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Exploring The Role of Instructional Coaching in A Shifting Classroom Technology Landscape

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Abstract

Instructional coaching shows unique promise as an approach for helping educators improve their practice with technology. The transition back to face-to-face instruction from online learning accelerated the need to deploy effective approaches like instructional coaching to help teachers keep pace with hastening technology change. The present study explores the role instructional coaching plays in enhancing their practice with technology. Two questions framed the investigation: (1) How do educators' perceptions of instructional coaching efficacy influence their technology use and perceptions? and (2) What specific instructional coaching behaviors affect educators' technology integration? Findings from the study reveal positive relationships between educators' perceptions of coaching efficacy and their technology use, with formal 1:1 coaching session most significantly impacting technology integration practice. These insights support the efficacy of instructional coaching as a mechanism for helping teachers improved with emerging educational technologies.

Keywords: *technology instructional coaches, professional learning, teacher perceptions*

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The pace of technology-driven education change is accelerating. Unfortunately, many educators and leaders in K-12 schools have not been able to keep pace. Whether driven by inequitable access to technology and the internet (González-Betancor, López-Puig & Cardenal, 2021) limited professional learning for educators (Barton & Dexter, 2020), or a lack of teacher buy-in (Lewis, 2014; Yuen and Ma, 2008), many educators miss opportunities to improve their practice with emerging technologies. While the Covid-19 epidemic forced many educators to deploy technology to reach their students, these efforts often stopped short of fully utilizing technology to deepen student engagement, maximize efficiency, and prepare students for their futures (Chiu, 2021; Hong, Liu, Liu & Zhao, 2021). Unfortunately, the post-covid return to the traditional classroom created even more complexity and challenge for educators seeking to enhance their practice with technology (Mahmud, Wong, & Ismail, 2022). The need for highly effective professional learning to assist educators in making the most of emerging technologies remains acute.

Instructional coaching shows promise as a means of supporting educators in enhancing their technology integration in today's rapidly changing learning environment. While instructional coaching has long been deployed to assist teachers in using new technologies, the flexibility of this approach shows unique promise in the complex post-covid era. The present study explored the perceptions of K-12 teachers related to their integration of technology to enhance learning and to the degree interactions with an instructional coach affects their uses and perceptions of educational technology. Two research questions guided this inquiry; (1) To what extent do educators' perceptions of the efficacy of instructional coaching influence their technology uses and perceptions? and (2) What instructional coaching behaviors influence

educators' technology uses and perceptions? Findings from the present study inform school leaders and professional learning providers on evidence-based approaches for assisting teachers in leveraging technology.

Technology as a Tool for Instructional Delivery

While many of the barriers associated with technology availability in public schools have been reduced through additional funding, material and human resources (United States Department of Education, 2017); educators are not consistently and effectively utilizing technology in the classroom. Findings from the 2017 National Educational Technology Plan (US Department of Education, 2017) indicate the teachers feel technology should be utilized more effectively in the classroom, but that a significant barrier is their own lack of professional development. The 2017 National Educational Technology Plan recommends that educators should be provided with professional learning experiences that build their digital literacy and empower them to embed technology in learning experiences and assessments. The National Center for Education Statistics (NCES) conducted a national study to determine the use of technology in schools during the 2019-20 school year, prior to start of the COVID-19 pandemic. Findings showed that only forty-five percent of schools provided computers for each student during the school day with only 15% of the students allowed to take the devices home (Gray & Lewis, 2021). Only 36% of the teachers were provided with a moderate amount professional learning (PL) on using the devices and 40% of the teachers were provided with a moderate amount of PL on how to use the device for teaching and learning (Gray & Lewis, 2021). Teachers reported outdated technology, lack of support on how to use technology for teaching as significant challenges for being able to use computers for teaching (Gray & Lewis, 2021).

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Post-pandemic, school districts experienced an increased usage and efficiency in digital learning technology (Gray & Lewis, 2021; United States Department of Education, 2017). However, lack of teacher professional learning related to technology integration continues to be a significant barrier. Following the return to face to face instruction some educators are not continuing to integrate technology in the classroom (Tosik & Hebeci, 2022). Post-COVID, teachers report their own lack of knowledge of how to use technology to enhanced instruction, a lack of competence and self-efficacy of their own technology capabilities and a lack of support when integrating technology as barriers (Pappa et al., 2023; Tosik & Hebeci, 2022). Ironsi (2022) found that post-COVID, that preservice teachers felt using technology effectively to increase student learning was difficult. The preservice teachers within this study indicated that while they possessed digital literacy, they did not have the skills to use technology effectively in the classroom (Ironsi, 2022). A shift in the personal digital literacy of educators post-COVID has not resolved the barriers to technology integration. All of these barriers could be minimized, if not resolved through high-quality professional learning experience.

Professional Learning and Instructional Coaches

The value of professional learning (PL) on changing teacher beliefs and practices is well-established. How effective PL is in changing teacher beliefs and practices is a question which continues to be explored (Darling-Hammond, et al., 2017; Desimone & Pak, 2017; Novak, et al., 2020). There are many variables which impact the effectiveness of PL. The relevancy to current curriculum and district policies, a content focus, opportunities to engage in active learning as well as sufficient time have been identified as key factors (Desimone, & Pak, 2017). Darling-Hammond, Hyler, and Gardner (2017) reviewed 35 studies and identified seven characteristics of

effective professional learning, which are content focus, active learning, collaboration, modeling, coaching and support, feedback and reflection and sustained duration (Darling-Hammond et al., 2017). Every Student Succeeds Act (ESSA) layouts of the critical components in effective professional development for educators. First, it must be sustained over a period of time, focuses intensively on a concept/topic/practice, be relevant to the educators' current position, based on data and tied to the needs of the participants and their students, and be practical in nature. Professional learning targeting technology integration has been proven successful when teachers participate in summer intensive workshops following by professional learning communities (Blanchard et al., 2016), personalized PL tailored to individual needs (Liao et al., 2017), engage with mentors who provide model lesson demonstrations and support (Gulamhussein, 2013) as well as authentic learning experiences (Burggraf, 2020).

Instructional Technology Coach

Instructional technology coaching is an effective professional learning model as it incorporates many of the best practices in PL (Desimone & Pak, 2017). Instructional coaches are valuable resources as they grow teacher capacity by providing instructional strategies and techniques which results in a more engaged student which leads to greater student growth (Eisenberg et al., 2017). Educational policy has identified instructional coaches as a means to achieve instructional goals (Coburn & Woulfin, 2012) yet the specifics of how or what an instructional coach is responsible for are often not delineated leaving it up to the Local Education Agencies (LEA) to determine. ESSA (2021) encourages LEAs to identify coaches within their districts and to provide training and compensation for their work with other teachers. ESSA suggests that coaches should be trained in student data analysis, as well as ways to develop,

deliver and differentiate instruction, as well as evaluating and providing feedback to teachers they have trained (Desimone & Pak, 2017).

Instructional coaching is designed to be ongoing support for teachers as both short- and long-term goals are established and monitored. Coaches push into the classrooms and provide demonstration lessons modeling the new instructional strategies and techniques followed by scaffolded opportunities for the teacher to implement the new pedagogies and reflect with their coach on what went well or did not go well (Eisenberg et al., 2017). The coaching cycle continues throughout the school year. Instructional coaching is an impactful means to deliver effective PL as it deploys all of the characteristics of effective PL: collaborative, job-embedded, data-driven, classroom focused and sustained (Darling-Hammond, et al., 2017; Desimone & Pak, 2017; ESSA, 2021; Novak, et al., 2020).

Supporting technology integration is multifaceted which has proven a challenge in defining and narrowing the scope of professional learning for educators. Technology integration may include purchasing orders, troubleshooting in the classroom, and developing PL for other educators. Educators need support in all aspects of technology integration, yet with limited hours of PL dedicated solely to instructional technology, the result is often inadequate PL for teachers. Originally, the coaching model was intended for PL related to reading and math instruction, however, this model would be beneficial to developing teachers' efficacy and proficiency with technology because of the ability to tailor it to the teachers' individual areas in need of professional growth (Bakhshaei et al., 2018; Liao et al., 2017). Instructional technology coaches provide this support through ongoing professional learning.

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In order for students to effectively use technology, educators must be provided with the knowledge and skills necessary to craft technology-rich learning experiences. While the technology coach role is flexible, there are some characteristics that have proven effective. Liao et al., 2021 identified three key elements to successful coaching. First, sustained coaching is critical for changing teacher practices. Second, the coaching needs to occur in the participants' classroom setting. With this individualized approach, the teacher was more successful at integrating the technology and utilizing it with their students. Finally, personalization is key to long term coaching success. Coaching provides a flexible space for the PL to be tailored to teachers' prior knowledge and skill set. Thus, allowing each teacher to move at their own pace to develop a new skill set. (Liao et al. 2021). Instructional technology coaches may meet with teachers in individual or small groups. During these interactive sessions, the coach wears multiple hats. First, as a mentor providing the encouragement, support and feedback to the teachers who are working on changing their practices. Second, as a facilitator who may model using a new technology tool, demonstrate a lesson utilizing technology, or assisting in data analysis. In some circumstances the coach may need to provide direct instruction if the district has implemented new policies (Desimone & Pak, 2017). Coaching sessions are collaborative in nature, as both the coach and educator are working together develop the teacher's knowledge and skill set (Darling-Hammond, et al.,2017). Coaches often push into the classroom to demonstrate or model as well as to observe the teacher. The effectiveness of modeling and observation in positively changing teacher mindsets and beliefs is well-documented (Darling-Hammond, et al.,2017; Desimone & Pak, 2017). Coaches are also instrumental in helping educators who are navigating new curriculum or programs required by the district and may be feeling overwhelmed

by the requirements or changes. The coach serves as support system helping the teacher balance changes and succeed in implementation of new strategies and pedagogies (Desimone & Pak, 2017). Instructional technology coaching is a natural fit with adult learning theory.

Adult Learning Theory

Developing effective PL requires the application of adult learning theory, which acknowledges that children and adults learn differently, therefore for adults to grow in the knowledge and skill sets, these learning differences must be taken into account. Educators vary greatly in their subject matter expertise, years of experience and willingness to try new approaches (Trotter, 2006). There are five key assumptions of andragogy, adult education (Knowles, 1980). Beginning with motivation to learn for adults is directly related to their current needs and interests. While learning is a lifelong process, self-direction is important to the learning process for adults who enjoy having ownership of their learning. Finally, learning needs change with the age of the learner, and learning style. PL that incorporates the understandings of andragogy will result in greater outcomes for both the teacher and student learning.

Instructional coaches are best suited to adapt the principles of adult learning theory and to provide personalized learning to teachers (Eisenberg et. al., 2017). As PL has evolved from the *sit and get* and *one and done* professional development sessions, instructional coaches are a logical choice for districts. Coaches are able to close that gap and offer continuous support and reflective practices. Most instructional coaches follow the “Before, During, After” cycle (Eisenberg et. al., 2017). To complete this cycle there must be a trusting relationship between the coach and teacher. The before part of this cycle is where conversation about the teacher's goal happens. The during part of this cycle is when the teacher and coach collaborate to come up with

a plan for improvement. The after part of the cycle is when the coach asks reflective questions to the teacher and how everything went. Instructional coaching is a collaborative process which is relevant to the learner, provides scaffolded practices and opportunities for self-reflection and growth as an educator.

International Society for Technology in Education (ISTE) standards for coaching define the role of the technology coach. It includes seven standards which are designed to be used as a roadmap for districts in creating instructional coaching positions. *Standard 4.1 Change Agent* focuses on inspiring educators to apply technology in ways that create equitable access to learning. Within this standard the focus is on creating and delivering high-impact teaching and learning experiences with technology. *Standard 4.2 Connected Learner* focuses inward on the importance of the coach in continuing their own PL and being a reflective practitioner. *Standard 4.3 Collaborator* addresses the key elements of effective coaching; 1). Establishing and building trust; 2) partnering with educators to align digital learning content to content standards, 3) partnering with educators to assess the quality of digital learning content and tools, 4) modeling and planning PL with individual teachers (ISTE, 2011). *Standard 4.4 Learning Designer* focuses on modeling and supporting teachers. *Standard 4.5 Professional learning facilitator* sets standards for coaches to design PL which empowers educators to implement technology in ways which enhance learning. Coaches are also expected to be self-reflective and evaluate the effectiveness of the PL and revise as appropriate to increase its impact. *Standard 4.6 Data-Driven Decision maker* charges coaches to utilize data to inform their PL and practice. Finally, *Standard 4.7 Digital Citizen Advocate* tasks coaches with modeling being a steward of technology and utilizing technology ethically and responsibly (ISTE, 2011).

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Teacher Perceptions of Technology Coaches

Changing teacher beliefs and practices occurs when they experience PL which is sustained, timely and targeted to their specifics needs (Darling-Hammond, et al.,2017; Lewis & Novak, 2022). While the majority of the literature focused on other types of instructional coaches in varying settings, teacher perceptions of the benefits of instructional coaches appear to be universal. First, coaches are effective in helping teachers develop their instructional practices through modeling, discourse, and reflection (Desimone & Pak, 2017). Second, the teachers felt they developed a positive relationship with their coach and as a result of this trust, the teachers felt more comfortable trying out the instructional practice (Elfarargy, et al., 2022).

Research focused on teacher perceptions of technology coaches have reported positive perceptions of technology coaching in improving their use of technology. Liao et al. (2021) found that teachers felt they most benefited from the individualization, modeling, space for reflection, and the relationship that was developed with their coach during the PL period. Liao et al, (2021) did not find any relationship between the number of years of teaching experience and growth of teachers' technology knowledge and skills. Rather a greater measure of the degree of change due to coaching would be the prior technology content knowledge, skill set and dispositions. All participants within this study reported positive changes in their technology use and practices (Liao, et al., 2021). A disconnect between teachers' knowledge of technology, digital literacy and the higher-level skill of being able to use technology for instruction is recognized as a newer barrier to technology integration (Dinçer, 2018; Ironsi, 2022). Instructional coaches help individuals who have knowledge of technology (e.g. social media, websites, apps) but lack the skill to put it into practice (e.g. enhancing learning). These findings

echo others in the field, teachers feel that technology coaches generally have a positive impact on their practice and beliefs related to technology. The benefits of instructional coaching are most acute when the coaches encourage and support the teachers as they implement new technologies in their classroom (Huang, 2023; Liao, et al., 2021; Ottenbreit-Leftwich, et al., 2020).

Instructional technology coaching offers tremendous promise for helping teachers capitalize on emerging technologies (Huang, 2023; Liao, et al., 2021; Ottenbreit-Leftwich, et al., 2020). As we exit the COVID-19 epidemic, instructional technology coaching will play an important role in ensuring technologies are used productively by teachers in their classrooms. The present study suggests the coaching mechanisms that should be pursued to achieve maximum impact on educator technology integration.

Methods

Participants

The present study utilized a quantitative approach and included eighty-three participants. The population was a sample of convenience composed of undergraduate and graduate alumni of a private regional university in the mid-Atlantic region of the United States. Participants were made eligible for this study by their status as active PK-12 educators. Sixty-one of the participants reported they were female and twenty-two reported that they were male. Their years of experience ranged from one to thirty-three years. Twenty-five participants possessed a Bachelor's degree, fifty-eight possessed a Master's degree, and three possessed a doctorate. All participants served as public PK-12 educators during the academic year preceding their participation in the project.

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Instruments

Participants' perceived efficacy for instructional coaching was determined using the Efficacy for Instructional Coaching (EIC) assessment, a six-item instrument designed by the study authors. These items were selected to assess participants' perception of the utility of instructional coaching in several key areas including student achievement, instructional engagement, school climate, and educators' use of effective strategy. The EIC also gauges participants' perceptions about the effectiveness for coaching. Four of the items on this instrument requested responders to indicate the influence of instructional coaches on their teaching practice using a likert scale from one through four. Responses to these items ranged from "very significant impact" to "no impact". One of the items asked respondents to generalize their beliefs about the efficacy of instructional coaching on a four-point scale from "significantly improve" to "never improve". The sixth item asked participants to indicate their personal enthusiasm for working with an instructional coach on a four-point scale from "actively seeking out opportunities to engage with an instructional coach" to "will not work with an instructional coach". Participants' responses for the items were tallied and averaged, which was used to calculate participants' EIC scores. Items from the EIC assessment are presented in Figure 1.

Item	Response Options
How much does instructional coaching positively influence student achievement at your school? How much does instructional coaching positively influence student engagement and wellness at your school?	• Very significant impact • Significant impact • Limited Impact • No impact

How much does instructional coaching positively influence the climate and culture at your school? How much does instructional coaching positively influence teachers' use of effective teaching strategies at your school?	
Which of the following best describes your personal enthusiasm for working with an Instructional Coach?	• I actively seek out opportunities to engage with an Instructional Coach to improve my professional practice • I utilize professional opportunities to engage with an instructional coach to improve me professional practice when they are presented to me. • I prefer to improve my professional practice without instructional coaching • I will not work with an instructional coach
Which of the following best describes your general belief about the efficacy of Instructional Coaching?	• Instructional Coaching significantly improves the quality of instruction delivered by educators who receive it. • Instructional Coaching usually improves the quality of instruction delivered by educators who receive it. • Instructional Coaching rarely improves the quality of instruction delivered by educators who receive it. • Instructional Coaching never improves the quality of instruction delivered by educators who receive it.

Figure 1. *EIC Assessment Items.*

Participants' frequency of engagement with Instructional Coaching was assessed using the Instructional Coaching Engagement (ICE) Survey. The survey included six common types of engagement teachers have with Instructional Coaching in school settings (Eisenberg et al., 2017;

Hasham, 2020). Participants indicated the total number of encounters of each type they had during the previous academic year. Items from the ICE survey are presented in Figure 2.

Item	Response Options
Participated in group professional development led by an Instructional Coach. Engaged in formal / scheduled 1:1 coaching/conferencing session(s) with an Instructional Coach. Engaged in informal/unscheduled collaboration/dialog with an Instructional Coach. Collaborated with Instructional Coach(es) to assist in student achievement data analysis and/or applying that analysis in instruction, grouping, or other purposes. Interacted with Instructional Coach(es) during grade level, team, or department meetings. An Instructional Coach made a professional visit to my classroom during instructional time.	• 0 times • 1-2 times • 3-5 times • 6 or more times

Figure 2. *Instructional Coaching Engagement Survey*.

Participants' perceptions of technology uses and perceptions were collected using the Technology Uses and Perceptions Survey (TUPS). This survey was licensed from the Florida Center for Instructional Technology. The present study utilized two panels from the TUPS. The first, Self-Perceptions of Technology Use (SPTU), includes twelve statements regarding the general usefulness of technology and requires participants to rate their agreement on a likert scale. The second, Technology Integration Practice (TIP) includes sixteen common pedagogies and requires participants to rate the frequency with which they deploy technology when performing each pedagogy. Participants select one of six options in a range from "not at all" to

"multiple times per day". Participants' responses were totaled and averaged to record SPTU and TI scores. The validity and reliability of the TUPS was affirmed by Ritzhaupt et al. (2017).

Data Collection

The EIC, ICE, and TUPS assessment were integrated into a unified digital survey. This survey was shared with the sample of convenience (alumni of the host institution's undergraduate and graduate programs). The participation invitation was distributed to 836 potential participants. 115 respondents consented to participate and eight-three completed all three of the surveys. The response rate for the project was 13%, which is a below-average response rate, but not unreasonably so due to the fact that it was administered digitally from a digital survey (Lavidas et al., 2022). Data from the digital survey were disaggregated into the EIC, ICE, and TUPS and deployed by the authors to address the project research questions.

Results

Data from the EIC and TUPS were analyzed to address research question number one (To what extent do educators' perceptions of the efficacy of instructional coaching influence their technology uses and perceptions?). Means from each survey and scale were applied to determine if correlations existed between participants' sense of efficacy for instructional coaching and their technology uses and perceptions. The means and standard deviations for the EIC and the SPTU and TIP subscales of the TUPS are presented in Figure 3.

Item	Mean	SD
Efficacy for Instructional Coaching (EIC)	2.63	0.56

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Self-Perceptions of Technology Use (SPTU)	3.87	0.72
Technology Integration Practice (TIP)	3.71	0.98

Figure 3. *Mean Scores of EIC, SPTU, and TIP.*

Simple linear regression analysis was used within SPSS to determine if a relationship existed between participants' EIC and SPTU. The scatterplot of standardized residuals predicted values showed that the data met the assumptions of homogeneity of variance and linearity. The data met the standard assumptions for simple linear regression allowing the researcher to proceed with the analysis. A significant regression equation was found ($F(1, 74) = 5.57$, $p < 0.02$, with an R^2 of = 0.05). Participants' predicted EIC is equal to 1.88 + 0.19 (SPTU). SPTU increased by .19 for each EIC point.

Simple linear regression analysis was also used to determine if a relationship existed between participants' EIC and TIP. The scatterplot of standardized residuals predicted values showed that the data met the assumptions of homogeneity of variance and linearity. The data met the standard assumptions for simple linear regression allowing the researcher to proceed with the analysis. No significant regression equation was found ($F(1, 80) = 0.05$, $p < 0.33$, with an R^2 of = 0.01).

Data from the EIC and TUPS were analyzed to address research question number two (What instructional coaching behaviors influence educators' technology uses and perceptions?). Means from each survey and scale were applied to determine if correlations existed between the types of instructional coaching participants received and their technology uses and perceptions. The means and standard deviations for the SPTU and TIP subscales of the TUPS are presented in

Figure 3. Means and standard deviations for each of the six items from the ICE are presented in Figure 4.

Item	Mean	SD
Participated in group Professional Development led by an Instructional Coach(es).	2.48	0.99
Engaged in formal/scheduled 1:1 coaching/conferencing session(s) with an Instructional Coach(es).	1.79	0.95
Engaged in informal/unscheduled collaboration/dialog with an Instructional Coach(es).	2.39	0.98
Collaborated with Instructional Coach(es) to assist in student achievement data analysis and/or applying that analysis in instruction, grouping, or other purposes.	1.71	1.09
Interacted with Instructional Coach(es) during grade level, team, or department meetings.	2.02	0.86
An Instructional Coach(es) made a professional visit to my classroom during instructional time.	1.58	0.88

Figure 4. *Means and Standard Deviations for the ICE.*

A one-way ANOVA was performed to compare the effects of technology coaching performances (ICE) on participants' SPTU. The analysis revealed no significant effects for any of the six performances. A one-way ANOVA was also performed to compare the effects of technology coaching (ICE) on participants' TP. The one-way ANOVA revealed a significant difference for one of the six behaviors, participants' engagement in formal 1:1 conferencing sessions with an instructional coach ($F(91) = [1.77]$, $p = 0.04$). Tukey's HSD Test for multiple comparisons found that the frequency of 1:1 conferencing with an instructional coach statistically significantly influenced participants' TIP ($p = 0.04$, 95% C.I. = [0.00, 0.52]).

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Descriptive statistics were deployed to explore relationships between the role of instructional coaches, and the number of years of teaching experiences, demographic data was collected and descriptive statistics was used to analyze. Forty-six participants reported they have been using technology in the classroom for the same number of years as they have been using technology. Teachers with more than fifteen years of experience were more likely to have fewer years of technology-use in the classroom.

Further exploring if there is a correlation between technology use and instructional coaches, participants completed the ICE survey (see Figure 4). Ten participants reported zero interactions with an instructional coach regardless of the format (see Figure 4). Eight of these ten educators reported they had been using technology for the same number of years which they had been teaching; one participant reported used technology in the classroom for fifteen of their twenty-five years, and one participant shared that they had used technology less than one year out of the 23 years of teaching experience. Of the ten teachers who reported no interactions with the instructional coach, eight felt instructional coaches usually or significantly improves the quality of instruction for those who received the coaching. Eight of these participants also indicated on the EIC that the instructional coaches in their district do not prioritize any of the selected topics (see Figure 5). An item of the EIC asks "Which of the following best describes your general belief about the efficacy of Instructional Coaching?" Six participants felt that instructional coaching *rarely* improves the quality of instruction delivered by educators who receive it, while seventeen (17) felt that there is a *significant* improvement in the quality of instruction delivered by educators. The majority (57) of the respondents felt that instructional coaching *usually* improves the quality of instruction delivered by educators who receive it. Of

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the 6 who felt the instructional coaching *rarely* improved instruction, five reported the same number of years using technology as years of teaching experience; only 1 reported having an instructional coach coming into their classroom to model instruction (3-5 times) with the others reporting zero interactions in the classroom.

Priority Rating	Assessment Development	Classroom Management	Curriculum Design/Lesson planning	Diagnostic and Standardized	Technology for Teaching and Learning
First	5	9	15	13	41
Second	19	8	36	11	9
Third	26	8	23	15	11
Fourth	26	20	7	18	12
Fifth	7	37	2	26	10

Figure 5. *Type of instructional coaching delivered.*

Data from the present study suggest first priority area for instructional coaches to focus on is working with educators to use technology for teaching and learning, the second overall priority area is curriculum design/lesson planning. Assessment development was a close third and/or fourth priority. With classroom management being ranked as the lowest priority (see Figure 5). Respondents reflected on how much they felt instructional coaching had a positive influence on student achievement, student engagement and wellness, climate and culture, and use of effective teaching strategies (see Table 6). Four participants felt there was no impact in all areas, these participants also reported zero interaction with an instructional coach and a preference for improving their instructional practice without the assistance of an instructional coach.

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How much does instructional coaching positively influence:	No impact	Limited Impact	Significant Impact	Very Significant Impact
Student achievement	7	49	32	5
Student engagement and wellness	13	44	30	6
Climate and culture at your school	12	50	26	5
Use of effective teaching strategies	7	39	39	8

Table 6. *Teacher perceptions of positive influence of instructional coaching.*

Discussion

Findings from this study supports the supposition that instructional technology coaches have a positive impact on teachers' use of technology in the classroom. Teachers' perceptions of the efficacy of technology coaches was tied to their own perceptions of technology integration use. The greater the individual's belief in their technology integration ability the greater efficacy they had for the instructional coach. There was not a statistically significant correlation between the EIC and TIP. This suggests that further PL may be warranted before a significant change to the TIP. This aligns with current best practices in PL, which emphasize the importance of sustained, on-going, targeted PL.

Findings from the present study directly affirm a trend in the literature suggesting that instructional coaching is a particularly impactful approach for helping teachers improve technology integration in their classrooms (Eisenberg et al. 2017; Hasham, 2020). While this has been shown to be effective for the use of instructional technology-specific instructional coaches on PL projects aimed specifically at addressing technology integration (Bakhshaei, 2018;

MacDonald, 2018; Peterson, 2015), it is less common to ass the effects of more general instructional coaching and improvements in teachers' technology integration. Findings from the present study help affirm the existing scholarship (Hashim, 2020; Wallick, 2022) suggesting that distributive (teacher-led) PL is an effective mechanism for improving technology integration.

Identifying which instructional coaching behaviors have the greatest impact on teacher technology usage, multiple regression analysis was conducted to determine if participants' efficacy for instructional coaching correlated to specific instructional technology practices. The coaching behavior with statistically significant findings was the participant's engagement in formal 1:1 conferencing sessions with an instructional coach. One on one conferencing provides an opportunity for the teacher to receive individualized feedback, mentorship, and opportunities to be self-reflective. This factor has consistently been attributed to having a significant impact on changing teacher technology usage in the classroom. For example, this approach has been credited with creating unique opportunities for shared control, reflection, and problem solving between coaches and teachers (Robertson et al., 2018). Similarly, Haneda, Teemamt & Sherman (2016) highlighted the importance of meaningful interchange between coaches and teachers during coaching as a mechanism for improving outcomes for learners. The present study helps to affirm the particular importance the coach-educator dialog is to helping educators improve their practice with technology.

Data from this study indicate that technology for teaching and learning remains the first priority for about 50% of the participants (see Figure 5). Depending on the priorities set by the district, it is plausible that the teachers' perceptions of the efficacy of the instructional technology coach would decrease when the PL is no longer targeted and applicable to their own

classroom setting. This finding supports the current literature in the field which shows the most effective PL occurs when it is job-embedded and connected to the classroom setting (Darling-Hammond, et al., 2017; Desimone & Pak, 2017; ESSA, 2021; Novak, et al., 2020).

While there is growing consensus that instructional coaching is an impactful approach for helping educators enhance their efficacy through technology integration, limitations to the present study, and the existing body of knowledge, give impetus for sustained investigation. First, instructional coaching represents a range of both formal and informal interactions educators have in schools (Wang, 2014). Some educators may benefit from instructional coaching without being aware of it. If, for example, they worked with a more experienced or skilled colleague to improve a lesson with technology, they may have received instructional coaching but may not attribute their enhanced practice to it. Additionally, schools often do not formally assess the impact of coaching (Moody, 2019). This makes it difficult to assess broad structural impacts of coaching on teaching practice.

Conclusion

Instructional coaching is an impactful approach to improving instruction in schools (Knight, 2021). This includes many factors of teachers practice, including pedagogy, classroom management, curriculum planning and more. The call for action has already been shared by educators who are willing but not prepared to implement technology. Instructional technology coaches are the solution to increasing teachers' competency as effective users of technology to enrich students' learning experiences. Coaching provides effective PL for educators through mentoring, 1:1 feedback, reflection, and lesson demonstrations. The present study affirms that

general instructional coaching can positively influence technology integration among teachers, particularly when delivered in 1:1 conferencing and on-demand support modalities.

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