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論新手代理教師於不確定中的適應性專業能力發展

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摘要

出生率的下降以及全球人工智慧的不斷強化使得台灣大多數的學校招聘專任教師的意願降低。教師工作機會緊縮，加上每年大量預備教師從大學畢業，使得教師甄試考試競爭益發激烈。造成許多預備教師在尚未通過教師甄試考試前，不得已先選擇暫時擔任代理教師的工作。代理教師一邊以新手之姿擔任教師工作，一邊準備競爭激烈的教師甄試考試，面對這兩邊龐大的壓力，代理教師是否能展現適應性專業能力以及他們的教師專業發展過程是台灣教育界極為重要的問題。然而，當今大多數關於教師專業發展的研究主要關注已經教學一段時間的教師或準教師，忽略了代理教師所面臨的獨有問題。因此，本研究希望填補此缺口，採用質化研究方法，針對兩位高中代理教師進行深度觀察與採訪。透過教學現場觀察，深度面談，探究代理教師在面對困難時，是否有潛力展現適應性專業能力？這些專業能力會被哪些因素所影響？研究結果顯示，高中代理教師通常具備認知/後設認知、教學，以及專業代理人的適應專業潛力。而影響代理教師最重要的因素是個人不確定生涯造成的內在情感因素。

關鍵詞：適應性專業能力、教師專業發展、台灣代理教師、英語教師、新手教師

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Navigating Uncertainty: Adaptive Expertise in Novice Substitute Teachers

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Abstract***

The decline in birthrates and the prevalence of AI technology have led schools to favor hiring substitute teachers over full-time staff due to budget concerns, increasing the competitiveness of teacher screening tests. Many substitute teachers not only take on courses left by others but must also prepare for the screening tests to secure full-time positions. Existing research predominantly focuses on pre-service and experienced teachers, rarely addressing substitute teachers' unique issues. This qualitative study examines the potential for adaptive expertise of Taiwanese substitute teachers and influencing factors across three dimensions: social, affective, and cognitive/meta-cognitive. The findings indicate that these teachers showed potentially adaptive social, affective, and cognitive/meta-cognitive capabilities, as well as significant capacities for teaching and professional agency. The most significant factors shaping their professional development are cognitive and personal/affective factors.

Keywords: Adaptive expertise, Teachers' professional development, Taiwan substitute teachers, English teachers, Novice teacher

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1. Introduction

Taiwan is experiencing a decline in birthrates and the increasing influence of AI, making teaching a less stable profession. A 2023 Central News Agency (CAN) report indicates that primary and secondary schools, facing class reductions, prefer employing substitute teachers, with 15.5% of teachers in substitute roles. Besides, the acceptance rate for primary school teacher screening exams is only 0.4%-5% in 2021. Despite the low acceptance rate, many certified young teachers persist in screening exam preparation while working as substitutes, though some eventually abandon their efforts after repeated unsuccessful attempts. Those who persist may face tremendous challenges, some may be perceived as inferior (Liaropoulos 2020) and lacking authority (Clifton & Rambaran 1987). They must continually adapt, mastering pedagogical skills, meeting diverse student needs, managing interpersonal relationships, and balancing teaching responsibilities with preparation for the teacher screening tests. These demands require flexible application of professional skills, making adaptive expertise indispensable to their success. Teachers' adaptive expertise according to Giyoo Hatano (2003) is the ability to apply meaningfully learned knowledge and skills flexibly and creatively to navigate unfamiliar situations. Teachers with adaptive expertise are able to transfer their existing knowledge and skills to solve unfamiliar problems (Carbonell et al 2014; Lee & Yuan 2021). Furthermore, Yuan and Yang (2022), drawing on complexity theory, posited that expertise emerges from dynamic interactions among multiple components, with properties that cannot be reduced to mere aggregates of the system's parts. They argue that expertise functions as an integrated, synergistic whole, which is continually shaped by intricate interactions within its constituent elements. While most current research (Allen et al. 2016; Moran et al. 2023; Wetzel et al. 2015; Mannikko 2019; Lee and Yuan 2021; Yuan and Yang 2022) has predominantly concentrated on exploring the adaptive expertise of regular in-service, pre-service or both teachers who are assured of their teaching career trajectories, comparatively, studies focusing on substitute teachers are scarce (Reupert et al. 2023), who face uncertainties regarding their future in the profession.

Most substitute teachers have received professional training, completed internships, and hold teaching certifications, which equip them for adaptive expertise. However, their temporary roles and limited integration within the school community may influence the development of adaptive expertise, which is distinct from that of permanent teachers.

Therefore, this present study focuses on substitute high school teachers in Taiwan and attempts to unpack the nuanced components of adaptive expertise and how various factors interplay to shape novice substitute teachers' professional development. The research questions guiding the study are as follows:

1. What attributes of adaptive expertise, if any, did the two substitute teachers display?
2. What factors were found to influence their development of adaptive expertise?

2. Literature Review

2.1 Current Discussion about Substitute Teachers

Due to cost considerations and declining student enrollment resulting from long-term low birthrates, many high schools in Taiwan prefer to hire substitute teachers. While full-time teachers are limited by the Ministry of Education to a maximum of 20 teaching hours per week, no such restriction applies to substitute teachers, resulting in some being assigned up to 25 hours per week. In addition to covering for teacher absences caused by training, administrative duties, illness, etc., substitutes take on leftover classes, attend meetings and school activities, and grade and prepare lessons. However, substitutes receive significantly lower pay, no compensation during vacations, and no year-end bonuses.

Reupert et al. (2023) conduct a narrative synthesis approach to systematically review studies focusing on the often-overlooked substitute teachers across the United States, Canada, Turkey, Brazil, England, and Australia. The authors analyzed 31 peer-reviewed empirical studies published from 2010 onwards, which centered on substitute teachers at primary and secondary levels. Their findings highlight several issues faced by substitute teachers. For example, the nature of substitute teaching demands high levels of professional flexibility and adaptability to navigate the evolving dynamics of classrooms and students. However, there is a lack of adequate support systems and resources specifically designed for substitute teachers, such as induction programs, school resources, and access to professional development opportunities. Substitute teachers often feel marginalized within the school community, which hinders their

ability to integrate and feel appreciated as members of the educational team. The authors also highlight the diverse composition of the substitute teacher workforce, which includes retired educators, volunteers, or individuals with limited options, each with varying qualifications and unique needs. They recommend addressing these challenges at both the systemic and school levels to better support substitute teachers.

The teaching environment for substitute teachers in Taiwan closely mirrors that described by Reupert et al. (2023). Most Taiwanese substitutes, seen as temporary staff, juggle heavy workloads while preparing for teacher screening exams, requiring flexibility and adaptability to thrive in this demanding environment.

2.2 Routine Expertise vs. Adaptive Expertise

Teachers' professional expertise is generally divided into two categories: routine and adaptive expertise. Hatano (1982) characterizes routine expertise by a high level of proficiency in familiar tasks, demonstrated through efficiency and automaticity. Routine experts are adept at quickly recognizing and applying prior knowledge to routine problems by detecting meaningful patterns and retrieving relevant information (Bransford et al. 2000; Chi et al. 1988). While this efficiency allows them to navigate familiar scenarios with ease, it can also lead to cognitive biases, oversimplification of complex situations, and potential misconceptions or errors (Feltovich et al. 2006). Moreover, routine expertise may become a limitation when encountering novel or unfamiliar challenges (Holyoak 1991).

In contrast, adaptive expertise, as defined by Hatano and Inagaki (1986), involves the ability to extend beyond established knowledge and apply it creatively to new or unfamiliar contexts. Branzetti et al. (2022) describe adaptive experts as those capable of transferring knowledge from prior experiences to solve novel problems innovatively (Hatano & Inagaki 1986; Meneses et al. 2023). Such experts are distinguished by their flexibility and continuous learning, enabling them to expand their knowledge base for problem-solving (Bereiter & Scardamalia 1993; Schwartz et al. 2005). This orientation toward adaptability allows them to effectively handle complex situations without succumbing to the biases and thinking patterns that can constrain routine experts.

Although routine expertise and adaptive expertise are two distinct competencies, they are fundamentally interconnected. Researchers point out that adaptive expertise does not operate in isolation from domain-specific knowledge (Cupido et al., 2022; Martiminanakis et al. 2020; Mylopoulos et al. 2018). Adaptive expertise emerges from routine expertise, and both routine and adaptive expertise frequently transfer and work concurrently. The cognitive transfer from routine to adaptive expertise requires metacognitive skills, which evaluates, monitors, and controls the applications of existing knowledge in new ways, and continuously develops strategies and reflects on one's thinking processes as situations evolve (Smith et al. 1997; Hertog et al. 2023). Through reflection and meta-cognitive evaluation, individuals can recognize the limitations of their current cognitive knowledge and skills, which catalyzes the search for new solutions and the adaptation of strategies based on their existing knowledge in order to meet novel demands. Thus, the higher proficiency of routine expertise can generate the better optimization of innovative knowledge transfer. This reflective practice is not isolated but integrated into the process of action, allowing professionals to modify their approach in real-time based on immediate feedback and results, thus embodying the principles of adaptive expertise (Moran et al. 2023).

In the context of teacher education, fostering adaptive expertise is particularly crucial due to the unpredictable and varied nature of classroom challenges.

2.3 Teachers' Expertise and Influencing Factors

Lee and Yuan (2021) employed the framework of adaptive expertise to investigate key factors contributing to the expertise of L2 writing teachers through a qualitative study. Data were collected from three experienced teachers via two semi-structured interviews and nine classroom observations. The participants reflected on the challenges encountered, strategies employed, and their adaptive expertise, while the interviews focused on instructional methods, feedback provision, and assessment practices. The study identified six core components of writing teachers' expertise: an integrated knowledge base, student-centered pedagogy, professional vision, self-agency and reflection, passion for teaching and writing, and a commitment to ongoing learning and progressive problem-solving. Additionally, the authors highlighted that cognitive, affective, and social dimensions interact synergistically to shape these components.

In a similar vein, Yuan and Yang (2022) explored EFL HK teachers through the lens of Complexity Theory to unpack the components and influencing factors of teacher educators' expertise. Two experienced language teachers from higher education participated in the study. Data collection methods include interviews, field observations, and informal communication over an academic year. The study reveals that teacher educators' expertise entails various components, including a dialogic teaching approach informed by research-based knowledge, emotional intelligence for effective teaching, a reflective and agentive mindset for continuous learning, and the capacity to promote expertise in multiple communities. In addition, external factors such as ongoing engagement in research, teaching and community service, institutional policy and requirements, and personal values and beliefs impact the development of expertise among teacher educators.

Both the above studies explore the multifaceted nature of teacher expertise, highlighting key components and influencing factors. Synthesizing the two studies reveals four constructs for teacher expertise: (1) cognitive and meta-cognitive skills, including integrated knowledge, research-informed practices, capacity to promote expertise in multiple communities, and problem-solving; (2) teaching practice, including dialogic teaching approaches, student-centered teaching approaches, and (3) professional agency, including vision, reflectivity, and self-agency; (4) affective dimension, such as passion for teaching, emotional intelligence, and commitment to learning. The influencing factors identified in both studies can be categorized into three categories: (1) cognitive (e.g., ongoing engagement in research), (2) social (e.g., institutional policy and requirements), and (3) affective (e.g., personal values and beliefs).

2.4 Expertise Development

Teachers' adaptive expertise is shaped by the dynamic interaction of prior experiences, current practices, and future professional aspirations, making its development crucial for understanding the factors that influence their evolving behaviors and adaptability (Anthony et al. 2015; Männikkö & Husu 2019). Timperley (2013) discussed the progression of prospective teachers in developing routine and adaptive expertise. The first stage involves shifting from a self-focused perspective—centered on their learner identity during the initial phase of learning to teach, efficacy/agency for self-preservation when confronting reality shock, and a tendency of self-normality assuming that all learners are similar to

themselves– to a student-centered focus that emphasizes promoting student value, improving learning outcomes, and recognizing diversity. In addition, new teachers often face "practice shock" and doubts about their effectiveness, especially when working with students from diverse backgrounds. Familiarity with the classroom can exacerbate these challenges by causing teachers to overlook questioning the effectiveness of their prior experiences as students (Feiman-Nemser & Buchmann 1986). In the second stage of developing adaptive expertise, teachers progressively deepen their understanding of teaching and learning, encompassing professional knowledge, social interactions, teachers' responsibilities, and students' learning environment. Timperley indicates that novice teachers initially prefer a teacher-centered approach to dominate the classroom and focus on transmitting knowledge through familiar ways that encourage memorization and recall (Feiman-Nemser & Buchmann 1985). As they develop routine expertise, teachers recognize that students filter learning through personal perspectives. They become more willing to build relationships with students to enhance learning, adaptively use students' cultural and linguistic resources, and view teaching as a collaborative process of knowledge construction, considering both students' conceptions and misconceptions while leveraging diverse resources. However, Timperley cautions against a simplistic linear progression from a novice to a routine to an adaptive expert, as a teacher's expertise may develop concurrently. In short, adaptive expertise emerges through experience, with teachers initially adopting a self-centered perspective before gradually shifting to a student-centered view.

3. Method

A qualitative case study was conducted, which is helpful when researchers aim to explore an issue to gain a deep, comprehensive understanding (Creswell & Poth 2018; Yin 2018). This approach enables a detailed examination of specific individuals or settings, making it particularly suitable for investigating adaptive expertise, if any, demonstrated by the substitute teacher participants and the factors that influence their expertise development.

3.1 Participants

Two high school substitute teachers, Will and Sean (pseudonyms), participated in the study. They both majored in English, held MA degrees, completed official English teacher training programs, and earned teaching certificates. They worked at the same high school and were preparing for

the teacher screening tests. As acquaintances of one researcher and members of the same study group, they regularly shared exam tips, resources, and collaborated on course design. Their close relationship minimized concerns about power dynamics and fostered open discussions about their challenges.

Despite the similarities in backgrounds, there are individual differences. Will has been a substitute teacher for four years. He graduated from a prestigious high school and earned both his Bachelor's and Master's degrees from Taiwan's top-ranked teacher training university. After completing his internship at an elite high school, he worked as a part-time English teacher in cram schools and as a tutor. He was attempting the screening test for the fourth time.[1] Although Will persisted in taking the screening test to pursue a full-time position, he also kept his options open for potential changes, e.g., working at a cram school.

Sean graduated from a community college, earned his BA from a technological university, and obtained a master's degree from a teachers' college. Before his current role, he spent ten years teaching English in cram schools and had been a substitute teacher for three years. At the time of this study, he was preparing for his third attempt at the screening test. The participants' profiles are illustrated in Table 1.

3.2 Context

Will and Sean were employed at a school (Abbreviated as CH) that encompasses both junior and senior high school departments, with the senior high school offering general and specialized streams such as music, fine arts, and physical education. The students' English proficiency was rated as low-medium based on the results of Comprehensive Assessment Program for Junior High School Students (CAP). Because Will and Sean had administrative duties, their teaching loads were reduced to 13 and 9 hours

[1] The teacher screening test consists of three stages: a written exam, a teaching demonstration, and an interview. (1) **Written Exam**: The written exam tests professional theories and practices, covering a broad range of topics. (2) **Teaching Demonstration** and (3) **Interview:** On the exam day, candidates draw a topic, conduct a 15-minute teaching demonstration, and are then interviewed by the recruitment committee. According to the Ministry of Education, the acceptance rate in 2021 was only 4.29%.

per week, respectively. However, they were required to attend administrative meetings two to three times a week, each lasting approximately 1 to 1.5 hours.

Table 1 Information about the Participants

	Will	**Sean**
Educational Background	BA and MA from the top-ranked teacher university	BA from a technological university, MA from a teacher university
Cram school teaching experience	5 yr	10 yr
Attempts of taking the teacher screening test	4	3
Workplace and teaching experience	CH high school/ 4 yr	CH high school/ 3 yr
Student's grade	Grade 10	Grade 10
Students' language proficiency	Low-medium	Low-medium
Teaching hours (hr/week)	13	9

3.3 Data collection

Data collection for each teacher included a pre-observation interview, a classroom observation, and a post-observation interview. Both interviews were semi-structured, with 14 questions exploring teaching challenges, social and affective perceptions, and problem-solving strategies. The interviews, conducted in Mandarin, helped researchers understand the teachers' challenges and how they applied their professional knowledge to adapt to changing classroom environments. The post-observation interview focused on addressing challenges identified earlier, students' engagement, and classroom dynamics. Sample interview questions can be found in Appendices A and B. Each participant's class was observed once for 45 minutes, with the observer seated at the back, observing without participating. The focus was on the challenges identified in the pre-observation interviews, along with teaching methods, teacher-student interactions, and student responses. With the teachers' permission, both classes were video-recorded for further analysis.

3.4 Data Analysis

The data from interviews and classroom observations were analyzed to address the research questions. Given that adaptive expertise involves the ability to respond flexibly to changing, challenging, and non-routine contexts by drawing upon prior knowledge, the analysis focused on the participants' responses to dynamic changes and challenges in their teaching practice by flexibly drawing on prior knowledge or creatively using resources. The synthesized components of teacher expertise identified by Lee and Yuan (2021) and Yuan and Yang (2022) serve as the coding framework for research question 1. The four synthesized constructs for coding were: (1) cognitive and meta-cognitive skills, (2) teaching practice, (3) professional agency, and (4) affective dimension. Additionally, the analysis employed three dimensions of influencing factors—cognitive, social, and affective—in order to answer research question 2.

The analysis procedure unfolded as follows: First, we thoroughly reviewed the interview transcripts and observation notes to gain a deep understanding of the content and generate initial codes. The initial codes were organized and linked, categorizing them into either expertise or influencing factors. Subsequently, the codes of expertise were further grouped into four predetermined types of adaptive expertise: (1) Cognitive and metacognitive skills, which is informed by knowledge of language and teaching, as well as teachers' ability to evaluate, assess, and reflect on their teaching practices. (2) Teaching practice, which focuses on practical teaching skills, including classroom management, student engagement, and effective instruction delivery. (3) Professional agency, which highlights teachers' self-driven motivation and the ability to take actions to achieve their goals. (4) Affective dimensions, which includes emotional intelligence, empathy, and self-efficacy.

The codes of influencing factors are categorized according to the three factor dimensions: cognitive, social, and affective. The cognitive/meta-cognitive dimension focuses on teacher's subject and pedagogical knowledge, as well as problem-solving and decision-making skills. The social dimension pertains to a teacher's relationships or interactions with students, colleagues, and organizations, integrating insights from these interactions to adapt their teaching methods. The affective factor encompasses aspects of a teacher's self and emotion, including self-esteem, emotional intelligence, motivation, commitment to teaching, and self-efficacy. If a code overlapped with other categories, it was assigned to all

relevant categories. Codes that did not align with these categories were assigned to new categories. During data analysis, most data fit within the four expertise components and the three influencing factors. However, "time management," lacks a clear intuitive classification. After discussion, we decided that when "time management" reflects a teacher's expertise, it would be classified under meta-cognitive skills, as it involves planning, monitoring, and self-regulation. Metacognitive skills help individuals become aware of how they spend their time and make adjustments to improve efficiency. This process may include setting goals, prioritizing tasks, and evaluating progress, all of which are key aspects of metacognition. If "time management" is an influencing factor shaping teachers' expertise, it would be classified as a "personal factor," as it involves individual circumstances, prioritization, and perception of time constraints, which reflects one's subjective experience and affective state. Given that the "affective factor" was already one of the influencing factors, we expanded this category to "personal/affective" to accommodate both emotional and non-emotional personal factors. Besides, as teacher's social negotiation skills did not align with the existing four expertise categories, a new category, "social skills" was created. Thus, the coding scheme comprised five components of teacher expertise: cognitive/metacognitive skills, teaching ability, professional agency, affective skills, and social skills, along with three influencing factors: cognitive, social, and personal/affective. Table 2 illustrates the data coding:

Table 2: Example of Data Coding

Category	Coding Rationale	Interview Data
[Expertise] Cognitive/meta-cognitive expertise & affective	Judging whether students are distracted (**meta-cognitive skills**), choosing relevant resources to the lesson to create humor (**cognitive skills**), and engaging students' attention in class (**affective skills** – empathizing with students' learning needs).	學生分心時，我會閒聊吸引他們注意力，比如，最近生活遇到的事情，學校的活動、最近新聞時事，或是講一些課文相關的笑話 (When students get distracted, I recapture their attention with casual conversations, sharing personal experiences, discussing school events, or making relevant jokes about the teaching content to engage students.

Category	Coding rationale	Interview Data
[Expertise]: cognitive/meta-cognitive. [Factor]: Personal/affective	Using professional knowledge to design learning assessment activities to capture students' attention (**cognitive skills**). A professional judgment of these activities is that they are time-consuming(**meta-cognitive skills**). However, this method is time consuming (**personal/affective factor**)	我把課文的重點挖空格給學生填，透過提問的方式讓他們回答空格問題…但是這方法會花大概兩倍到三倍的時間 ("I would create fill-in-the-blank exercises for key points and ask questions to guide students' responses, but this method requires two to three times more class time.")
[Expertise] – Cognitive/ meta-cognitive; **[Factor]:** Personal/affective	Professional judgment evaluates insufficient time for teaching preparation (**cognitive and meta-cognitive skills**) and decides what to teach or omit (**cognitive and meta-cognitive skills**); the influencing factor of insufficient time **is coded as personal/affective.**	我沒這麼多時間備課，因此，我需要決定哪個教學部分可以被犧牲 ("I don't have a lot of time to prep lessons, so I need to figure out which teaching parts can be trimmed down.")

To ensure coding reliability, the two researchers acted as coding partners. Upon completing the data coding, we compared our coded data. Any discrepancies were resolved through discussions.

4. Results

Through data triangulation, findings of each participant teachers are presented as follows.

4.1 Will's Story

During the interview, Will identified three main challenges he was

confronting– he struggled with students' short attention spans during classes, their low learning outcomes, and frustration from not being able to apply his learned knowledge effectively due to students' low English proficiency. To deal with the first problem, Will said he used to engage students in conversations related to the lesson when he noticed their attention waning. He believed this strategy not only regains their attention but also enhances teacher-student relationships.

> To regain students' attention, I usually ask two types of questions: one about their personal experiences, like school life, and the other linking the material to topics of interest. Students are more motivated when discussing their daily lives

Additionally, Will said that he would break down teaching materials into smaller units to make learning more manageable, though this approach is time-consuming. Divided the course into smaller components and gave quizzes after each section to assess learning, such as teaching 5-10 vocabulary words followed by a quiz. While some students' grades improved, this method takes two to three times more time, requiring trade-offs in managing my schedule.

The second major challenge Will highlighted was students' low learning outcomes. Initially, he employed teaching methods that had been successful at the cram schools where Will used to teach, but the unsatisfactory performance of his students prompted him to explore alternative strategies.

> My previous mindset in teaching was that I hoped to provide as much additional material as possible, which worked well for cram school teaching. But I found that this approach doesn't suit my current students.

To improve students learning, Will limited the scope of each quiz, making preparation more manageable. He also implemented some reinforcement strategies, such as allowing students to retake quizzes until they reached the standard or offering rewards to boost motivation.

Besides, Will also adjusted his expectations, choosing to focus more on students' learning attitudes rather than learning outcomes:

> I lowered my expectations and shifted the focus from grades to

students' learning attitudes. I told them, "If you pay attention and take notes seriously, I'll consider it a sign of commitment and award credit for it."

In the pre-observation interview, Will demonstrated cognitive and metacognitive knowledge by evaluating student engagement and adjusting his materials. He broke down content and tests to improve students' learning attention and outcomes. He also showed adaptive social skills by using casual conversations to connect learning to students' daily lives. However, Will also displayed low self-efficacy regarding his current teaching. With an MA in Linguistics from a prestigious university, he expressed deep frustration in the pre-observation interview about not fully utilizing his expertise when teaching lower-level students. He hoped to pass the teacher screening test and secure a position at an elite school. When asked what he would do if he did not pass the screening test, he shrugged, "I'd likely prefer teaching at cram schools rather than being a substitute at lower-level schools." Will's frustration with teaching lower-level students, along with uncertainty about his future career, resulted in his low self-efficacy and lack of commitment.

In the observed class, Will introduced "Grimm's Law," a complex linguistic theory of sound changes to enhance his students' vocabulary. However, this instructional choice led to scheduling issues, causing him to fall behind the planned curriculum. To compensate, Will offered an optional after-school online session. Despite his innovative adaptivity, this make-up session could potentially have been avoided. While teaching Grimm's Law demonstrated Will's linguistic knowledge, he did not adequately evaluate its appropriateness for high school students with lower proficiency levels. This oversight became apparent as several students were visibly confused during his lecture. After the class, two students approached Will to discuss their difficulties understanding the complex phonetic law. Will defended his use of Grimm's Law as just an "alternative" learning method, and insisted its value in "learning word meanings over spelling accuracy." In the post interview, Will responded,

> I'm using Grimm's Law to memorize vocabulary to prepare for my teacher screening test. And I think this approach is quite effective for helping me with word recognition, so I want to share it with my students. I know that not all students could get it well. I believe some really can benefit from it, while

> others might feel it adds extra burdens. So, somehow, I can understand why some students might resist it

Based on Will's teaching observation, he chose a familiar teaching theory, Grimm's Law, that he believed to be helpful, but he overlooked the learning needs of lower-level students. While his overall teaching was not highly effective, it reflects several signs of his developing adaptive expertise. (1) Will creatively transferred his familiar knowledge used for his test preparation to change traditional vocabulary teaching, indicating his adaptive expertise in cognitive skills. (2) He addressed the issue of falling behind his teaching schedule by offering an online activity, showing his flexible professional agency skills. (3) Will also appeared to possess meta-cognitive skills for assessing some students' frustration, as he recognized that teaching Grimm's Law did not meet all students' needs. Despite the above attributes of adaptive expertise displayed in Will, his teaching suggests that some affective factors, e.g., low self-efficacy and low commitment to teaching lower-level students, led him to deprioritize their learning needs.

Additionally, Will's rigid adherence to certain conventional classroom practices was also observed, such as not erasing the blackboard himself. He later explained that he did not clean the blackboard during recess until the second section resumed because he wanted to accommodate latecomers and act like a teacher.[2] This decision unnecessarily extended the transition periods between lessons, further reducing instructional time. Will's insistence on having students erase the blackboard reflects his desire to establish authority as a teacher. This approach indicates that he was still in the process of exploring and developing his teacher's identity.

4.2 Sean's Story

Sean disclosed during the pre-observation interviews that he struggled with work overload and fear of his abilities being questioned. Initially, Sean's duties spanned both the junior and senior high school departments, requiring him to attend meetings and prepare different courses for each. However, the breaktime in school usually is the time that Sean used to

[2] In Taiwan secondary schools, it is customary for teachers not to clean the blackboard themselves as it is part of the students' classroom duty. It is also a sign of respect to clean the blackboard for the teacher.

prepare his teaching so he could reserve the evenings for preparing his teacher screening tests.

> Preparing lessons took up all my breaks, and mandatory meetings forced me to use my evenings, which I had reserved for teacher screening test prep. With 24 weekly classes, including after-school tutoring, my workload feels overwhelming.

To save time, Sean adopted pre-made teaching templates from a former colleague, but soon realized they did not suit his students' proficiency levels. His perfectionism and unfamiliarity with the materials led him to spend excessive time in creating teaching worksheets and PowerPoint slides, encroaching on his evening study time.

> I initially used templates from my previous school but found them too overwhelming for my current students. Therefore, I had to create new lecture notes and PowerPoint slides based on the textbook, which was very time-consuming.

Sean pushed himself, believing the stress was temporary due to inexperience. However, one incident changed his perspective. On a busy day, unable to create PPT slides, he used photos of his handwritten notes instead. Surprisingly, the students responded positively, encouraging him to adaptively revise his teaching more confidently.

> Pressed for time, I wrote notes in the textbook, photographed them, and projected them in class. To my surprise, students preferred this approach, saying the photos made it easier to follow along compared to my previous PPT slides.

In the pre-observation interview, Sean identified another challenge: the fear of having his abilities questioned. Sean used to be reluctant to seek help, worrying that people might view his request for assistance as a sign of incompetence. To prove his capability, he responded by overworking and accepting every assigned task, which not only exacerbated his workload but also blurred personal boundaries.

> I hesitated to refuse colleagues' requests, fearing they'd view me as incapable or be disappointed. I rarely shared how much work I already had or said no to requests, even when they conflicted with my responsibilities. Saying 'no' was very difficult for me.

Sean mentioned that the accidental success of negotiating teaching by using photographed written notes empowered him with confidence to negotiate with students. Over time, Sean gradually recognized the importance of negotiation, learning to take initiative to articulate his needs strategically. As he gained more positive experiences, he felt more comfortable advocating for his needs. He said, "after I learned to reject some requests from my colleagues a few times, and my colleagues understood my situation, I realized that it's OK to say 'NO.'" Additionally, Sean sought to build his competence and confidence by excelling in teaching and integrating advanced online resources. He attended numerous workshops and applied what he learned to his teaching, using online tools, resources, and games to engage students, which helped reduce his preparation time.

Sean initially relied on old teaching templates to transfer routine expertise. However, when they proved ineffective and time was limited, he adapted by using photographed handwritten notes, showcasing his cognitive and metacognitive adaptive expertise. His ability to improvise, which received positive student feedback, also highlighted his adaptive teaching skills. This success, along with the need to save time for teacher screening test preparation, pushed him to develop adaptive social skills to negotiate his needs and decline colleagues' requests when necessary. Through trial and error in managing interactions with students and colleagues, he gradually emerged professional agency and confidence, taking action on his personal agenda (e.g., saying 'no' to colleagues or attending teaching workshops). Notably, preparing for the teacher screening test was a key factor shaping his adaptive expertise in cognitive and metacognitive skills, as well as his professional agency.

In the observed 12th-grade fine arts class, Sean spent 10 minutes reviewing common errors in students' self-introduction writings, followed by one-on-one conferences. While some waiting students were off-task, he did not manage the class order. He wrapped up by asking students to use an AI "speech to text" tool to convert their written self-introductions into audio for pronunciation practice.[3]

Classroom observations revealed students' poor punctuality issue and suboptimal classroom order. In the post-observation interview, Sean explained his rationale for one-on-one writing conferences, emphasizing the importance of helping students prepare oral self-introductions for the General Scholastic Ability Test. Since the previous lesson had already covered self-introduction writing, the conferences allowed him to offer personalized guidance to each student. Additionally, holding individual conferences allowed Sean to save time from teaching preparations to focus on preparing for the teacher screening test. Regarding classroom management, Sean maintained a gentle approach, choosing minimal intervention while students waited for their turn of the writing conferences, prioritizing a harmonious teacher-student relationship. He said, "If students could orally introduce themselves, I had achieved my teaching objectives." However, when asked how he would evaluate students' oral self-introductions practices, Sean had no concrete plan, relying instead on students' self-regulated learning through the assigned AI tool.

Sean's teaching demonstrated empathy by recognizing students' need for individualized feedback on self-introductions. Integrating one-on-one writing conferences allowed him to personalize instruction while reducing his teaching preparation time. Using an AI tool to scaffold students' oral practice also showcased his creative cognitive knowledge. In short, his teaching reflected his potential for adaptive expertise as he displayed some attributes like empathy, metacognitive skills in time management, and professional agency in implementing non-traditional conference activities. However, to save time (a personal/affective factor) for his own test preparation and to maintain positive teacher-student relationships (a social factor), Sean's teaching quality was compromised.

[3] The students have finished their College entrance exams but may soon face entrance interviews.

Both Sean and Will had sufficient professional teaching knowledge and demonstrated some potential for adaptive expertise through undertaking innovative methods—Will applying Grimm's Law and Sean using one-on-one writing conferences. However, their teaching abilities were still developing. Both lacked confidence, relying on projecting authority (e.g., teaching Grimm's Law, avoiding cleaning the blackboard) and maintaining humble relationships to affirm their teacher identity. Additionally, their lack of commitment and need to save time for teacher screening test seemed to significantly influence their teaching practices.

5. Discussion

5.1 RQ 1. What Attributes of Adaptive Expertise, If Any, Did the Two Substitute Teachers Display?

Through data analysis, both substitute teachers exhibited some attributes of adaptive expertise, demonstrating potential for it across several domains:

5.1.1 **Cognitive/Meta-Cognitive Expertise:** Both teachers demonstrated strong cognitive expertise in professional knowledge. Will broke down complex concepts into smaller parts to maintain student attention, tested small portions of the subject to enhance learning, and adapted Grimm's Law—his personal vocabulary method—into innovative teaching materials, departing from traditional methods. Similarly, when pressed for time, Sean creatively used photographed notes instead of PowerPoint slides and implemented one-on-one writing conferences for personalized feedback. Additionally, both teachers exhibited adaptive metacognitive skills: Will assessed when students were distracted and re-engaged them with humor and relatable content, while Sean demonstrated strong judgment in managing his workload and navigating interpersonal interactions with students and colleagues.

5.1.2 **Teaching Ability:** Both teachers showed teaching capabilities but made less effective choices when other priorities arose. For example, Will chose to teach Grimm's Law despite knowing it would not fully accommodate lower-level students, prioritizing time-saving and the benefit to advanced students. Although he claimed to center on students, Will's observed teaching practices and actions indicated otherwise. Sean, using one-on-one writing conferences, anticipated potential classroom disruptions but prioritized personalized feedback and the need to save

time for his test preparation, opting to overlook classroom management. These seemingly unsuccessful teaching practices did not necessarily reflect a lack of teaching ability, despite room for development. Rather, they highlighted their prioritized choices when facing competing demands.

5.1.3 **Professional Agency:** Both teachers displayed strong motivation and agency to minimize lesson preparation time, using school breaks for planning and reserving after-school hours for personal exam preparation. Will integrated the linguistic method used for his test preparation into his teaching to achieve dual outcomes, while Sean negotiated with colleagues to reduce tasks that interfered with his study time, even at the risk of straining relationships. Any activities that infringed on their personal exam preparation were viewed as

5.1.4 **Affective Skills:** Based on the findings, although the two substitute teachers appeared to prioritize their future careers over their current but temporary teaching jobs, they still made efforts to address internal challenges and fulfill the basic demands of their roles, demonstrating potential command of affective skills. Will managed his dissatisfaction with his job while maintaining his teaching responsibilities, lowering his expectations for lower-level students to avoid frustration. He also strived hard to "act" like a teacher, teaching the complex Grimm's Law, and asking students to clean the blackboard. Sean, on the other hand, focused on building his confidence as a teacher and developing his teacher identity through attending workshops and negotiating with students.

5.1.5 **Social Skills:** Due to the temporary nature of their positions, both substitute teachers adopted a gentle and accommodating approach in their interpersonal relationships. As the youngest, least experienced, and most marginalized staff members, they avoided conflicts with students and colleagues to safeguard future employment opportunities. Recommendation letters from previous schools are crucial for job applications, and any personnel disputes could permanently damage their reputations. Will used humor and informal conversations to foster student engagement and lowered expectations for lower-proficiency students to reduce tension. Sean, on the other hand, tactfully negotiated with students and colleagues to protect his own interests, overlooking classroom disruptions during one-on-one conferences to maintain a friendly teacher role.

To conclude, these two substitute teachers, equipped with teaching licenses and prior teaching experience, appeared to possess some attributes of adaptive expertise, demonstrating some potential for it. Many of their seemingly ineffective or unsatisfactory teaching practices were the result of carefully strategic evaluations and decisions. While this ability is often not recognized as adaptive expertise within the traditional scope of Teacher Professional Development (TPD) research—given its focus on personal gains rather than student benefits—it can be viewed as adaptive expertise in a broader sense. Den Hertog et al. (2023) define experts as individuals who outperform others in effectively and efficiently executing tasks within a specific professional domain. It is evident that Will and Sean demonstrated the potential of adaptive experts. Their teaching choices and interpersonal relations reflect their capacity to optimize return-on-investment decisions, transferring routine expertise under constrained resources (e.g., time and effort) to address unfamiliar challenges (e.g., balancing teaching and personal goals). This aligns with Becker's "Investment Model" (1964), which posits that individuals make decisions based on anticipated returns relative to the resources invested. In these cases, their engagement in professional activities was viewed as an investment, where they carefully weighed costs (e.g., time, effort, interpersonal resources) against perceived benefits (e.g., test preparation, teaching efficacy, career advancement, and self-actualization), and adaptively solved problems with minimal effort while maximizing time for their own test preparation.

5.2 RQ 2. What Factors Were Found to Influence their Development of Adaptive Expertise?

5.2.1 Cognitive Factor—Adaptive Expertise Evolving from Self-centered to Beyond Self

Will taught “Grimm’s Law” out of personal convenience, as he had learned it during his Linguistics graduate studies and used it for his teacher screening test. His familiarity with Grimm’s Law likely influenced this decision, aligning with Riel and Rowell’s (2017) view that adaptive expertise relies on familiarity or experience. Regardless of student needs, it was easier and more comfortable for Will to teach it, as it required little preparation time. During instruction, Will employed a teacher-centered approach, which is common among novice teachers seeking control and structure (Schuh 2004). Additionally, Will’s approach aligns with Timperley's (2013) observation that new teachers are often self-focused

and exhibit a self-normality bias, assuming all learners should learn as they do, and tend to use familiar content without considering students' actual needs.

Sean, like Will, prioritized his own interests in teaching. To save time, he conducted writing conferences while disregarding noise from the waiting students, focusing on meeting his teaching objectives rather than student learning goals. As Timperley notes, when teachers adaptively employ new strategies or confront new challenges, they often start with a self-centered perspective and shift beyond themselves only after gaining experience (Timperley 2013). Thus, novice teachers' adaptive expertise may typically develop from a self-focused viewpoint.

5.2.2 Affective Factors

5.2.2.1 Emerging Teacher's Identity and Seeking External Validation.

Both substitute teachers struggled to establish their teacher identity and sought validation. Research shows that novice teachers often worry about their performance and seek external affirmation (Jin et al. 2022). Substitute teachers, in particular, perceive themselves as inferior to full-time colleagues and often feel disconnected, isolated, or ignored (Topchyan & Woehler 2021; Driedger-Enns 2014; Charteris et al. 2017). They are sometimes labeled as "outsiders," "babysitters," "incompetent," or "not real teachers" (Landis 2019), which the two teachers also experienced. Will's refusal to erase the blackboard was an effort to assert authority, while Sean's lack of confidence stemmed from his belief that he was not exceptional. This insecurity made him hesitant to refuse others' requests and to ask for help, fearing it would signal incompetence (Uchida et al. 2022). As a result, Sean avoided addressing classroom disruptions during conferences, while Will sought authority by teaching Grimm's Law and refusing to clean the blackboard.

5.2.2.2 Low Teaching Commitment

Both substitute teachers prioritized their career preparation over student learning, opting for familiar and convenient teaching methods. Their decisions reflected low commitment to their teaching roles. For example, Will's disregard for low-proficiency students and desire to leave this position indicated a lack of dedication. In his interview, Will mentioned that the students' low proficiency prevented him from fully utilizing his expertise, diminishing his engagement. Although he recognized that some

students might struggle with Grimm's Law, he focused on high achievers, overlooking the needs of others. Rather than improving his teaching methods, he lowered his expectations for low-proficiency students, allowing him to use preferred materials and methods without guilt, regardless of their effectiveness for student learning. Similarly, Sean's use of photographed notes was a last-minute choice due to insufficient time for PPT preparation, indicating that lesson planning was not his priority. While he adopted a student-centered approach with one-on-one conferences, Sean avoided risking student relationships to maintain classroom order but was willing to risk tensions with colleagues to safeguard his exam preparation time. This shows that maintaining his teacher role was secondary to prioritizing his own exam preparation.

5.2.2.3 Misalignment between Their Teaching and Their Pursuit of Self-actualization and Self-worth

Due to the instability and lack of long-term prospects in their current positions, both substitute teachers did not see their roles as a primary path to self-actualization or personal fulfillment. For instance, Will admitted that he did not seek professional solutions for teaching lower-proficiency students, as he prioritized preparing for his teacher screening test. Having taken the exam four times without passing, he was desperate to succeed and leave behind the label of failure. His ideal self—focused on passing the exam and teaching high-level students—created a stark contrast with his current situation, reflecting Higgins' (1987) Self-Discrepancy Theory. This highlights the impact of uncertain aspirations on professional growth, a factor often overlooked in TPD studies.

Similarly, Sean hesitated to seek help, fearing it would make him seem incompetent to his peers. He desired recognition as a legitimate teacher, but his colleagues treated him as inferior, expecting him to handle leftover tasks and complete work independently unless he negotiated otherwise. This context made Sean prioritize exam preparation over lesson planning or maintaining classroom order, seeing the exam as the key to his self-actualization, much like Will. In conclusion, both substitute teachers demonstrated potential for adaptive expertise. However, rather than using it to enhance teaching effectiveness, they often applied it for personal gain. Reupert et al. (2023) noted that classroom management, teaching strategies, and content knowledge are vital skills for substitute teachers (Bekingalar 2015; King 2016; Reupert et al. 2023; Robinson 2016). While these skills are essential for all teachers, our findings suggest that the lack

of professional expertise in substitutes is more related to self-focused priorities, low commitment, and misalignment with their pursuit of self-actualization. Given their temporary positions, their priorities were elsewhere.

6. Conclusion

In Taiwan, novice substitute teachers represent a cohort of professionally trained educators facing uncertainty about their future careers. This qualitative study aims to find out if Taiwanese substitute teachers possess adaptive expertise and the factors influencing their adaptive expertise development. Although this study is limited by its small sample size, specifically targeting novice substitute teachers, this study elucidates the intricacies of their professional development in adaptive expertise during their temporary teaching assignments, contributing to the broader discourse on teacher professional development.

Faced with demanding teacher screening test and their own aspirations, both substitute teachers in the study made strategic choices, displaying some potential for adaptive expertise by juggling social, cognitive, and personal factors to manage teaching. However, since their primary focus remained on passing exams to achieve personal goals, they could not invest too much time in their teaching preparation. This suggests that the professional development of substitute teachers, in terms of adaptive expertise, should not be equated with that of in-service or full-time teachers, as their current teaching job is a temporary transition rather than their ultimate career destination.

We agree with Reupert et al. (2023) that addressing issues related to substitute teachers requires attention at both the system-wide and school-based levels. To develop adaptive expertise in substitute teachers, we offer two recommendations: First, teacher training programs should emphasize educational ethics to build a strong professional identity and commitment to student learning (Warnick and Silverman 2011), helping teachers align their values with professional responsibilities. Second, schools should provide better support for substitute teachers, including reasonable workloads, fair evaluations, and mentorship programs to promote professional growth, exam preparation, and a sense of belonging

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Appendix A. Interview Questions for Pre-observation Interview

1. 請問在教書的經驗裡，您曾經或正在經歷過什麼挑戰（如全英文授課、學生中有特教生、難搞的家長、校方、或行政工作）或問題？（如，自信心、對教師身份的信念、焦慮感、人際關係）？請協助我想出三個。
   (In your teaching experience, have you encountered or are you currently experiencing any challenges (e.g., teaching English in English(TEIE), having students with special needs, dealing with difficult parents, school administration, or administrative work) or issues (e.g., lack of confidence, belief in your identity as a teacher, feelings of anxiety, interpersonal relationships)? Please help me come up with three.
2. 針對第一個 / 第二個 / 第三個挑戰，想請您談談，您覺得為什麼他是一個挑戰？
   Regarding the first/second/third challenge, could you please discuss why you consider it a challenge?
3. 請問第一個 / 第二個 / 第三個挑戰，目前解決了嗎？
   Regarding the first/second/third challenge, is it solved?
4. （承第三題）若已經解決，請問您當時是如何面對並解決這項挑戰的？
   (Continuing from Question No. 3) Could you please discuss how you overcame the challenge?
5. （承第四題）請問您當時是如何構思出這樣的解決方法的？想請您談談解決問題的過程。
   (Continuing from Question No. 4) Could you please discuss how you came up with the solutions? I am curious about the process of problem-solving.
6. （承第五題）請問您花了多久時間解決這項挑戰的？
   (Continuing from Question No. 5) How long did it take you to resolve this challenge?
7. （承第三題）若尚未解決，請問您目前仍嘗試解決這項挑戰嗎？
   (Continuing from Question No. 3) If it has not been resolved yet, are you still attempting to address this challenge?
8. （承第七題）若是，是什麼讓您決定繼續堅持下去的？
   (Continuing from Question No. 7) If so, what made you decide to continue persevering?
9. （承第八題）請問您目前嘗試解決這項挑戰的方法是什麼？

(Continuing from Question No. 8) Could you please explain what methods you are currently using to address this challenge?

10. （承第九題）請問您如何想出 / 決定使用這樣的解決方法，繼續面對挑戰的？想請您談談面對困難時，內心摸索反思的過程。
(Continuing from Question No. 9) How did you come up with such solutions, to continue facing the challenge? I am curious about the process of introspection and reflection you went through when dealing with difficulties.
11. （承第七題）若沒有，為何您決定不再嘗試呢？
(Continuing from Question No. 7) If not, why did you decide to no longer attempt it?
12. 請問您從這項(第一個 / 第二個 / 第三個)挑戰中得到了什麼收穫？
Could you please discuss what you gained from this challenge (the first/second/third one)?
13. 請問這項(第一個 / 第二個 / 第三個)收穫對您的教學有什麼影響？
Could you please discuss how the gains from this challenge (the first/second/third one) impact your teaching?
14. 請問這項(第一個 / 第二個 / 第三個)收穫對您本身有什麼影響？
Could you please discuss how the gains from this challenge (the first/second/third one) affect you personally?

Appendix B. Sample Interview Questions for Post-observation Interview

1. 請問老師覺得今天上課，同學表現和平常有什麼不同嗎？
   Do you notice any differences in the students' performance in class today, compared to usual?
2. （承第一題）若有，老師覺得平時學生是什麼樣子？又是什麼導致學生有不同以往的表現？
   (Continuing from Question No. 1) If so, what do you think the students are usually like? And what could have caused them to perform differently from usual?
3. 請問今天學生給老師的反應，跟老師預期的相同或相似嗎？
   Was the response from the students today similar to what you expected or anticipated?
4. 請問老師對於學生反應的預期是什麼？
   What kind of response did you expect to receive?
5. （承第三題）若不同，好奇老師因此在上課時做了什麼教學上的改變？
   (Continuing from Question No. 3) If not, what changes did you make during the class?
6. （承第五題）請問老師覺得這樣的調整，學生反應如何？
   (Continuing from Question No. 5) What do you think of the students' response to these adjustments?

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