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Virtual Professional Development for School Leadership: Designing and Testing a Practical Web-based Simulation for Classroom Observation

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Abstract

Among numerous responsibilities, conducting effective classroom observations is crucial for school leaders. This research explores the perspectives of 23 aspiring and practicing school leaders about their experiences of learning classroom observation skills with LeadWise simulation, an interactive e-learning tool. Qualitative analyses of text data collected via an open-ended survey revealed overall positive perceptions of the simulation training among the participants. The participants benefited from simulation-based professional development and viewed it as an opportunity for ongoing training. They also emphasized the possibility of acquiring practical application experiences in an interactive learning environment. While both groups of school leaders benefited from the simulation, aspiring and less experienced practicing leaders seemed to value the learning opportunities offered by the simulation more than

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experienced leaders. Yet, all the participants agreed on the significance of well-designed simulations with quality learning materials and expressed their interest in further training using web-based simulations.

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Introduction

Over the last few decades, empirical studies have provided ample evidence that school leaders and their practices can significantly affect various educational processes. Most importantly, school leaders play a key role in overall school improvement and influence student outcomes through their practices focusing on teaching and learning processes (Hallinger, 2005; Laursen et al., 2024; Leithwood et al., 2008; Tan et al., 2024). Therefore, one of the major shifts in the educational policy landscape has been the increasing attention to leaders' engagement with instruction (Grissom et al., 2021; Hallinger et al., 2020). Instructional leadership practices, which involve various actions related to improving teaching and learning processes, such as providing guidance and support for teachers and participating in curriculum design, can contribute to school effectiveness and academic performance (Hitt & Tucker, 2016; Robinson et al., 2008).

School leaders are increasingly expected to guide teachers in implementing effective instructional strategies and enhancing student learning. Effective classroom observation has become critically important since it enables school leaders to gain insights into teachers' classroom performances and students' learning experiences (Marshall, 2012). Through classroom observations, school leaders gather data on various classroom activities, such as instructional practices, teacher-student interactions, curriculum implementation, classroom management, and assessment processes, allowing them to provide constructive feedback to teachers (Danielson, 2007; Zepeda, 2013).

Related research has focused on training school leaders for effective classroom observation. Several studies provided examples of leader preparation for classroom observation utilizing traditional class-based pedagogies supplemented with video technologies or school-embedded practical activities (Baecher et al., 2016; Bergin et al., 2017; Carraway & Young, 2015). However, applying simulation-based approaches in school leaders' classroom observation training has been under-researched despite its high relevance for developing leaders' instructional leadership skills (Militello et al., 2021).

Scenario-based learning activities have been essential for school leadership preparation programs, particularly in the United States (US) (Anderson et al., 2018; Dexter et al., 2022). Simulations enable the active engagement of participants in such learning activities, in or outside of the classroom environment, allowing them to apply theoretical knowledge to practical challenges (Dexter et al., 2020; Errington, 2011). Despite the long history of using educational simulations in leadership preparation and the growing trend of online learning and digitalization, digital simulations (computer, web, or

video-based) have not been used widely in educational leadership programs (Dexter et al., 2020; Hallinger et al., 2025).

Against this backdrop, this research describes the development of a practical, interactive classroom observation simulation using one of the common e-learning platforms, Articulate, and qualitatively reports its pilot implementation for the professional development of aspiring and practicing school leaders in the US.

Literature Review

Effective Professional Development for Classroom Observation

There has been increasing research evidence supporting the effectiveness of various professional development activities in equipping school leaders with the essential knowledge and skills necessary to accomplish their demanding tasks (Aas & Blom, 2018; Gümüş & Bellibaş, 2016; Hayes, 2019). Therefore, providing more professional development opportunities to both pre-service and in-service school leaders has become crucial for many educational systems around the world (Brauckmann et al., 2023; Lazenby et al., 2022; Rowland, 2017).

School leaders must possess specific knowledge and skills to fulfill their classroom observation role. In addition to evaluating the alignment of various classroom activities with standards, they should communicate effectively with teachers and provide feedback to ensure teachers' professional growth and high-quality teaching and learning in their schools (DiPaola & Wagner, 2018). Therefore, there has been a pressing need to develop the capacity of school leaders to conduct effective classroom observations (Garza et al., 2016).

Professional development programs for school leaders can play a significant role in addressing this need and fostering instruction-focused conversations between teachers and school leaders (McBrayer & Rahimi, 2023). However, recent research has shown that in the US context, most states do not have well-developed, research-driven policies aimed at in-service principal training (Davis et al., 2020). Some training programs offered in partnership among school districts, universities, and educational boards could be effective (Darling-Hammond et al., 2022). However, not all school leaders can access such continuous, high-quality on-the-job training (Rowland, 2017).

Moreover, existing professional development programs are often highly theoretical and detached from daily practices and challenges (Rowland, 2017; White, 2020). Kolb (1984) emphasized that the learning process could be enhanced when learners immerse themselves in practical, real-world experiences. The author proposed an experiential learning model that places individuals' objective and subjective experiences at the core of the learning process. Experiential learning implies that knowledge and skills acquisition stem from learners' active engagement with practical, hands-on situations (Kolb, 2015). Professional development activities should provide experiential learning opportunities and other forms of support, such as mentoring, coaching, and timely feedback (Levin et al., 2020). For classroom observation, in particular, practice opportunities regarding the pre-observation process, collecting and using data through observation, and fostering instruction-focused post-observation conversations are crucial (Zepeda, 2013). Professional development programs providing such opportunities are more likely to enhance leaders' capacity and create a long-term impact.

Through technology-enhanced professional development opportunities, school leaders can leverage various options to enhance their knowledge, skills, and collaboration with a more flexible arrangement (Carpenter & Munshower, 2019; O'Dowd & Dooly, 2022). Accordingly, virtual classroom observation has been used as a technology-enhanced strategy to facilitate the classroom observation process, particularly during the COVID-19 pandemic. It also serves as a means of improving the observation skills and overall development of school leaders and teacher candidates while engaging them in experiential learning opportunities (Andrew et al., 2021; Lynch et al., 2021; Mehta, 2023). For example, the Practitioner-Based Mentor-Teacher Candidate Model utilizes virtual classroom observations to conduct evaluations that offer both teacher and leader candidates genuine and thoughtful feedback (McBrayer & Rahimi, 2023). Such models emphasize the importance of viewing classroom observations as an ongoing process.

Digital Simulations for School Leaders' Development

Various disciplines like medicine, the military, and aviation enjoy using digital simulations for different purposes, including personnel training. For example, in healthcare, simulations allow medical professionals to immerse themselves in real-world scenarios for training their clinical skills, critical thinking, and decision-making abilities, as well as preparing to serve in leadership roles in an interactive, feedback-rich environment without endangering patient safety (Koivisto, 2020). Similarly, simulations help avoid risks associated with live training while offering authentic opportunities for learners to train and improve military skills (Kubola et al., 2024). The training of employees in aviation also benefits from the utilization of simulations, as it can substantially increase flight safety (Ziakkas et al.,

2023). Along with providing realistic, hands-on opportunities, it is agreed across various fields that digital simulations enhance the availability and accessibility of training, thus expanding opportunities for continuous professional development (Dantas et al., 2023; Källström et al., 2022).

Although authentic experiences, skills development, and training accessibility demonstrate great potential for digital simulations to be utilized for school leadership preparation and development, their usage in educational leadership development programs is relatively new (Hallinger & Wang, 2020; White, 2020). A limited amount of studies, primarily conducted in the US context and mainly engaging graduate students as subjects, have provided evidence that this type of experiential learning could foster the development of critical leadership skills, such as effective decision-making, strategic thinking, collaboration, and result in higher self-efficacy and self-confidence of the school leaders (Gilbert, 2017; Gilbert et al., 2018; Hallinger et al., 2017; Volante et al., 2020; Walker et al., 2024). In addition, few researchers have argued that participation in a learning simulation contributed to the development of school leadership capacities, enriching their understanding of effective strategies of change implementation and improving their overall perceptions of school innovations (Hallinger & Kantamara, 2001; Nguyen et al., 2024; Strycker, 2016). Digital simulations can also aid aspiring leaders in transitioning from their roles as teachers to their new roles as educational leaders. In their inquiry, Piro and O'Callaghan (2021) suggested that assuming leadership roles via the simulations could facilitate the future transition to school leader positions.

Digital simulations also offer substantial potential for professional development in the context of classroom observations, although the evidence of their utilization is limited to a few studies. Research by Militello et al. (2021) exploring educational leaders' experiences with a virtual reality platform affirmed that innovative methods, such as immersive virtual reality experiences, can be important milestones in enhancing school leaders' classroom observation skills. Another recent study by Ceballos and Bixler (2024) delved into school leaders' experiences with a mixed-reality simulation. While mainly focusing on developing leaders' post-observation feedback skills, the study inferred that simulations prove beneficial for cultivating leaders' instructional conversation capacities.

Overall, digital simulations' potential for enhancing leadership preparation programs, especially those aimed at developing classroom observation skills, holds significant promise. By promoting the adoption of observations and meaningful conversations, such technologies could facilitate a shift from mere evaluation to a more comprehensive approach to improving teacher practice. In a simulated environment, school leaders can explore various scenarios and practice relevant skills (DeJong & Grundmeyer, 2018).

Development of LeadWise

Theoretical Underpinnings of the Design Process

Developing interactive digital learning experiences requires designers to bring together theories, practices, and experiences from multiple disciplines (Akcaoglu, 2014; Akcaoglu et al., 2023), including knowledge of content/skill domains, digital tools, and design processes and principles. The training tool used in this research is an interactive simulation developed by the first two authors of this paper;

one is an expert on educational technology with a particular focus on digital learning tools (Akcaoglu, 2016; Akcaoglu et al., 2022), and the other is an educational leadership scholar with particular expertise on instructional leadership (Cansoy et al., 2024; Gümüş & Akcaoglu, 2013; Gümüş et al., 2021).

To create an e-learning experience for classroom observation, we first identified key elements from the related literature. Benefitting from the extant literature (Danielson, 2007; Glickman et al., 2001; Marshall, 2012; Zepeda, 2013), the designed simulation emphasized the various steps in conducting classroom observations, including planning, observing, analyzing, providing feedback, and reflecting. During the development process, the effectiveness and limitations of scenario-based learning were considered within the capabilities of the software utilization, ensuring a balanced approach to the simulation's implementation (Errington, 2011).

Software and User Interface Design

Articulate, an e-learning platform, was used to create an engaging and interactive online learning experience for this project. Articulate has a user-friendly interface, offering an intuitive design that allows quick learning and adaptation, even for those without extensive technical expertise. It could also be used in various devices, including tablets and smartphones, ensuring accessibility for a diverse audience. Additionally, the platform's customization capabilities, including the creation of custom interactions, assessments, and feedback, align with the needs of the research.

The platform allows for linear stories, which can be likened to guided tours with interactivity built in. Throughout their experience, the

learners engage with a set of questions and receive feedback based on their responses. The process follows a linear path, meaning that the participants' responses do not change the content of the subsequent questions. To take full advantage of this, a story was developed to be the basis of each simulation scenario, aligned with learning goals and objectives. First, different teacher profiles were created (two examples are provided below in Figure 1), and an option for selecting a teacher to continue classroom observation was added. Some hints for each teacher were also provided before starting the observation (Figure 2). At this stage, learners were expected to collect some background information about the teachers and, based on that, make an informed decision on which teacher's practice they would engage with for an observation.

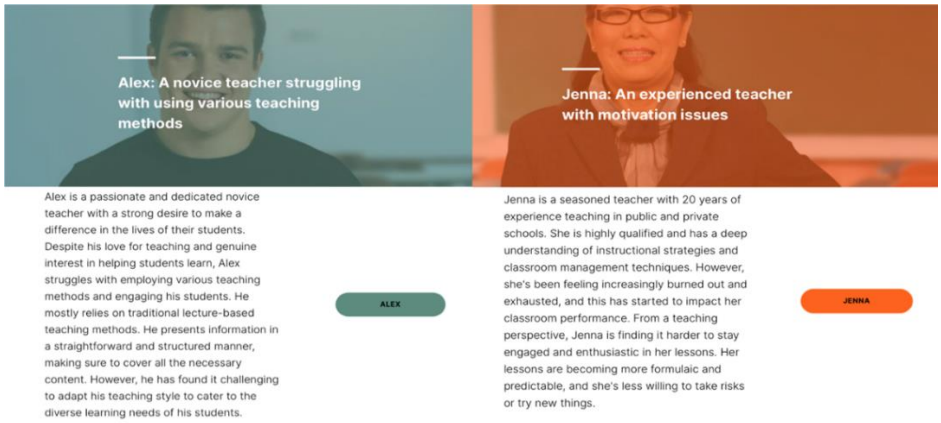

Figure 1. *Examples of Teacher Profiles*

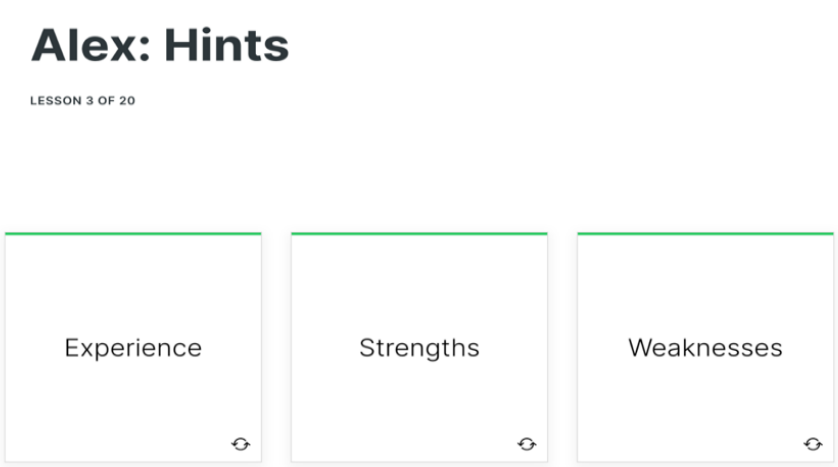

Figure 2. *Hints before Starting the Observation Process*

Due to the linear flow afforded by Articulate, we considered creating our story in the "teach then practice" format. Therefore, based on our objectives, we identified key terms and/or content and introduced them at the beginning of each step (Figure 3). During this "teaching" stage, learners could acquire foundational knowledge about each step of classroom observation (pre-observation conference, observation, post-observation feedback) and enhance their understanding of the process.

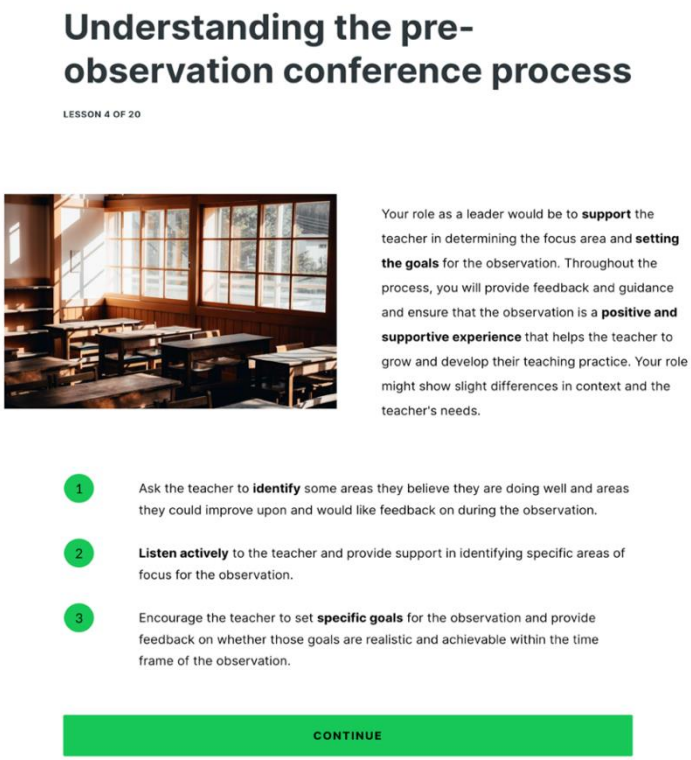

Figure 3. *Teaching the Basics*

Following the teaching phase, we provided a personal, interactive experience in each scenario, where the users needed to make some decisions based on their previous learning to solve a problem. For example, in our pre-conference scenario, users go through the steps to determine the best practices and the decision-making process, from the easiest to the more complex ones. We used interactivity to add engagement through immediate visual feedback (Figure 4).

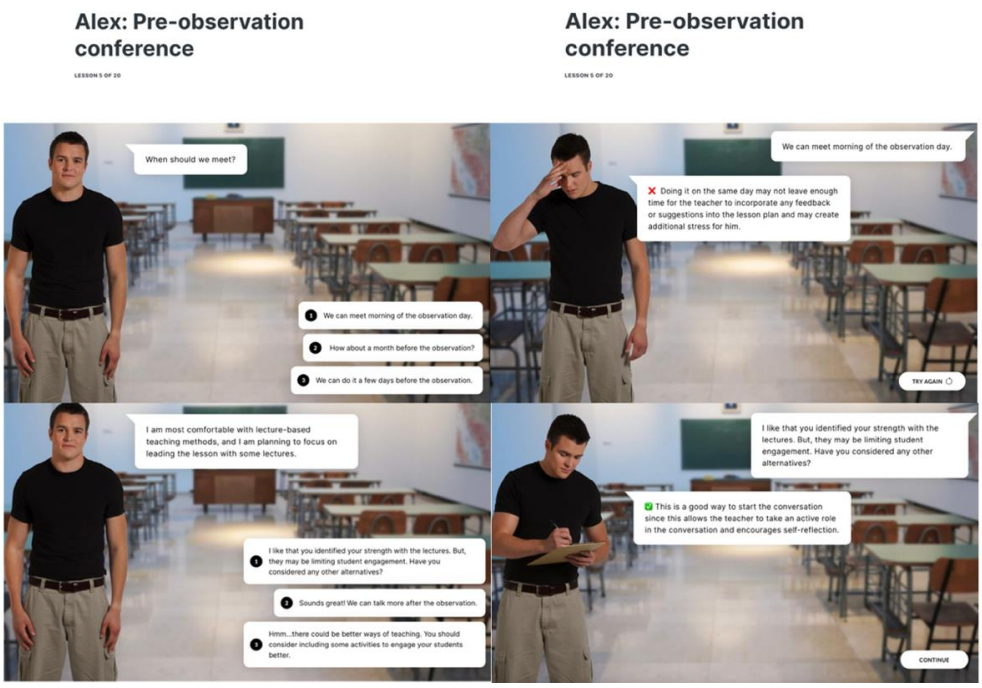

Figure 4. *Illustrations of Immediate Feedback*

Table 1 below summarizes the learning and cognitive activities that learners would engage in at each phase of their preparation experience with the simulation.

Table 1.
Learning and Cognitive Activities Prompted by LeadWise

#	Phase	Learning activity	Cognitive activity
1	Selecting scenario	1. Reviewing teacher profiles; 2. Gathering background information; 3. Selecting a teacher for observation.	1. Information gathering; 2. Decision-making.
2	Teaching the basics	1. Reading about the key terms and concepts.	1. Knowledge acquisition; 2. Comprehension development.
3	Practice and feedback	1. Answering multiple-choice questions; 2. Reflecting/revising based on feedback.	1. Decision-making; 2. Problem-solving; 3. Practical application.

Investigating the Effectiveness of LeadWise: Pilot Study

To ensure continuous improvement of the developed simulation, we piloted it and gathered feedback via qualitative data involving open-ended survey questions to gauge participants' experiences and perceptions and evaluate its technical performance and usability. Qualitative open-ended surveys invite participants to answer a range

of questions about a specific topic using their own words (Braun et al., 2021). Since the study aimed at collecting only a brief amount of data from each participant, it was deemed appropriate to use an open-ended survey instead of an interview design. Another reason for selecting this method over interviews was the narrow focus of the data collection, which required gathering only participants' feedback on the simulation (Braun et al., 2021). Using this study design allowed for the collection of rigorous and subject-focused data that aligned with the purposes and scope of the study.

Participants and Implementation

Students in an educational leadership master's program at a state university in Georgia, US, were invited to participate in the pilot study. A diverse group of aspiring and practicing K-12 school leaders (n=23) participated. Among all participants, nine were aspiring leaders (experienced teachers), and 14 were practicing school leaders (principals and vice principals) with various levels of leadership experience. This purposive sampling strategy ensures the inclusion of a diverse group of participants with varied experiences and backgrounds, aligning with the study's objective to receive comprehensive feedback for future improvement (Creswell & Creswell, 2017). The distribution of the participants' teaching experience, role, and location is shown in Table 2 below. The sampling technique was also supplemented by the convenience sampling strategy (Creswell & Creswell, 2017), indicating that the researchers recruited participants who were easily accessible through their professional networks.

Table 2.

Participant Demographics

Participant no.	Participant category	Experience level	Location
Participant 1	Aspiring leader	Practicing teacher (4-20 years)	Urban
Participant 2	Aspiring leader	Practicing teacher (4-20 years)	Suburban
Participant 3	Aspiring leader	Practicing teacher (4-20 years)	Suburban
Participant 4	Aspiring leader	Practicing teacher (4-20 years)	Suburban
Participant 5	Aspiring leader	Practicing teacher (4-20 years)	Suburban
Participant 6	Aspiring leader	Practicing teacher (4-20 years)	Suburban
Participant 7	Aspiring leader	Practicing teacher (4-20 years)	Suburban
Participant 8	Aspiring leader	Practicing teacher (4-20 years)	Rural
Participant 9	Aspiring leader	Practicing teacher (4-20 years)	Rural
Participant 10	Practicing leader	New to leadership (0-3 years)	Urban
Participant 11	Practicing leader	Novice leadership (4-20 years)	Urban
Participant 12	Practicing leader	New to leadership (0-3 years)	Suburban
Participant 13	Practicing leader	New to leadership (0-3 years)	Suburban

Participant 14	Practicing leader	New to leadership (0-3 years)	Suburban
Participant 15	Practicing leader	New to leadership (0-3 years)	Suburban
Participant 16	Practicing leader	Novice leadership (4-20 years)	Suburban
Participant 17	Practicing leader	Novice leadership (4-20 years)	Suburban
Participant 18	Practicing leader	Novice leadership (4-20 years)	Suburban
Participant 19	Practicing leader	Novice leadership (4-20 years)	Suburban
Participant 20	Practicing leader	Novice leadership (4-20 years)	Rural
Participant 21	Practicing leader	Veteran leadership (20+ years)	Rural
Participant 22	Practicing leader	Veteran leadership (20+ years)	Rural
Participant 23	Practicing leader	Novice leadership (4-20 years)	Virtual

Before engaging in any research activities, the participants were provided with detailed information about the study and asked to sign the consent forms. They were also assured that their confidentiality and anonymity would be protected, and that no personal information would be disclosed at any research stage. Afterward, the participants were provided access to the developed simulation, guiding them through a scenario related to classroom observation. Facilitation and support were offered throughout the implementation, ensuring participants' understanding and engagement with the simulated tasks.

Instruments and Data Collection

At the end of the simulation, participants were asked to fill out an online survey using a Google Form. The survey included open-ended items to capture insights into participants' experiences, perceptions, and suggestions for improvement. Specifically, the participants provided feedback for the following questions:

- Can you provide any feedback about the usefulness of this training to better prepare you as a current or aspiring school leader?
- From a content standpoint, what resonated with you, and/or what would you suggest we do for improvement?
- From an interactive and design standpoint, what resonated with you, and/or what would you suggest we do for improvement?
- What topics would you suggest for additional training opportunities beyond this one?
- Would any of the topics provided by edWeek be of interest to you to engage in a virtual training like this one? edWeek Link: https://www.edweek.org/teaching-learning/opinion-11-critical-issues-facing-educators-in-2023/2022/12

The first three authors designed the survey collaboratively, drawing on their expertise in educational leadership and educational technology. The third author also had extensive teaching and school leadership experience in the US context. A review of previous studies was also conducted.

Data Analysis

The surveys gathered through Google Forms were exported as a CSV file for analysis. Then, the survey data were analyzed using a thematic

analysis approach (Braun & Clarke, 2006). To minimize researcher bias, the researchers performed the data coding collaboratively (Saldaña, 2015). Two authors completed the coding independently and then met to discuss their codes and reach an agreement. The remaining two authors were also informed of the process, and a Zoom meeting was conducted to decide on a few cases jointly.

After the coding phase was completed, similar codes were placed under broader categories, which were further classified into key themes (Maxwell, 2013). Four key themes emerged as a result of the analysis, and each of them was discussed and interpreted in the context of the study's objectives. Table 3 below demonstrates the coding process using the example of one of the themes. The insights gained from the analysis helped the researchers understand the participants' experiences and contributed to the broader understanding of the effectiveness of the simulation (Merriam & Tisdell, 2015).

Table 3
Example of the Coding Process

Participant's response	Code	Category	Theme
"I think the specific questioning and feedback options presented in the pre- and post-observation were helpful." (Participant 14)	Usefulness of feedback in pre- and post-observation	Usefulness of feedback skills	
"I enjoyed the multiple-choice feedback if an incorrect answer was selected." (Participant 12)	Usefulness of multiple-choice feedback in the simulation		

"I enjoyed that the experience required me to consistently engage and make decisions. It was not a passive experience." (Participant 16)	Consistent engagement with the simulation	Conversational nature of simulation	Appreciation of feedback opportunities and interactivity
"I enjoyed the prompts and how it was set up like we were having a conversation" (Participant 7)	Interactive nature of the training		
"Something that is important is understanding how to give balanced feedback. Oftentimes, leaders can be just punitive or just positive." (Participant 3)	Learning to provide balanced feedback	Willingness to further develop feedback skills	
"How to provide constructive feedback from observations. For example, giving ideas for improvement" (Participant 6)	Learning to provide constructive feedback		

Findings

Setting Directions

Based on the data analysis, four major themes were identified: perspectives on the format of the training, appreciation of feedback opportunities and interactivity, and the role of practice in expertise development. Table 4 summarizes the key findings for each theme.

Table 4.
Summary of Key Findings

Themes	Key findings
Perspectives on the format of the training	1. Benefitting from scenario-based professional development format 2. Opportunity for continuous professional development 3. The need to enhance content and interface
Appreciation of feedback opportunities and interactivity	1. Usefulness of feedback 2. Conversational nature of simulation 3. Willingness to further develop feedback skills
Role of practice in expertise development	1. Appreciating real-world experiences 2. Relevance to current work practices 3. Further training on conducting observations and other topics

Perspectives on the Format of the Training

The major finding from the participants' responses was valuing scenario-based learning as a professional development opportunity. This was mentioned by 10 participants, mostly by aspiring and less experienced practicing school leaders. The participants advocated for the significance of training opportunities and emphasized the value of simulations and coaching. One of the school leaders mentioned, "I loved this simulation! It felt very real, and the responses from the teacher seemed very reasonable" (Participant 12), reflecting the common sentiment of enjoying the format among the participants.

The participants also emphasized the value of the simulation program for continuous training opportunities, which are vital for school leaders. One of the participants indicated, "It [training] is a good way to be reminded of best practices and can help a new teacher or new leader to understand the observation process" (Participant 11).

Although most of the participants expressed that they enjoyed this format of training and perceived the design as easy to navigate, they also emphasized the importance of ongoing refinement and enhancement of learning materials. This was mentioned by seven participants, including both aspiring and practicing leaders. For instance, one of the participants stated, "I would say add more detail about the process and simulations. For example, provide actual videos of what is happening in a classroom and ask, "What did you notice?" (Participant 5). In this excerpt, the participant suggested offering more explanations for the simulations and proposed using videos as supporting materials. Among other suggestions for content enhancement, the participants highlighted providing complete examples, offering opportunities for written feedback, ensuring the accuracy of the content, and improving the program interface.

Appreciation of Feedback Opportunities and Interactivity

Another significant finding that emerged from participants' responses was the appreciation for immediate feedback opportunities and the interactivity provided by the training program. Sixteen out of 23 school leaders, particularly the aspiring and less experienced practicing leaders, found the opportunity to receive immediate feedback on their training experience very helpful. For instance, one of the participants stated, "I enjoyed the multiple-choice feedback if an incorrect answer was selected. It allowed for me to reflect on why I was wrong, rather

than just letting me guess again" (Participant 12). As the participant explained, the feedback was necessary for their further understanding of and reflection on the content of the simulation program.

Participants also emphasized that they particularly enjoyed the interactive nature and conversational mode of the design, allowing them to engage as active learners and interact with the content. As one of the participants mentioned, "I enjoyed that the experience required me to consistently engage and make decisions. It was not a passive experience. The speaking bubble sometimes represented the teacher's words. Other times, it was the system/directions" (Participant 16).

In addition, three participants, two of which were aspiring leaders, expressed their interest in receiving further training focused explicitly on feedback skills. For example, when asked about the topics for additional training, one of the participants responded, "Something that is important is understanding how to give balanced feedback. Oftentimes, leaders can be just punitive or just positive. Neither really supports the growth of an employee" (Participant 3). This further illustrates the value that the participants placed on the development of their feedback-giving capacity as well as their understanding of the importance of providing constructive feedback.

Role of Practice in Expertise Development

The analysis demonstrated that the participants appreciated that the content of the training was relevant, and the materials and mode of learning provided real-world experiences. The practical usefulness of the training was highlighted by 10 out of 23 participants and was relevant for school leaders at all experience levels, although aspiring and novice practicing leaders mentioned it more frequently. The

participants appreciated the variety of options and scenarios reflecting real-world experiences, viewing them as valuable opportunities for practice. One of the participants responded, "I love how the training provided different scenarios we might encounter and how to effectively respond" (Participant 5). The leaders were primarily elaborating on how the examples in the simulation were well-aligned with their leadership practices. One of the participants mentioned, "Different teacher profiles allowed for me to think about a current teacher I am mentoring and help me reflect on how I am currently doing while providing suggestions for the future" (Participant 12), indicating that the materials provided resonated with their current work experiences.

The participants' appreciation of practice opportunities for their expertise development was further reinforced by their willingness to participate in further training. Seven participants, five of which were aspiring leaders, suggested topics that would elaborate more on various aspects of conducting classroom observations, such as taking notes, engaging in paired observations with other leaders, evaluating observations, and giving constructive feedback. As one participant noted, "I would be interested in seeing more about the next steps. Now that we've seen this and discussed what the classroom observation looks like, how are we giving feedback? What does that look like?" (Participant 23).

The next finding that emerged from the analysis is the suggestion for arranging a training program on communication (written and oral) with other school stakeholders. This was mentioned by five participants, most of whom were aspiring and less experienced practicing leaders. To illustrate, two of them mentioned "parent

communication/conferencing from a leadership standpoint" (Participant 12) and "addressing crucial conversations, addressing challenges with staff" (Participant 13) as the topics to consider for further training.

Participants also reviewed a list of topics on EducationWeek titled "11 Critical Issues Facing Educators in 2023" and selected the ones they would like to receive more professional development on. The topic that attracted the most interest was social-emotional learning, selected by a total of seven participants. A closer inspection of the data revealed that the interest in social-emotional learning among educators existed across different experience levels. The following most selected topics were de-implementation, teacher shortage, and poverty.

Overall, the findings suggest that both aspiring and practicing school leaders value training that enhances their skills and knowledge. While both groups benefited from simulation-based training and appreciated feedback opportunities and practical learning experiences, aspiring and less experienced practicing school leaders more frequently highlighted the value of those activities for their learning. The findings also indicated that school leaders placed strong emphasis on the continuous enhancement of the learning materials and ensuring the quality and consistency of the program. Understanding the specific needs of school leaders with various experience levels can inform the design and delivery of professional development initiatives tailored to each group's specific needs and preferences.

Discussion and Conclusions

In this paper, we investigated the application of an interactive web-based simulation to improve classroom observation skills among school leaders. The context for this investigation arises from the recognition that school leaders play an indispensable role in enhancing educational outcomes by guiding teachers to employ effective instructional strategies. Classroom observations, as highlighted by Marshall (2012) and Danielson (2007), are essential for this purpose, offering a vital window into the classroom environment and opportunities for professional growth.

The findings of the study indicated that the participants benefited from the scenario-based format and agreed that this type of training can be used for the continuous professional development of school leaders. This finding suggests that scenario-based format, and educational simulations in particular, can be applied to enhance the quality of the current professional development programs for school leaders. This aligns with previous research findings, which stress the effectiveness of simulation-based learning for school leaders' critical skills development and for improving their leadership practices (Gilbert, 2017; Gilbert et al., 2018; Hallinger & Kantamara, 2001; Hallinger et al., 2017; Nguyen et al., 2024; Piro & O'Callaghan, 2021; Strycker, 2016; Volante et al., 2020; Walker et al., 2024). However, unlike other studies mainly recruiting aspiring leaders as participants, our study demonstrated that this training format could also be advantageous for practicing school leaders by offering them necessary on-the-job, real-time professional development.

The study also found that practice opportunities, an interactive environment, and the availability of feedback are crucial for school leaders' professional development, which was demonstrated by the participants' shared recognition and appreciation of those features. This finding reaffirms the relevance of experiential learning strategies (Kolb, 1984) and underscores the need to revise the outdated pedagogies of leadership professional development programs to provide more practical application experiences for learners (Dexter et al., 2022; Rowland, 2017). This finding also resonates with the literature on effective leadership development programs, highlighting the importance of providing opportunities for practice, reflection, and constructive feedback (Ayers et al., 2020; Ralph, 2015).

Such innovative learning methods, particularly the use of scenarios enabling school leaders to bridge theory and practice, simulate real-world situations, and experiment with feedback strategies, can be particularly helpful for training school leaders to conduct observations. The findings of the current study imply that digital simulations are capable of providing learners with necessary practical experiences and an interactive environment, which enables them to accumulate their classroom observation skills. These findings contribute to the limited research evidence regarding the use of digital simulations for preparing school leaders to conduct classroom observations and further strengthen the case for simulation-based training and its value in developing observation skills (Ceballos & Bixler, 2024; Militello et al., 2021). The findings also revealed distinct patterns in the perceptions and preferences of aspiring, novice and more experienced leaders, which aligns with previous research on the diverse needs of educators at different career stages (Brennan, 2017). As aspiring and some of the practicing leaders in this study had very

little experience in leadership, they might have appreciated the simulation as a tool to assist with their transition to leadership roles, as discussed in Piro and O'Callaghan (2021). This finding also aligns with the notion that effective professional development for educators should bridge the gap between theory and classroom practice (Darling-Hammond et al., 2017).

The diverse perspectives of school leaders with varying leadership experiences underscore the importance of tailoring professional development programs to cater to the specific needs and preferences of each group. Personalized learning approaches have been shown to enhance engagement, motivation, and learning outcomes (Pane et al., 2015), suggesting that customized training experiences could be more effective in fostering professional growth. Simulations or e-learning are highly adaptable and open to personalization. Our findings indicate the value of our approach for leader professional learning. We should also note that given the user-friendly interface of the interactive e-learning platforms, our study can point to potential training tools for school leaders. Higher education faculty and/or district professional development leaders can create similar experiences on different topics with ease (after a quick training), without the need for a technology expert.

Nevertheless, the simplicity of development should not lead to a compromise in the quality of the training program. Most participants' responses in the current study aligned regarding the need for content improvement and simulation design enhancement, highlighting the importance of enhancing learning materials, ensuring content quality and consistency, and improving the program's interface. Indeed, the researchers suggest that the quality of the simulation and the quality

of the learning it offers are fundamental if simulations are to become an essential component in leadership training programs (Mann et al., 2011). Also, when properly designed, simulations can transform leaders' attitudes to change and encourage them to introduce innovations in schools (Gilbert, 2017). Therefore, it is crucial that the developers of the simulation collaborate with educators and researchers and adopt a comprehensive approach when designing the software, taking into consideration both the content of the program and the quality of the software interface. These findings also reinforce the significance of the collection of feedback and analytics, enabling efficient updates and improvements to the professional development content and delivery.

The important role of practice in leaders' expertise development is further reinforced by their keen interest in further training. Their suggestions for additional simulation topics focused on additional training in classroom observations, professional development in communication strategies with school stakeholders, and social-emotional learning. These findings align with the literature underscoring the importance of effective observation practices (Danielson, 2007; Garza et al., 2016), and communication strategies for educators (Grissom & Condon, 2021), as well as the benefits of social-emotional learning for student outcomes and school climate (Durlak et al., 2022). Incorporating these topics into future professional development programs could enhance their practical relevance and better prepare educational leaders for the multifaceted challenges they face. Simulations and scenario-based e-learning experiences can effectively address these specific training needs through interactive and immersive scenarios.

Limitations and Suggestions for Future Research

While the findings of this study provide valuable insights, certain limitations should be acknowledged. The sample size and geographical constraints may limit the generalizability of the results. Additionally, potential biases in self-reported data should be considered. Future research could conduct longitudinal studies to evaluate the long-term impact of tailored simulation-based professional development programs for school leaders on educator effectiveness, school improvement, and student outcomes.

Conclusions

Our study provides preliminary evidence of the effectiveness of the simulation while also offering several areas for improvement. We hope to further develop our simulation training based on the data and contribute to the broader discourse on the integration of innovative tools like simulation-based training in educational leadership. We also aspire to offer insights into how simulation-based training can enhance the instructional supervision skills of school leaders, contributing to the ongoing improvement of educational leadership practices.

In conclusion, this study highlights the importance of considering the diverse perspectives and needs of aspiring and practicing school leaders in the design and implementation of professional development initiatives. By tailoring content and delivery methods to cater to the specific preferences and priorities of each group, professional learning opportunities can be more effective in fostering growth, enhancing skills, and ultimately improving educational outcomes.

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