the student should move on to the next grade, repeat a course, take advanced courses, receive honors, participate in extra-curricular activities, and attend college (Olsen & Buchanan, 2019). When grades carry such significant consequences for students, and teachers face pressure to ensure students perform well, teachers may resort to controlling teaching methods to produce compliance and performance. Due to grades being a reliable predictor of whether a student will graduate from high school and how they will perform in college (Brookhart et al., 2016), teachers may resort to controlling methods to boost grades to maintain or raise grades as a proxy for success

Further, since much of what is done in the classroom tends to be graded and used to gatekeep students from opportunities, grades can serve a controlling rather than informational purpose (Ryan & Deci, 2017). This assumes that grades and high-stakes accountability testing will motivate students to perform better, which is a questionable assumption (Butler, 1987; Kramer et al., 2024; Link & Guskey, 2022; Nichols & Harris, 2016; Ryan & Deci, 2017). Despite surrounding pressures to use controlling methods, teachers can still manage their classrooms by teaching in ways that satisfy students' psychological needs and by having students internalize their learning, while reducing the "need frustration" (i.e., not having students' psychological needs fulfilled; Vansteenkiste & Ryan, 2013) and anti-internalization.

A possible objection is that reforming the grading method (e.g., standards-based grading [SBG]) to align with SDT elements could increase motivation and student learning. While reforming grading methods may align with elements of supporting students' intrinsic motivation and internalization, such as providing rationales that are "explicit and transparent about the learning goals or standards" (Link & Guskey, 2022, p. 408), no evidence appears to suggest that other grading methods, such as SBG, solely increases motivation (Kramer et al., 2024) or improves student learning (Link & Guskey, 2022).

Seven Autonomy-Supportive Instructional Behaviors

Seven autonomy-supportive instructional behaviors (ASIBs) can be implemented in the classroom to support students' intrinsic motivation and internalization (Furrer et al., 2014; Reeve & Cheon, 2021; Reeve et al., 2022). The first and foundational ASIB is for the teacher to, in part, set aside their own perspective and instead view the classroom from the students' perspective. Teachers should ask students what they want, think, or feel, thus enabling students to voice their opinions and adjust the lesson accordingly (Reeve et al., 2022).

The next two ASIBs are intended to support students' intrinsic motivation. ASIB 2 invites students to pursue their personal interests by asking them what they like to do and what they are interested in. ASIB 3 is to present learning activities in need-satisfying ways by providing meaningful choices in classroom activities, methods, topics, work pace, and participation; offering optimal challenges and guidance; and encouraging students to pursue prosocial goals together.

The remaining four ASIBs support internalization, which is essential for students to internalize societal norms. ASIB 4 is to provide explanatory rationales, in which the teacher explains why the activity is worth the student's effort. ASIB 5 is to acknowledge negative feelings, which is done by acknowledging the feelings, accepting the validity of the adverse affect, and working collaboratively to remedy. ASIB 6 is to rely on invitational language, such as "you may" versus "you must," and consider the pitch, speed, and quality (i.e., soft versus sharp) of tone. ASIB 7 is to display patience by listening to and understanding students, and by waiting to advise until the student is ready to hear the teacher's input.

Teachers can be trained to implement these seven behaviors effectively in the classroom (Reeve et al., 2004). For a more in-depth look at ways to support students' psychological needs and for more tangible examples, consider reading articles by Reeve et al. (2022) and Reeve and Cheon (2021).

CONCLUSION

The position of this essay is not that grading practices need no reform; there is certainly room for improvement. Indeed, research has shown significant variation in the validity and reliability of teachers' grading (see Brookhart et al., 2016). However, addressing controlling teaching methods and supporting students' psychological needs through autonomy-

supportive instruction may be more directly tied to improving motivation and graduation rates than grading reform alone. Future research should explore how grading practices intersect with self-determination theory to understand their combined effects on student motivation and graduation rates.

The focus here is that principals should shift their focus from grading practices and the graduation rate to promoting psychological well-being and implementing autonomy-supporting instructional behaviors in classrooms—if the ultimate goal is to increase student learning. As Ryan and Deci (2017) point out, few "have specifically focused on improving basic need supports as the strategy for leveraging better achievement and completion outcomes" (p. 377). While amending grading practices to pass more students may increase graduation rates and provide a short-term relief for high school administrators, Campbell (1979) suggests that undesirable consequences often occur. Instead, if principals seek to improve academic achievement in their schools, it is worth considering the principles of SDT in the classroom environment.

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Manuscript submitted: ***March 16, 2025***
Manuscript revised: ***May 18, 2025***
Accepted for publication: ***May 31, 2025***