Exploring the Multifaceted Characteristics of Pre-Service EFL Teachers during Practicum: A Complexity Theory Perspective in Vietnam

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Abstract: Despite research on pre-service teacher practicums, few studies have examined these experiences through a complexity theory lens to capture the intricate, dynamic interplay of factors involved. Addressing this gap, this qualitative case study explored the multidimensional influences shaping the practicum experiences of three pre-service English as a Foreign Language (EFL) teachers in Vietnam. Using an in-depth case study design with semi-structured interviews and classroom observations, the study analyzed the participants' lived experiences across diverse school environments through the lens of complexity theory principles. The findings revealed complex interactions of student factors, curricular demands, resource constraints, and contextual influences shaping the pre-service teachers' dynamic, self-organizing learning trajectories as they adapted to emergent needs. Notably, the pivotal role of context profoundly influenced pedagogical decision-making. The study's insights underscore the importance of teacher education programs providing contextualized support and learning opportunities to nurture adaptable, reflective educators responsive to complexity. This research contributes a nuanced complexity theory perspective on the multifaceted nature of pre-service EFL teacher learning.

Keywords: Characteristics, Pre-service EFL Teachers, Practicum, Complexity Theory.

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Introduction

The practicum experience represents a critical juncture in teacher education programs, bridging the divide between theoretical concepts and practical classroom realities (Cabaroglu, 2014; Farrell, 2008). During this immersive period, pre-service teachers confront the multifaceted complexities of teaching, allowing them to cultivate essential pedagogical skills, strategies, and dispositions (Borg, 2003; Korthagen, 2017). However, the learning process during the practicum is not linear or straightforward; instead, it is intricately shaped by a confluence of personal and contextual factors that interact in dynamic and complex ways (Lei, 2023; Clements, 2020).

Researchers have increasingly focused on pre-service teachers' professional experiences during the practicum, recognizing the challenges they face as novice educators teaching in unfamiliar classroom environments (Al-Jaro & Asmawi, 2018). Traditional perspectives on knowledge acquisition may fail to capture the nuances of these experiences, prompting scholars to adopt alternative theoretical lenses to explore the intricate nature of pre-service teacher learning (Clements, 2020). Frameworks such as activity theory (Maharani & Fithriani, 2023; Engeström, 1987) and sociocultural perspectives (Edwards & D'Arcy, 2004; Eun, 2021) have illuminated the multidimensional and context-dependent aspects of teacher development, highlighting the interplay between individual factors, social interactions, and environmental influences (Johnson, 2009; Putnam & Borko, 2000).

The literature has challenged traditional linear conceptions of teacher learning, which risk oversimplifying the complex processes involved and artificially separating learning from practice (Gao et al., 2022; Clements, 2020). Consequently, pre-service teachers' practicum experiences are characterized as multifaceted, dynamic, and inherently dependent on the specific context, often presenting myriad challenges and obstacles that contribute to the complexity of their learning journeys (Clements, 2020). Recognizing this complexity, researchers highlight the importance of examining the opportunities and limitations present in various practicum settings. Doing so can cultivate a more profound comprehension of the experiences faced by those training to become teachers (Clements, 2020).

Recognizing the complex and organic nature of pre-service teacher learning during the practicum is particularly pertinent in the context of educational reforms and curriculum changes. Vietnam, for instance, has recently embarked on a new phase of English curriculum reform, with a heightened emphasis on developing communicative competencies among learners (Ha & Uyen, 2021; Hoa & Vien, 2019). This reform poses significant challenges for both pre-service and experienced EFL teachers, as they are expected to navigate the intricate

process of implementing innovative pedagogical approaches while potentially grappling with deeply ingrained beliefs and practices (Hien, 2018).

The juxtaposition of new curricular demands and established teaching practices can create a fertile ground for conflicts and tensions, particularly during the practicum, where pre-service EFL teachers may encounter mentors who are resistant to change or adhere to traditional methods (Ho, 2015; Nguyen & Ngo, 2017). This complex interplay between pre-service teachers' desire to implement innovative approaches, experienced teachers' entrenched beliefs, and the broader contextual factors can profoundly shape the learning experiences and professional development trajectories of pre-service EFL teachers.

In light of these intricate dynamics, this study aims to explore the multifaceted characteristics of pre-service EFL teachers' learning during the practicum in Vietnam through the lens of complexity theory. Complexity theory offers a powerful conceptual framework for understanding the intricate, non-linear, and dynamic nature of teacher learning, recognizing it as a complex organic system embedded within a broader ecosystem of interacting elements and influences (Opfer & Pedder, 2011; Radford, 2006). While existing research has shed light on the complex and multidimensional nature of pre-service teacher learning during practicum, there remains a paucity of studies that specifically examine this phenomenon through the lens of complexity theory, particularly in the context of EFL teacher education in Vietnam. By employing a complexity theory perspective, this research endeavors to fill this gap and contribute to a deeper understanding of the intricate dynamics that characterize pre-service EFL teachers' practicum experiences.

Theoretically, this study aims to extend the application of complexity theory to the domain of teacher learning, elucidating how pre-service EFL teachers' development during practicum can be conceptualized as a complex organic system embedded within a broader ecosystem of interacting elements and influences. Specifically, the research seeks to investigate the nature and characteristics of this complex system, exploring how pre-service EFL teachers navigate the practicum experience, the challenges and constraints they encounter, and the strategies they employ to negotiate the inherent complexities of their learning journeys. Furthermore, this study holds significant practical implications for enhancing the effectiveness of practicum experiences and supporting pre-service EFL teachers' professional growth. By unpacking the interplay between individual factors, such as beliefs, motivations, and prior experiences, and contextual elements, including social interactions, institutional factors, and broader educational reforms, the findings can inform the design and implementation of more tailored and responsive practicum programs.

Additionally, the insights gained from this research can guide the development of targeted support mechanisms and interventions to better equip pre-service EFL teachers in navigating the complexities of their learning trajectories.

Literature Review

Complexity Theory and Teacher Education

Complexity theory has emerged as a powerful framework for exploring and understanding the intricate nature of social phenomena, including the processes of learning and teaching (Opfer & Pedder, 2011; Radford, 2006). This theoretical lens posits that human activities, such as teacher development, occur at the "edge of chaos" (Waldrop, 1992), where there is a delicate balance between order and disorder, enabling growth and adaptation while avoiding complete chaos or stagnation.

At its core, complexity theory conceptualizes systems as comprising numerous interacting components that continuously change and evolve over time (Davis & Sumara, 2014; Morrison, 2008). These complex systems are not isolated entities; rather, they are part of larger systems and contain smaller sub-systems within them, existing in a nested and interconnected manner (Opfer & Pedder, 2011). Furthermore, complex systems are characterized by heterogeneity, dynamism, nonlinearity, openness, and the presence of multiple levels of organization (Kuhn, 2008; Radford, 2006).

In the context of teacher education, complexity theory offers a lens through which to view teacher learning as a complex dynamic system that is profoundly impacted by the socio-cultural context in which it occurs (Freeman & Richards, 1996; Clarke & Hollingsworth, 2002). This perspective represents a departure from traditional linear and causality-based views of teacher learning, embracing the notions of co-adaptation and emergence (Opfer & Pedder, 2011). Rather than treating the context as a mere background, complexity theory recognizes that it interrelates with other systems in a dynamic and reciprocal manner, shaping and being shaped by the learning process (Kuhn, 2008; Opfer & Pedder, 2011). A key tenet of complexity theory is the recognition that variability in system behavior is not merely noise or error but rather an inherent and essential aspect of the interaction process (Opfer & Pedder, 2011; Radford, 2006). This variability can lead to the emergence of novel and unpredictable patterns, behaviors, and structures, which are not reducible to the individual components of the system (Davis & Sumara, 2014; Morrison, 2008).

In recent years, complexity theory has gained traction in the field of teacher education research, with scholars exploring its application to areas such as teacher professional

development, teacher identity formation, and teacher wellbeing (Cochran-Smith et al., 2014; Erçetin et al., 2014; Kuhn, 2008). However, there remains a need for further investigation into the dynamics of pre-service teacher learning during the practicum experience, particularly through the lens of complexity theory (Clements, 2020).

By employing a complexity theory perspective, researchers can shed light on the multifaceted characteristics of pre-service teachers' learning journeys during the practicum, acknowledging the interplay between individual factors, social interactions, institutional contexts, and broader educational reforms (Opfer & Pedder, 2011; Radford, 2006). This approach recognizes that pre-service teacher learning is not a linear or predetermined process but rather a complex organic system that emerges from the intricate interactions between various elements within and across multiple levels of a larger ecosystem (Clarke & Hollingsworth, 2002).

The Practicum Experience

The practicum experience plays a pivotal role in the professional development of pre-service teachers, serving as a crucial bridge between theory and practice (Nguyen, 2021). It provides pre-service teachers with their first sustained exposure to the realities of the classroom, allowing them to apply the pedagogical knowledge and skills acquired during their teacher education programs (Farrell, 2008; Zeichner, 2010). Through this immersive experience, pre-service teachers have the opportunity to develop their professional identities, refine their teaching strategies, and gain confidence in their abilities to manage and facilitate learning in authentic classroom environments.

Numerous factors shape the nature and quality of pre-service teachers' practicum experiences. The school context, encompassing elements such as the institutional culture, curricular expectations, and available resources, plays a significant role in shaping the learning environment and the challenges faced by pre-service teachers (Zeichner, 2010). Additionally, the mentorship provided by experienced cooperating teachers is widely recognized as a critical component of successful practicum experiences (Ambrosetti & Dekkers, 2010; Stanulis & Russell, 2000). Effective mentors not only offer guidance and feedback but also serve as role models, fostering the development of pre-service teachers' professional identities and teaching practices.

Furthermore, the unique characteristics and dynamics of the student population can significantly influence the practicum experience. Pre-service teachers must navigate diverse student backgrounds, learning needs, and behavioral patterns, requiring them to adapt their

pedagogical approaches and classroom management strategies (Farrell, 2008; Stanulis & Russell, 2000). This exposure to the complexities of the classroom environment is a valuable learning opportunity but can also present challenges that pre-service teachers must navigate (Nguyen, 2021). Despite the valuable learning opportunities afforded by the practicum, pre-service teachers commonly face a range of challenges during this formative experience. One of the most common challenges is the "reality shock" that arises from the dissonance between the idealized theories learned in teacher education programs and the practical realities of the classroom (Farrell, 2008). Pre-service teachers may struggle to reconcile their preconceived notions and expectations with the complexities they encounter, leading to feelings of uncertainty and self-doubt (Caires et al., 2012; Nguyen, 2021).

Time management and workload demands also present significant challenges for pre-service teachers during the practicum (Farrell, 2008; Stanulis & Russell, 2000). Balancing the responsibilities of lesson planning, classroom instruction, assessment, and other administrative tasks can be overwhelming, particularly for those with limited prior teaching experience. Additionally, pre-service teachers may face difficulties in establishing their authority and classroom management strategies, as they navigate the delicate balance between maintaining control and fostering a positive learning environment (Caires et al., 2012; Nguyen, 2021).

Pre-service EFL Teacher Learning

While the practicum experience is a pivotal component of teacher education programs across various disciplines, pre-service EFL teachers encounter unique challenges and considerations that shape their learning trajectories. The sociocultural context in which EFL teaching and learning take place plays a significant role in influencing the pedagogical approaches, classroom dynamics, and overall learning experiences of pre-service EFL teachers (Nguyen, 2021; Zeichner, 2010).

One of the distinct aspects of pre-service EFL teacher learning is the need to navigate language and cultural differences (Farrell, 2008; Richards & Crookes, 1988). Pre-service EFL teachers may encounter challenges in communicating effectively with students, particularly in contexts where English proficiency levels vary widely among learners. Additionally, cultural differences in classroom norms, educational values, and teaching methodologies can create potential barriers or misunderstandings that pre-service EFL teachers must navigate (Pham, 2019; Zeichner, 2010).

The sociocultural context also shapes the specific pedagogical approaches and strategies that pre-service EFL teachers must develop and refine during their practicum experiences. EFL teaching often involves incorporating elements of communicative language teaching, task-based learning, and culturally responsive practices to promote authentic language acquisition and meaningful engagement with the target language (Richards & Crookes, 1988; Zeichner, 2010). Pre-service EFL teachers must learn to adapt and contextualize these approaches to meet the unique needs and backgrounds of their students, requiring a high level of pedagogical flexibility and responsiveness.

Furthermore, the practicum experiences of pre-service EFL teachers are influenced by factors such as language proficiency levels, both their own and those of their students (Farrell, 2008; Nguyen, 2021). Pre-service EFL teachers may face challenges in delivering clear and effective instruction, providing feedback, and fostering meaningful communication in the target language, particularly in contexts where their own language proficiency or that of their students is limited. These challenges can impact their confidence, classroom management, and overall ability to create an engaging and supportive learning environment for language acquisition.

Research Gap

Despite the growing recognition of the complex and multifaceted nature of pre-service teacher learning during the practicum, there remains a paucity of research that explicitly examines this phenomenon through the lens of complexity theory, particularly in the context of EFL teacher education. While complexity theory has been applied to investigate various aspects of teacher learning and professional development (Opfer & Pedder, 2011; Radford, 2006), its application in understanding the intricate dynamics and interplay of factors shaping pre-service EFL teachers' practicum experiences remains limited.

Existing literature has explored the challenges and factors influencing pre-service EFL teacher learning during the practicum, such as the role of mentors, school contexts, and sociocultural influences (Farrell, 2008; Pham, 2019; Richards & Crookes, 1988; Zeichner, 2010). However, few studies have explicitly adopted a complexity theory perspective to holistically examine the multidimensional and interconnected nature of these factors and the emergent patterns that arise from their interactions.

Moreover, while research has been conducted on pre-service teacher learning in various contexts, there is a lack of empirical studies specifically focused on pre-service EFL teachers' practicum experiences in Vietnam. The unique sociocultural, educational, and linguistic

landscape of Vietnam presents distinct challenges and opportunities for pre-service EFL teachers, warranting further investigation to understand the contextual nuances and dynamics at play.

This research study aims to address these gaps by explicitly applying a complexity theory lens to explore the multifaceted characteristics shaping the practicum experiences of pre-service EFL teachers in Vietnam. By adopting a complexity theory perspective, this study seeks to gain a nuanced understanding of the intricate interplay between individual, social, and contextual factors that contribute to the emergent nature of pre-service EFL teacher learning during the practicum. Furthermore, by situating the research within the Vietnamese context, this study aims to provide valuable insights into the unique challenges and dynamics encountered by pre-service EFL teachers navigating the sociocultural and educational landscape of this specific context.

To explore the multifaceted characteristics of pre-service EFL teachers' learning during practicum through the lens of complexity theory, this study seeks to address the following research questions:

1. What are the main characteristics of the complex learning process experienced by pre-service EFL teachers during their practicum in Vietnam?

2. What factors contribute to and influence these characteristics of pre-service EFL teacher learning during the practicum?

Methodology

Research Setting

This study was conducted at a Vietnamese university that specializes in teacher training. The practicum experience under investigation was a crucial component of the initial EFL teacher education program offered by the university. Prior to the practicum, the pre-service EFL teachers had completed three years of coursework, including classes on English language teaching theories and skills, as well as engaging in micro-teaching practices.

The research sites for this study were carefully selected from schools with long-standing cooperative partnerships with the university for practicum placements. These included a secondary school located in a rural, countryside area, a public high school in the city center, and a private high school, also situated in the city center.

Participants

The participants in this study were three pre-service EFL teachers, assigned the pseudonyms Nam, Hoa, and Mai to maintain confidentiality. They were enrolled in the fourth year of the Faculty of English Language Teacher Education program at the Vietnamese university where the research was conducted. Nam was placed at a public high school in the city center for his practicum, teaching Grade 10 students. Hoa was assigned to a private high school in the city center, where she instructed Grade 11 students. Mai undertook her practicum at a secondary school in the countryside, teaching Grade 6 students. All three pre-service teachers were mentored and guided by experienced teachers at their respective placement schools, which played a crucial role in supporting their professional development and learning throughout the practicum period.

Research Methods

This study adopted a case study methodology to investigate the complex phenomenon of pre-service EFL teacher learning during the practicum experience. Case studies are well-suited for exploring intricate and multifaceted real-life situations, allowing for an in-depth examination of the interplay between various factors within their naturalistic contexts (Baxter & Jack, 2015; Yin, 2018). By employing a case study design, the researcher aimed to gain a comprehensive understanding of the characteristics and dynamics that shape pre-service EFL teachers' learning journeys during the practicum. This approach enabled the researchers to capture the rich complexities and nuances of the participants' experiences, shedding light on the individual, social, institutional, and contextual elements that contribute to the emergent nature of their learning processes (Merriam, 2014; Stake, 1995).

Data Collection

The data collection process employed two complementary methods: semi-structured interviews and classroom observations. Semi-structured interviews were selected as a suitable approach for capturing participants' lived experiences and narratives (Duff, 2018; Kvale & Brinkmann, 2009). This method allowed the researchers to follow up on emergent issues, seek clarifications, and explore significant topics in-depth, enabling a rich exploration of the participants' experiences, identities, and emotional states (Dörnyei, 2007).

Each of the three pre-service EFL teachers participated in four phases of interviews in Vietnamese throughout their practicum experience. The first interview occurred before the practicum commenced, focusing on their expectations and preparations. Subsequent

interviews were conducted at the end of each month during the practicum period, with the final interview taking place two days after its completion. Following the initial interview, questions for the later interviews were formulated based on the participants' previous responses, allowing for a tailored exploration of their evolving experiences (Cohen et al., 2018).

To complement the interview data, classroom observations were conducted to gain firsthand insights into the pre-service teachers' classroom practices, instructional strategies, and interactions with students. Multiple observation sessions were scheduled for each participant, and detailed field notes were taken using an observation protocol to ensure consistency across different sessions.

During the interviews and observations, the researchers embraced a methodology of "deliberate openness" (Cohen et al., 2018), enabling the formulation of insightful follow-up queries and a thorough exploration of the participants' viewpoints. The interview sessions each spanned approximately 45 minutes and were audio-recorded to preserve the integrity of the data.

To enhance trustworthiness, member checking was conducted by sharing preliminary interpretations with participants for feedback and clarification (Creswell & Miller, 2000). An external auditor reviewed the research process, data collection, and analysis procedures (Merriam & Tisdell, 2016). Peer debriefing sessions with experienced qualitative researchers further bolstered credibility (Lincoln & Guba, 1985). These strategies addressed researcher bias, ensured accurate participant representation, and established confirmability.

Data Analysis

The analysis followed an inductive, iterative process utilizing thematic analysis (Braun & Clarke, 2006) and principles of complexity theory (Barkhuizen, 2008) as an analytical lens. Interview transcripts underwent thorough review, with preliminary memos and annotations capturing initial insights (Merriam & Tisdell, 2016).

A systematic coding process was then employed, involving open coding of data extracts, followed by axial coding to identify relationships and develop categories (Saldaña, 2021). This iterative process facilitated the refinement and solidification of emergent categories through multiple coding cycles. Three essential categories emerged, describing the pre-service teachers' methods of learning to teach, coping strategies within the practicum environment, and the influence of contextual factors.

As coding progressed, the pre-service teachers' experiences emerged as complex systems characterized by co-adaptation with multiple personal and contextual factors over time. Consequently, complexity theory was deliberately applied as a theoretical framework, guiding the final coding phase. This involved identifying system components, interactions, dynamic changes, and outcomes within the pre-service teachers' experiences.

The analysis culminated in the identification of three core characteristics: complexity, dynamism, and self-organization, which captured the inherent complexity of the practicum experiences while maintaining a holistic account. NVivo software facilitated data management and coding, enhancing analytical rigor. Trustworthiness was addressed through member checking, peer debriefing, and maintaining an audit trail of analytical decisions (Lincoln & Guba, 1985).

Findings

The findings vividly illustrate the complex, dynamic, and self-organizing experiences of the three pre-service EFL teachers – Nam, Hoa, and Mai – during their practicum placements. Through an in-depth analysis of interview data and extensive classroom observations, several key characteristics emerged, exemplifying a complexity theory perspective on pre-service teacher learning.

Complexity

The inherent complexity encountered by the pre-service teachers was shaped by the intricate interplay of numerous interconnected factors, including diverse student backgrounds, curricular demands, instructional expectations, and resource constraints within their respective school environments.

At the public high school, Nam navigated a classroom with significant variations in student proficiency levels. As he elaborated:

"It was an incredibly diverse class. Some students came from wealthy families and had attended private English tutoring for years, so their foundations were quite strong. But then I had other students who came from underprivileged backgrounds and had very limited exposure to English before joining my class. Trying to cater to both ends of the spectrum was a constant juggling act".

Classroom observations corroborated Nam's efforts to address these diverse needs. In one lesson, he employed differentiated instruction by providing advanced reading materials and extension activities for the more proficient students, while simultaneously

offering simplified texts and targeted scaffolding for those struggling with basic vocabulary and comprehension.

Hoa, placed at the prestigious private high school, faced the complexity of teaching Grade 11 students in a fiercely competitive academic culture with stringent curricular demands and high parental expectations. During an interview, she reflected:

"The pressure was immense. Not only did I have to ensure my lessons aligned with the school's rigorous standards, but I also had to contend with parents who were constantly scrutinizing their child's progress. During parent-teacher meetings, I frequently encountered parents dissatisfied with their child's performance, demanding that I accelerate their learning or provide additional support".

Observations captured Hoa's adaptations to this complex environment, such as incorporating real-world applications and engaging activities to maintain student motivation. In one instance, she facilitated a lively debate on a contemporary social issue, encouraging students to draw upon their English skills to articulate and defend their positions persuasively.

Mai's practicum at the rural secondary school presented distinct complexities stemming from limited resources and minimal prior English exposure among her Grade 6 students. As she poignantly described:

"For the majority of my students, our English class was their only interaction with the language. Their families could not afford supplementary materials, tutoring, or even basic educational resources beyond the outdated textbooks we had. It was a constant struggle to find ways to make my lessons engaging and relatable when they had such limited exposure and access to English outside the classroom".

Observations revealed Mai's creative efforts to overcome these resource constraints. In one lesson, she utilized simple household items, such as empty bottles and cardboard boxes, to create interactive games and activities that reinforced vocabulary and sentence structures. Her use of contextualized examples and hands-on learning experiences helped bridge the gap between the classroom and her students' daily lives.

However, despite their best efforts, the pre-service teachers encountered moments of frustration and self-doubt when faced with the complexities of their respective contexts. Hoa, for instance, expressed feeling overwhelmed at times by the high expectations placed upon her, questioning her ability to meet the demanding standards.

These findings underscore the multidimensional complexity inherent in the pre-service teachers' practicum experiences, shaped by the intricate interplay of factors unique to each

context. Their reflections, coupled with observed practices, shed light on the inherent challenges of navigating diverse student needs, curricular demands, resource availability, and broader sociocultural landscapes – all while striving to deliver effective and engaging instruction.

Dynamism

The experiences of Nam, Hoa, and Mai during their practicum placements highlighted the dynamic and ever-evolving nature of their professional learning journeys. Their teaching approaches, classroom strategies, and overall learning systems underwent continuous transformations as they navigated the complexities of their respective contexts and adapted to the emergent needs of their students.

Nam's experience at the public high school exemplified this dynamism. Initially, he struggled to engage students with diverse proficiency levels effectively, relying heavily on traditional lecturing methods. However, as he gained more experience and developed a deeper understanding of his students' learning styles and needs, Nam embraced a more dynamic approach. In his own words:

"At first, I was stuck in a cycle of lecturing and textbook exercises, but I quickly realized that this one-size-fits-all approach was not working for my diverse class. Some students were completely lost, while others were disengaged and bored. It was then that I knew I had to make a drastic change".

Classroom observations captured Nam's subsequent efforts to incorporate more interactive activities, collaborative group work, and differentiated instruction techniques. In one lesson, he introduced a role-play activity where students assumed different personas and engaged in simulated conversations, catering to various proficiency levels through scaffolding and leveled prompts.

Similarly, Hoa's practicum at the private high school demonstrated the dynamic nature of her professional growth. Initially focused on strictly adhering to the prescribed curriculum, Hoa soon recognized the need to incorporate more practical, real-world applications to captivate her high-achieving students' interests. As she explained:

"I was so consumed by covering the content that I lost sight of making the lessons relevant and engaging for these driven learners. They craved opportunities to apply their English skills in authentic contexts, and my textbook-based approach was falling flat".

Through ongoing dialogue with her mentor teacher and critical self-reflection, Hoa began to transform her approach dynamically. Observations revealed her integration of case

studies, project-based learning, and opportunities for students to apply their English skills in simulated professional settings, such as mock job interviews and business negotiations.

Mai's experience in the rural secondary school underscored the dynamic nature of her learning journey as she adapted to the unique needs and backgrounds of her Grade 6 students. Initially reliant on traditional teaching methods and textbook-based instruction, Mai soon realized the limitations of this approach in effectively engaging her learners. As she reflected:

"The textbook examples were so disconnected from my students' lived experiences. They couldn't relate to the contrived scenarios and decontextualized activities. I knew I had to find a way to bridge that gap and make the content more meaningful and accessible for them".

Recognizing the need for more culturally responsive and contextualized teaching strategies, Mai embarked on a dynamic transformation of her pedagogical practices. Observations captured her incorporation of local folktales, traditional games, and cultural artifacts into her lessons, fostering a more engaging and inclusive learning environment for her students.

These examples illustrate the dynamic and responsive nature of the pre-service EFL teachers' learning trajectories, as they continually reshaped their practices in response to the emergent needs of their students, the specific contextual demands, and their own evolving professional insights. Their willingness to critically reflect, experiment with innovative strategies, and embrace a growth mindset – essential attributes for navigating the complexities of the teaching profession and fostering effective, student-centered learning environments.

Self-Organization

Throughout their practicum experiences, Nam, Hoa, and Mai demonstrated a remarkable capacity for self-organization, proactively seeking out resources, support systems, and professional development opportunities to enhance their growth and overcome challenges. This self-organizing behavior was evident in their ability to identify areas for improvement, leverage available support networks, and implement strategies to refine their teaching practices continually.

Nam's self-organization manifested in his active collaboration with his mentor teacher and fellow pre-service teachers. Recognizing the wealth of knowledge and experience these individuals possessed, Nam sought their guidance and insights regularly. As he shared in an interview:

"My mentor teacher was an invaluable resource. Whenever I hit a roadblock or felt unsure about how to handle a particular situation, I would schedule a meeting with her to discuss my concerns. She would provide constructive feedback, suggest alternative strategies, and share her own experiences navigating similar challenges".

Classroom observations corroborated Nam's willingness to leverage this support system, as he was often seen taking detailed notes during post-observation debriefs with his mentor teacher.

Moreover, Nam fostered a collaborative community among his cohort of pre-service teachers. "We had a group chat where we would share our successes, vent our frustrations, and bounce ideas off each other," he explained. "It was incredibly valuable to have that network of peers going through similar experiences – we could learn from one another and offer moral support when needed".

Hoa's self-organization was exemplified by her proactive approach to seeking feedback from her students and continuously refining her teaching methods based on their responses. As she revealed, "After each lesson, I would distribute anonymous feedback forms to my students, asking them to share what worked well and what areas could be improved". This practice not only fostered open communication and student-teacher rapport but also provided Hoa with invaluable insights into her students' learning preferences and needs.

Observations captured Hoa's diligent efforts to analyze and incorporate this feedback into her subsequent lessons. In one instance, after several students expressed difficulty grasping a particular grammar concept, Hoa redesigned her approach, introducing visual aids and hands-on activities to reinforce the learning objective more effectively.

Mai's self-organization was particularly evident in her efforts to connect with the local community and integrate culturally relevant examples and resources into her lessons. Recognizing the importance of creating authentic and meaningful learning experiences for her rural students, Mai sought out collaborations with community elders and local experts. As she shared:

"I quickly realized that my textbook-based lessons felt disconnected from my students' lived experiences. So, I started reaching out to respected elders and local artisans, asking them to share their stories, proverbs, and cultural practices with me".

Classroom observations revealed Mai's thoughtful integration of these locally sourced materials into her teaching. In one lesson, she introduced a traditional folktale as a springboard for discussing moral values and character development, seamlessly weaving in vocabulary practice and writing prompts related to the story's themes.

The self-organizing behavior exhibited by Nam, Hoa, and Mai underscores their commitment to continuous professional growth and their ability to leverage available resources and support systems effectively. Their proactive efforts to seek feedback, collaborate with mentors and peers, and integrate contextually relevant materials into their teaching practices exemplify the self-organizing characteristics that contributed to their successful practicum experiences and overall development as competent, culturally responsive educators.

The Role of Context

The diverse contexts in which Nam, Hoa, and Mai undertook their practicum placements played a pivotal role in shaping their teaching experiences, professional growth trajectories, and the challenges they encountered. The unique characteristics of each school environment, including its geographical location, student demographics, curricular demands, and resource availability, significantly influenced the pre-service teachers' pedagogical approaches and the strategies they employed to navigate the complexities of their respective settings.

For Mai, the rural, countryside context of her secondary school placement presented distinct challenges and opportunities. Many of her Grade 6 students came from socioeconomically disadvantaged backgrounds, with limited exposure to English outside the classroom. As Mai shared:

"Most of my students' families relied on subsistence farming or menial labor jobs. English was seen as a luxury, not a necessity. Their parents couldn't afford tutoring or extra materials, so our classroom was their only real interaction with the language".

This socioeconomic reality necessitated a culturally responsive and inclusive approach. Classroom observations highlighted Mai's efforts to leverage locally available resources, such as integrating folktales, proverbs, and agricultural examples into her lessons, making the content more relatable and meaningful.

In contrast, Hoa's practicum at the prestigious private high school presented different contextual factors. The school's reputation for academic excellence created immense pressure to meet high standards, as Hoa acknowledged: "The expectations from students, parents, and the administration were intense. Top grades were the norm, and anything less was seen as a failure".

To engage these high-achieving learners, Hoa employed dynamic strategies like case studies and project-based learning. In one observed lesson, she facilitated a mock business

negotiation, challenging students to apply their English proficiency in a simulated professional context.

Nam's experience at the public high school highlighted the significance of catering to a diverse student population. "My class was a true melting pot," he elaborated. "I had students from wealthy expatriate families alongside those from impoverished neighborhoods, all with vastly different levels of English exposure".

To address this complexity, Nam employed differentiated instruction techniques. Observations captured his use of leveled reading materials, tailored writing prompts, and flexible grouping strategies to meet the unique needs of each learner.

These examples underscore how the specific contexts, whether rural, urban, public, or private, shaped the pre-service teachers' pedagogical decisions. Their ability to recognize and adapt to these contextual factors, such as socioeconomic backgrounds, academic expectations, and resource availability, was crucial in creating engaging, inclusive, and effective learning environments tailored to their respective student populations.

Discussion

While previous research has explored pre-service teacher learning during practicum experiences, this study offers a more nuanced and comprehensive understanding by applying the lens of complexity theory. Prior work has often oversimplified the complexities involved in pre-service teacher development, overlooking the intricate interplay of individual, social, and contextual factors (Phantharakphong & Liyanage, 2021). This study addresses these gaps by providing an in-depth examination of the multifaceted nature of pre-service EFL teachers' learning journeys, illuminating the themes of complexity, dynamism, self-organization, and the pivotal role of context aligns with the notion that teacher learning is a complex, non-linear process that unfolds within an intricate ecosystem (Clarke & Hollingsworth, 2002; Opfer & Pedder, 2011).

The inherent complexity observed in Nam, Hoa, and Mai's practicum experiences, shaped by interconnected factors such as diverse student backgrounds, curricular demands, and resource constraints, exemplifies the intricate interplay between individual, social, and contextual elements that influence teacher learning. As Nam expressed, "My class was a true melting pot...I had students from wealthy expatriate families alongside those from impoverished neighborhoods, all with vastly different levels of English exposure". This complexity resonates with the view that teacher professional development occurs within a

larger ecosystem, where multiple elements interact and co-evolve (Falkner et al., 2018; Ehrenfeld, 2022).

Moreover, the dynamic nature of the pre-service teachers' learning trajectories, characterized by their ability to adapt, experiment, and refine their approaches in response to emergent needs and insights, aligns with the principles of complexity theory. Hoa's teaching strategies evolved dynamically, as she shared, "I had to continually find ways to challenge these exceptional students and demonstrate the practical value of the English language skills they were acquiring". These experiences underscore the dynamic and ever-evolving nature of teacher learning, which is constantly reshaped by various internal and external factors (Kuhn, 2008; Opfer & Pedder, 2011).

The self-organizing behavior exhibited by the pre-service teachers manifested through their proactive pursuit of resources, support systems, and professional development opportunities, further exemplifies the principles of complexity theory. This self-organization reflects the inherent capacity of complex systems to reorganize and optimize their structures and processes in response to changing conditions and feedback (Davis & Sumara, 2014). For instance, Mai actively engaged with community elders, gathering folktales and cultural insights to incorporate into her lessons, fostering authentic and meaningful learning experiences for her students.

Furthermore, the pivotal role of context in shaping the pre-service teachers' experiences aligns with the complexity theory perspective, which emphasizes the significance of considering the broader ecosystem and the interconnectedness of various elements within and across multiple levels (Opfer & Pedder, 2011; Radford, 2006). The diverse school environments, with their unique characteristics, curricular demands, and resource availability, profoundly influenced the pre-service teachers' pedagogical approaches and strategies. As Mai reflected, "The school's location in a remote, rural area meant that many of my students' families had limited financial means and could not afford supplementary English learning materials or tutoring".

These findings have significant implications for the design and implementation of pre-service teacher education programs and practicum experiences. First, recognizing the multifaceted complexity of pre-service teacher learning necessitates the integration of comprehensive support systems and mentoring structures within practicum placements (Caires et al., 2012; Stanulis & Russell, 2000). Second, the dynamic and ever-evolving nature of pre-service teacher learning underscores the importance of fostering a growth mindset and promoting a culture of continuous professional development (Bradbury et al., 2020). Third,

recognizing the self-organizing tendencies of pre-service teachers highlights the need to provide opportunities for them to actively shape their learning journeys, such as through inquiry-based projects or action research (Williams, 2022; Espinoza Hernández et al., 2023). Fourth, the pivotal role of context emphasizes the importance of carefully selecting and preparing practicum placement sites that expose pre-service teachers to diverse school environments, fostering their ability to adapt to different student populations, curricular demands, and resource availability (Caires et al., 2012; Zeichner, 2010).

While this study contributes to a more nuanced understanding of pre-service EFL teacher learning during practicums through the lens of complexity theory, further research is warranted to continue advancing this field. Longitudinal studies could provide a more comprehensive understanding of the long-term impacts of practicum experiences on professional development trajectories. Comparative studies across diverse cultural and educational contexts could yield insights into the role of socio-cultural factors in shaping teacher-learning processes. Future research could also delve deeper into the influence of specific contextual factors, such as school leadership, parental involvement, or educational policies, on pre-service teacher learning during the practicum. Employing mixed-methods research designs could provide a more comprehensive understanding of the complex phenomena under investigation, triangulating findings and enhancing validity and reliability. Additionally, involving pre-service teachers as active participants in the research process through participatory or action research approaches could foster a deeper understanding of their lived experiences and amplify their voices in shaping teacher education programs and practicum designs. By pursuing these research avenues, the field of teacher education can continue to advance our understanding of the complex and multifaceted nature of pre-service teacher learning, informing the development of more effective, responsive, and contextually relevant teacher preparation programs.

Conclusion

This study offers a nuanced and comprehensive exploration of the complexities that shape pre-service EFL teachers' learning experiences during their practicum in Vietnam. By applying the lens of complexity theory, the research provides fresh insights into the intricate dynamics and interwoven factors that contribute to the multidimensional nature of pre-service teacher development. The in-depth case study methodology allowed for a rich examination of the lived realities of Nam, Hoa, and Mai as they navigated diverse school environments and teaching contexts.

The findings resonate profoundly with the tenets of complexity theory, underscoring the dynamic, situated, and multifaceted nature of pre-service teachers' learning trajectories. The diverse student backgrounds, varying English proficiency levels, curricular demands, resource constraints, and unique contextual factors encountered by the participants exemplify the intricate interplay of interconnected elements that shape the emergent nature of teacher learning. This complexity challenges traditional linear models and aligns with the notion that professional development occurs within a broader ecosystem, where multiple factors across individual, social, and environmental domains interact and co-evolve (Opfer & Pedder, 2011; Radford, 2006).

Moreover, the study illuminates the dynamic and ever-evolving character of the pre-service teachers' learning journeys, contrasting with more static conceptualizations prevalent in earlier literature. Their ability to reflect critically, experiment with innovative pedagogical strategies, and continually refine their approaches in response to emergent needs and insights underscores the non-linear, adaptive, and responsive nature of their professional growth, reflecting the iterative and fluid nature of teacher learning processes (Kuhn, 2008; Opfer & Pedder, 2011).

Notably, the research highlights the pre-service teachers' remarkable self-organizing behavior, an aspect often overlooked in previous work. Their proactive pursuit of feedback, collaboration with mentors and peers, and integration of contextually relevant materials exemplify their capacity to actively shape their learning trajectories. This self-organization aligns with the inherent ability of complex systems to reorganize and optimize their structures and processes in response to changing conditions and feedback loops (Davis & Sumara, 2014).

Furthermore, this study challenges the notion of a "one-size-fits-all" approach to teacher education by emphasizing the pivotal role of context in influencing the pre-service teachers' experiences. The diverse school environments, characterized by their geographical locations, student demographics, curricular expectations, and resource availability, profoundly shaped the pedagogical approaches and strategies employed by Nam, Hoa, and Mai. This finding underscores the significance of considering the broader eco-system and the interconnectedness of various elements across multiple levels, resonating with the complexity theory perspective on teacher learning (Opfer & Pedder, 2011; Radford, 2006).

The insights generated by this study have significant implications for the design and implementation of pre-service teacher education programs and practicum experiences within the Vietnamese context and beyond. By acknowledging the complexity, dynamism, self-

organizing nature, and contextual influences inherent in pre-service teacher learning, teacher education programs can adopt more holistic, responsive, and contextualized approaches that move beyond traditional, oversimplified models.

While contributing novel understandings, this study represents an initial exploration inviting further scholarly inquiry. Longitudinal analyses mapping long-term impacts, cross-cultural comparisons, mixed-methods designs enhancing validity, and participatory approaches amplifying pre-service teacher perspectives could collectively deepen insights into this multifaceted phenomenon and extend the application of complexity theory to teacher education research.

In conclusion, this study serves as a compelling reminder of the intricate tapestry that characterizes pre-service EFL teachers' learning journeys during their practicum experiences in Vietnam. By embracing the complexities, dynamism, self-organizing tendencies, and contextual influences illuminated through the lens of complexity theory, teacher education programs can better support and prepare future educators for the multifaceted challenges and opportunities that await them in the dynamic landscape of language teaching. Ultimately, by fostering a deeper understanding of the complex nature of pre-service teacher learning and implementing responsive, contextualized approaches, teacher education can contribute to the development of highly competent, reflective, and culturally responsive educators poised to navigate the ever-evolving demands of the EFL teaching profession in Vietnam and worldwide.

Declaration of Conflicting Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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