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A Phenomenological Study of the North Carolina Principal Fellows Program Internship Experience

Tyler Kulp
Michele Parker
Yan Liu
University of North Carolina Wilmington, USA

ABSTRACT

This transcendental phenomenology study explored the paid internship experiences of graduates from the North Carolina Principal Fellows Program (NCPFP). The study addressed the question: How does the paid internship experience in Master of School Administration (MSA) programs help graduates prepare for successful leadership in K–12 schools? Nine graduates from the NCPFP answered questions through phenomenological interviewing. The participants reflected on how their internships prepared them for effective leadership in today's complex educational landscape. Using transcendental phenomenological data analysis, three key themes emerged: professional networking, crisis management, and the authenticity of practice as critical elements in leadership preparation. The results aligned with National Educational Leadership Preparation (NELP) Standard 8 (2018), which underscores the importance of authentic internship experiences in principal development. Implications highlight the need for continued innovation in principal preparation, including diverse instructional strategies, updated curriculum design, and embedded supports for leadership growth and well-being within MSA programs.

***Keywords*:** phenomenology, principal preparation, standards, relationships, authenticity

Effective principal preparation is crucial for school success, yet current programs show significant shortcomings (Darling-Hammond, 2009; WestEd, 2019). Criticisms include outdated curricula, insufficient fieldwork, and a lack of alignment with contemporary educational standards (Levine, 2005; VanTuyle & Hunt, 2013). Recent research stresses the importance of integrating meaningful fieldwork and internships into principal preparation programs (Pannell et al., 2015; Zubnycki, 2013). Research on principalship indicates that the profession quickly evolves due to accountability practices, technological advances, and community changes (Herman et al., 2017; Kaufman et al., 2017;)

Jackson (2024) characterizes some of these traditional principal preparation programs as lacking in coherence, vision, and structure. Other principal preparation programs are labeled as innovative or exemplary, emphasizing the importance of a coherent curriculum that aligns with current state and professional standards, as well as an intensive internship experience (Jackson, 2024; UCEA, 2018). Scholars show that principal preparation programs need to shift their focus to updated standards-based curriculum and design approaches, essential leadership evolving pedagogy, and fieldwork and/or internships that allow theory to become the practice in training (Darling-Hammond et al., 2009; Davis & Darling-Hammond, 2012). This study aims to gain a deeper understanding of the paid internship experience to help ensure the quality preparation of future leaders as principals.

LITERATURE REVIEW

This literature review examines the impact of standards and accountability on school leadership, the effects of the Leandro case on educational policies in North Carolina, and the role of internships in principal preparation programs. Additionally, it explores the North Carolina Principal Fellows Program and its contributions to principal training and development.

Standards on Leadership

The Interstate School Leaders Licensure Consortium (ISLLC) established principal standards in 1996, updated in subsequent years to reflect evolving educational needs (Davis et al., 2005; North Carolina Department of Public Instruction [NCDPI], 2013). North Carolina Standards for School Executives (NCSSE), approved in 2006, guide professional development and evaluation (NCSSE, 2006). The standards emphasize strategic, instructional, cultural, and managerial aspects of leadership, with ongoing revisions to address emerging challenges (NCDPI, 2013; NCES, 2012). Research on principalship indicates that the profession quickly evolves due to accountability practices, technological advances, and community changes (George W. Bush Institute, 2016; Herman et al., 2017; Kaufman et al., 2017; NASSP, 2010).

Principal preparation programs need to shift the focus of the programs to updated standards-based curriculum and design approaches, essential leadership evolving pedagogy, and fieldwork and/or internships that allow theory to become the practice in training (Darling-Hammond et al., 2009; Davis & Darling-Hammond, 2012), potentially shifting towards more of an exemplary approach to principal preparation (UCEA, 2018; Winn et al., 2016). In 2015, the National Policy Board for Educational Administration (NPBEA) established the Professional Standards for Educational Leaders (PSEL) (NPBEA, 2015). Along with the PSEL, the National Educational Leadership Preparation (NELP) standards were developed to guide program design, accreditation review, and state program approval (NPBEA, 2018). These standards provide specificity to the latest performance expectations for beginning-level school and district leaders.

Principal Standards for North Carolina

In 2003, the Wallace Foundation sponsored a research study titled *Making Sense of Leading Schools: A Study of the School Principalship.* Based on this research project and the ISLLC's initial standards for professional practice, the state of North Carolina approved its initial seven principal standards on December 7, 2006 (Davis et al., 2005; NCSSE, 2006): strategic, instructional, cultural, human resource, managerial, external development, and micropolitical leadership (NCSSE, 2006). A rubric was later released in 2008, and Standard Eight, Academic Achievement, was released in 2011 (NCDPI, 2013; NCES, 2012). With the ongoing additions and addenda to the evaluative standards, North Carolina principals would be assessed on different levels within the standards, termed *elements*. They would be given an assessment score based on standardized testing (*does not meet expected growth*, *meets expected growth*, or *exceeds expected growth*) and given an overall evaluation score on effectiveness (*highly*, *effective*, or *need of improvement*) (NCDPI, 2013; NCES, 2012). The latest revised version of the NCSSE was published in 2013 (NCDPI, 2013).

North Carolina Principal Fellows Program

In 1993, the North Carolina General Assembly created the North Carolina Principal Fellows Program (NCPFP) to prepare candidates for leadership positions in the state's schools (Bastian & Marks, 2017). The program provides a scholarship loan to attend one of the eleven participating UNC System schools to earn a Master of School Administration (MSA) degree (Bastian & Marks, 2017). In the academic year, Principal Fellows receive $30,000 to assist them with tuition, books, and living expenses (WestEd, 2019). In the second year, Principal Fellows receive an amount equivalent to the salary of a first-year assistant principal, as well as a stipend for interning under a principal (WestEd, 2019). The program offers one year of academic study and a one-year internship in a public school in North Carolina (Bastian & Marks, 2017).

After completing the program, the Principal Fellow promises to seek and obtain employment in a public school in North Carolina for four years, and the loan is forgiven (Bastian & Marks, 2017; NCPFP, 2020). Principal Fellows who do not meet the requirement or who decide to leave education must repay the loan in full, including interest (Bastian & Marks, 2017). Traditionally, the fellows participating in the program are more effective than other MSA graduates based on student achievement, student absences, and teacher retention rates (based on the outcomes of the NC Teacher Working Conditions Survey (Bastian & Fuller, 2015; Bastian & Marks, 2017; WestEd, 2019). Studies by Bastian and Fuller (2015) have also shown higher graduation rates in MSA programs and higher employment rates after completing the MSA compared to non-Principal Fellow participants.

Internships within MSA programs

Internships have traditionally been part of MSA programs. Field-based internships constitute a significant characteristic of effective leadership preparation programs (Crow & Whiteman, 2016; Darling-Hammond et al., 2010). Several studies (Christian, 2011; Crow & Whiteman, 2016; Darling-Hammond et al., 2010; Duncan et al., 2011; Orr, 2011) have noted the importance of high-quality internships embedded in school leadership programs. Typically, there are three types of internships within programs: full-time embedded internships, detached internships with documentation, and course-embedded internships (Crow & Whiteman, 2016). Successful internships can be characterized by many different qualities. Some researchers (Christian, 2011; Duncan et al., 2011) link the success of internships to mentoring, coaching, and the relationship between the intern and the school, while other researchers (Havard et al., 2010; Sherman & Crum, 2009) note success through standards-based experiences and practical leadership responsibility training.

Perez et al. (2011) found that, over an extended period, interns lead with a shared vision of excellence through data-driven approaches, build individual and organizational capacity, and are better prepared to lead after gaining this experience. Meanwhile, Cunningham et al. (2019) discuss how principal preparation programs can help future leaders analyze situations by examining the how and why of situations through transformative and experiential processes to support development. The intended purpose of an internship or fieldwork experience is to provide these interactions and experiences to foster growth toward becoming future school administrators (Cunningham et al., 2019).

Paid Internships within NCPFP

As an NCPFP scholar, the program's second half is designed as a paid internship (NCPFP, 2020). According to the NCDPI site (2023), NCPFP scholars will participate in a one-year full-time internship at a public school in North Carolina. The student will be paid as an assistant principal with no experience (NCDPI, 2023). The requirements for the paid internship are as follows:

- An active, enrolled, full-time student
- 10-month supervised clinical internship with a mentor (Fusarelli et al., 2019)
- Not enrolled in a state-funded position (leave of absence required from previous employment)
- Enrolled at a university that garners the NCPFP scholarship (NCDPI, 2023)

Herman et al. (2022) note that internships with universities have common practices that align with national standards (specifically PSEL and NELP), and that selecting appropriate mentors for interns is part of the redesign process for universities' MSA programs.

METHODOLOGY

This study explores how recent graduates from cooperating universities perceive the paid internship experience of the North Carolina Principal Fellows Program (NCPFP). The research question is: *How does the paid internship experience in the MSA program at state universities prepare graduates for effective leadership in today's challenging educational environment?*

Phenomenological Study

Given the educational context of this research, a phenomenological study is ideal because it explores the "how" and "what" of a contemporary phenomenon in a real-life setting (Merriam & Tisdell, 2017; Moustakas, 1994). More specifically, the primary author used transcendental phenomenology to understand principals' prior internship experiences by reflecting on both their subjective acts and their objective aspects (Moustakas, 1994).

Participants and Selection

Purposive sampling was used to identify participants (Peoples, 2021). Nine graduates from a population of over 140 possible candidates were selected, representing all three graduating years (2021, 2022, 2023) and five universities within the UNC System. Their ages ranged from 20 to 49 years. To protect anonymity in this research, the names Jane and John, along with a number, were assigned to each participant.

Data Collection

Phenomenological interviewing uncovers the essence of experiences by exploring perceptions and reflections (Creswell, 2013; Peoples, 2021). Researchers aim to reveal the deep meanings that guide actions and interactions (Marshall & Rossman, 2016; Seidman, 2013). When researchers conduct phenomenological interviews, a single in-depth interview can yield highly trustworthy data for qualitative research (Englander, 2016; Høffding & Martiny, 2015). This research used a semi-structured interview protocol (Peoples, 2021), which covers key questions while allowing for deeper exploration of relevant topics. The researcher sent participants a total of seven questions before the session. Below is an overview of the interview protocol along with its literature background.

Table 1.

Interview Protocol with Literature Connections

	Interview Question	Literature Connection
Q1	What was your perception of being accepted into an MSA program as an NCPFP scholar?	Describe the lived experience while finding hidden meanings - Aguas, 2022; Moustakas, 1994; Seidman, 2013; Van Manen, 1990
Q2	How did you perceive transferring from your previous position to a paid internship?	Describe the lived experience while finding hidden meanings - Aguas, 2022; Moustakas, 1994; Seidman, 2013; Van Manen, 1990
Q3	Can you describe the setting of your paid internship?	Perspective and relation to the phenomena - Aguas, 2022; Creswell, 2013; Patton, 2015
Q4	What was your experience with your mentor during the paid internship?	Mentor relationship - NELP Standard 8, specifically Component 8.3, Ni et al., 2022; Pounder, 2011
Q5	In your paid internship, can you tell me an example where you experienced…. a) strategic leadership? Possible probes on mission, vision, alignment b) instructional leadership? Possible probes on learning, assessment c) cultural leadership? Possible probes on equity, inclusiveness, cultural responsiveness d) external development? Possible probes on community involvement	Standards Literature - NELP, NCSSE - Amsterdam et al., 2003; Catano & Stronge, 2007
Q6	How was this experience valuable to you in your principal preparation?	Internship value - Ni et al., 2022, Pounder, 2011
Q7	Anything else you want to tell me about your experience as a paid intern?	Will vary

Before collecting any data, the researcher compiled a list of potential participants using several methods, including reviewing university websites and NCPFP media (websites and social media posts). Once the researcher identified an overall population of 140 potential participants, a mass email was sent to the graduates explaining the study and inviting them to participate, with email addresses in the BCC line to protect anonymity. As participants began responding, the researcher

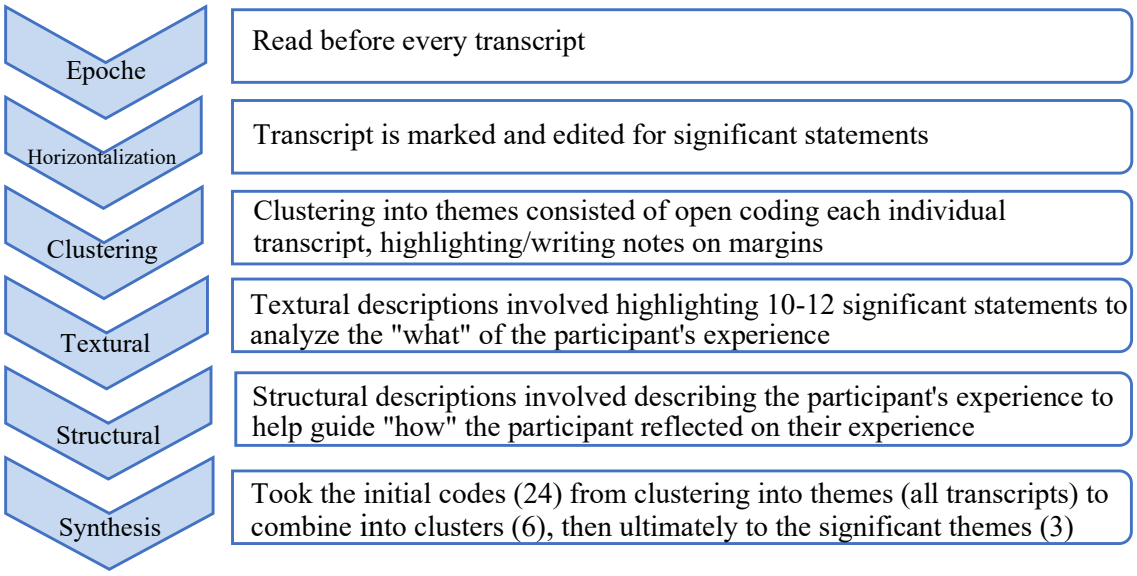
assigned each a participant code (e.g., J1, J2) for confidentiality and used pseudonyms to protect their anonymity (Peoples, 2021). The researcher collected data via Zoom, recording and transcribing all interviews, each lasting less than one hour.

Data Analysis

Transcendental phenomenology requires researchers to follow a detailed and systematic approach to data analysis, as outlined by Creswell and Poth (2018). Researchers suspend judgment and aim to capture the essence of phenomena, acknowledging that full comprehension remains elusive and cannot be achieved all at once (Peoples, 2021). To analyze transcendental phenomenological data effectively, researchers adhere to a thorough, multi-stage analysis process described by Colazzi (1978), Van Kaam (1966), and Moustakas (1994). This rigorous process preserves the integrity of the phenomena, ensuring that the analysis fully captures them. Explication, a key aspect of this process, investigates phenomena while maintaining their context as a cohesive whole (Peoples, 2021). Figure 1 displays the six stages of explication that the researchers applied in this study.

Figure 1.

Stages of Explication



Note. Adapted "Collaborative Reflections on a Practical Journey through Transcendental Phenomenology Data Analysis," by T. Kulp, H. Alzahrani, and M. A. Parker, 2025, *The Qualitative Report, 30*(9), p. 4366 (https://doi.org/10.46743/2160-3715/2025.7973). Copyright 2025 by Tyler Kulp. Reprinted with permission.

FINDINGS

This section reports findings, emphasizing three themes and six clusters, derived from twenty-four original codes.

Theme One: Professional Networking

Participants emphasized that professional networks were vital to their paid internship experience. They valued the bonds formed with mentors (both on-site and at the university), principals, assistant principals, cohort members, faculty, students, community members, conference presenters, professors, district personnel, and others. They considered these connections essential to successful leadership in today's educational environment.

Mentor Partnership with a Trusty and Supportive Relationship

In all nine interviews, each intern reported a positive experience with their mentor. For example, Jane 10 highlights the significance of the partnership between intern and mentor, emphasizing the importance of honesty in preparation:

> He did a fantastic job preparing me, told me all the things I didn't want to hear, but I needed to hear. He had no problem having a crucial conversation when necessary . . . . [He] pointed out faults, you know, as we say, areas of improvement or you know, I wasn't lulled into a false sense that I was doing a good job.

She went on to say, "That's why I didn't hesitate to take on the challenge [of the paid internship]" and "if I don't know something, I'm able to reach back for help." She continues to describe that her program still provides a "directory email," and when she "rolled across the stage, there is still a support system for me now." These connections she built during her paid internship remain prominent in her leadership today, as Jane 1 is now a high school principal.

Mentorship remained a strong theme throughout the research. Jane 5 described her excitement about connecting with "future administrators from across the state" and "developing those relationships" while completing her MSA and internship. From the start of the paid internship, participants found connecting with others highly valuable.

Networking with Varied Stakeholders

Throughout the interviews, the interns expressed their gratitude for the connections they had with other professionals and stakeholders. Jane 1 described connections with various professionals during her experience as a paid intern:

> So we had some leadership coaches that came in, former retired superintendents, former principals, people who work the district office. . . . I would have coaching sessions once a month. . . . I had their cell phone numbers . . . I had all the support I needed.

Jane 8 described how connecting with community members after a chaotic event was an important part of her internship: "We had a huge community meeting at the end of the year where anyone from the community could come in and voice their concerns, frustrations, needs. . . . It was a very powerful experience for me."

Even in a difficult situation, this experience with Jane 8 shows the importance of professional networking with other professionals in the community as valuable preparation for leadership.

Jane 9 focused on different aspects of professional networking: "There are experienced practitioners who can vouch for these different ideas . . . it gave me the confidence by looking at their research and hearing what other respected experienced educators have to say."

The commonality among these experiences was the importance of building relationships and professional connections across their schools, communities, and country. The theme of professional networking was a vital aspect of the paid interns' professional growth and helped them prepare for successful leadership in today's challenging educational environment.

Theme Two: Crisis Management

The second theme, *crisis management*, stems from clusters of *strategies developed in response to COVID-19* and *related emergencies*. This theme was developed from five original codes: chaos, COVID-19, challenge, new, and present. To capture the essence of the experience surrounding the theme, the researchers provided both textural and structural descriptions.

Strategies Developed in Response to COVID-19

The COVID-19 pandemic was a major part of the paid interns' experiences during the early 2020s. Learning strategies to deal with the COVID-19 pandemic were a common topic in interviews. Jane 9 discusses her experience with the issue of attendance in her alternative school setting: "I came in right as the limited attendance from the Pandemic was lifting, and things were kind of dismantled and had sort of come off the wheels [*sic*]. I really had to build everything from the ground up."

Later in the conversation, Jane 9 discussed learning how to address safety and student movement towards the end of COVID-19: "Things were deconstructed . . . people asked me what your plan for student movement is . . . so we had to figure out everything."

Related Emergencies

As safety planning remains an important aspect of crisis management, dealing with authentic emergencies during the internship proved to be a common topic. Jane 2 described one emergency experience that helped prepare her during her internship:

> I had my first car chase . . . we had a student leave the campus because he was upset, he did not get a popsicle. Our security officer saw him run out the front door. Myself, the assistant principal, the principal, and our security officer went after him. I hopped in my car . . . then the school bus came up behind me, and the security officer got her close enough to jump out and scoop him up. We were close to a mile up the street.

She further describes the importance of the event by saying, "It was crazy; that is something you cannot get in a textbook."

During the first few months in the paid internship, Jane 12 experienced two emergencies: first, a natural disaster, and then the death of a staff member. She explained, "So my first week, as an assistant principal intern, I am in muck boots downtown clearing out stores like we're working." She continued, "Then we were doing the right thing for our community as a whole…we're going on just to different businesses; we just want to help." Discussing the second crisis, she described, "This was my 15th year in education, and I never had a staff member die. You know, we had kids who witnessed everything, and my principal never experienced that. You do the best [you can]." She ended our conversation reflecting on the events by saying, "That you get to learn, and I think real life is the best teacher…the paid internship bolsters that."

Crisis management was a major theme throughout the interviews. In dealing with different, chaotic events or planning for them, crisis management helped prepare these future leaders for today's challenging educational environment.

Theme Three: Authenticity of Practice

The third theme, *authenticity of practice*, stems from the clusters *program expectations* and *utilizing data for change*. These clusters were formed from 13 codes: standards, diversity, equity, data-driven, student learning, focus, mental health, problem-solving, mindset, wisdom, reflection, opportunity, and confidence.

Program Expectations

Participants shared that the authenticity of practice was a vital part of their paid internship experience. This theme particularly addressed sub-question 1 by examining the components of the professional standards and highlighting the importance of genuine practice in administrative tasks in preparation for future leadership of K-12 educational buildings. This theme was prevalent due to the different aspects of interns' professional growth, including leadership and learning to lead key tasks outlined in the professional standards. However, in each experience, the cluster of program expectations was prevalent in encapsulating the original codes. To analyze this idea further, Table 2 outlines the different ways in which the paid interns experienced alignment with professional standards.

To discuss some specific examples of the authenticity of practice theme through the cluster of program expectations, Jane 1 described her program, along with a specific example highlighting the standards through the program expectations to give her an authentic example of practice: "I will give kudos to [university], like they really have a great program laid out . . . Everything is just so organized, and you're just supported along the way." Further, Jane 1 went on to elaborate on the Strategic Leadership standard(s):

> I was a part of the school leadership team, where we sat down and worked on the school improvement plan. . . . where you are really leaning on your principal's vision and making sure that you're supporting their vision to the mission for what they have for the school.

Jane 3 discussed the authentic practice of conducting a teacher observation: "He sat down with me, and we did three observations at the beginning of the year together. He showed me how to take low inference notes whenever you're going into a classroom."

These stories of authentic practice through the leadership standard are apt examples of how the paid internship program created experiences that helped the paid interns prepare for successful leadership in today's challenging educational environment.

Table 2

Standard and Alignment with Experiences

Standard	Alignment with Experiences
NCSSE 1. Strategic Leadership + NELP 1. Mission, Vision, and Improvement	● Mission and Vision Statement Revisions ● Mottos ● School Improvement Team ● School Leadership Team ● School Improvement Plan ● Scheduling
NCSSE 2. Instructional Leadership + NELP 4. Learning and Instruction	● Professional Learning Communities ● Observations ● Beginning Teachers
NCSSE 3. Cultural Leadership + NELP 3. Equity, Inclusiveness, and Cultural Responsiveness	● School Improvement Team ● Data-driven decisions ● MTSS (multi-tiered system of support) ● PBIS (positive behavior implementation strategies)
NCSSE 6. External Development Leadership + NELP 5. Community and External Leadership	● Parent Nights ● Community Nights ● Parent Advisory Council ● Surveys ● Field Trips

Utilizing Data for Change

Jane 8 described an instance where she talked about struggling students with a teacher who helped her with her instructional leadership:

> I worked with a BT [beginning teacher] . . . I was able to introduce additional strategies that she could use in class that I had created. It was based on that focus group that had two students with the EC teacher, who was also the BT. We got some student feedback to find out what was working and what wasn't working in class.

Jane 10 discussed an example of utilizing data for change in terms of state testing and how that authentic practice helped her during her paid internship:

> So when I sat down during the PLCs, and talked about EOC [end-of-course testing], we needed to see proficiency in biology and growth in English. The whole state was sliding in English at the time, and you know, having these conversations and coming up with interventions, how are we going to track these kids who are bubble kids, who's probably going to be a level three, or who's a high or low three that we need to focus on.

DISCUSSION

The discussion highlights the findings in light of prior research and additional studies for further support. This section is organized by study themes: (1) professional networking, (2) crisis management, and (3) authenticity of practice.

Professional Networking

In describing the theme of professional networking, it is essential to note that, in transcendental philosophy, self-reflection and intuition take precedence over deduction (Moustakas, 1994). When looking back on the experience of the paid internships, the participants often noted early on and throughout their individual descriptions the importance of the relationships they built and the people who shaped their experience. Led by the mentor relationship, bonds created with professional and stakeholder networking during their experience were vital.

Crow et al. (2002) discussed issues within principal preparation programs early in the 21st century, specifically linking them to a lack of awareness of the extensive community responsibilities required of a principal at the time. Additional research (Christian, 2011; Duncan et al., 2011) links the success of internships through mentoring, coaching, and the relationship between the intern and the school. Even in the report of the NPBEA (2015), when they released the latest administrative standards, they noted the importance of relationship building as they released the new standards.

This theme of professional networking, built into the program, was highly prevalent in this research. Whether it was the mentor relationship or other educational leaders within the building, community, or county, professional networking was an important thread throughout the paid internship experience.

Drake et al. (2023) discussed in their recent quantitative study that principal mentors played a key role in determining the quality of their internship experience, particularly in areas such as autonomy in expertise and the support they received. Drake et al. (2023) discussed how mentors' encouragement of proactive behavior and pushing interns to seek opportunities with other professionals beyond those directly assigned (mentor) helped ensure interns engage in real-time problem-solving experiences. This theme of professional networking is a crucial part of the internship experience and was supported by the paid experiences.

Crisis Management

Within phenomenological research, Creswell (2013) notes that sometimes, finding individuals who all (within the study) experienced a common phenomenon can be difficult. Given the study's time frame (2021 to 2023), the crisis management theme would likely remain relevant, as the COVID-19 pandemic continued to impact our world into 2024 and beyond.

Principal preparation is about developing. The emphasis within the new principal preparation standards, NELP (2018), specifically highlights Standard 8: Internship, with three components: emphasizing an authentic field and/or clinical experience, minimum time frame requirements, and effective mentorship are crucial for the experience. Also, new research using the INSPIRE software to analyze the internship experience embedded within the programs could be incredibly beneficial for future research, as noted by Ni et al. (2022).

With all these emergent situations, the heightened awareness of crisis during the principalship internship was worth noting in preparation. Zhang et al. (2022) note that a study of Chinese colleges found higher levels of anxiety among graduates with academic degrees than among graduates of other professional programs. Mudiwa et al. (2023) also stated that school administration interns who were impacted by the pandemic needed to learn flexibility and lead with intentionality as future characteristics of leaders within the context of crisis.

One possible addition to preparation programs could be an idea stemming from a group of professors in North Carolina. Allen et al. (2020) discuss the importance of preparing principals for trauma-sensitive leadership. In their study, Allen et al. (2020) discuss incorporating brain-based research and examining different adverse childhood experiences (ACEs). Trauma-informed leadership would at least allow future principals to be aware of the different situations that arise among students and to understand how crises affect the brain. This theme of crisis management is difficult to simulate; however, it is undeniably evident in participants' experiences in the study.

Authenticity of Practice

Husserl's phenomenology is transcendental because it adheres to discovery through reflection on subjective acts and their objective correlates (Moustakas, 1994). Further, phenomenology commits itself to the descriptions of the experiences by means of the *noema* and *noesis* (Moustakas, 1994). Noema is defined by what is experienced, and Noesis is how it is experienced (Moustakas, 1994). Through these descriptions and definitions of phenomenology, the theme *authenticity of practice* is defined by our participants through the noesis (Moustakas, 1994) of the standards-based approach of the principal preparation program, as informed by the paid internship experience.

Early in the 21st century, both Morrow (2003) and Levine (2005) described how principal preparation programs failed to keep pace with changes in the principalship in the field. Further, Davis et al. (2005) and Murphy et al. (2008) discussed

how principal preparation programs were inadequate training grounds. As the research continued to produce such negative findings on such programs, the standards evolved. In North Carolina, the standards were initially established in 2006 (NCSSE, 2006), then a more explicit rubric and evaluation tool in 2008 (NCDPI, 2013; NCES, 2012), along with a new standard in 2011 (NCDPI, 2013; NCES, 2012), and finally the latest updated standards in 2013 (NCDPI, 2013). Unfortunately, with these updates, the specific concern was on the standardized testing movement in the US, not the actual principalship. As the research focused more on training, Darling-Hammond et al. (2009) and Davis and Darling-Hammond (2012) noted that fieldwork/internships allow future principals to practice in training, and that it needs to be emphasized. However, other researchers (e.g., McCarthy, 2014; Young et al., 2013) noted the limited research on the impact of fieldwork.

With changes to standards under the NPBEA (2015) and the NELP (2018), programs began using different data collection instruments to identify their strengths and weaknesses. The Initiative for Systematic Program Improvement through Research in Educational Leadership (INSPIRE) research collaborative has developed surveys to gain insights into various aspects of the programs from different stakeholders (Ni et al., 2022). As this tool is relatively new and mirrors the latest national standards revisions (Ni et al., 2022; NPBEA, 2015), the amount of empirical evidence remains thin and preliminary (Ni et al., 2022), and there are too few quantitative studies to show the impact of changes (Crow & Whiteman, 2016).

In the current research study, the *authenticity of practice* theme was highlighted through the participants' responses, explicitly stating the importance of referring to the standards (five of the nine participants) and through different leadership opportunities utilizing data to mimic fundamental responsibilities of principals like Professional Learning Communities (PLCs) and beginning teachers' programming (all participants). These participants specifically highlighted standards-based approaches used in their paid internships to provide authentic leadership practice. The primary researcher specifically asked, using a cross-section of standards (both national and North Carolina-specific), for examples that highlighted authentic practice. However, he is confident that if he had discussed all eight standards of the latest NCSSE revision (NCDPI, 2013), the participants would have discussed individual experiences correlated with each.

In this study, the finding that participants' responses to the experiences aligned with the standards was interpreted positively. In establishing the theme *authenticity of practice*, the researchers identified additional positive research aligned with this aspect of the paid internship experience. Walker and Gray (2022) discuss the importance of using data in clinical experiences to improve principal preparation. Dexter et al. (2022) note that the specific data within emphasized competencies can serve as prevalent leadership preparation tools to better prepare future leaders. Mudiwa et al. (2023) discussed the essential preparation of principal interns through functional skills and core leadership competencies. Standards-based preparation is essential to a future principal's internship/fieldwork experience, and these authentic practice experiences are fundamental for leadership.

Implications for Practice

We suggest several implications for principal preparation programs:

1. Authentic Field-Based Experience: The theme *authenticity of practice* suggests that programs should emphasize authentic, field-based internships. Programs might consider incorporating paid internships to enhance practical learning (Winn et al., 2016).

2. Program Redesign: Programs should bridge theory and practice, integrating fieldwork, coursework, and practicums. Collaborative redesign efforts could drive continuous improvement (Dodson, 2015; Walker & Gray, 2022).

3. Crisis Management Training: The theme *crisis management* suggests that programs should include crisis management and trauma-sensitive leadership courses in curricula, reflecting the pandemic's impact on educational experiences (Mudiwa et al., 2023; Allen et al., 2020).

4. Professional Networking: The theme *professional networking* suggests that programs should enhance opportunities for expanding professional networks and ensure high-quality internships by focusing on mentor training (Drake et al., 2023).

5. Standards Compliance: The theme *authenticity of practice* suggests that programs should align with the National Educational Leadership Preparation Standards, which require a minimum of six months of concentrated, authentic leadership internship experiences (Standard 8 Component 8.2).

Overall, integrating these elements could improve principal preparation and better support future educational leaders.

Limitations

This study has several limitations. Only 9 of 15 initial respondents participated, with a notable gender imbalance (8 females) and limited racial diversity (only Black or African American and Caucasian participants). Additionally, two universities were not represented. Furthermore, the participants' experiences were heavily influenced by the COVID-19 pandemic, affecting their education through remote instruction and altered schedules. This pandemic impact was a significant theme in the study. The phenomenological approach also meant that certain perspectives might have been overlooked due to the researcher's current context and horizon.

Essence of the Phenomenon

The essence of the phenomenon is that, through the lens of professional standards, state universities in North Carolina successfully prepare future school administrators for a challenging educational environment through paid internships, allowing NCPFP scholars to experience professional networking, crisis management, and the authenticity of practice.

CONCLUSION

This transcendental phenomenological study could help various professionals prepare future school administrators for the challenging educational environment of the 2020s, post-COVID-19 Pandemic. The internship experience is crucial in preparing future principals (Winn et al., 2016). Incorporating the latest professional standards throughout the internship is a strategic way to ensure that future school leaders receive better training. In the study, which used the current NELP standards (2018), it was found that when candidates are provided with a variety of coherent, authentic field and/or clinical experiences within the framework of professional standards, school administrators are better prepared for the principalship than those without internship experience. State universities in North Carolina are effectively preparing aspiring school administrators to navigate the complexities of present-day educational settings. The NCPFP's paid internship component provides scholars with authentic opportunities for professional networking, crisis management, and the development of leadership practices grounded in real-world experience within school communities. This study affirms that intentional alignment between university preparation (through the lens of current NELP standards) and field-based internships not only strengthen the leadership pipeline but also advances the overall quality and sustainability of school leadership across the state.

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TYLER KULP, EdD, is an adjunct professor and recent graduate of the University of North Carolina Wilmington. He is the Associate Superintendent of schools in the Diocese of Wilmington. Email: tylerkulp21@gmail.com

MICHELE PARKER, PhD, is a Professor of Educational Leadership at the University of North Carolina, Wilmington. She earned her Ph.D. in Research, Statistics, and Evaluation from the University of Virginia and focuses her work on instructional technology and educational research methodology.

YAN LIU, PhD, is an Associate Professor of Educational Leadership at the University of North Carolina Wilmington. She earned her Ph.D. from Michigan State University and specializes in quantitative research on school leadership and effectiveness.

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Exploring the Roles School Administrators Can Play in Helping Elementary Teachers Implement Mathematics Differentiated Instruction More Effectively

Sheldon McDonald
Florida International University, USA

ABSTRACT

Recent data indicate that students' overall achievement in mathematics in the United States continues to deteriorate and that performance deficits worsen over time, highlighting the importance of focusing intervention efforts on early grades. To resolve this problem, many schools now require teachers to incorporate differentiated instruction (DI) into their practice, as research suggests that when appropriately implemented, DI improves learning and performance through instructional modifications that more effectively incorporate students' interests and differences in learning. However, studies also indicate that many teachers feel unprepared to implement DI effectively to support their diverse classrooms. This phenomenographic study explores the perspectives of 17 elementary mathematics teachers on their understanding of DI and barriers to effective implementation, to better inform school administrators about the support teachers need to overcome these challenges. Results indicate that administrators can best support teachers with DI implementation in several ways, including fostering the awareness that DI is not only useful for struggling students; providing more modeling of DI implementation in practice; offering more training for online differentiation; and engendering consensus among staff on what terms/language to use or avoid when referring to different groups of students, to facilitate empowerment and collaboration.

***Keywords*:** differentiated instruction, cultural and linguistic diversity, students with disabilities, inclusive mathematics teaching

The Program for International Student Assessment (PISA) is an international assessment that measures mathematics, science, and reading literacy among 15-year-olds, administered to evaluate the effectiveness of educational systems worldwide. PISA is administered by the 38-member-country Organization for Economic Cooperation and Development (OECD). The most recent data published in 2023 by PISA show that, among 38 countries, the United States ranks 28th and has had its worst performance in mathematics since the assessment's inception in 2000 (Barshay, 2023). Further analysis of the data suggests that as much as 67% of 15-year-olds within the United States, who are primarily in grade 10, are unable to compare distances between two routes or convert money from one currency to another (Barshay, 2023). In addition, studies show that culturally and linguistically diverse (CLD) student populations and students with disabilities (SWD) continue to experience significantly lower levels of mathematics achievement in comparison to their peers and that the deficit between high-achieving and low-achieving students continues to widen (Barshay, 2023; Dorn et al., 2020; Pak & Parsons, 2020; UNESCO, 2017).

In an effort to resolve these academic learning and performance deficits, many school districts across the United States now require teachers to incorporate differentiated instruction (DI) into their practice. As defined by Tomlinson and Imbeau (2023), differentiated instruction involves incorporating students' various cultural/linguistic backgrounds, readiness levels, interests, learning differences, and learning profiles into the teaching process and using this information to modify instruction accordingly. Within such learning environments — populated by increasingly diverse student populations —

teachers, support staff, and other professionals collaborate to facilitate optimal learning experiences for all students. The learning environment is also characterized by students feeling valued for their unique strengths and having access to various ways to demonstrate what they know (Mulroy & Eddinger, 2003; Tomlinson & Imbeau, 2023).

Research increasingly demonstrates that, when appropriately implemented, DI can improve academic learning and performance outcomes through instructional modifications that more effectively incorporate students' needs, interests, and differences in learning (Heacox, 2002; Tomlinson & Imbeau, 2023). However, despite the immense potential DI can offer the inclusive classroom, research shows that while most teachers have some understanding of it, many feel incapable of appropriately implementing DI to accommodate their students' dynamic differences in learning (Lavania & Nor, 2020). These challenges are often associated with insufficient DI knowledge, inadequate knowledge of data-driven teaching and learning methodology, insufficient time to plan and implement DI, large class sizes, insufficient administrative support, and overloaded curricula (Lavania & Nor, 2020). Given that disproportionate learning and performance deficits in mathematics widen as students advance to higher grade levels (Dorn et al., 2020), the support mathematics teachers need in earlier grades to incorporate DI more effectively amongst their increasingly diverse student body becomes even more important. In fact, the literature shows that students' early experiences with mathematics can have a lasting impact on engagement, learning, and achievement in future schooling (Clements & Sarama, 2014). As such, the purpose of this phenomenographic study was to explore elementary teachers' conceptions of DI and the barriers to successful DI implementation, especially for resolving the historical mathematics learning and performance deficits among CLD students and SWD. It is expected that the resulting implications will provide a framework that can be used by school administrators to provide the support necessary for teachers to implement DI more effectively in resisting long-standing learning and performance deficits in mathematics.

REVIEW OF LITERATURE

DI Is Not New

Although DI has gained significant attention in recent decades, the concept is not new. Betts (1946) advocated this approach to teaching through what he termed *differentiated guidance*, requiring teachers to guide students through their individual stages of development, informed by continual assessment of their strengths and weaknesses. Also, according to Sherman (2008), the applications of DI stem from the work of John Dewey, who highlighted the importance of teachers modifying instruction to serve the needs of their students (Dewey, 1916). Though not a new concept, current representations of DI are widely attributed to the work of educator, professor emeritus, and author Dr. Carol Ann Tomlinson. Within these models, differentiation takes place across four domains: content (the knowledge, understanding, and skills that students need to learn), process (the ways in which students come to understand and make sense of what is being taught), product (the ways in which students are allowed to demonstrate what they have learned), and affect/learning environment (the look and feel of the classroom and the ways in which students are allowed to interact with each other) (Tomlinson, 2003; Tomlinson & Imbeau, 2023).

Durgin (2026) emphasizes an important assumption associated with DI theory—that DI is not only for struggling students or SWD but also benefits all learners. Furthermore, Durgin notes that when teachers consider content, instruction, assessment, and the learning environment when planning DI for mathematics, certain features are typically associated with instructional practices. These include *peer collaboration* (e.g., a couple of students are paired together, with one reading a math word problem to the other); *differentiated tasks* (e.g., a group of students is working on a version of a word problem worksheet with simpler sentence structures, or a group of students is meeting with the teacher to participate in an extension math activity); *access to additional support when needed* (e.g., a small group of students is meeting with the teacher to be retaught a math skill or to receive additional time to complete a math project or assignment); and *active autonomy in one's own learning* (e.g., a variety of different colored folders are present on a math center table that students can choose from, each with a different activity based on their various needs or preferences, or students are provided with a variety of options to demonstrate that they have mastered a skill).

The Evidence for DI

While research on measuring DI implementation continues to evolve, it has been challenged by a lack of consensus in the literature on how best to measure DI effectiveness. Van Geel et al. (2019) conducted a systematic review of the literature to understand the various methods by which DI has been measured in research. The review found that in most studies, attention varied across how students were grouped, which instructional materials were used, how lessons were paced, and

the types of questioning teachers employed. These findings suggest a need for more research focused on developing more valid and reliable forms of DI measurement (Parsons et al., 2018).

Notwithstanding the complexity of measuring the effectiveness of DI, it is clear that its implementation improves academic performance. For example, Am et al. (2023) conducted a systematic review and meta-analysis of 49 studies published between 2010 and 2023 that measured academic outcomes in students after DI was implemented, compared with control groups. Among the studies, DI strategies identified included providing differentiated tasks that cater to students' differing interests, teaching students numerous learning strategies tailored to their unique learning styles, and incorporating flipped instruction, where instruction is sometimes provided online in the form of homework so that class time can be used primarily for peer collaboration and working on projects. The extensive scope of the studies assessed included outcomes such as academic performance, critical thinking skills, reading comprehension, decoding skills, and mathematics problem-solving. In addition to mathematics, the reviewed studies examined the effects of DI across a range of subjects, including science and English. The studies originated from the continents of Africa, Asia, and Europe, and from the United States, and spanned kindergarten, elementary, high school, and college academic levels. Am et al. (2023) acknowledge that the effectiveness of DI implementation is highly nuanced and contextual, based on specific country and school environments and norms. Nonetheless, the data generally indicated a significant positive influence of DI on academic engagement and performance compared with control groups of students who were not instructed using DI pedagogy. The authors concluded that these results indicate substantial consistency in effect size across grade level, subject, and sample size, thereby supporting the universality of DI's efficacy.

Teachers Feel Unprepared for Effective DI Implementation

Research on early-grade teachers' conceptions and experiences with DI is burgeoning and beginning to point to some causes of unsuccessful DI implementation. For example, in a study conducted by Strogilos et al. (2017) on elementary co-taught classroom teachers, some of whom were inclusive general education teachers and some of whom were special education teachers, it was found that teachers generally found DI implementation challenging because of the lack of sufficient time and resources, pressure to complete the approved curriculum, and insufficient training. Some teachers also indicated being fearful of accusations of discrimination while attempting to treat SWD "the same" as their peers within inclusive classroom settings. Strogilos et al. (2017) identified several barriers to effective DI implementation, including the belief held by many teachers that DI is suitable only for SWD. Furthermore, many teachers believed that DI was necessary only when students needed more help or had difficulty understanding what the teacher was saying. It was also found that the majority of the teachers considered differentiation only in terms of adjustments to teaching strategies, without indicating awareness of other dimensions of DI, such as assessments or the learning environment.

Other studies have identified similar challenges that general education teachers face in appropriately implementing DI within inclusive classrooms. While the co-teaching instructional model—where classes are taught by both a general education teacher and a special education teacher—has been the most common form of inclusive co-teaching (Cook et al., 2017), many general education teachers in this setting report experiencing inadequate co-teaching support (Pak & Parsons, 2020). Studies consistently report that within the inclusive setting, when DI is appropriately implemented, general education teachers increasingly come to acknowledge that specialized services work well not only for SWD but for all students (Florian, 2014); the academic performance and socio-emotional engagement of SWD are significantly improved (Biklen et al., 2014); and the inclusion of SWD in general education classrooms does not impede the academic progress of their peers. In fact, peers of SWD are more likely to view disability in a positive light (Salend, 2016), and special education teachers experience a greater sense of belonging and purpose when exposed to a broader range of learner differences (Salend, 2016). Despite these potential benefits, however, many general education teachers are unable to reap these benefits, because of the influence of certain barriers such as limiting DI beliefs (De Jager, 2017); insufficient support and training to manage students who experience emotional disturbance (Gilmour, 2018); and the combination of insufficient time, additional paperwork, overwhelming class sizes, and numerous other school responsibilities (Aldossari, 2018; De Jager, 2017; Lunsford, 2017).

Several factors served as motivation for this study. Firstly, while DI scholarship is promising, DI research has paid most of its attention to special education classrooms (Choi et al., 2020). Additionally, despite its relevance to best practices in teaching, how general education teachers think about implementing DI for the inclusive classroom, and the factors influencing their perceived efficacy with its implementation, remain insufficiently explored (Russo et al., 2021).

METHODS

A phenomenographic methodology was employed for this study because the goal was to obtain a more in-depth understanding of the different ways in which general education elementary teachers of mathematics understand the role of DI and the factors that impede its efficacy in implementation. Phenomenography is a qualitative form of research concerned with exploring different understandings or conceptions of a phenomenon and seeks to identify categories of description that depict appearances, experiences, and meanings (Hajar, 2021; Marton & Pang, 2008).

After approval was received from a large Southeastern State University's Institutional Review Board, recruitment emails inviting teachers to participate in the study were sent using public, charter, and private school websites within the state. General education elementary mathematics teachers of varying demographics, including age and gender, with at least three years of experience with the implementation of DI, participated in the study, since teachers generally need at least three years of experience to develop competence and confidence (Murray & Male, 2005), and also since teachers generally require more than three years of experience with DI implementation to feel competent to use it consistently (Van Geel et al., 2022). Data saturation was achieved by the seventeenth interview, meaning that no new insight continued to emerge from the interviews. Through open-ended, structured Zoom interviews, insight into general education elementary mathematics teachers' conceptions of DI and of barriers to their efficacy in its implementation was attained. Table 1 provides additional information about the teachers who were interviewed. Pseudonyms were used to maintain participant confidentiality.

Table 1

Participant Information

	Gender	Grade Level	Years of Experience	School Type	Qualification(s)
T1	Female	5	3	Public	B.Sc. Spec Ed.
T2	Male	4	11	Public	M.Sc. Elem. Ed.
T3	Female	5	6	Public	B.Sc. Biology
T4	Female	4	5	TI Public	B.Sc. Elem. Ed.
T5	Male	2	10	Public	Ed.D. Ed. Ldshp; M.Ed. Spec. Ed
T6	Female	5	13	Public Virtual	Ph.D. Ed. Ldshp; M.Sc. Sec. Ed.
T7	Female	4	20	Public	B.Ed. Elem. Ed.
T8	Female	1	10	TI Public	M.Sc. Elem. Ed.
T9	Female	4	8	Public	B.Sc. Elem. Ed.
T10	Female	2,3	5	Private	BA. Crim. Justice
T11	Female	3	8	TI Public	Ph.D. Ed. Ldshp; M.Sc. Elem. Ed.
T12	Male	2	6	Public	B.Sc. Spec. Ed.
T13	Female	3	17	Public	M.S. Reading; B.Sc. Earth Sci.
T14	Female	1	10	Charter Virtual	M.Sc. Elem. Ed.
T15	Female	4	6	TI Public	M.Sc. Reading
T16	Female	4,5	23	Private	Ph.D. Math Ed; M.Sc. Elem. Ed.
T17	Female	3	24	Public	Ph.D. Elem Ed; M.S. English

Note. TI refers to Title I teachers.

To analyze the data, all interviews were transcribed verbatim using the closed-caption feature provided by the Zoom software platform. Transcriptions were coded after each interview by highlighting code words obtained from the participants' own words (verbatim coding). As the interviews progressed, the patterns identified in the codes informed the development of the themes suggested by the data. The resulting interpretations were then examined to answer the study's research questions:

1. What are general education elementary mathematics teachers' conceptions of DI and conceptions of the barriers that affect their efficacy with its implementation?
2. Based on general education mathematics teachers' conceptions, what forms of support are necessary for them to more effectively implement DI in ways that resist historically disproportionate mathematics learning and performance among CLD students and SWD?

3. Based on general education mathematics teachers' conceptions, what changes within the learning environment are necessary for a culture of equity, inclusivity, collaboration, and fairness to flourish within inclusive general education elementary mathematics classrooms?

RESULTS AND IMPLICATIONS

The results of the study are presented as a guide that school administrators can use to help prepare mathematics teachers at all grade levels to navigate seven identified barriers to instruction that inhibit effective DI implementation. Accompanying this guide is a set of discussion questions for school administrators and professional development practitioners to encourage more meaningful dialogue with teachers and make the implementation of mathematics DI more effective, practical, and sustainable.

Barrier 1: The Misconception that DI is Intended for Struggling Students

Research Insights

The majority of general education teachers interviewed view DI as a temporary intervention strategy aimed primarily at supporting SWD or those performing below grade level. Typically, they associate DI with small-group instruction following poor test performance on specific standards. For example, participant T4 described DI as "small groups for students who did not do well on particular standards in a test." T7 stated that DI "benefits the ones who struggle the most." Teachers who had special education training demonstrated a broader and more inclusive understanding of DI. They acknowledged its value in supporting a wide range of students, regardless of ability level. As stated by T12, DI involves "…providing the students in your class with what they need to be successful, no matter how low or high they may be." Also, T2 stated, "All students benefit from DI. I as the teacher must ensure that I cater to all learning styles and preferences for learning."

Recommendations for School Administrators

School administrators should instill an understanding, particularly in general education teachers, that DI is not limited to remediation. It should be continuously implemented to meet the diverse learning needs of all students, including high achievers. Additionally, collaborative planning sessions between general education and special education teachers should be promoted to share inclusive DI strategies. Furthermore, mentorship models that allow special education teachers to guide their peers in using strategies that enhance both engagement and achievement for all students should be incorporated into school practice.

Discussion Question

What are some ways in which you could differentiate mathematics content that address the needs of your struggling students as well as your high-achieving students?

Barrier 2: Insufficient IEP/504 Paperwork Preparation

Research Insights

Most general education teachers reported feeling unprepared to handle the paperwork and legal requirements associated with teaching SWD with IEPs or 504 Plans. However, all special education teachers reported feeling adequately prepared for these responsibilities. For example, T1 indicated that majoring in K-12 special education enabled her from the start of her teaching career to meet IEP and 504 expectations. She stated, "I majored in K-12 special education, so I had the tools and felt comfortable with coping with IEP accommodation requirements. I'm just not sure how teachers who did not get this training cope with these things, especially at the beginning of their careers." On the other hand, T10, for example, noted, "no one taught me about IEPs [or] 504s. No one taught me what the difference between IEPs and 504s are and so on."

Special education teacher T5 also highlighted a nuanced aspect of working with IEP and 504 students that many new teachers are unaware of—identity and acceptance among peers. T5 stated,

> Regarding IEPs, [I have to] handle kids who are conscious about how they look with their peers and not wanting to utilize accommodations provided in their IEPs. Because it is a legal document, you have to help the child understand

this is something that has to be provided, then, in collaboration with the parents at the yearly IEP review meeting, we can reconsider whether certain accommodations are no longer needed.

Recommendations for School Administrators:

It is recommended that school administrators provide targeted professional development focused on the differences between IEP and 504 Plans, their legal implications, and best practices for implementation. Also, it is suggested that experienced teacher mentors be assigned to assist beginning teachers with the documentational and instructional aspects of SWD teaching.

Discussion Question

Do you know what the acronym *IEP* stands for or the significance of the number *504* in reference to 504 plans?

Barrier 3: ELL and ESE Teacher Certifications Alone Do Not Sufficiently Prepare Teachers to Accommodate English Language Learners in Mathematics

Research Insights

The study revealed that teachers are concerned that state-mandated ELL and ESE certifications fail to adequately prepare them to accommodate students whose first language is not English. For example, T15 stated, "I'm considering having that certification removed...there is so much I do not know about ESE students' needs, and it is stressful." She emphasized that being fluent in Spanish—rather than having obtained the certification—was what enabled her to support her ELL students effectively. It was also found that there is a general lack of cultural sensitivity in the instructional resources provided for teachers to use with their ELL and ESE students. For instance, T1 recalled a situation that caused tremendous confusion among some of her students because a mathematics textbook cited a word problem in which the character's name was *Cara*, which also means *expensive* in Spanish. T1 felt that a teacher with ELL or ESE certification who was not a native Spanish speaker would likely miss the source of this confusion. According to T1,

> There was an issue with a particular problem in our math textbook. The topic involved least to greatest. In the problem, the name of the character was "Cara." Cara happens in Spanish to mean expensive, but in the problem, Cara had received the least amount. This caused confusion in some of my ELL students. Even though I myself happen to speak Spanish, I overlooked this as a potential issue for my English language learners. I can imagine how much more of a challenge this could be for teachers who are not fluent in Spanish. So, I learned from this moving forward that I need to double-check the assignments provided to my students for issues such as this, and change the names accordingly.

Recommendations for School Administrators

As a best practice, school administrators should leverage multilingual staff to assist with translation, small-group reteaching, and reviewing instructional materials for potential cultural/linguistic misunderstandings. It is also recommended that administrators advocate for in-school ELL/ESE professional development training to supplement state-approved ELL and ESE certifications.

Discussion Question

When you see or hear the terms *ELL* or *ESE*, do you automatically think of Spanish as being the most common native language of your ELL or ESE students? To what extent do you think other native languages have become more typical in today's diverse classrooms, and what can your school do to support students with these rapidly increasing non-Spanish native languages?

Barrier 4: Insufficient Modeling of DI Implementation Techniques in Teacher Preparation and Professional Learning Programs

Research Insights

Teachers generally reported that although their teacher preparation programs introduced them to the concept of DI, it was not modeled for them in the classroom. For example, T9 noted, "What I learned in college about DI looked totally different from what it looks like in the actual classroom." T10 added,

> I had a bachelor's degree in criminal justice. So, I had no formal training as a teacher, but as you know, I was still able to obtain my temporary certificate, which is what I now have, which allows me to start teaching. So, I have no prior training in DI as it was self-taught. I have only taught in private institutions. No one sat me down and walked me through how to write lesson plans [or] how to implement DI.

Also, T1 advised that "I am not comfortable with giving small group instruction because I wasn't given the training on how to do it. I was lectured on how to do it in school, but that was different from real-life implementation. Teacher colleges need to model more."

Recommendations for School Administrators

School administrators would need to provide ongoing professional development opportunities for teachers in which current research-based DI implementation strategies are both discussed and modeled, empowering teachers to implement DI more effectively in their own classrooms. As an extension of this, the practice of peer observation should be encouraged, so that beginning teachers can see effective DI strategies being implemented by more experienced teachers in that particular school context.

Discussion Question

DI may look different across the various mathematics classrooms in your school. With this in mind, are there still important actions or activities you would expect to occur in all classrooms?

Barrier 5: Unawareness of the Benefits of Heterogeneous Student Grouping Over Homogeneous Student Grouping

Research Insights

Studies show that in many circumstances, homogeneous (same-ability) grouping can undermine mathematics learning and engagement by reinforcing ability labels, leading teachers to persist with low expectations for some students. On the other hand, heterogeneous (mixed-ability) grouping, though more demanding, is generally associated with more equitable learning opportunities and improved academic outcomes across ability levels (Coles & Brown, 2021; Russo et al., 2021).

While some teachers reported a preference for homogeneous grouping—sometimes due to administrative expectations—others reported successfully implementing heterogeneous grouping. Those teachers in the study who incorporated mixed-ability student groups cited stronger peer interactions and more collaborative skill development. For example, T13 noted, "At every table, there are faster students, lower students, and those in the middle so they can learn from each other." Also, T3 stated, "If they didn't learn it from me, oftentimes their peers can explain it better."

While all teachers in the study reported that DI implementation is expected at their schools, they noted that, in most cases, their administrators sought evidence of implementation primarily through the presence of homogeneous student grouping, usually in the form of small-group instruction. For example, T13 stated, "It is difficult to work with an administration who has expectations for DI but is not knowledgeable enough to appreciate that DI involves more than just a group of students sitting at the back table in a group." Commonly reported challenges teachers face when grouping students include insufficient modeling in teacher preparation programs for forming effective groups, dominant students taking over group tasks, difficulty assigning clear and meaningful roles, and uncertainty about choosing between homogeneous and heterogeneous grouping.

Recommendations for School Administrators

It is recommended that more opportunities be built into daily schedules for collaborative lesson planning and peer observations focused on sharing effective grouping strategies. Additionally, flexible grouping—both homogeneous and heterogeneous, where appropriate—should be incorporated into DI classroom evaluation protocols so that teachers may come to understand that heterogeneous student grouping is an expected component of mathematics DI implementation.

It is also important that administrators understand that while looking for evidence of DI in their teachers' classrooms, be aware that DI extends beyond student grouping and can also involve flexible content delivery, varied questioning techniques, scaffolding, language supports for ELL students, and other adaptations to the learning environment that encourage diversity, inclusion, collaboration, and the celebration of learning differences.

Discussion Question

What can be done in your school to promote a culture that encourages school administrators to continually avail themselves of up-to-date DI research-based best practices, so that their expectations of teachers, as is the case with student grouping, remain data-driven?

Barrier 6: Insufficient Training on How to Differentiate Mathematics for Virtual Teaching

Research Insights

The COVID-19 pandemic provided an unexpected lens into both the challenges and potential of DI in virtual teaching. T4 stated, "Some kids had laptops with no internet . . . It was difficult for them having to learn behind a laptop for eight hours a day, even having to do P.E. online." T13 reported, "There is a difference between simply using technology, and using technology with a purpose. Simply assigning an online video on BrainPOP to students isn't DI. You have to have a meaningful purpose behind it." T6 added,

> Due to COVID, the number of students enrolled in our online classes ballooned, and so many more teachers had to be hired to deliver online lessons. It was a challenge trying to teach new teachers not only how to use the various technology but being able to use them to effectively differentiate instruction. . . . things as simple as learning how to write on the board in Zoom.

Several teachers in the study expressed a concern that the pandemic forced them to become more comfortable with digital tools, but many felt unprepared to use them effectively for DI. Insufficient training led many teachers to resort to one-size-fits-all approaches during remote learning.

The teachers who reported navigating virtual instruction effectively, cited specific tools that helped them differentiate instruction, including i-Ready, Success Maker, Reflex Math, IXL Math, Go Math, Teaching Strategies Gold, Kahoot, Google Classroom, Group Jam, BrainPOP, CLEVER, Jam Board, and Class Dojo.

Recommendations for School Administrators

As a best practice, more virtual DI professional development should be facilitated in schools, with both outside specialists and experienced teachers within the school invited to share their knowledge of the software programs they use and how they differentiate these tools remotely to accommodate students' diverse learning styles and interests. Also, regular technology audits should be conducted to ensure that all students and teachers have access to reliable devices, internet access, and support. Encourage an academic environment in which teachers feel more prepared to transition to remote learning if necessary and more capable of using the virtual tools at their disposal to differentiate mathematics effectively.

Discussion Question

The number and nature of virtual software, many of which are free, available to support students' learning in mathematics continue to grow exponentially. What plan could your school put in place to keep teaching staff abreast of these virtual tools and how to use them effectively?

Barrier 7: Unawareness of How Terms Used in the Classroom to Refer to Differences in Students May Affect Engagement, Learning, and Performance in Mathematics

Research Insights

The use of terms/language carries tremendous power to both uplift and disenfranchise different populations (Ladson-Billings, 2013). During the interviews, it was observed that teachers' choices of terms for different groups of students in their classrooms highlighted an important issue that could significantly impede the effectiveness of DI implementation efforts. Terms used by the teachers during the interviews include *special-needs students*, *students with disabilities*, *students with specific learning disabilities*, *neurodiverse students*, *African American students*, *Black students*, *minorities*, *Latino students*, *Latinx students*, *Hispanic students*, *Brown students*, *Native American students*, *Mexican students*, *high students*, *middle students*, *low students*, *slow students*, *weak students*, *average students*, *fast students,* and *global majority students*.

At various points during the interviews, the teachers were observed to be extremely cautious in their choice of terms when referring to particular groups of students, seemingly out of fear of being perceived as politically incorrect. It is therefore crucial that teachers have a good understanding of terms to avoid that could potentially disenfranchise students, such as "My autistic students." Instead, a teacher who uses the phrase "My students with autism" empowers students to appreciate that autism is only one of the many dimensions of their identities (Clarke et al., 2017).

Recommendations for School Administrators

The development of a shared framework that guides the use of language in schools should be facilitated for all staff, including non-teaching employees, when referring to students' various identity groups (e.g., race, ethnicity, ability, neurodiversity, academic performance). This framework should be flexible, data-driven, and culturally responsive. It should be developed collaboratively with teachers, families, students, and community members to ensure that the terms align with the lived realities of the students involved.

Training centered on culturally responsive and identity-affirming language should be incorporated into professional development initiatives while ensuring that teachers have space to ask questions, discuss terminology without fear of judgment, and learn about how identity language evolves over time. For instance, workshops could explore the implications of terms used to describe different groups of students, such as *Latinos*, *students of color*, or *special needs*, and examine how their usage varies across communities and over time, and how societal changes have led to the need to reimagine many of these terms. It is also recommended that regular audits of textbooks and curriculum resources be conducted to ensure that the terminology used is affirming, up to date, and representative of students' identities. For example, during her interview, T11, who has Native American heritage, expressed concern that even today, many textbooks portray Native Americans as historical figures who have gone extinct. Therefore, school administrators should consult with cultural consultants and other experts to ensure that all instructional materials reflect contemporary and accurate representations of all student populations.

Discussion Question

Historically, terms such as *special needs* and *retarded* were seen as legitimate descriptors of certain categories of students. Over time, these terms came to be seen as limiting and demeaning. What factors do you think contribute to these changes over time, and can you think of terms in use today that are ready for a similar change?

Table 2

A Summary of Barriers to DI Implementation and Recommendations for School Administrators

Barriers to Effective DI Implementation	Recommendations for School Administrators
The misconception that DI is intended for struggling students	Share with teachers, evidence-based research that demonstrates that DI improves learning and engagement in all students and not only those who may be struggling.
Insufficient IEP/504 paperwork preparation	Don't assume that teachers know what IEP and 504 documents are and how they should be used, and ensure that this issue is adequately addressed in professional development.
ELL and ESE teacher certifications alone do not sufficiently prepare teachers to accommodate English language learners in mathematics	Recognize that classrooms are diverse and students speak numerous first languages that teachers may not be competent in. Encourage teachers to collaborate more with multi-lingual staff and regularly audit teaching materials to ensure that they foster inclusivity and collaboration instead of disenfranchisement.
Insufficient modeling of DI implementation techniques in teacher preparation and professional learning programs	Incorporate a system of peer-observation so that new teachers within their unique school contexts, will have ample opportunities to observe more experienced teachers, recognized as effective DI practitioners, modeling DI implementation successfully.
Unawareness of the benefits of heterogeneous student grouping over homogeneous student grouping	Incorporating group work effectively takes time and experience. Therefore, teacher planning time should allow for teachers to collaborate and to share ideas about what grouping strategies are effective within their particular school contexts. At the same time, administrators should understand that when looking for evidence of DI, there is a lot more to it than only group work.
Insufficient training on wow to differentiate mathematics for virtual teaching	Ensure that professional development opportunities include training on the available and ever evolving virtual tools that can be incorporated into teachers' DI practice.
Unawareness of how terms used in the classroom to refer to differences in students may affect engagement, learning, and performance in mathematics	Through collaboration with teachers, students, parents, and community members, seek to develop consensus on the use of terms or language used to refer to different groups of students. This will help create a learning environment in which instead of feeling belittled or demeaned, all students can experience a sense of empowerment and confidence.

CONCLUSION

This study illuminates how elementary mathematics teachers understand and experience DI, as well as the barriers they typically face in its implementation. It highlights some important forms of support that teachers require to successfully incorporate DI into their teaching. Research indicates that, when deciding whether to leave their positions, teachers' perceptions of working conditions and job satisfaction have tremendous influence, and principals play the most powerful role in shaping these perceptions (Burkhauser, 2017; Duyar et al., 2013).

Furthermore, studies show that the power principals have in influencing teachers' perceptions of their working conditions and job satisfaction stems from the reach they have in managing the behavior of students, making the safety and needs of teachers a priority, and also acknowledging the effort and accomplishments of teachers (Duyar et al., 2013). Therefore, for teachers to be equipped with the necessary resources and to become proficient in using DI appropriately to improve the engagement, learning, and performance of all their students, it is important for school administrators to recognize the powerful roles they play in helping students achieve the maximum potential benefits that DI has to offer.

Future Research

An avenue of future research for this study will be to explore the perspectives of school administrators to obtain a deeper understanding of their perceptions regarding the role of DI, as well as to gain further insight into the challenges they face and the support they would need to create learning environments best suited for their teachers to implement mathematics DI effectively

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SHELDON MCDONALD, PhD, is a Post-Doctoral Associate in the Stem Transformation Institute at Florida International University. His major research interests lie in the area of differentiated instruction as well as equipping mathematics teachers and school administrators with the tools required to more effectively engage culturally and linguistically diverse students and students with disabilities. Email: shemcdon@fiu.edu

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Increasing School Administrator Competency in Indonesia: Determinant Factors to Consider

Andi Wahed
Bambang Budi Wiyono
Ali Imron
Ahmad Yusuf Sobri
Universitas Negeri Malang, Indonesia

ABSTRACT

This study explores the role of school administrative staff and highlights the importance of professional improvement training in the era of the Industrial Revolution 4.0. Using a survey method, data were collected from 775 respondents across various regions in Indonesia. Data analysis was conducted using exploratory factor analysis (EFA). The results identified three core factors of administrative staff competence in Indonesian schools: motivation for competence development, core understanding and foundational skills, and core functional competencies of school administration. These findings underscore the multidimensional nature of school administrative roles, which require not only technical skills and task-based knowledge but also intrinsic motivation for continuous professional growth. The high factor loadings on items related to digital skills and professional self-development suggest that administrative staff are not merely operational support personnel but are essential actors in the broader ecosystem of school effectiveness. Their competencies directly impact the efficiency of school management, the accuracy of data and information systems, and the responsiveness of schools to policy and technological change. The results affirm the relevance of adopting a competency-based approach in managing, training, and supporting school administrative personnel. This study contributes to the literature by offering an empirically validated structure for understanding the competencies required in modern school administrative functions, particularly in contexts undergoing digital and systemic reform.

Keywords**:** determinant factors, increasing competency, school administrative staff, school administrators, educational management

As times change, traditional educational methods are becoming less relevant, necessitating strategies that effectively incorporate technology and modern management to increase the success of educational institutions (Khosrow-Pour, 2021). In the era of Industry 4.0, these changes are closely aligned with the concept of Society 5.0, first introduced in Japan, which envisions a technology-driven society characterized by extensive digital transformation (Alvarez-Cedillo et al., 2019; Darmaji et al., 2019; Icela et al., 2023; Polat & Erkollar, 2021; Salimova et al., 2020). The rapid advancement of technology has significantly changed the way school administrative staff work, enabling them to perform their tasks more efficiently, accurately, and in an integrated manner (Winarno et al., 2020; Wiyono et al., 2021).

Within the changing educational landscape, school administrative staff occupy a critical yet often undervalued position. They are responsible for a wide range of tasks that ensure the smooth daily functioning of schools, thereby creating an environment that fosters productivity among students, teachers, and other stakeholders (Biçer, 2014; Fischer, 2016; Vizeshfar & Torabizadeh, 2018; Waziana et al., 2022; Wiyono et al., 2021). Previous studies have demonstrated that the competence and motivation of school administrative staff are closely linked to their performance, which in turn influences

student achievement and overall school effectiveness (Jeno et al., 2023; Yalçınkaya et al., 2021; Yulianti, 2021). This underscores the importance of educational resource management, which aims to optimize the use of human resources, facilities, finances, curriculum, and technology to achieve institutional goals (Alvaro & Triwiyanto, 2024; Kowalski, 2012; Nwuke, 2021).

However, the increasing demands placed on schools have also reshaped the roles of educational leaders. While accountability pressures and a stronger focus on outcomes have transformed school administration in many countries (Starr, 2021), research shows that principals often spend a disproportionate amount of time on managerial and bureaucratic tasks, leaving limited capacity for instructional leadership (Anselmus Dami et al., 2022; Hallinger et al., 2018). To address this challenge, initiatives such as the School Administration Manager (SAM) model have been developed to reallocate managerial duties away from principals, allowing them to devote more attention to the learning process (Goldring et al., 2020; Sheng et al., 2017).

Similar trends toward the professionalization of school administration roles can be seen internationally. In the United States and the United Kingdom, for example, "School Business Managers" or "School Business Leaders" have emerged as specialized professionals with responsibilities spanning finance, human resources, and operations (Creaby, 2021; Woods, 2014). Despite their growing importance, limited scholarly attention has been paid to the challenges these professionals face or to the institutional support needed for their continued development (Armstrong & Rayner, 2021).

In Indonesia, the situation is further complicated by the perception of school administrative staff as subordinate support personnel with limited decision-making authority (Bayat & Fataar, 2020). This perception has contributed to insufficient investment in their training and professional development (Nafi'a et al., 2024; Rodriguez et al., 2021; Suryana et al., 2018), even though their work is essential for the smooth and effective operation of schools (Farradiba et al., 2024; Lumungga & Bafadal, 2024; Umnia et al., 2024). Strengthening their competencies is therefore not merely a matter of operational efficiency, but a strategic priority for improving school performance as a whole (Sa'diyah et al., 2024).

Operational Definitions

For the purpose of this study, competency is operationalized as the measurable knowledge, skills, and attitudes required by school administrative staff to effectively perform their professional roles. Competency is treated not as a singular ability but as a multidimensional construct encompassing motivational, cognitive, technical, and functional domains. A determinant factor is defined as a latent construct identified through factor analysis that significantly influences the development of school administrative staff competency. Each factor is operationalized as a set of interrelated variables with high factor loadings, indicating that they collectively drive competency formation.

Significance of the Study

This research serves as a crucial first step in developing the capacity of school administrative staff by using factor analysis to identify and analyze the determinant factors that shape their competencies. By doing so, this study directly addresses the limited scholarly attention given to their roles and aims to provide a clear foundation for professional development frameworks, policy decisions, and strategies that support principals in focusing on instructional leadership. Furthermore, these findings can offer practical insights for local governments and schools in Indonesia, ultimately enhancing the professional capacity of administrative staff and contributing to improved educational outcomes and broader school management reform.

Research Objectives and Questions

Building on these gaps, the objectives of this study are:

1. To identify the underlying latent constructs (determinant factors) influencing the competencies of school administrative staff.
2. To categorize these competencies into multidimensional domains, including motivational, cognitive, technical, and functional aspects.
3. To provide a theoretical and practical framework for strengthening the professional development of school administrative staff within the education system.

Based on these objectives, the study seeks to answer the following research questions:

- RQ1: What determinant factors underlie the competency of school administrative staff?
- RQ2: How can these competencies be categorized into distinct, multidimensional domains?

- RQ3: What are the implications of these determinant factors for the professional development and effectiveness of school administrative staff in educational institutions?

METHODS

Research Design

In this research, a cross-sectional survey design was implemented to examine the responsibilities of school administrative staff and identify the key factors contributing to their competence development in Indonesia. The study then applied exploratory factor analysis (EFA) to uncover the latent factor structure of administrative competence (Watkins, 2018; Yong & Pearce, 2013). EFA is a statistical technique employed in the absence of prior theoretical assumptions or hypotheses about the data structure. Its primary objective is to identify latent patterns or structures within a set of observed variables, reduce dimensionality by grouping correlated variables into key factors, and reveal the underlying constructs that account for the observed data (Alavi et al., 2020; Goretzko et al., 2021; Lorenzo-Seva, 2021; Rogers, 2022; Watkins, 2018).

Participants

The target population included school principals, teachers, and administrative staff from various schools in Indonesia. A total of 775 respondents were selected through simple random sampling to ensure representation across different school roles. The sample, consisting of school principals, teachers, and administrative staff, provided their perceptions of the competence development needs of school administrative staff. According to Comrey and Lee (2013), a sample size above 500 is considered "very good" for factor analysis (Comrey & Lee, 2013), thus confirming that the 775 respondents provided robust data for the EFA.

Instrument

The instrument was a self-developed questionnaire consisting of 18 items designed to measure perceptions of the need to improve the competence of school administrative staff. To assess participants' perceptions, a 5-point Likert scale was used, anchored by 1 (strongly disagree) and 5 (strongly agree). The instrument was developed based on a review of the literature on school administration and competence development and was reviewed by educational experts to ensure content validity (DeVellis, 2017).

Data Analysis

Data analysis was performed using Factor software (version 12.06.08 x64bits). This freely available software, developed by the Department of Psychology at the Universitat Rovira i Virgili Tarragona, Spain, can be accessed through its official website (Ferrando & Lorenzo-Seva, 2017). Prior to the analysis, the dataset's readiness for factor analysis was examined using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. In addition to the overall KMO, the individual measure of sampling adequacy (MSA) was calculated for each item. In this study, we report the Normed MSA values, a specialized version of the MSA index provided by the Factor software (version 12.06.08), to ensure that each item has sufficient correlation with other items.

While KMO provides an overall index for the entire dataset, the MSA is a variable-specific index that identifies whether a particular item belongs to the same construct as other variables. A KMO value greater than 0.6 and a significant Bartlett's test ($p < .05$) indicated that the data were appropriate for factor analysis (Field, 2024; Nkansah, 2018). Items with a Normed MSA value below 0.50 were considered for exclusion from the analysis, as such a value suggests insufficient correlation with other items (Lorenzo-Seva & Ferrando, 2021).

The optimal number of factors was determined primarily using parallel analysis (Horn, 1965), widely recognized as the most accurate and recommended method for factor retention (Rogers, 2022). Principal component analysis (PCA) was used for factor extraction (Fabrigar et al., 1999), followed by promax rotation to allow for correlated factors (Lorenzo-Seva & Ferrando, 2019). Communality values exceeding 0.40 were considered sufficient, indicating that the corresponding variables were well represented by the extracted factors (Cramer & Howitt, 2004; Hogarty et al., 2005; Mundfrom et al., 2005; Tabachnick et al., 2019). Consistent with established practice, the rotated loading matrix presents the factor loadings, and items with factor loadings below 0.4 were excluded to ensure a clear factor structure (Costello & Osborne, 2005; Hair et al., 2013).

RESULTS

Assessment of Factorability

Prior to conducting the EFA, we rigorously assessed the dataset's suitability for factor extraction, following the criteria specified in the data analysis section. We used multiple established criteria for this assessment, including the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, Bartlett's test of sphericity, and the individual MSA for each item, as defined in the data analysis section. These preliminary tests are crucial for determining whether the observed correlations among variables are significant enough to warrant a factor-analytic approach. The calculated KMO value was 0.9086. This exceptionally high value, exceeding the commonly accepted threshold of 0.80 ("meritorious") and 0.90 ("marvelous") (Kaiser, 1974), indicates a high degree of common variance among the observed variables and strongly confirms the appropriateness of the data for factor analysis as planned in the methodology.

Additionally, a statistically significant result was found from Bartlett's test of sphericity (Approximate $\chi 2 = 28832.3$, $df = 153$, $p < 0.00001$). This significant finding affirms the presence of significant correlations among the variables and supports the utility of factor analysis for dimensionality reduction. In addition to these overall tests, the individual normed MSA values for each item were examined to ensure their unique contribution and appropriateness within the factor structure. As presented in Table 1, all 18 items demonstrated very high Normed MSA values, ranging from 0.85 to 0.95.

Table 1

The Individual Normed MSA Values

Items	Normed MSA	Conclusion
Data Management Skills	**0.86	Meritorious
Understanding of School Policies	**0.90	Marvelous
Understanding of Main Duties and Functions	**0.91	Marvelous
Technology Skills	**0.85	Meritorious
Financial Administration Competence	**0.89	Meritorious
Communication Skills	**0.92	Marvelous
Public Relations Administration Competence	**0.95	Marvelous
Enhancement of Knowledge and Skills	**0.94	Marvelous
Upgrade of Current Understanding	**0.89	Meritorious
Need for Digital Competence Development	**0.92	Marvelous
Impact of Competence Development	**0.94	Marvelous
Curriculum Administration Competence	**0.91	Marvelous
Desire to Improve Digital Competence	**0.92	Marvelous
Facilities and Infrastructure Administration	**0.92	Marvelous
Student Administration Competence	**0.90	Meritorious
Personnel Administration Competence	**0.92	Marvelous
Correspondence Administration Competence	**0.90	Marvelous
Digital Archiving Competence	**0.91	Marvelous

As illustrated in Table 1, the lowest individual MSA value was 0.85 (Technology Skills), while the highest was 0.95 (Public Relations Administration Competence). These consistently high values, all well above the desirable threshold of 0.70, further underscore the excellent suitability of each variable for inclusion in the factor analysis and indicate that no items require removal due to poor sampling adequacy or insufficient shared variance.

Factor Retention

Analysis was conducted using Factor software (version 12.06.08 x64-bit), which generated 775 random correlation matrices via permutation of the raw data (Buja & Eyuboglu, 1992). The parallel analysis specifically utilized polychoric correlation matrices, appropriate for the nature of the data. Table 2 displays the real-data eigenvalues, as well as the mean and 95th-percentile eigenvalues from random datasets. Following the standard for factor retention in parallel analysis, only factors with a real-data eigenvalue exceeding the corresponding 95th percentile random eigenvalue were kept.

Table 2

Results of Parallel Analysis for Factor Retention

Variable	Real-data Eigenvalues	Mean of random Eigenvalues	95 Percentile of Random Eigenvalues
1	8.83*	1.36	1.43
2	3.65*	1.30	1.34
3	1.65*	1.24	1.28
4	0.57	1.20	1.24
5	0.52	1.15	1.19
6	0.40	1.12	1.15
7	0.35	1.08	1.11
8	0.33	1.04	1.07
9	0.26	1.01	1.04
10	0.24	0.97	1.00
11	0.23	0.94	0.97
12	0.21	0.91	0.94
13	0.18	0.87	0.90
14	0.15	0.84	0.87
15	0.14	0.80	0.83
16	0.12	0.77	0.80
17	0.11	0.72	0.76
18	0.08	0.67	0.71

Note. Real-data eigenvalues were obtained from a principal component analysis. The asterisk (*) indicates that the real-data eigenvalue is greater than the 95th percentile random eigenvalue, suggesting that the corresponding factor should be retained. The advised number of dimensions is 3.

Based on this criterion, three factors were identified as statistically meaningful. The analysis revealed that Factor 1 exhibited a real-data eigenvalue of 8.83, significantly exceeding its 95th-percentile random eigenvalue of 1.43. Factor 2 had a real-data eigenvalue of 3.65, significantly exceeding its 95th-percentile random eigenvalue of 1.34273. For Factor 3, the real-data eigenvalue was 1.65, exceeding the corresponding 95th-percentile random eigenvalue of 1.28. For Factor 4 and subsequent factors, the real-data eigenvalues were consistently lower than their respective 95th percentile random eigenvalues, indicating that these factors explained no more variance than would be expected by chance. These findings are further corroborated by the Factor software's direct advisement of three dimensions. Therefore, the parallel analysis unequivocally supported the extraction of a three-factor solution.

Unrotated Factor Loading Matrix and Communalities

Following the determination of a three-factor solution based on parallel analysis, the initial unrotated factor loading matrix was examined (Table 3). This matrix presents the raw loadings of each observed variable on the extracted factors before rotation, illustrating the initial variance distribution.

As shown in Table 3, all variables demonstrated substantial loadings across the first three factors. The presence of both positive and negative loadings, as well as cross-loadings (where items load significantly on more than one factor), is typical in an unrotated solution. This initial matrix confirms that the selected factors effectively capture a considerable amount of variance from the original variables, providing the foundation for subsequent rotation to enhance interpretability.

The proportion of variance in each observed variable explained by the extracted factors, known as communalities, is shown in Table 3. All communality values were notably high, ranging from 0.68 (Communication Skills) to 0.89 (Upgrade of Current Understanding). The high communality values suggest that a substantial amount of each item's variance is explained by the three extracted factors. This strong explained variance provides additional evidence for the data's suitability for factor analysis and validates that the three-factor model accurately captures the underlying constructs without sacrificing crucial information from the variables.

Table 3

Unrotated Factor Loading Matrix

Variable	F1	F2	F3	Communality
Understanding of Main Duties and Functions	-0.63	-0.55	0.41	0.87
Technology Skills	-0.64	-0.54	0.40	0.87
Data Management Skills	-0.62	-0.55	0.40	0.85
Understanding of School Policies	-0.65	-0.54	0.34	0.83
Communication Skills	-0.66	-0.47	0.16	0.68
Enhancement of Knowledge and Skills	-0.73	-0.29	-0.36	0.75
Desire to Improve Digital Competence	-0.75	-0.27	-0.47	0.85
Impact of Competence Development	-0.81	-0.23	-0.31	0.81
Upgrade of Current Understanding	-0.75	-0.26	-0.52	0.89
Need for Digital Competence Development	-0.77	-0.24	-0.47	0.87
Student Administration Competence	-0.65	0.50	0.13	0.70
Personnel Administration Competence	-0.73	0.48	0.10	0.77
Curriculum Administration Competence	-0.66	0.53	0.10	0.73
Financial Administration Competence	-0.63	0.55	0.07	0.70
Facilities and Infrastructure Administration	-0.72	0.50	0.13	0.79
Public Relations Administration Competence	-0.67	0.48	0.11	0.69
Correspondence Administration Competence	-0.74	0.417	0.11	0.74
Digital Archiving Competence	-0.76	0.405	0.01	0.74

Factor Structure

Following the determination of a three-factor solution through parallel analysis, the factor structure was further examined. The initial unrotated factor loading matrix (Table 3) provided insight into the variance distribution across factors. With all variables exhibiting strong loadings and high communality values (ranging from 0.68 to 0.89), it was evident that the three extracted factors accounted for a substantial proportion of each variable's variance.

The factors were subjected to promax rotation to achieve a more interpretable and theoretically meaningful factor structure. This decision was based on the cross-loadings observed in the unrotated matrix and is a typical practice for correlated factors. The rotated loading matrix (Table 4) presents the factor loadings, with loadings lower than an absolute 0.60 omitted to highlight salient relationships and facilitate interpretation (Table 4).

Based on Table 4, the three factors, along with their respective item loadings, explained variance, reliability, and factor determinacy index, are detailed below. The correlation among the variables yields three new factors, each given a common label representing a previously undefined variable or a general factor.

Factor 1: Motivation for Competence Development

Factor 1 is strongly defined by items reflecting the drive and mechanisms for improving digital skills and knowledge. Key items loading on this factor include Upgrade of Current Understanding (1.01), Desire to Improve Digital Competence (0.95), Need for Digital Competence Development (0.95), Enhancement of Knowledge and Skills (0.82), and Impact of Competence Development (0.78). This factor highlights a proactive approach towards acquiring and improving digital-related competencies and overall knowledge.

Factor 2: Core Understanding and Foundational Skills

Factor 2 is characterized by items related to fundamental understanding of roles and policies, the ability to operate school systems efficiently, and general technological and communication abilities. Prominent loadings include Understanding of Main Duties and Functions (0.96), Technology Skills (0.95), Data Management Skills (0.95), Understanding of School Policies (0.90), and Communication Skills (0.68). This factor represents the foundational knowledge base and essential interpersonal and digital skills necessary for daily operations.

Table 4

Rotated Factor Loading Matrix

Variable	F1	F2	F3
Understanding of Main Duties and Functions		0.96	
Technology Skills		0.95	
Data Management Skills		0.95	
Understanding of School Policies		0.90	
Communication Skills		0.68	
Enhancement of Knowledge and Skills	0.82		
Desire to Improve Digital Competence	0.95		
Impact of Competence Development	0.78		
Upgrade of Current Understanding	1.01		
Need for Digital Competence Development	0.95		
Student Administration Competence			0.86
Personnel Administration Competence			0.87
Curriculum Administration Competence			0.88
Financial Administration Competence			0.87
Facilities and Infrastructure Administration			0.89
Public Relations Administration Competence			0.84
Correspondence Administration Competence			0.82
Digital Archiving Competence			0.78

Note. Loadings lower than an absolute 0.60 are omitted.

Factor 3: Core Functional Competencies of School Administration

Factor 3 encompasses a broad range of specific administrative functionalities within an institutional context. Items loading highly on this factor are Facilities and Infrastructure Administration Competence (0.89), Curriculum Administration Competence (0.88), Personnel Administration Competence (0.87), Financial Administration Competence (0.87), Student Administration Competence (0.86), Public Relations Administration Competence (0.84), Correspondence Administration Competence (0.82), and Digital Archiving Competence (0.78). This factor delineates the practical and operational proficiencies required across various schools.

DISCUSSION

The findings of this study directly address the research objectives and questions by identifying three determinant factors for the development of school administrative staff competence: Motivation for Competence Development, Core Understanding and Foundational Skills, and Core Functional Competencies of School Administration. These factors reflect a multidimensional structure of administrative roles in schools, confirming that effective school administration requires more than just technical knowledge; it demands motivation, adaptability, and domain-specific expertise.

The first factor, Motivation for Competence Development, emerged as a critical driver for professional growth among administrative staff. The findings of this study align with prior research emphasizing the importance of internal drivers such as self-development, intellectual curiosity, and the alignment of personal and organizational goals (Balida, 2024; Hayudini, 2021; Szmyd, 2024). Consistent with prior research, motivated staff are more likely to engage in continuous learning and demonstrate long-term commitment to school objectives (Sa'diyah et al., 2024; Tj, 2021). Additionally, the lack of motivation, limited in-service training, and low compensation were identified as significant barriers to staff performance (Ndaipa, 2016), underscoring the need for structured and ongoing professional development (Joyce & Showers, 2002; Pregot, 2016).

Effective capacity-building should combine core training for all staff with targeted support for those seeking advanced development, such as coaching or mentoring (Bloomfield et al., 2024; Erath et al., 2019; Hoffner et al., 2021). Tailoring training to staff needs not only improves efficiency but also enhances satisfaction and retention (Armstrong & Rayner, 2021;

Nemeh et al., 2023). Leadership practices that recognize contributions and foster growth further strengthen motivation and morale (Morris et al., 2020; Wilson Heenan et al., 2023).

The second factor, Core Understanding and Foundational Skills, highlights the foundational knowledge and abilities required for effective daily operations. This factor includes proficiency in technology, data management, policy understanding, and communication, which are critical for efficient school administration (Anisah et al., 2020; Daswin et al., 2022; Gunawan et al., 2023; Ossai et al., 2024; Sumarsono et al., 2022). The prominence of this factor is consistent with the literature emphasizing the transformative impact of digital tools on enhancing administrative efficiency (Butler & Visscher, 2014; Chandra et al., 2020). Furthermore, mastery of information technology, data analysis skills, and adaptability to new systems are core competencies essential for future administrative staff (Adhikari et al., 2024; Ajani & Dlomo, 2025; Nkambule & Ngubane, 2024).

Beyond technical proficiency, these foundational skills also encompass essential human and organizational capabilities, such as communication, teamwork, and visionary leadership, all of which are vital for fostering a supportive school environment (Akinnubi et al., 2024; Atiş & Dilbaz, 2022; Sohn & Woo, 2023; Sonsaard & Darbavasu, 2019). They also exhibit organizational skills such as time management, crisis management, and stakeholder engagement. They are adept at planning, supervising, coordinating tasks, and adapting to change (Atiş & Dilbaz, 2022; Manafa, 2020; Ossai et al., 2024; Sonsaard & Darbavasu, 2019).

Although school administration staff have made progress in using digital technologies, their abilities remain in the "sufficient" category (Sumarsono et al., 2022). Thus, there is a clear need for continued investment in targeted digital training that is both context-specific and up to date (Calinici & Drugan, 2015; Kong et al., 2024; Szmyd, 2024). The effective implementation of cloud-based school management systems can significantly improve data management, flexibility, and overall efficiency (Chandra et al., 2020). By integrating technical, human, and organizational skills, schools can cultivate administrative staff capable of meeting both current operational demands and future institutional challenges (Nafi'a et al., 2024).

The third factor reflects the core functional competencies of school administration in curriculum, student services, personnel services, finance, infrastructure, and public relations. These areas are core to the day-to-day operations of educational institutions (Hallinger et al., 2018; Nwuke, 2021; Widiyanti et al., 2024). The increasing professionalization of administrative roles in educational systems globally underscores the complexity of these responsibilities (Abdullah & Arifin, 2024; Creaby, 2021; Nemeh et al., 2023; Starr, 2021), requiring staff to possess not only technical knowledge but also the ingenuity, conceptual thinking, and organizational skills to apply it effectively in diverse contexts (Anietie & Ayonuwe, 2022; Efendi & Desmiarti, 2021; Marmoah et al., 2019).

The School Administration Manager (SAM) framework provides a structured approach for principals to delegate or streamline managerial duties, allowing them to focus on instructional leadership (Goldring et al., 2020; Sheng et al., 2017). However, successful adoption of such frameworks requires investment in personnel, training, and ongoing support, as well as addressing challenges related to time, resources, and staff buy-in (Goldring et al., 2020). Regular training and capacity building, alongside empowerment programs and performance assessments, are crucial for maintaining and enhancing these competencies (Gunawan et al., 2023; Lidyanti et al., 2023; Nafi'a et al., 2024; Sabandi et al., 2018; Wibowo et al., 2024). Clear communication and well-defined roles also enhance technical competence and streamline school operations (Srimawati et al., 2025).

Collectively, these three factors demonstrate that school administrative competence is inherently multidimensional, integrating motivation, foundational knowledge, and functional expertise to support effective management and the broader goal of educational quality improvement. By comprehensively addressing all three factors (Motivation for Competence Development, Core Understanding and Foundational Skills, and Core Functional Competencies of School Administration), school leaders and policymakers can cultivate a more effective, engaged, and adaptable administrative staff. This strategic approach directly supports overall school improvement and contributes significantly to educational success by enabling principals to focus on strengthening instructional leadership rather than purely managerial and business aspects of schools.

IMPLICATIONS

Our findings confirm that the role of school administrative staff is far more complex than just providing support. The three core factors of their competence (from a drive for professional growth to a command of technical and administrative skills) highlight their integral role in school effectiveness. The implication is clear: school leaders and policymakers must view administrative staff not as a secondary resource, but as a primary investment. By adopting a competency-based approach to

training and management, schools can directly enhance their operational efficiency and adaptability in an era of rapid technological and systemic change.

1. Differentiated Professional Learning Design

The implications highlight the need for customized professional development that addresses the administration staff not only task-specific technical skills but also internal motivational factors. School leaders and professional development coordinators should consider designing tiered training models that support both skill-building and self-driven professional growth among administrative staff.

2. Leadership Support for Digital Transformation

The prominence of digital competence-related items within the factor structure signals a critical need for leadership support in digital capacity building. School administrators are encouraged to prioritize digital upskilling initiatives, ensuring that non-teaching staff can effectively manage data, communication, and archiving tasks in increasingly technology-integrated school environments.

3. Strategic Human Resource Practices in Schools

The factor structure provides a clear empirical basis for adopting competency-based approaches in recruitment, training, and performance appraisal. School leaders and HR departments should align administrative roles with the identified competence domains to clarify expectations and guide professional growth trajectories.

4. Policy and Resource Allocation

The evidence highlights the need for policies that prioritize comprehensive capacity-building for school administrative staff. Such policies should not only strengthen technical expertise but also foster motivation for continuous self-improvement and adaptability. To achieve this, local and national governments are encouraged to institutionalize competency-based training through structured programs and sustained resource allocation, thereby ensuring that administrative staff are recognized and empowered as central contributors to school effectiveness.

5. Strengthening School Leadership Capacity

Since administrative staff play a critical role in supporting school operations, developing their competence directly contributes to school leadership capacity and organizational effectiveness. Principals and school leaders should recognize the strategic importance of administrative staff as partners in school improvement efforts.

CONCLUSION

The factor analysis identified three principal factors of school administrative staff competence: Motivation for Competence Development, Core Understanding and Foundational Skills, and Core Functional Competencies of School Administration. The first factor reflects a proactive drive to continuously enhance digital skills, knowledge, and overall professional competence. The second factor encompasses a solid understanding of core duties, school policies, technological proficiency, data management, and communication skills as the foundation for effective daily operations. The third factor captures the technical expertise required to execute key administrative functions, including curriculum, finance, personnel, facilities, student services, public relations, and digital archiving. Collectively, these dimensions demonstrate that school administrative competence is inherently multidimensional, integrating motivation, foundational knowledge, and functional expertise to support effective management and the broader goal of educational quality improvement. In doing so, this study fulfills its research objectives by clarifying the determinant factors of competence, categorizing them into motivational, cognitive, technical, and functional domains, and outlining practical implications for professional development and policy.

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ANDI WAHED is a doctoral candidate in Educational Management at the Faculty of Education, Universitas Negeri Malang, Indonesia. His research interests focus on school administration, educational leadership, and staff competence development. Email: andi.wahed.2201329@students.um.ac.id

BAMBANG BUDI WIYONO, EdD, M.Pd., is a professor and Chair of the Doctoral Program of Educational Management at the Faculty of Education, Universitas Negeri Malang, Indonesia. He holds an Ed.D. in Educational Research and Evaluation. His major research interests include educational quality management, educational leadership, and educational human resource management. Organizational behavior in educational institutions and teacher & lecturer competence development Email: bambang.budi.fip@um.ac.id

ALI IMRON, EdD, M.Pd., is a professor in the Department of Educational Management at the Faculty of Education, Universitas Negeri Malang, Indonesia. He earned his Ed.D. in Educational Management. His research focuses on school-based student management, school/madrasah management, educational supervision, educational policy & planning, and quality management & school program evaluation. Email: ali.imron.fip@um.ac.id

AHMAD YUSUF SOBRI, EdD, M.Pd., is an associate professor and the Dean of the Faculty of Education at Universitas Negeri Malang, Indonesia. He completed his Ed.D. in Educational Management. His primary research interests cover school/madrasah principal leadership, school-based management (SBM), school organizational culture, and change management in educational institutions. Email: ahmad.yusuf.fip@um.ac.id

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The Crucial Role of School Leaders' Administrative Support in the Research Capability of Teachers

Charllote S. Matela
Salawagan Central Elementary School, Department of Education, Quezon, Bukidnon, Philippines
Manuel E. Caingcoy
Bukidnon State University, Malaybalay City, Philippines

ABSTRACT

Research on educators' research capability has surged in recent years, as scholars and practitioners remain intrigued by how teachers develop investigative skills alongside pedagogical mastery. To ensure evidence-based decision-making, policy formulation, and program development, school leaders must inspire teachers to contribute empirical evidence. However, previous literature has often neglected the link between teachers' research capability and the administrative support provided by school leaders. To address this gap, an explanatory study was conducted to examine the crucial role of administrative support in enhancing these capabilities. The study was conducted in the Quezon II District of Bukidnon, Philippines, and involved 151 teachers who voluntarily responded to survey instruments. After analyzing datasets using descriptive and inferential statistics, the findings indicated that while administrative support was frequently observed across all dimensions, teachers demonstrated only moderate proficiency in writing research proposals and publishable papers. The tested models revealed a nuanced relationship between support and capability, and the dimensions of administrative support did not significantly explain research capability when analyzed individually. When these dimensions were integrated into hypothesized models, administrative support significantly predicted teachers' research capability, accounting for 10.9%-12.2% of the variance in research capability. Ultimately, school leaders' administrative support plays a vital role in enhancing teachers' capability in writing research proposals and publishable papers. The study infers that each component of support is indispensable; only through a holistic approach can school leaders effectively elevate teachers' research capabilities.

***Keywords*:** administrative support, research capability, explanatory analysis, public school teachers, school leaders

In recent years, studies on educators' research capability have increased exponentially (Bonganciso, 2024; Gonzales et al., 2020; Manila et al., 2022; Pilongo, 2020; Tolentino, 2021; Weaver et al., 2013; Whitton et al., 2022). This trend reflects the growing interest among scholars and practitioners in understanding how teachers develop research capability within their professional environment alongside pedagogical mastery. Research capability, as a construct, refers to individuals' potential to conduct effective, efficient, and high-quality research (Caingcoy, 2020; Pilongo, 2020). This capability evolves as teachers accrue experience and participate in professional development, but it may eventually plateau at a certain stage in their careers. During their most productive years, school leaders can harness teachers' research capability, particularly for innovative school initiatives.

Research capability is vital to teachers' engagement in scientific inquiry and their overall teaching practice (Alake-Tuenter et al., 2012; Enderle et al., 2014; Hall, 2009; Herrington et al., 2016; Southerland et al., 2016). Specifically, Hall (2009) establishes a clear connection between research capability and active involvement in scholarly work. Building on this, Southerland et al. (2016) argue that relevant research experiences serve as a powerful force for informing a teacher's classroom work. Furthermore, Herrington et al. (2016) claim that these experiences significantly influence middle and high school science teachers' beliefs, attitudes, and values regarding teaching science as an inquiry-based approach. Ultimately,

when teachers demonstrate robust research capabilities, their engagement in scholarly endeavors yields numerous benefits, including personal growth, pedagogical improvement, and student impact.

Writing a research proposal may be easier than writing a publishable paper, as the latter requires a distinct set of knowledge and skills rooted in both science and art. Pickett and McDonnell (2017) highlight six areas that every author should be keen on when writing a publishable paper: 1) A well-written and easy-to-understand story, 2) A well-supported, robust, and reliable message and conclusions, 3) Appropriate and robust methodology and data analysis, 4) Clear explanations of how the article addresses existing knowledge gaps, 5) A comprehensive and up-to-date list of references, and 6) A message that is relevant to a wider audience.

Administrative support is pivotal to teachers' research capacity, particularly in tasks such as writing research proposals and producing publishable papers. This support may manifest in various forms, including emotional, informational, appraisal, or instrumental aspects (Watson, 2021). Institutionalizing research within the basic education sector is essential for supporting policy-making, decision-making, and program or project development. Consequently, every school system requires well-rounded leaders who can inspire teachers to embrace the responsibility of teacher-researchers. School leaders can cultivate an enabling environment that fosters collegial support and collaboration, especially in research proposal writing and paper publication, thereby embodying research leadership themselves (Turner, 2020).

Garrido et al. (2019) outlined 10 rules for providing optimal administrative support to team researchers, advocating for the enhancement of soft skills, proactive decision-making, effective communication, collaboration, curiosity about science, responsible data management, participation in onboarding processes, appreciation of cultural diversity, fair treatment, and active team participation. Adhering to these rules may help school leaders advance teachers' research capabilities.

However, previous studies have often overlooked the vital role of school leaders' administrative support in developing teachers' research capability. Research in this area has primarily focused on either research capability or administrative support independently, without establishing a clear link between these two essential constructs in the fields of research and school management. Consequently, administrative support has been largely absent from prior research on capability. For instance, administrative support has been identified as a predictor of teachers' job satisfaction (Tickle et al., 2011) and intent to stay (Peronto, 2013; Tickle et al., 2011; Yilmaz, 2016), while Brown (2019) examined administrative support in the context of implementing a teacher evaluation system.

In the Philippines, research capability has been extensively explored, with studies investigating its driving forces (Wong, 2019), correlates, determinants (Caingcoy, 2020), and mere assessment (Janer et al., 2022) via self-reporting. Wong's (2019) study found that institutional support improved research culture but not teachers' research capability. Only one study that the researcher is aware of reported that management support can lead to higher research capabilities among elementary school teachers (Gonzales et al., 2020). Hence, there is a pressing need to explore this promising avenue of research.

This explanatory study aims to examine the crucial role of administrative support from school leaders in shaping teachers' research capability, specifically in writing research proposals and producing publishable papers. This investigation seeks to uncover compelling evidence regarding the significance of administrative support in advancing teachers' research capability. The findings from this study will not only inform current and future school administrators about the importance of consistently providing administrative support to teachers but also guide curriculum developers and graduate program implementers in integrating advanced research knowledge and skills necessary for preparing future school leaders. The study aims to test the following null hypothesis:

The administrative support provided by school leaders does not significantly explain teachers' research capability in terms of writing proposals and publishing papers.

Framework of the Study

The study drew inspiration from previous research conducted by Agatep and Villalobos (2020), who investigated the research capability of graduate students concerning the composition of research proposals and the production of publishable papers. A component of their inquiry focused on the availability of administrative support.

Research capability is defined as the potential of individuals to undertake effective, efficient, and high-quality research (Caingcoy, 2020). It entails one's ability to "solve problems in a systematic way that brings transformation" (Ormond & Williams, 2013, p. 24). Both the writing of research proposals and the development of publishable papers fall under this conceptualization.

Additionally, the present research is rooted in Billingsley et al.'s (2020) assertion that teachers often work within supportive environments cultivated by supportive leadership. These studies lay the groundwork for the current investigation, in which supportive leadership is posited to equip teachers with the emotional, appraisal, instrumental, and informational

support essential to their engagement in research. Given that research endeavors are demanding and exacting, teachers must receive support from authoritative figures to thrive in their scholarly pursuits.

Watson (2021) delineated four distinct dimensions of administrative support: 1) emotional support refers to acknowledging teachers' work, valuing teacher input, and encouraging collegiality; 2) appraisal support denotes setting clear expectations and providing clear, consistent feedback while maintaining fairness in evaluation; 3) instrumental support pertains to providing necessary resources and assisting with classroom management while enforcing established norms; and 4) informational support includes providing useful information to teachers, sharing teachers' needs with authorities, and communicating a clear school vision.

METHODOLOGY

This research employed a predictive or explanatory design to examine the role of administrative support provided by school leaders in teachers' research capability in writing research proposals and publishable papers. Such a method analyzed the variances in teachers' research capability attributed to the administrative support of school leaders. The study was conducted in the Quezon II District of the Division of Bukidnon, Philippines, involving 15 schools and 247 teachers. The desired sample size was 171 teachers; however, only 151 teachers responded to the invitation and signed the informed consent forms. These individuals were selected using simple random sampling based on calculated values from a sampling table.

Data Collection

The study utilized two sets of instruments. The first instrument was designed to measure research capability and consisted of two sub-parts: writing research proposals and writing publishable papers. Both sections employed a 5-point Likert scale ranging from 1 (not capable at all) to 5 (highly capable). To ensure the instrument's quality, the items were derived from a comprehensive literature review and subjected to several validation steps: 1) a pilot test was conducted with 15 teachers from nearby districts within the same division, and 2) the entire instrument underwent content and expert validity checks to ensure alignment between the research problem and the data collection tool.

The instrument demonstrated exceptional internal consistency, as evidenced by the Cronbach's Alpha coefficients. The first subpart achieved an overall Cronbach's Alpha of .991, with Cronbach's Alpha values for its 25 items ranging from .983 to .985. The second subpart attained an overall Cronbach's Alpha of .991, with Cronbach's Alpha values for its 26 items ranging from .991 to .990. Sample items on writing proposals are as follows: "I can write a persuasive rationale in the introduction" (Item 3) and "I can spot the gaps in the reviewed literature" (Item 11). Another sample item on writing papers includes: "I can prepare a stand-alone abstract with representations from the major sections" (Item 2), and "I can write an introduction enriched with relevant literature on the topics" (Item 5).

The second research instrument used in this study, the Administrative Support Inventory Survey, was adopted from Watson (2021). This tool utilizes a 5-point scale from 1 (not observed at all) to 5 (always observed) and comprises 32 items categorized into four dimensions: emotional, appraisal, instrumental, and informational support. To illustrate the nature of the survey, sample items included the following: "recognizes my accomplishment publicly" (Item 12), "shows confidence in my action as a teacher" (Item 9), "enforces school rules" (Item 16), and "shares legislative updates and initiatives with staff" (Item 4). The entire instrument underwent rigorous reliability analysis to ensure its suitability for the study. As shown by these values (overall Cronbach's Alpha of .993 and Cronbach's Alpha values for items ranging from .992 to .993), the instrument demonstrated a high level of internal consistency, crucial for academic research, thereby ensuring unbiased results and a reliable measure of administrative support.

Researchers sought formal approval and permission from the relevant authorities prior to commencement. Throughout the pre-survey, implementation, and post-survey phases, researchers strictly adhered to established principles of research ethics regarding the treatment of participants, the confidentiality of provided information, and the systematic management of data. To ensure comprehensive data collection, the instruments were administered through a dual approach: during field visits and via email to participants who were unavailable during those visits. To facilitate the process, focal persons were assigned to oversee the retrieval of the instruments on behalf of the proponents. Based on the desired sample size, the study achieved an actual response rate of 88.30%.

Data Analysis

This inquiry applied both descriptive and inferential statistics to address the research objectives. The data analysis was conducted using IBM SPSS Statistics Version 26. Using mean and standard deviation scores, the study provided a

comprehensive overview of the extent of teachers' research capability and administrative support, based on participants' perceptions. The datasets were primarily analyzed using simple and multiple linear regression to test four hypothesized models with corresponding specifications. Across these tested models, administrative support served as a predictor (exogenous) variable, while the research capability in terms of writing proposals and publishing papers was treated as a criterion (endogenous) variable.

RESULTS

Before delving into the pivotal role of administrative support in teachers' research capability, it is beneficial to preview the descriptive statistics for each variable under study. In this analysis, administrative support is examined both as a collective construct and as distinct dimensions. From the participants' perspectives, school leaders have consistently provided emotional (M = 4.09, SD = .81), appraisal (M = 4.09, SD = .78), instrumental (M = 4.06, SD = .80), and informational (M = 4.07, SD = .78) support to teacher-researchers. The overall administrative support provided by school leaders (M = 4.08, SD = .78) indicates a consistent pattern. In Table 1, the results indicate that teachers perceive themselves as possessing moderate research capability in writing research proposals (M = 3.32, SD = .74) and writing publishable papers (M = 3.25, SD = .80).

Table 1

Descriptive Statistics for Study Variables

Variables/Dimensions	*N*	*M*	*SD*	Qualitative Description
Emotional Support	151	4.09	.81	Frequently observed
Appraisal Support	151	4.09	.78	Frequently observed
Instrumental Support	151	4.06	.80	Frequently observed
Informational Support	151	4.07	.78	Frequently observed
Overall Administrative Support	151	4.08	.78	Frequently observed
Research Capability (WRP)	151	3.23	.74	Moderately capable
Research Capability (WPP)	151	3.25	.80	Moderately capable

However, one should note that research capability levels may improve when teachers receive the necessary support from school administrators. This is why the current study explores variations in teachers' research capability that can be explained or predicted by the administrative support provided by school leaders. Specifically, the study delves into the crucial role of school leaders' administrative support in writing research proposals and publishable papers. Looking at the model summaries in Table 2, both the original and adjusted R-squared values consistently indicate that Model 1 has better explanatory power. It can explain and predict 14.9% (original) and 12.6% (adjusted) variance in teachers' research capability. However, these statistics alone are insufficient to evaluate the model's fit or its superiority over other tested models.

Table 2

Models Tested in the Study

Models	*R*	*R* Square	Adjusted *R* Square	*SE* of Estimates
Model 1	.386	.149	.126	.69468
Model 2	.331	.109	.103	.70348
Model 3	.364	.132	.109	.76333
Model 4	.349	.122	.116	.76024

ANOVA results (Table 3) indicate that all tested models are statistically significant at the .05 level, suggesting that each model adequately represents the sample data and reflects the teacher population. Thus, these models demonstrate a good fit for the data. This evidence provides a basis for further analysis to determine whether the overall school leader support and the corresponding dimensions predict teachers' research capability in writing research proposals and publishable papers.

Table 3

ANOVA Results

Models		Sum of Squares	*df*	Mean Squares	*F*	*p*
Model 1	Regression	12.323	4	3.081	6.384	.000
	Residual	70.457	146	.483		
	Total	82.781	150			
Model 2	Regression	9.042	1	9.042	18.272	.000
	Residual	73.738	149	.495		
	Total	82.781	150			
Model 3	Regression	12.795	4	3.244	5.567	.000
	Residual	85.071	146	.583		
	Total	98.046	150			
Model 4	Regression	11.930	1	11.930	20.641	.000
	Residual	86.117	149	.578		
	Total	98.046	150			

Among the four tested models, the predictor variables in Models 1 and 3 do not have significant estimates, as shown in Table 4. In these models, the four dimensions of administrative support were treated as separate predictor variables. The results may suggest that when one or two dimensions of administrative support are not provided by school leaders, the remaining dimensions cannot significantly contribute to teachers' research capability. Individually, emotional, appraisal, instrumental, and informational support cannot account for any variance in teachers' research capability, as none of the estimates are statistically significant. Considering the model summaries, ANOVA results, and model coefficients, the study has identified Models 2 and 4 as statistically significant. These models pertain to the predictive role of the overall administrative support provided by school administrators in writing research proposals (Model 2) and producing publishable papers (Model 4). This means emotional, appraisal, instrumental, and informational support were combined as predictors. In Model 2, the administrative support of school administrators can significantly explain 10.9% (original) variance, while 10.3% (adjusted) variance in teachers' research capability in writing research proposals ($\beta = .331$, $t = 4.275$, $p < .05$). Meanwhile, in Model 4, the administrative support of school administrators can significantly explain 12.2% (original) variance and 11.6% (adjusted) variance in teachers' research capability in writing publishable papers ($\beta = .349$, $t = 4.543$, $p < .05$).

Table 4

Tested Model Coefficients

Models	Variables	Unstandardized Coefficients (*B*)	*SE*	Standardized Coefficients (β)	*t*	*p*
Model 1	Constant (WRP)	1.914	.304	-.634	6.290	.000
	Emotional Support	-.580	.299	.060	-1.940	.054
	Appraisal Support	.057	.278	.498	.203	.839
	Instrumental Support	.459	.320	.416	1.435	.154
	Informational Support	.392	.273		1.435	.153
Model 2	Constant (WRP)	1.959	.304	.331	6.450	.000
	Administrative Support	.312	.073		4.275	.000
Model 3	Constant (WPP)	1.825	.334		5.461	.000
	Emotional Support	-.131	.329	-.132	-.400	.690
	Appraisal Support	-.038	.306	-.037	-.123	.902
	Instrumental Support	.552	.351	.551	1.572	.118
	Informational Support	-.030	.300	-.029	-.100	.920
Model 4	Constant (WPP)	1.790	.328		5.452	.000
	Administrative Support	.359	.079	.349	4.543	.000

DISCUSSION

Based on the descriptive findings, this study revealed that teachers are moderately capable of writing research proposals and publishable papers. These results imply significant opportunities for further growth as researcher-teachers. Simultaneously, these findings present opportunities for school leaders to bolster administrative support. Although leaders are perceived to provide such support frequently, they must better sustain these efforts until teachers achieve higher capabilities in writing and publishing. Furthermore, school leaders can tap into and collaborate with experts, including experienced researchers, to assist in mentoring teachers. In one way or another, such collaborations would help leaders expand their administrative support beyond the four primary dimensions.

Araneta et al. (2020) found that school leaders demonstrated significant support for their teachers across the emotional, environmental, instructional, and technical realms. Similarly, Watson (2021) identified the top five most important administrative support behaviors: 1) demonstrating confidence in teachers' actions, 2) providing adequate planning time, 3) ensuring fairness in evaluations, 4) setting clear expectations for everyone, and 5) soliciting input from teachers when discussing performance. These support behaviors were frequently observed by teachers and deemed highly important. Therefore, school leaders must be mindful of these behaviors as essential components of their roles. As Nobles (2009) aptly stated, "Teachers appreciate administrators who support them by being visible, initiating frequent communication, and providing the resources they need to be successful" (p. 1). These studies corroborate the descriptive findings of the present inquiry.

The descriptive findings align with the study by Agatep and Villalobos (2020), which reported similar levels of moderate capability among teachers in writing research proposals and publishable papers. Furthermore, Pilongo (2020) corroborates that teachers exhibited moderate proficiency in the technical aspects of research and in the major components of publishable papers. Here, research capability is defined as the potential of individuals to undertake effective, efficient, and high-quality research (Caingcoy, 2020). In another study, teachers were found to have a slight capability in conducting educational research, often requiring close supervision from an expert when writing research proposals (Manila et al., 2022). Small-scale research reported that doctoral students possessed moderate capabilities in writing research proposals, while they felt neutral about their capabilities in writing publishable papers (Caingcoy, 2024).

The descriptive results in the present study relate to Gigante and Firestone's (2008) findings, which indicate that support tasks helped teachers in their work but did not contribute to teacher learning. Administrative support provides more opportunities for teachers to engage in professional development. Pilongo's (2020) research found a significant relationship between teachers' research capability and the degree of research support. However, it's important to note that the analysis

conducted in Pilongo's study was non-causal. The claim in the framework is somewhat confirmed by the present findings, which show that teachers reported working in supportive environments stemming from supportive leadership. This means supportive leadership ensures a supportive working environment, whether teachers are engaged in teaching-related tasks or research activities (Billingsley et al., 2020).

While the findings in the current study lack direct parallels in existing literature, given that previous research has often measured administrative support more broadly or through different frameworks, related studies offer significant contextual alignment. For instance, Uy and Callo (2023) found that the relationship between teachers' research readiness and their research skills, including research writing, is mediated by a supportive environment. Similarly, Pablo et al. (2025) found that receiving instrumental support, such as financial assistance, increased science teachers' motivation to conduct research and publish papers, suggesting an indirect link between instrumental support and research output.

Furthermore, Oancea et al. (2025) found that an institution's ability to adjust ongoing responsibilities, as a key element of administrative support, can determine its involvement in capacity-building initiatives such as writing and publication support. This idea aligns with the claim by Pentang and Domingo (2024) that institutional support, including financial resources and manageable workloads, is crucial for success in research writing. More specifically, Ahmad (2021) noted that sustained technical and publishing support, such as research training and software tools, can directly address teachers' challenges in proposal writing. Ultimately, these findings confirm Hall's (2009) earlier claim that a clear and significant connection exists between research capability and active engagement in scholarly work, specifically in writing research proposals and publishing papers in reputable journals.

CONCLUSION

The study examined the crucial role of administrative support from school administrators in teachers' research capabilities. Participants were found to be moderately capable of writing research proposals and producing publishable papers, while they frequently observed administrative support from school administrators across all dimensions. Therefore, the null hypothesis, that administrative support provided by school leaders does not significantly explain teachers' research capability in writing proposals and publishing papers, is rejected. The findings provide sufficient empirical evidence that as school leaders increase administrative support, teachers become more likely to demonstrate substantive research capability in writing research proposals and publishable papers.

Implications

These findings carry several implications for school leadership and management. Chief among these is the need for school leaders to equip themselves with research writing and publishing skills; by doing so, they can provide more targeted support to teachers on writing and publishing tasks. Such support has the potential to transform teachers' engagement in research when they feel adequately supported. When the dimensions of administrative support are considered individually, they fail to significantly explain teachers' research capability, whether in writing research proposals or producing publishable papers. Thus, it is concluded that each component of school leaders' administrative support is indispensable in elevating teachers' research capability.

The provision of emotional, appraisal, informational, and instrumental support by school leaders can significantly enhance teachers' research capabilities, particularly in crafting research proposals. By acknowledging teachers' work, valuing their input, and encouraging collegiality; setting clear expectations and providing consistent feedback while maintaining fairness in evaluation; providing necessary resources and assisting with classroom management; and communicating a clear school vision while sharing teacher needs with authorities; leaders play a crucial role in making teachers more capable of writing research proposals. Furthermore, these dimensions of support are pivotal in enhancing teachers' capability to produce publishable papers. These findings suggest that holistic administrative support from school leaders is necessary to advance teachers' professional development in research writing and the subsequent publication of their work in reputable journals. These results imply that school leaders should upgrade their skills to extend these supports more frequently and effectively. To sustain, these supports and capabilities can result in viable research productivity in the future.

Limitations

The study encountered limitations due to a small sample size that did not reach the desired number of participants and a lack of literature on similar constructs to support the current findings. For future inquiries, researchers could include more

teachers or even involve school administrators in evaluating the administrative support they provide to teacher-researchers. Such an approach would allow for cross-checking and validation of the extent of administrative support from teachers' perspectives. Likewise, researchers could develop an instrument for administrative support specifically aligned with teachers' research capabilities, using exploratory factor analysis for construct validation and an exploratory sequential mixed-methods design. Furthermore, research coordinators at the district or school level could collaborate with school leaders to cultivate a more supportive work environment. This collaborative effort could help teachers progress from being moderately capable of writing research proposals and publishable papers to becoming highly capable researchers, thereby increasing research engagement and publication output.

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CHARLLOTE S. MATELA, MAEd, is a Teacher IV at Salawagan Central Elementary School, Salawagan, Quezon, Bukidnon. Her scholarly work focuses on administrative support and research capability. Email: charllotemats@gmail.com.

MANUEL E. CAINGCOY, PhD, is an accredited professor in Educational Administration at Bukidnon State University. His research interests include educational leadership, advocacy, cultural responsiveness in education, research capability, and education for sustainable development. Email: manuelcaingcoy@buksu.edu.ph.

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