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Advancing Instructional Leadership: Instructional Coaching Skills Development Through Mixed Reality Experiences

Marjorie Ceballos
University of Central Florida, marjorie.ceballos@ucf.edu

Krista Bixler
Florida Gulf Coast University, kbixler@fgcu.edu

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Marjorie Ceballos[1] and Krista Bixler[2]

Abstract

Educational leadership preparation programs are tasked with advancing the development of future educational leaders' instructional capacities, including the ability to engage teachers in instructional conversations through instructional coaching. The educational leadership program studied here includes a mixed reality experience designed to develop future educational leaders' instructional coaching conversation skills. Therefore, the purpose of this research study was to examine future educational leaders' perceptions of the development of instructional coaching conversation skills because of participation in the mixed reality experience. Findings indicated that, overall, participants held positive views of the mixed reality experience in supporting their development of instructional coaching conversation skills. Additionally, participants indicated development of other skills including, on-the-spot thinking, confidence, and reflection, among other skills. Results suggest that mixed reality experiences provide authentic, realistic learning opportunities to develop instructional leadership capacities.

Keywords

instructional coaching; instructional leadership; leadership curriculum; teacher supervision; simulations; supervision

[1] University of Central Florida
[2] Florida Gulf Coast University

Corresponding Author:
Marjorie Ceballos (Department of Educational Leadership and Higher Education, College of Community Innovation and Education, University of Central Florida, P.O. Box 161250, Orlando, FL 32816, USA)

email: marjorie.ceballos@ucf.edu

Introduction

Instructional leadership is recognized as the most impactful leadership orientation influencing student academic outcomes as school leaders collaborate with teachers on instruction (Hattie, 2009; Robinson et al., 2008). Effective instructional leaders must be able to engage with teachers on instructional practice through evaluation and coaching feedback (Grissom et al., 2021). To develop instructional leadership capacities, future educational leaders need realistic practice and active learning of those features. Instructional approaches like simulation exercises, role-playing exercises, and mixed reality experiences are used in educational leadership preparation programs to provide active, realistic learning experiences grounded in the day-to-day instructional leadership practices of future educational leaders (Ceballos et al., 2020; Darling-Hammond et al., 2022; Mann et al., 2011; Tucker & Dexter, 2011).

In the educational leadership preparation program where this study was completed, a mixed reality experience (MRE) is an instructional approach used to provide students with realistic practice in providing a teacher with instructional coaching feedback in a post-observation conference. In an MRE, technology is blended with improvisational interactors to provide authentic, active experiences (Dieker et al., 2008; Dieker et al., 2012; Hughes, 2014). In the post-observation conference MRE, students practice giving feedback to an onscreen teacher avatar played by an improvisational actor who interacts with each student in real-time in the role of a teacher receiving instructional feedback from a school administrator. Throughout the MRE, the onscreen teacher avatar responds to the instructional feedback provided by the student by asking clarifying questions, soliciting guidance on next steps, or by being resistant to the feedback. MREs may provide future educational leaders with an authentic learning experience that develops their capacity to implement teacher supervisory practices informed by instructional coaching. We refer to this teacher supervisory practice as instructional coaching conversation skills.

The purpose of this research study was to examine educational leadership students' perceptions of the development of instructional coaching conversation skills following participation in an MRE. This research study was guided by three research questions: (1) what are students' perceptions of instructional coaching skills development due to mixed reality participation and feedback? (2) what are the differences, if any, in student perceptions of instructional coaching conversation skills development based on professional characteristics? and (3) what are the themes related to students' perceptions of instructional coaching conversation skills development? We begin with a review of the literature on teacher supervision preparation and instructional coaching, followed by a discussion on powerful learning experiences, simulations as an instructional approach in educational leadership preparation, and conclude with a description of the mixed reality experience that was the data source for this study.

Literature Review

The research supports the importance of instructional leadership in successful school leadership (Leithwood et al., 2004; Leithwood et al., 2020) and in impacting student academic outcomes (Hattie, 2009; Robinson et al., 2008). Teacher supervision with a focus on instructional growth, knowing how to assess instruction, and honing communication skills to address instructional

needs are salient dimensions of instructional leaders (Taylor Backor & Gordon, 2015). Thus, teacher supervision and instructional coaching warrant deep development in educational leadership preparation programs. Without adequate development, educational leaders with teacher supervision responsibilities may not be able to discharge them in a way that leads to teacher growth and development (Antonio, 2019). To be effective teacher supervisors, educational leaders must possess teacher supervision skills, including knowledge of instruction, data collection procedures and tools, provision of feedback, and conversational skills that engage teachers in discussions on strengths and opportunities for growth (Ovando, 2005). Development of these skills has occurred through methods such as field-based experiences (Ovando, 2005) or through collaborations that allowed for realistic practice (Jones & Ringler, 2020).

In addition to overall teacher supervision development, there has been an increased focus on the supervisory practice of instructional coaching as a collaborative, differentiated approach for instructional growth (Knight, 2019), similar to developmental teacher supervision (Glickman et al., 2024). Through this approach, individuals providing instructional coaching differentiate their coaching approach based on teacher context; collaborate with teachers on instructional improvements; support teachers in understanding strengths and opportunities for growth through various forms of data; identify goals for instructional improvements; provide expertise on instructional strategies; and support teachers throughout the growth process until goals are achieved (Knight, 2019; Taylor & Chanter, 2019). Solution-focused supervision, as described by Stark and colleagues (2017), builds on this description of instructional coaching by empowering the teacher to be the problem solver, while the educational leader facilitates problem solving through a structured, reflective process.

Instructional Coaching Conversation Skills

To foster teachers' instructional growth and empowerment, instructional coaching conversation skills are necessary skillset for future school leaders to develop as evidenced by the literature (Glickman et al., 2024; Jones & Ringler, 2020; McGhee & Stark, 2021; Knight, 2019; Nolan & Hoover, 2011; Ovando, 2005; Taylor & Chanter, 2019; Taylor Backor & Gordon, 2015). Facilitating instructional coaching conversations that spur teacher growth, particularly in a post-observation conference setting, requires future educational leaders to be able to build and maintain relationships, structure the instructional conversation, offer evidence-based feedback, collaborate with teachers, identify next steps for instructional growth, and engage in self-reflection (Nolan & Hoover, 2011; Taylor & Chanter, 2019). In the present study, we use the term *instructional coaching conversations skills* to refer to 10 distinct teacher conferencing skills (Table 1) drawn primarily from Nolan and Hoover (2011) and Taylor and Chanter (2019), the course texts used to prepare future educational leaders for the MRE and further supported by the reviewed literature. The *instructional coaching conversation skills* include: rapport, set focus, transitioning, inquiry, accuracy checks, and summarizing (Nolan & Hoover, 2011) and data and evidence for teaching and learning, data and evidence for instructional decisions, next steps, and reflection (Taylor & Chanter, 2019). Table 1 presents the 10 instructional coaching conversation skills, definitions of the skills as defined by Nolan and Hoover (2011, pp. 43-44) and Taylor and Chanter (2019, pp. 50-51) and supporting literature for the skills.

Table 1. *Instructional Coaching Conversation Skills*

Skill	Definition	Supporting Literature
Rapport	Having a welcoming disposition and positive body language	DeJong & Grundmeyer, 2018; Jones & Ringler, 2020; Nolan & Hoover, 2011; Taylor & Chanter, 2019
Set Focus	Setting the focus for the post-observation conference to uncover teacher processes, needs, and concerns	Nolan & Hoover, 2011; Knight, 2019; Taylor & Chanter, 2019
Transitioning	Using structuring to transition from the beginning, to the middle, and to the end of the post-observation conference	Nolan & Hoover, 2011; Taylor & Chanter, 2019
Inquiry	Using open-ended questions and requesting additional information	Nolan & Hoover, 2011; Knight, 2019; Taylor & Chanter, 2019; Stark et al., 2017
Accuracy Checks	Confirming understanding of points discussed and demonstrating support, respect, and empathy for the teacher	Jones & Ringler, 2020; Nolan & Hoover, 2011; Taylor & Chanter, 2019
Summarizing	Summarizing for shared understanding and accurate capture of ideas	Jones & Ringler, 2020; Nolan & Hoover, 2011; Knight, 2019; Taylor & Chanter, 2019
Data & Evidence for Teaching & Learning	Using data and evidence from the observation to analyze the relationship between instruction and student learning with the teacher	Nolan & Hoover, 2011; Knight, 2019; Taylor & Chanter, 2019; Stark et al., 2017
Data & Evidence for Instructional Decisions	Using data and evidence from the observation to make evidence-based instructional decisions with the teacher	Jones & Ringler, 2020; Nolan & Hoover, 2011; Knight, 2019; Taylor & Chanter, 2019; Stark et al., 2017
Next Steps	Generating next steps for instructional improvements following the conference and setting the focus of the next observation	Nolan & Hoover, 2011; Knight, 2019; Taylor & Chanter, 2019; Stark et al., 2017
Reflection	Self-reflecting on one's own instructional coaching practices using feedback	Gilbert et al., 2018; Mann et al., 2011; Taylor & Chanter, 2019

Conceptual Framework

To develop instructional leadership skills such as instructional coaching conversation skills, future educational leaders benefit from authentic opportunities for practice where they can develop specific skills, engage in reflection, and build self-confidence (Jones & Ringler, 2020; McGhee & Stark, 2021). A powerful learning experience (PLE) is designed to present future educational leaders with "authentic problems of practice" (Young, 2015, p. 401). Powerful learning experiences are rooted in andragogy and comprised of nine characteristics (Cunningham et al., 2019). Young (2015) noted that although PLE-designers should strive to include all nine characteristics in a PLE, it was understandable if a PLE did not include all characteristics. We briefly describe seven of the nine PLE characteristics described by Cunningham and colleagues (2019), aligned with the teacher post-observation conference MRE in this study.

The first PLE characteristic, *authentic, meaningful, and problem finding*, involves creating learning opportunities where future educational leaders are presented with a realistic problem of practice, requiring decisions and/or responses (Cunningham et al., 2019, pp. 82-83). The second PLE characteristic, *sensemaking around critical problem of practice*, emphasizes that the learning opportunities provides future educational leaders opportunities to analyze and make determinations about the issue raised in the problem of practice (p. 83). The fourth PLE characteristic, *collaboration and independenc*e, stresses that the learning should allow for collaboration among future educational leaders which contributes to how they interpret the learning experience (pp. 84-85). The fifth PLE characteristic, *develop confidence in leadership*, underscores the need to create a space for future educational leaders to build self-confidence in their leadership capabilities (pp. 85-86). The sixth PLE characteristic, *places both the professor and student in a learning situation*, emphasizes the importance of creating a learning environment where the future educational leaders and instructors are in the learning situation together on equal footing rather than hierarchically (pp. 86-87). The seventh PLE characteristic, *empower learners and make them responsible for their own learning*, empowers future school leaders to be active participants in their own learning, analyzing what they are learning, its potential applications, and how they can improve upon current performance (pp. 87-89). Lastly, the ninth PLE characteristic, *reflective component,* highlights the need to create opportunities for critical reflection as part of the learning process to analyze how theory and knowledge were used in practice (pp. 90-91).

Simulations in Educational Leadership Preparation

Technologies, such as simulations and mixed reality experiences, that incorporate PLE characteristics may provide opportunities for future educational leaders to engage in authentic, problem-based learning experiences. Simulations support the development of specific leadership skills, allow for individualized feedback, engage students in reflection, and help students to build self-confidence (Ceballos et al., 2020; DeJong & Grundmeyer, 2018; Mann et al., 2011; Tucker & Dexter, 2011). Future educational leaders held positive views of development of overall leadership decision-making skills, self-efficacy, confidence, and "certainty about the decision making process," following a decision-making simulation (Tucker & Dexter, 2011, p. 250). Moreover, individualized feedback during simulations support future educational leaders in identifying strengths and leadership areas in need of development and stimulate reflection on

learning to create new mental models of leadership approaches in a school (Mann et al., 2011). Additionally, simulations allow for student confidence-building when responding to leadership situations, particularly in building or maintaining relationships with various school stakeholders (Ceballos et al., 2020; DeJong & Grundmeyer, 2018). The MRE described in the following section uses simulation technology to provide students with a realistic opportunity to practice instructional coaching conversation skills in a setting the incorporates PLE characteristics.

The Mixed Reality Experience Post-Observation Conference

The MRE used as the data source for this study takes place during the second and final educational supervision course in the educational leadership preparation program where this research was completed. Students complete an MRE where they engage in an authentic problem of practice—providing instructional feedback to a teacher in a post-observation conference, using instructional coaching conversation skills. The role of the teacher is played by an improvisational actor who is represented as an onscreen avatar. Students complete the mixed reality post-observation feedback in groups of four through videoconferencing software.

Students are provided an orientation prior to the MRE by the mixed reality coach who is a practicing school leader with extensive expertise on instructional coaching for instructional improvement within their school district. The orientation affords students an overview of what to expect during the MRE and how to prepare for the experience, using course texts (Nolan & Hoover, 2011; Taylor & Chanter, 2019) and resources. Each student is provided with four brief scenarios during the orientation that describe a classroom observation. The scenarios are utilized as the scenarios for the MRE.

The Mixed Reality Scenario. An MRE scenario provides classroom details observed during a teacher observation. Information such as the classroom management techniques used and student response are described within the scenario. Further, a description of the instructional strategies employed by the teacher is provided as well as how many students mastered or struggled with the content of the class. For example, a scenario would be written as follows:

Ms. Smith, a novice Grade 8 Algebra teacher in her first year of teaching, began her mathematics class five minutes after the bell rang. During the 5 minutes, you observed students completing bellwork that was posted on the front board. The work was an extension of the learning goal posted in the front of the classroom. After 5 minutes, Ms. Smith instructed the students on a new concept, the distributive property. After she explained the concept, she completed 3 examples for the class on the whiteboard.

After completing the examples, she asked the students to complete problems 1-5 in their textbook on their own. As the students worked, Ms. Smith returned to her desk to grade papers. You noticed some students began work right away, while others were flipping through the pages of the book looking for more direction or were whispering to their neighbors for help. After 15 minutes, Ms. Smith collected the papers. You reviewed the papers Ms. Smith collected and noted, 5 out of the 18 students solved all 5 problems correctly. Most student had only solved one or two problems correctly.

The Mixed Reality Interaction. For the MRE, students are organized into groups of four to complete the interaction with one group participating in the MRE at a time. On the day of the MRE, each student within the group of four is assigned one of the four scenarios at random. Students engage in a 10-minute mixed reality interaction with the onscreen avatar, practicing providing instructional feedback. The course instructor, who is a former school instructional coach and district-level administrator, and the mixed reality coach who provided the student orientation are present in the virtual room to observe each group's MREs. Immediately following each individual student interaction within a group, students are provided on-the-spot feedback on their instructional coaching conversation skills performance by the course instructor, mixed

Table 2. *PLE Characteristics and Post-Observation Conference Mixed Reality Components*

PLE Characteristic	Post-Observation Mixed Reality Component
PLE 1: Authentic, Meaningful, and Problem Finding	Provide feedback to a teacher in a post-observation conference after a classroom observation.
PLE 2: Sensemaking Around Critical Problems of Practice	Analyze post-observation conference scenarios to determine teacher's instructional strengths and opportunities for instructional improvement.
PLE 4: Collaboration and Interdependence	Collaborate during the orientation on the practice scenario and provide feedback to one another immediately following the mixed reality experience.
PLE 5: Develop Confidence in Leadership	Develop confidence in providing feedback to various types of teachers, depending on the scenario, including novice and veteran teachers.
PLE 6: Places Both the Professor and Student in a Learning Situation	Create a learning environment where the course instructor and mixed reality coach are present during the experience and provide feedback based on the improvisational actor's interactions with the students.
PLE 7: Empower Learners and Make Them Responsible for Their Own Learning	Provide a safe space for students to reflect with the instructor, coach, and peers immediately following the experience to self-determine strengths and opportunities for growth.
PLE 8: Reflective Component	Complete a written reflection shortly after the mixed reality experience to connect instructional coaching practices and knowledge to the mixed reality experience.

Note. Powerful learning experiences (PLEs) characteristics drawn from "Using Powerful Learning Experiences to Prepare School Leaders," by K. M. Cunningham, B. A. VanGronigen, P. D. Tucker, and M. D. Young, 2019, *Journal of Research on Leadership Education*, *14*(1), pp. 74-97. https://doi.org/10.1177%2F1942775118819672

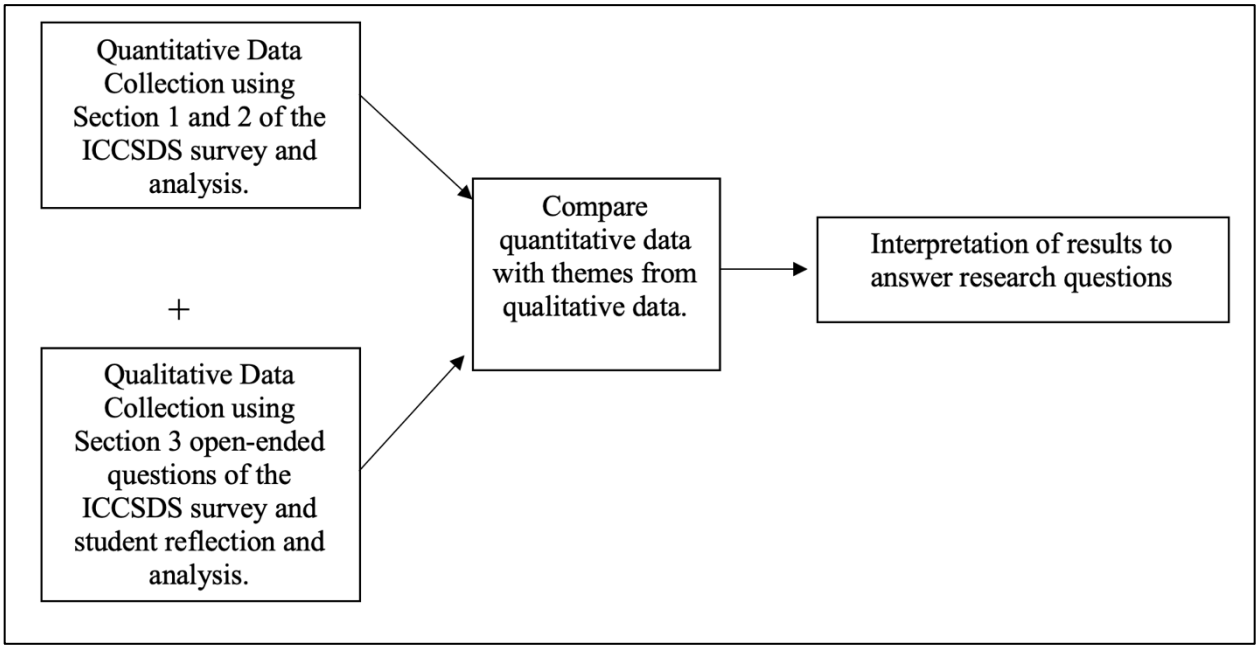
reality coach, and from the other students present during the interaction. By the conclusion of the MRE, students will have viewed an interaction for each of the possible four scenarios. As a follow-up assignment to the MRE, students complete a two-to-three-page reflection assignment where they examine what went well during the interaction and identify opportunities for growth informed by the course literature.

The teacher post-observation MRE is designed to be active, authentic learning in a group environment. As such, the MRE incorporates various characteristics of PLEs as described by Cunningham et al. (2019). Table 2 presents the identified PLE characteristics and teacher post-observation conference mixed reality components to further illustrate components and PLE underpinnings of this instructional approach.

Methods

The purpose of this investigation was to gather data on future educational leaders' perceptions of instructional coaching conversation skills development because of participation and coaching feedback during an MRE. The researchers employed a convergent design for this study consisting of quantitative analysis through a survey and qualitative analysis through open-ended survey responses and students' mixed reality reflection assignment (Creswell & Plano Clark, 2018) as shown in Figure 1.

Figure 1. *Convergent Design Study Sequence*



Sample and Instrumentation

The purposive sample used for this research study consisted of 137 educational leadership graduate students enrolled in Educational Supervisory Practices II during the Fall 2020, Spring 2021, Fall 2021, and Spring 2022 semesters. Students in the educational leadership program of

study are education professionals from local school districts, charter schools and/or private schools in the immediate geographic region of the higher education institution where this research was completed. At the conclusion of each semester, students were invited to participate in the study by completing the survey and/or consenting to the use of their mixed reality reflection assignment as a data source for this study. Participation in the research study was voluntary and not a course assignment. Forty-eight participants (35.0%) completed the Instructional Coaching Conversation Skills Development Survey (ICCSDS), and 20 participants (14.6%) consented to having their mixed reality reflection assignments used for this study.

To complete the study, the researchers designed the ICCSDS to collect descriptive data (Creswell & Creswell, 2018) on students' perceptions of instructional coaching conversation skills development following mixed reality participation and coaching feedback. The ICCSDS survey consisted of three sections comprised of 15 items. Section I of the survey consisted of three items designed to collect the professional characteristics of participants, including number of years in education, their professional role in schools or school districts, and years in the professional role. Table 3 presents frequencies and percentages of the professional characteristics of participants.

Table 3. *Participant Professional Characteristics (N = 48)*

Professional Characteristic	*f*	%
Professional Role		
Teacher	22	45.8
School Instructional Support	11	22.9
Central Office /Administrator	10	20.8
Other School Staff	5	10.4
Years in Professional Role		
< 1 year	7	14.6
1-3 years	8	16.7
4-6 years	13	27.1
7-9 years	9	18.8
>9 years	11	22.9
Years in Education		
0-10 years	20	41.7
11-15 years	9	18.8
16-20 years	12	25.0
> 21 years	7	14.6

Note. Percentages may not total 100% due to rounding.

Section II of the survey consisted of 10 items where participants rated their level of agreement on a four-point Likert scale, ranging from 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Agree*, 4 = *Strongly Agree*, and *Not Applicable*. The 10 items in this section of the survey collected student perceptual data on the development of instructional coaching conversation skills during the mixed reality teacher post-observation conference with feedback as identified in Table 1. In Section II of the Survey, students' level of agreement reflected students' perceptions of the extent to which MRE participation and coaching feedback contributed to their development of

instructional coaching conversation skills. Therefore, lower levels of agreement with a statement were interpreted as the MRE experience and feedback not contributing to development of an instructional coaching conversation skill. We designed Section II of the survey using the tailored design method set forth by Dillman et al. (2009). The Cronbach Alpha reliability coefficient for Section II of the survey was $\alpha = .96$, indicating acceptable reliability (Mueller & Knapp, 2019). Due to the limited sample, we used the study sample to calculate the reliability. Section III, the final section of the survey, consisted of two open-ended items asking participants about other skills developed during the MRE and other perceptions of the MRE not included in the survey.

To further understand participant perceptions of the overall MRE, we gathered participants' mixed reality reflection assignment as part of the data for this study to conduct a thematic analysis. The use of both quantitative and qualitative data sources permitted researchers to synthesize the results of both data sources to gain an understanding of overall participant perceptions of the MRE (Creswell & Plano Clark, 2018).

To answer research questions 1 and 2, the researchers used ICCSDS data. Descriptive statistics in the form of means and standard deviations were used to answer research question 1, to determine overall student perceptions of instructional coaching skills development due to mixed reality participation and coaching feedback. To answer research question 2, the researchers used the Kruskal-Wallis test to determine differences among groups due to unequal group sample sizes and significant *p* values for the Shapiro-Wilk test. The dependent variable was the ICCSDS sum score, which was calculated using the 10 items in Section II of the survey.

Research question 3 was answered using the open-ended responses in Section III of ICCSDS and the mixed reality reflection assignments. To analyze the open-ended qualitative data, including additional skills developed during the MRE and other perceptions shared by students about the MRE, researchers used the constant comparative method coupled (Glaser & Strauss, 2008) with In Vivo coding and axial coding (Saldaña, 2016) to synthesize categories and identify themes. To analyze the participant reflections, the researchers used NVivo 12 software to identify and aggregate themes.

Results

Overall, participant perceptions of instructional coaching skills development were positive with mean scores above 3 for all items. The highest responses ($M = 3.63$) were to Item 7, "The MRE and coaching feedback contributed to my development in using inquiry to seek clarification through open-ended questions and requesting additional information," and Item 13, "The MRE and coaching feedback contributed to my development in reflecting on my instructional coaching practice using feedback from faculty and colleague students." Table 4 presents number of responses per item, means, and standard deviations for the 10 items presented in descending order.

Differences in Perceptions by Professional Characteristics

A sum ICCSDS score was calculated for each participant for the 10 items in Section II of the survey ($\Sigma = 40$). The Kruskal-Wallis was used to test the independent variables of *years in*

education, professional role and *years in professional role*. For *years in education* independent variable, participants were divided into four groups (group 1: 0-10 years [n = 20, mean rank 23.15]; group 2: 11-15 years [n = 9, mean rank 21.67]; group 3: 16-20 years [n = 12, mean rank 31.83]; group 4: > 21 years [n = 7, mean rank 19.43]). Results of the Kruskal Wallis indicated no statistically significant difference for the four groups, $H(3) = 4.83$, $p = .185$.

Table 4. *Participant Perceptions of Instructional Coaching Skills Development (N = 48)*

Survey Items	*n*	*M*	*SD*
Survey Item Stem*: The mixed reality experience and coaching feedback contributed to my development in…*			
Using inquiry to seek clarification through open-ended questions and requesting additional information	48	3.63	0.70
Reflecting on my instructional coaching practice using feedback from faculty and colleague students	46	3.63	0.74
Using structuring to set the focus for the post-conference, uncover processes, needs, and concerns of the teacher	47	3.55	0.75
Using accuracy checks to confirm understanding and to demonstrate support, respect, and empathy for the teacher	48	3.46	0.74
Using data and evidence from the observation to make instructional decisions with the teacher	48	3.42	0.79
Using summarizing to confirm shared understanding and demonstrating accurate capture of ideas	48	3.40	0.74
Generating next steps following the conference and establishing the focus for the next observation	48	3.40	0.74
Building rapport by having a welcoming disposition and positive body language (i.e., affirming head nods, smiles, etc.)	48	3.35	0.79
Using data and evidence from the observation to examine the relationship between instruction and student learning with the teacher	48	3.33	0.81
Using structuring to transition from one part of the conference to another (i.e., to transition from the beginning, to the middle, and to the end of the conference)	48	3.29	0.77

Note. Number of participant responses vary by item.

For the *professional role* independent variable, participants were divided into five groups (group 1: central office instructional support or administrator [n = 10, mean rank 26.25]; group 2: school instructional support [n = 11, mean rank 21.34]; group 3: teachers [n = 22, mean rank 21.34]; group 4: other school staff [n = 5, mean rank 28.90]). Results of the Kruskal-Wallis indicated no statistical difference among professional role groups, $H(3) = 2.22$, $p = .528$.

For *years in professional role*, participants were divided into five groups (group 1: < 1 year [n = 7, mean rank 29.36]; group 2: 1-3 years [n = 8, mean rank 29.00]; group 3: 4-6 years [n = 13, mean rank 26.50]; group 4: 7-9 years [n = 9, mean rank 20.17]; group 5: > 9 years [n = 11, mean rank 19.32]). Results of the Kruskal-Wallis indicated no statistically significant differences for the five groups, $H(4) = 4.36$, $p = .359$.

Instructional Coaching Conversation Skills Development Themes

To determine themes that arose from the qualitative data, researchers analyzed the two open-ended survey items and the reflection assignments submitted following the MRE. We begin by presenting the themes found in the open-ended questions related to additional skills developed during the MRE and participant feedback related to the MRE contributing to participants' development of instructional coaching conversation skills. We conclude with themes present in participants' reflection assignments.

Open-ended Response: Additional Skills Developed. Thirty participants responded to the open-ended item, "What other skills not included in this survey did you develop during the mixed reality experience?" Analysis of additional participant responses demonstrated perceptions of having developed four main additional skills: *on-the-spot thinking*, *confidence during difficult conversations*, *coaching without judgment and letting the teacher lead*, and *reflection*.

***On-the-Spot Thinking*.** Participants described development of this skill as giving them the capability to practice adjusting during an instructional conversation with a teacher as the "conversation shifts" and "to prepare for the unexpected response." Practicing on-the-spot thinking through the mixed reality experience also contributed to participant self-efficacy (Tucker & Dexter, 2011) in implementing instructional coaching conversation skills. One participant noted, "[Mixed reality] helped prepare me for on the spot questions that a textbook cannot predict." Another participant stated, "Having to think on your feet. The questions and outline planned doesn't always go in the way you think it will." Based on these responses, these participants perceived the mixed reality experience to having helped them develop the ability to recalibrate their conversations with teachers as the conversation progressed.

Confidence During Difficult Conversations. Participant confidence to face a difficult leadership situation during a post-observation conference was built during the MRE (Ceballos et al., 2020; DeJong & Grundmeyer, 2018; Mann et al., 20110). Development of this skill included allowing participants the opportunity to practice "confronting" a teacher on an issue and to practice "keeping a volatile situation calm." Further, development of this skill included confidence when incorporating classroom observation data to maintain objectivity during a difficult conversation. One participant stated, "I developed an understanding of better ways to go about handling a

teacher who is not so open to suggestions." Another participant noted that the MRE helped them in "monitoring the tone and inflection of my voice when speaking to an emotional person." Participants perceived that the MRE helped them to build confidence and strategies to use when having difficult conversations. As another participant put it, "Most people will shy away from confrontations. I am not saying that I do not need to improve in this area, but [mixed reality] gave me that opportunity."

Coaching without Judgment and Letting the Teacher Lead. The MRE allowed participants to practice facilitating instructional coaching conversations and to empower teachers (McGhee & Stark, 2021; Stark et al., 2017). Participants indicated development of these skills included "listening instead of talking," learning how to communicate with teachers in a "non-judgmental manner," and "letting the teacher lead the conversation." Participant perceptions suggested the MRE allowed them to practice listening to teachers during an instructional coaching conversation to focus on their individual needs (Knight, 2019; Taylor & Chanter, 2019). One participant stated, "The [mixed reality] experience helped me have a better understanding of the need to meet the teacher where they are and use their own ideas/interests to help them see their area of need and find ways to improve."

Reflection. Development of the skill of reflection included the ability to "self-reflect" because of the collaborative nature of the MRE, where participants observed other participants engage in the MRE (Cunningham et al., 2019; Gilbert et al., 2019). The ability to watch peers' instructional coaching conversations prompted additional reflection and a broadening of approaches when communicating with teachers. One participant reflected:

> The [mixed reality] experience provided me with a safe place to practice my coaching skills. It allowed me to not only practice myself, but to also watch my peers. By watching my peers, it gave me ideas on how to handle situations in which I may not have thought of handling them. All in all, the [mixed reality] experience is memorable, due to its interactive nature. We can read scenarios out of books, but it is these experiences that stick with us the most.

Open-ended Response: Participant Feedback. Twenty-one participants responded to the open-ended item, "Please add anything else you would like to share about your experience in mixed reality in contributing to your development of instructional coaching conversation skills." Analysis of participant responses yielded two main feedback themes: *useful experience* and *improvement recommendations*.

Useful Experience. The MRE provided an experience that was authentic, active, and focused on a problem of practice (Cunningham et al., 2019). Participants indicated that the MRE was practical because it provided an opportunity to practice instructional coaching in a realistic environment. One participant noted:

> It was probably the most uncomfortable assignment I've ever participated in, but it's also the one I learned the most from. When you engage with an avatar that you don't "know," you rely greatly on the framework and knowledge learned to guide you. There's no

> crutch - so to speak - of having a relationship with the teacher and knowing what to expect from them.

Participants not only indicated that the MRE was practical and useful, but also that it was unique. Another participant stated:

> The [mixed reality] experience was very unique. Although there were times of frustration and feeling overwhelmed, it was a great experience that has allowed me to reflect on my procedures and actions/reactions as an instructional coach. I learned how to listen more and ask more open-ended questions so that the teachers can find the solutions on their own and grow in their own professional growth.

Improvement Recommendations. Participants noted providing additional opportunities to participate in MREs, recording the interaction to reflect on the experience later in the semester, and having the MRE later in the semester rather than in the first part of the course. One participant stated, "Overall, the [mixed reality] was a very practical experience. My feedback would be to consider offering additional practice opportunities for students to 'freely' participate without it being attached to an assignment." Another participant noted feeling constrained by the interaction time limit, stating "I would have loved for the experience to be longer, and to have more opportunities to do it."

Participant Reflection Assignment Themes

Twenty student reflection assignments were uploaded into NVivio 12 software. Researchers read student reflections and coded themes from each in regard to student perceptions of development of their instructional coaching conversation skills due to their participation in the MRE and identification of areas of focus for improvement. Four overall themes emerged from the student reflections: *reflection for self-growth*, *building rapport*, *generative thinking*, and *communication skills*.

Reflections for Self-Growth. Participants reflected upon what they needed to improve or do differently as they moved forward in conducting instructional coaching conversations. Participants most often identified using quantitative evidence from the observed instruction. One participant shared the importance of this, expressing:

> Another goal for our post-observation was to share my concern that only 16% percent (3 out of 18) of her students correctly answered the questions about literary elements. Sharing this specific data allowed me to remove subjective judgments and use the data to support any recommendations or suggestions.

Participants also identified utilizing the E.A.S.Y. Framework (Taylor & Chanter, 2019) to support their questioning skills during the post-observation conference and asking open-ended questions. The E.A.S.Y. Framework is utilized in the course as a tool students can use to support generative thinking skills of a classroom teacher during a post-observation conference (Taylor & Chanter, 2019). E.A.S.Y. stands for "evidence, analysis, solutions to explore, and yes agreements for next steps" (Taylor & Chanter, 2019, p. 50). Students embed instructional coaching

conversation skills within this framework to facilitate the post-observation conference conversation to solutions focused on improved instruction. One participant explained how they utilized this framework to prepare for the post-observation conference and how it benefited the conversation by stating:

> When planning my questions for my [mixed reality] interactions, I referred to this [E.A.S.Y.] framework, and I feel that it allowed me to feel confident in leading the conversation. The questioning allowed the teacher to do a lot of the talking and reflecting which allowed me to better understand the processes and practices being done in her classroom.

Another participant discussed the benefit of asking open-ended questions by stating, "Additionally, I felt the way I approached my questioning with the teacher allowed for open conversation that led her to a lot of reflection."

Finally, participants noted the need to identify specific next steps to provide targeted support to the teacher. Determining the appropriate level of support, whether directive or non-directive (Glickman et al., 2024), can limit conflicts related to teachers' knowledge, skill base, and expectations that may hinder improvement. As one participant noted, "In addition, I realized the teacher might need a more collaborative approach instead of a nondirective approach. I will provide a little more direction during a coaching conversation and find the balance between coaching support and teacher autonomy."

Building Rapport. Building rapport is critical as it lays the foundation of trust between participants which provides for more open, honest conversation and building and maintaining relationships (Nolan & Hoover, 2011; DeJong & Grundmeyer, 2018). Participants noted that they needed to start the post-observation meeting by asking the teacher what went well in the observation/lesson. One participant stated they utilized this approach because "it is important to validate the teachers' feelings and to know how they are feeling, good or bad."

Next, participants identified thanking the teacher for the observation at the beginning of the post observation conference as an important aspect of building rapport as participants felt this strategy "helped set the tone for the rest of the conversation."

Making the teacher feel comfortable was also identified by participants. One participant stated, "My goal for this exercise was to ensure the teacher felt comfortable so she could open up and be vulnerable and observe where changes needed to be made in her classroom."

Generative Thinking. Generative thinking is the ability to formulate new ideas for growth and improvement based on reflection rooted in data or evidence (Taylor & Chanter, 2019). Participants viewed generative thinking as the ability to leverage and facilitate instructional discussions and use prompting to generate new mental models. Educational leaders need to be able to facilitate teachers' generative thinking process to create new ideas for their improvement (Stark et al., 2017). Within this theme, generative thinking coupled with the use of data helped participants to not self-impose personal values and expectations upon the teacher. As one student

put it, "using data instead of judgments can help the teacher reflect on student learning and get clarity on how her performance impacts the students' learning."

Prompting was also a part of generative thinking. This refers to the school leader's ability to provide guiding questions that allow the teacher to reflect critically on their practice and performance to create strategies for improvement (Glickman et al., 2024; Taylor & Chanter, 2019). One participant summed up this point up by stating, "I tried to phrase as much as I could within the question form to allow the teacher to feel as though she was able to arrive at the solution on her own."

Summarizing Communication Skills. Participants identified improvement in their ability to demonstrate active listening by summarizing what the teacher was saying due to their participation in the MRE. Summarizing is critical in the post-observation conference as it ensures a common understanding and correct interpretation of ideas (Jones & Ringler, 2020; Nolan & Hoover, 2011; Knight, 2019; Taylor & Chanter, 2019). According to one participant's reflection, summarizing was beneficial as "it was critical for the teacher to feel that her concerns did not fall on deaf ears."

Participants noted that paying attention to verbal and nonverbal cues was important in active listening. One participant shared:

> As I began the post-conference with the teacher, I kept one thing in the forefront of my mind, every nonverbal and verbal cue in the conversation can build or tear down the relationship established with the teacher, so I needed to be intentional and mindful at all times.

Though participants noted not interrupting the teacher and being non-judgmental as important, participants did not expand on how these skills assisted in the mixed reality session progressing smoothly.

Discussion

Although this study had a limited sample size and was implemented in one educational leadership program, the findings of this research further confirm the potential of MREs to develop future educational leaders' instructional leadership capacities related to instructional coaching conversation skills. Overall, results indicated that future educational leaders held positive perceptions of the MRE coupled with individualized coaching feedback in supporting development of instructional coaching conversation skills. Further analysis by participants' professional characteristics of years in professional role, years in education, and professional role did not demonstrate differences among participants based on their professional characteristics. Among the skills future educational leaders perceived to have developed most, participants noted using inquiry for clarification and engaging in self-reflection. Overall, these finding suggest that MREs, like other simulations, may prove beneficial as an instructional approach for instructional leadership development (Ceballos et al., 2020; Staub & Bravender, 2014; Tucker & Dexter, 2011).

Analysis of the open-ended responses and reflection assignments also demonstrated that the MRE helped to reinforce or enhance the intended skills development of collaborative reflection (Cunningham et al., 2019; Gilbert et al., 2019) and reflection for self-growth, building rapport (Dejong & Grundmeyer, 2018), facilitating teachers' generative thinking (Stark et al., 2017; Taylor & Chanter, 2019), and enhanced communication skills that reflect active listening (Jones & Ringler, 2020; Nolan & Hoover, 2011; Knight, 2019; Taylor & Chanter, 2019). Based on participant perceptions, the MRE was not only advantageous because it allowed for development of these skills, but also because it provided students with opportunities to reflect on the importance of the skill. Participants noted, for example, that building rapport through expressions of gratitude and inviting teacher input at the start of the conference supported teachers' willingness to be open during the post-observation conference. In terms of facilitating teachers' generative thinking, participants noted that using evidence from the observation to guide the conversation and asking the teacher open-ended questions supported the teacher's ability to generate solutions collaboratively with them (Stark et al., 2017).

Lastly, participants' open-ended responses demonstrated that the MRE provided participants with opportunities to develop other leadership skills, including, on-the-spot thinking skills (Tucker & Dexter, 2011), confidence during difficult conversations (Ceballos et al., 2020; Dejong & Grundmeyer, 2018; Mann et al., 2011), and coaching without judgment and empowering teachers (McGhee & Stark, 2021; Stark et al., 2017). These findings suggest that although simulations may be designed to develop and/or enhance a specific skillset, they may also support future educational leaders' development of complementary skills that may augment overall instructional leadership acumen. Overall, in the open-ended responses, participants highlighted the usefulness of the MRE due to its unique nature and indicated that further MREs would be beneficial.

Based on the findings of this study, virtual rehearsals through MREs that incorporate characteristics of powerful learning experiences (Cunningham et al., 2019) may be a critical tool in furthering instructional leadership development to advance student outcomes (Hattie, 2009; Grissom et al., 2021; Jones & Ringler, 2020; McGhee & Stark, 2021; Ovando, 2005). Future educational leaders in this study engaged in an authentic problem of practice—providing instructional feedback to a teacher after a classroom observation—that integrated seven of the nine characteristics outlined by Cunningham and colleagues (2019). Analysis of the qualitative data revealed that future educational leaders themselves identified PLE characteristics within the MRE such as the authenticity of the experience, the ability to practice implementation of a problem of practice, taking control of their own learning in real time, collaborating with peers, and engaging in critical reflection. Participants noted that additional MREs would prove useful in their instructional leadership development.

Given the findings of this study, MREs and other simulations may provide future educational leaders with virtual leadership rehearsals that provide for authentic, realistic, and safe practice (Dieker et al., 2012; Dieker et al., 2008; Hughes, 2014). Educational leadership preparation programs could consider including MREs and other types of simulations as instructional approaches to bridge theory to practice, allowing for implementation of instructional leadership practices and provision of individualized feedback prior to engaging in real-world leadership situations.

Due to the limited sample of this study, further research is needed with a larger sample to extend the findings. Additionally, research is needed to determine the types of MREs that could be designed to support the development of instructional leadership capacities presented in the educational leadership literature and identified by school districts. Since this research study focused on future educational leaders' perceptions of the MRE, more needs to be understood about how participation in a mixed reality practice influences their execution of instructional leadership skills in real-world leadership situations during field-based experiences and once they become school leaders. Lastly, future research could determine future educational leaders' perceptions of initial need to develop specific instructional coaching conversation skills in pre- and post-analysis to determine perceptions of existing levels of specific skill and the growth in that skill as a result of the MRE.

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Author Biographies

Marjorie Ceballos is an assistant professor of Educational Leadership at the University of Central Florida. She has worked in public secondary schools as a teacher, instructional coach, and school district administrator. Her research areas include instructional leadership, educational leadership preparation, student access to advanced courses, and the effect of school policies and practices on English learners' achievement.

Krista Bixler is an assistant professor of Educational Leadership at Florida Gulf Coast University. She has worked in public elementary and secondary schools and the district office as a teacher, special education staffing specialist and school principal. Her research areas include instructional leadership, educational leadership preparation, and educational policy development.