

# Needs Assessment for Developing a Personal Learning Environment Application Based on Self-Determined Learning and Learning Contract to Enhance Lifelong Learning Skills of Student Teachers

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## Abstract

This study aimed to 1) assess the needs for developing a personal learning environment application based on self-determined learning and learning contract to enhance student teachers' lifelong learning skills, and 2) examine the student teachers' current and desired states of lifelong learning skills. The sample consisted of 745 student teachers selected through multi-stage sampling. The research instrument was a questionnaire with a reliability coefficient of 0.98, which included sections on demographic information, personal learning environments based on self-determined learning and learning contract and lifelong learning skills requirements. The data were analyzed using descriptive statistics and the Modified Priority Needs Index (PNI<sub>modified</sub>). The findings revealed that the highest-priority need in the personal learning environment domain was communication tools between students and teachers and among students (PNI<sub>modified</sub> = 0.32). In the self-determined learning and learning contract domain, the highest-priority needs were participation in goal setting, learning plans, learning supports, self-regulation, and evaluation between teachers and students (PNI<sub>modified</sub> = 0.33), together with self-reflection of online learning and activities (PNI<sub>modified</sub> = 0.33). Regarding lifelong learning skills, the highest-priority need was fundamental skills for learning and daily life activities (PNI<sub>modified</sub> = 0.33), followed by personal, social, and emotional skills (PNI<sub>modified</sub> = 0.31), and personal skills for professional development (PNI<sub>modified</sub> = 0.31). The findings of this study will serve as a basis for the development of a personal learning environment application to foster student teachers' lifelong learning skills.

**Keywords:** personal learning environment, self-determined learning, learning contract, lifelong learning skills

## Introduction

In the 21st century, characterized by rapid change and uncertainty, student teachers need lifelong learning skills to develop adaptability, reflective thinking, self-regulation, and creativity, which contribute to effective teaching and professional growth. Teacher education programs should therefore emphasize lifelong learning, as these skills are associated with positive professional attitudes and effective pedagogical practices (Celik & Taspinar, 2024; Low, 2024). Moreover, advances in information technology have expanded opportunities for lifelong learning through digital platforms and learning innovations. For example, several countries have developed digital solutions for reskilling and upskilling, while Thailand has promoted lifelong learning through national digital education initiatives (Office of the National Strategy Committee, 2018; World Economic Forum, 2020). Nevertheless, a major challenge in online learning is the difficulty of supporting and monitoring learners' learning processes, particularly when learners lack self-regulation skills. Previous studies have indicated that a significant challenge in online learning management among student teachers is their limited ability to engage in self-directed learning and self-regulation in online learning environments (Erarslan & Şeker, 2021; Sadeck et al., 2023). Furthermore, student teachers may lack sufficient knowledge and understanding

of digital learning tools and information technology, which affects their attitudes and abilities in managing their own Personal Learning Environments (PLEs) (Huang & Huang, 2025; Lim & Newby, 2021).

Consequently, educators have increasingly explored the concept of Personal Learning Environments (PLEs) as a potential solution to address challenges in online learning. A PLE can be understood as a learner-centered learning environment that integrates digital tools, learning resources, and social networks to enable learners to manage, organize, and construct their own learning experiences. In particular, PLEs support the integration of formal and informal learning through digital technologies and social media, allowing learners to develop learning networks and engage in continuous learning processes (Hien & Suppasetseree, 2024; Li & Casey, 2026; Sun & Xu, 2024; Zhou et al., 2026). Furthermore, mobile technology-based PLEs can serve as a learning ecosystem that promotes lifelong learning by providing learners with flexibility, accessibility, and control over their learning environments (Bin Syed Ali & Bai, 2024; Dabbagh, 2024). However, the effectiveness of PLEs does not depend solely on the availability of digital tools and resources but also requires learners' ability to actively manage their own learning. Therefore, self-determined learning provides an important theoretical foundation for designing PLEs because it

emphasizes learners' autonomy, self-direction, goal setting, and responsibility for their learning processes. This approach is particularly relevant to online learning contexts, where learners need to regulate their motivation, learning strategies, and progress independently (Blaschke, 2021; Hainsworth et al., 2022; Hase, 2016; Lofandri, 2024). In addition, learning contracts can function as a supporting mechanism within PLEs by helping learners define learning goals, establish learning plans, monitor their progress, and reflect on their learning outcomes. In online learning environments, where instructors may have limited opportunities to observe learners' learning processes directly, learning contracts provide a structured approach to promote self-regulation and clarify learning expectations. Previous studies have reported that learning contracts enhance self-directed learning, learner motivation, engagement, and communication between learners and instructors (Clement et al., 2023; Noviyanti, 2021; Xu et al., 2024; Zhong et al., 2024).

Although previous studies have demonstrated that PLEs can support lifelong learning and that self-determined learning and learning contracts can promote learner autonomy and self-regulation, limited research has focused on integrating these concepts into the design of a PLE application specifically for student teachers. In particular, further investigation is needed to identify the essential needs of student teachers regarding the features and functions of a PLE application that can support self-directed learning and lifelong learning skills. Therefore, this study aimed to assess the needs for developing a Personal Learning Environment (PLE) application based on self-determined learning and learning contract approaches to enhance lifelong learning skills among student teachers. The study also examined the current and desired states of lifelong learning skills among student teachers to provide essential information for designing a PLE application that supports their lifelong learning and professional development.

## ■ Objectives

1. To assess the needs for developing a personal learning environment application based on self-determined learning and learning contract to enhance lifelong learning skills of student teachers.
2. To examine the current and desired states of lifelong learning skills of student teachers.

## ■ Literature Review

### Personal Learning Environment as a Dynamic Ecosystem Supporting Lifelong Learning Skills

A Personal Learning Environment (PLE) is conceptualized as a learner-centered learning environment that enables individuals to organize, manage, and construct

their own learning processes through the integration of digital tools, learning resources, and social networks (Rahimi et al., 2015). Unlike traditional learning environments that often emphasize structured instruction and content delivery, PLEs emphasize learner autonomy, flexibility, and active participation in learning activities across formal and informal contexts (Saadatmand et al., 2017). The integration of PLEs with digital technologies, particularly online platforms, provides learners with opportunities to establish personal learning goals, manage learning resources and processes, communicate with others, and participate in collaborative learning activities. These characteristics contribute to the development of learner autonomy, digital competence, information management skills, and lifelong learning practices (Rus-Casas et al., 2021). Based on a synthesis of previous studies and related literature, PLEs consist of five essential components: 1) learning resources and data storage tools, 2) knowledge inquiry tools, 3) communication tools, 4) content creation and collaboration tools, and 5) publishing and knowledge-sharing tools (Na Songkhla, 2018; Rahimi et al., 2015; Rus-Casas et al., 2021). These components enable learners to access, create, exchange, and manage knowledge, thereby supporting continuous learning and the development of lifelong learning skills.

### Self-Determined Learning and Learning Contracts

To maximize the benefits of PLEs, learners require instructional approaches that support autonomy and self-management. Self-determined learning is an approach that encourages learners to take responsibility for their learning by making decisions about learning goals, strategies, and assessment methods according to their individual needs (Blaschke, 2021; Hainsworth et al., 2022). This approach aligns closely with the learner-centered nature of PLEs and has been associated with increased motivation, engagement, creativity, and learning effectiveness in online learning environments (Moore, 2020; Rusli et al., 2020). Learning contracts complement self-determined learning by providing a structured mechanism through which learners and instructors can negotiate learning goals, learning plans, assessment methods, and expected outcomes. Previous studies have shown that learning contracts promote self-regulation, responsibility, commitment, and motivation while supporting students' success in online learning environments (Hainsworth et al., 2022; Lan et al., 2023; Noviyanti, 2021). Based on the literature, self-determined learning and learning contracts encompass five major components: 1) goal setting, learning planning, learning support, self-regulation, and assessment; 2) learning activities; 3) information and experience sharing; 4) presentation and evaluation of work; and 5) self-reflection (Blaschke, 2021; Hase, 2016; Knowles, 1986; Lan et al., 2023).

## Lifelong Learning Skills and the Role of Personal Learning Environments for Student Teachers

Lifelong learning skills have become increasingly important in teacher education due to rapid technological advancement, expanding digital learning environments, and evolving professional expectations. Student teachers are expected not only to acquire pedagogical and disciplinary knowledge but also to continuously update their competencies, adapt to emerging technologies, and engage in ongoing professional learning throughout their careers (Aytaç et al., 2024; Gaur, 2025; Ramaila & Molwele, 2022). However, previous studies have reported that many student teachers face challenges related to self-directed learning, self-regulation, digital competence, and the effective use of educational technologies (Erarslan & Şeker, 2021; Lim & Newby, 2021; Sadeck et al., 2023). Such challenges may limit their ability to manage their learning effectively and prepare for continuous professional development. Drawing from international frameworks and previous studies, lifelong learning skills for student teachers can be categorized into three dimensions: 1) cognitive skills, including literacy, language abilities, application of mathematics and science, creative thinking, and critical thinking and problem-solving; 2) soft skills, including self-management, communication, collaboration, flexibility, leadership, and citizenship; and 3) professional skills, including digital literacy, learning management, and the effective use of educational technologies (European Commission, 2019; OECD, 2018; Sala et al., 2020; Teachers' Council of Thailand, 2019; World Economic Forum, 2015).

Given these challenges, PLEs integrated with self-determined learning and learning contract approaches offer a promising means of supporting lifelong learning among student teachers. Such environments can help learners set goals, manage learning activities, monitor progress, engage in reflection, and build professional learning networks. Although previous studies have demonstrated the potential of PLEs, self-determined learning, and learning contracts for promoting learner autonomy and lifelong learning, limited research has explored how these concepts can be integrated into a PLE application specifically designed for student teachers. Furthermore, little attention has been given to identifying student teachers' needs regarding the features and functions of such an application. Therefore, a needs assessment

is necessary to provide a foundation for the design and development of a PLE application that effectively supports lifelong learning and professional development among student teachers.

## Methodology

This study employed a needs assessment research design to identify the priority needs for developing a personal learning environment (PLE) application based on self-determined learning and learning contract approaches to enhance lifelong learning skills among student teachers. The study was conducted in two phases: 1) assessing the needs for developing a PLE application by examining the current conditions and priority needs related to the application's features and functions; and 2) examining the current and desired states of lifelong learning skills among student teachers. Data were collected through an online questionnaire and analyzed using descriptive statistics and the modified priority needs index ( $PNI_{Modified}$ ) to determine the priority needs for development.

### Population and Sample

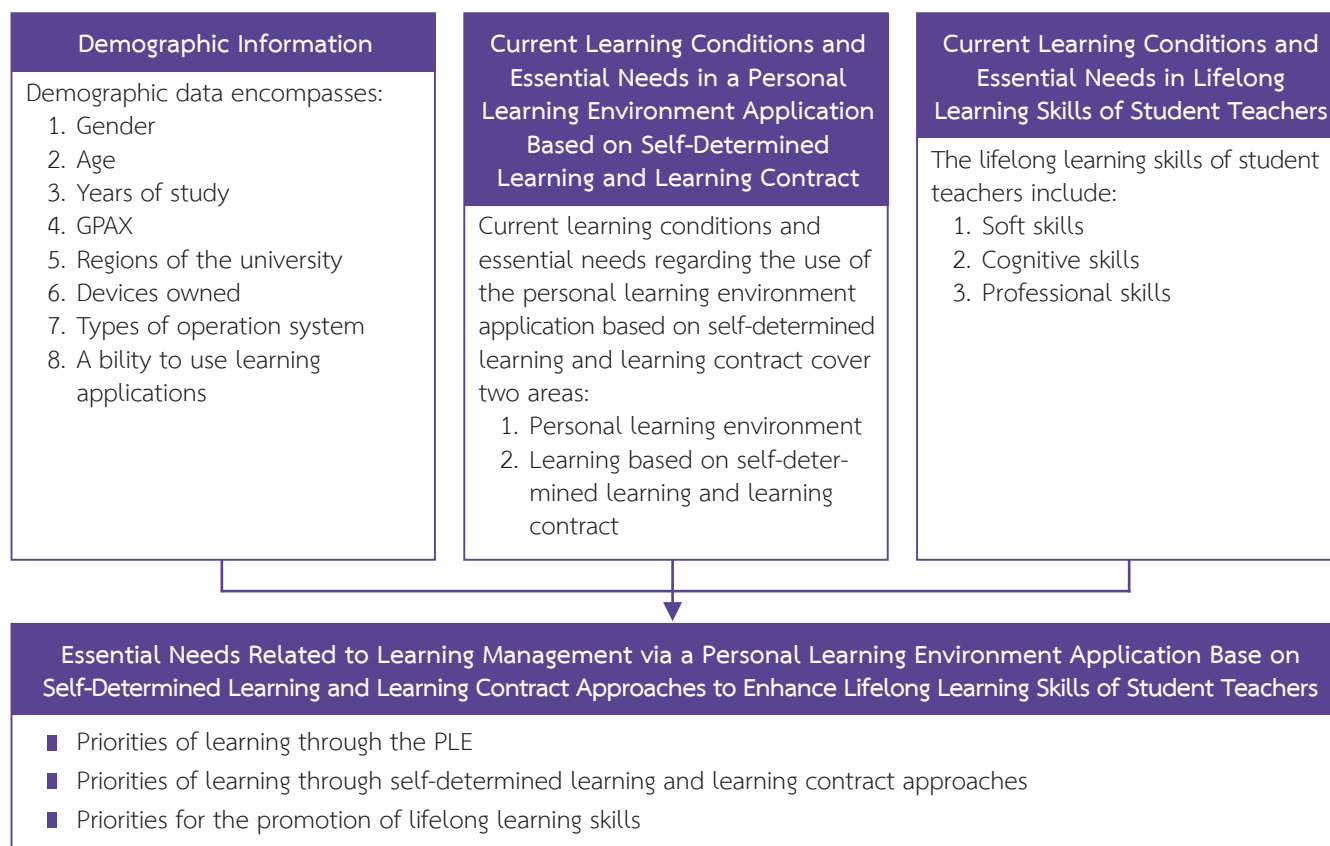
The population for the study consisted of 144,690 student teachers enrolled in teacher education programs at public universities across Thailand during the 2024 academic year, according to data reported by the Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation (2024). The population included undergraduate student teachers from the first to fourth year of study across all teacher education disciplines. The sample size was determined using Krejcie and Morgan's (1970) formula, yielding a minimum representative sample of 384 student teachers. To compensate for the response rate of the online questionnaire, the sample size was increased to 768 student teachers, assuming a projected 50% return rate (Rattanamanee, 2019).

The sampling process was carried out in three main steps as follows: 1) stratified random sampling was employed to classify the population of student teachers into five regional subgroups, namely Northern, Northeastern, Central, Eastern, and Southern; 2) simple random sampling was subsequently adopted to select representative universities offering teacher education programs across those regions; and 3) simple random sampling was utilized to randomly select student teachers.

## Research Framework

**Figure 1**

*Research Framework*



## Research Instruments

The questionnaire was developed based on a comprehensive review of literature and prior studies to ensure that it was comprehensive and appropriate for student teachers. Content validity was evaluated using the item-objective congruence (IOC) index. The questionnaire consisted of three main parts as follows: 1) demographic information, with 9 multiple-choice items; 2) current conditions and essential needs among student teachers regarding the use of the personal learning environment application based on self-determined learning and learning contract, with 10 items on a five-point Likert scale. Of these, five items focused on the Personal Learning Environment, while the remaining five items addressed learning based on self-determined learning and learning contracts; 3) current learning conditions and needs for lifelong learning skills of student teachers, with 3 items on a five-point Likert scale. The questionnaire was reviewed by three experts for content validity. All items achieved IOC index values ranging from 0.67 to 1.00, indicating that the items met the acceptable criterion for content validity. After being revised according to the experts' feedback, the questionnaire was piloted with 50 student teachers to assess its reliability using Cronbach's Alpha Coefficient. The resulting Cronbach's alpha value was 0.98, indicating a high level of internal

consistency and suggesting that the instrument possessed an acceptable level of reliability for the purposes of this study. Finally, the study was approved by the Human Research Ethics Committee of Chulalongkorn University (COA No. 351/67).

### Data Collection

The researcher formally requested permission from the deans of 15 faculties offering teacher education programs at participating universities. Data collection was conducted between January and March 2025. Following institutional approval, the researchers coordinated with course instructors to distribute the online questionnaire link to eligible student teachers. Participation was voluntary, and informed consent was obtained from all participants prior to completing the questionnaire. After the completion of this process, returned questionnaires were reviewed, and 745 questionnaires with valid responses were identified, which were used for data analysis.

### Data Analysis

Descriptive statistics were employed to analyze the data. Frequency and percentage were used to describe the respondents' demographic information, while the arithmetic mean and standard deviation were calculated to examine the current conditions and essential learning needs. The interpretation of mean scores was based on

a five-level rating scale, defined as follows: mean scores between 4.51 and 5.00 indicated the highest level; mean scores between 3.51 and 4.50 indicated a high level; mean scores between 2.51 and 3.50 indicated a moderate level; mean scores between 1.51 and 2.50 indicated a low level; and mean scores between 1.00 and 1.50 indicated the lowest level. The assessment of needs was conducted using the modified priority needs index (PNI<sub>modified</sub>) proposed by Wongwanich (2015). The priority of needs was determined by ranking the PNI<sub>modified</sub> values in descending order. Higher PNI<sub>modified</sub> values indicated greater needs and, consequently, a higher priority for development. Based on the criteria adapted from Wongwanich (2015), PNI<sub>modified</sub> values of 0.30 or above were considered urgent needs requiring immediate development; values greater than 0.20 and up to 0.30 indicated areas that should be developed; values greater than 0.10 and up to 0.20 suggested development as appropriate; and values of 0.10 or below indicated that the current condition should be maintained.

## ■ Results

In addressing the research objectives, the results are presented in three parts. Specifically, Part 1 presents the respondents' demographic information. Part 2 presents the needs for learning through a personal learning

environment application based on self-determined learning and learning contract to enhance lifelong learning skills of student teachers. Part 3 presents the current and desired levels of lifelong learning skills among student teachers.

### Part 1: Demographic Information of the Respondents

As illustrated in Table 1, the results demonstrated that the sample comprised 197 male students (26.44%), 538 female students (72.21%), and 10 students identifying with other genders (1.34%). The majority of the respondents, specifically 244 students (32.75%), were second-year undergraduate students. Most of the respondents, namely 382 (51.28%), had a GPAX ranging from 3.5 to 4.00. Additionally, smartphones were the most commonly personally owned devices among 743 students (99.73%), followed by personal computers with 455 (61.07%), and tablets with 353 (47.38%). With regard to operating systems, iOS (Apple) was the most widely used among 519 students (69.66%), followed by Android with 209 (28.05%), and both operating systems with 16 (2.15%). Regarding applications, 737 students (98.93%) commonly used social media such as Facebook, LINE, TikTok, Instagram, and Twitter (X), while 597 (80.13%) used online teleconferencing tools such as Zoom, Google Meet, and Microsoft Teams.

**Table 1**  
*Results of the Demographic Data Analysis*

|                          |              |        |            | (n = 745) |
|--------------------------|--------------|--------|------------|-----------|
| Variable                 | Categories   | Number | Percentage |           |
| Gender                   | Male         | 197    | 26.40      |           |
|                          | Female       | 538    | 72.20      |           |
|                          | Other        | 10     | 1.30       |           |
| Year of Study            | Year 1       | 204    | 27.38      |           |
|                          | Year 2       | 244    | 32.75      |           |
|                          | Year 3       | 142    | 19.06      |           |
|                          | Year 4       | 155    | 20.81      |           |
| GPAX                     | Below 2.00   | 3      | 0.40       |           |
|                          | 2.00-2.49    | 19     | 2.55       |           |
|                          | 2.50-2.99    | 81     | 10.87      |           |
|                          | 3.00-3.49    | 260    | 34.90      |           |
|                          | 3.50-4.00    | 382    | 51.28      |           |
| Region of the University | Central      | 191    | 25.64      |           |
|                          | Northern     | 110    | 14.77      |           |
|                          | Northeastern | 123    | 16.51      |           |

**Table 1**  
(continued)

| Variable                                                                                  | Categories                 | Number | Percentage |
|-------------------------------------------------------------------------------------------|----------------------------|--------|------------|
|                                                                                           | Eastern                    | 140    | 18.79      |
|                                                                                           | Southern                   | 181    | 24.30      |
| Do students own a personal computer?                                                      | Yes                        | 455    | 61.07      |
|                                                                                           | No                         | 290    | 38.93      |
| Do students own a smartphone?                                                             | Yes                        | 743    | 99.73      |
|                                                                                           | No                         | 2      | 0.27       |
| Do students own a tablet?                                                                 | Yes                        | 353    | 47.38      |
|                                                                                           | No                         | 392    | 52.62      |
| Operating systems run on students' devices                                                | Android                    | 209    | 28.05      |
|                                                                                           | iOS (Apple)                | 519    | 69.66      |
|                                                                                           | Both                       | 16     | 2.15       |
| Do students have the ability to use the following applications?<br>(Check all that apply) | Social media               | 737.00 | 98.93      |
|                                                                                           | Search engines             | 556.00 | 74.63      |
|                                                                                           | Video streaming            | 542.00 | 72.75      |
|                                                                                           | LMS tools                  | 554.00 | 74.36      |
|                                                                                           | Video conferencing systems | 597.00 | 80.13      |

## Part 2: Current Conditions and Essential Needs regarding the Use of a Personal Learning Environment Based on Self-Determined Learning and Learning Contract to Enhance Lifelong Learning Skills

The study investigated the essential needs for utilizing personal learning environment application based on self-determined learning and learning contract to enhance lifelong learning skills of student teachers. The results showed the priority of essential needs regarding the use of a personal learning environment application based on self-determined learning and learning contract approaches as follows.

1. As shown in Table 2, the highest priority need in the personal learning environment dimension was communication tools between students and teachers as well as among peers for learning and activities ( $PNI_{\text{modified}} = 0.32$ ). This was followed by the need for

learning resources and data storage tools for online learning and activities as well as tools for publishing work or knowledge in online contexts ( $PNI_{\text{modified}} = 0.30$ ).

2. According to Table 2, regarding learning based on self-determined learning and learning contract approaches, the highest priority need identified by student teachers was participation in setting goals, learning plans, learning supports, self-regulation, and evaluation between teachers and students, along with self-reflection of online learning and activities ( $PNI_{\text{modified}} = 0.33$ ). This was followed by studying content, engaging in online activities, sharing information and experiences with others, and presenting work online for self-assessment and peer assessment ( $PNI_{\text{modified}} = 0.32$ ).

Table 2 presents the prioritized needs across the identified categories, indicating the areas with the highest priority for development to enhance the lifelong learning skills of student teachers.

**Table 2**

*Current Conditions and Essential Needs Regarding the Use of a Personal Learning Environment Application Based on Self-Determined Learning and Learning Contract to Enhance Lifelong Learning Skills*

| Topic                                                                                                                            | Current Condition (D) |           | Desired Condition (I) |           | Modified Priority Needs Index |            |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------|-----------------------|-----------|-------------------------------|------------|
|                                                                                                                                  | <i>M</i>              | <i>SD</i> | <i>M</i>              | <i>SD</i> | $PNI_{\text{modified}}$       | Priorities |
| Personal Learning Environments                                                                                                   |                       |           |                       |           |                               |            |
| Use of learning resources and data storage tools for learning and activities                                                     | 3.25                  | 1.03      | 4.24                  | .68       | 0.30                          | 2nd        |
| Use of knowledge inquiry for learning and activities                                                                             | 3.32                  | 1.01      | 4.26                  | .71       | 0.28                          | 4th        |
| Use of communication tools between students and teachers and among peers for learning and activities                             | 3.23                  | 1.00      | 4.26                  | .71       | 0.32                          | 1st        |
| Use of content production and/or collaboration tools for learning and activities                                                 | 3.29                  | 1.03      | 4.25                  | .70       | 0.29                          | 3rd        |
| Use of tools for publishing work or knowledge                                                                                    | 3.27                  | 1.05      | 4.24                  | .71       | 0.30                          | 2nd        |
| Learning Based on Self-Determined Learning and Learning Contract Approaches                                                      |                       |           |                       |           |                               |            |
| Participation in setting goals, learning plans, learning supports, self-regulation, and evaluation between teachers and students | 3.21                  | 1.04      | 4.27                  | .65       | 0.33                          | 1st        |
| Studying content and engaging in learning activities                                                                             | 3.24                  | 1.05      | 4.27                  | .67       | 0.32                          | 2nd        |
| Sharing information and experiences in learning activities with others                                                           | 3.22                  | 1.07      | 4.24                  | .70       | 0.32                          | 2nd        |
| Presenting or demonstrating work, receiving self-assessment, and engaging in peer assessment                                     | 3.21                  | 1.05      | 4.24                  | .70       | 0.32                          | 2nd        |
| Self-reflection of learning and activities                                                                                       | 3.18                  | 1.05      | 4.22                  | .69       | 0.33                          | 1st        |

### Part 3: Current Learning Conditions and Essential Needs in Lifelong Learning Skills of Student Teachers

The study examining the prioritized needs in lifelong learning skills of student teachers identified the following highest-ranked essential needs. The highest priority need ranked among students concerned fundamental skills for learning and daily life activities, such as literacy, multilingual skills, application of mathematics and science, creative thinking, and reflective thinking and

problem-solving ( $PNI_{\text{modified}} = 0.33$ ). The second priority need was personal skills, social and emotional skills e.g., self-improvement, collaboration, responsible citizenship, ethics, morality, and adaptability to future changes—and personal skills for professional development, such as digital literacy, learning management skills, and use of educational media and technology. ( $PNI_{\text{modified}} = 0.31$ ). The details are shown in Table 3.

**Table 3**

*Current Learning Conditions and Essential Needs in Lifelong Learning Skills of Student Teachers*

| Topic                                                                                                                                                                                                | Current Condition (D) |      | Desired Condition (I) |     | Modified Priority Needs Index |            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-----------------------|-----|-------------------------------|------------|
|                                                                                                                                                                                                      | M                     | SD   | M                     | SD  | PNI <sub>modified</sub>       | Priorities |
| Personal skills, social and emotional skills: self-improvement, collaboration, responsible citizenship, ethics, morality, and adaptability to future changes                                         | 3.28                  | .98  | 4.28                  | .67 | 0.31                          | 2nd        |
| Fundamental skills for learning and daily life activities, e.g., literacy, multilingual skills, application of mathematics and science, creative thinking, and critical thinking and problem-solving | 3.19                  | 1.04 | 4.25                  | .68 | 0.33                          | 1st        |
| Personal skills for professional development, e.g., digital literacy, learning management skills, and use of educational media and technology.                                                       | 3.26                  | 1.00 | 4.27                  | .67 | 0.31                          | 2nd        |

## Discussion

The study investigating the essential learning needs of student teachers in using personal learning environment application based on self-determined learning and learning contract approaches to enhance the lifelong learning skills revealed several key findings. In particular, the majority of students primarily used iOS (Apple), with smartphones as their main device for daily life and learning. Moreover, they were highly capable of using social media for daily activities, such as Facebook, LINE, TikTok, Instagram, and Twitter (X), followed by online teleconferencing tools, e.g., Zoom, Google Meet, and Microsoft Teams; search engines, such as Google and Bing; and learning management systems, such as Google Classroom, MOOC, Moodle, Edmodo, and Microsoft Teams. These findings provide important implications for the design and development of a personal learning environment (PLE) application based on self-determined learning and learning contract approaches. The results indicate that student teachers are already familiar with mobile technologies, social media platforms, online communication tools, search engines, and learning management systems, which are considered key components of a digital learning ecosystem (Alserhan et al., 2023; Wei et al., 2021). A Furthermore, Dhanushya and Kakade (2025) reported that students commonly use social media platforms for communication and informal interaction. Therefore, the proposed PLE application should be designed to support mobile access, communication through social media platforms, online teleconferencing tools, collaboration among learners, integration with diverse online learning resources, and opportunities for knowledge sharing and reflection. Such features are consistent with the characteristics of PLEs, which enable

learners to manage, organize, and construct their own learning experiences through a variety of digital tools and resources (Altuncekic, 2025; Pedro & Santos, 2022).

Regarding the needs assessment for a PLE application, the highest-priority need was communication tools that facilitate interaction between students and teachers, as well as among peers for learning and learning activities. This was followed by the need for learning resources and data storage tools to support learning activities, and tools for publishing and sharing work or knowledge. These findings highlight the importance of designing a PLE application that aligns with the needs and learning preferences of student teachers. The application should incorporate communication, collaboration, resource management, and knowledge-sharing functions to support student teachers in managing their own learning processes, developing academic skills, enhancing digital competence, accessing diverse learning resources, engaging in reflective learning, and building professional networks. Such features can contribute to fostering the development of lifelong learning skills (Li & Casey, 2026; Said et al., 2021; Sun & Xu, 2024). Similarly, Dabbagh and Castañeda (2020) argued that promoting social interactions, learning networks among students, and various learning activities within PLEs can cultivate self-regulation of learning and lifelong learning skills.

As for self-determined learning and learning contract approaches, the highest priority need involved setting goals, learning plans, learning supports, self-regulation, and evaluation between teachers and students and self-reflection on learning and activities in online contexts. Active involvement in setting learning goals, planning learning activities, receiving learning support, engaging in ongoing feedback and evaluation

between teachers and students, and participating in reflective practices within a personal learning environment (PLE) enables student teachers to develop essential skills in planning, monitoring, and evaluating their own learning. These competencies represent core dimensions of self-regulated learning (SRL), which are closely associated with lifelong learning. Moreover, such involvement enhances learners' sense of ownership, promotes professional reflection, and facilitates personalized support, thereby contributing to the development of lifelong learning skills and continuous professional growth (Nan Cenka et al., 2024; Tarnanen et al., 2023).

In terms of lifelong learning skills, the area ranked as the highest priority need was fundamental skills for learning and daily life activities, e.g., literacy, multilingual skills, application of mathematics and science, creative thinking, and reflective thinking and problem-solving. This was followed by the need for personal skills, social and emotional skills and Personal skills for professional development. Furthermore, fundamental skills for learning, should be developed alongside social and emotional competencies, and twenty-first-century teaching competencies, and ICT skills for teaching (Kausar & Ajmal, 2024). Together, these competencies can support student teachers in responding effectively to educational and societal changes while promoting lifelong learning and continuous professional development. Preparing student teachers with social and emotional skills is an important aspect of teacher professional development. To effectively apply these competencies in classroom practice, student teachers need a solid understanding of social, emotional, and cognitive processes. Therefore, teacher education institutions should develop personal learning environment (PLE) applications that support the integration of Social and Emotional Learning (SEL) into teacher preparation programs. Through personalized learning pathways, collaborative activities, reflective practices, and continuous access to learning resources, PLE applications can foster both social and emotional competencies and lifelong learning skills among student teachers (Matschek-Jauk & Reicher, 2021). Finally, professional skills are essential for student teachers because they enable continuous learning, adaptation to educational changes, and ongoing improvement of professional practice. These skills encompass digital literacy, Learning management, Cultural Acceptance, and the effective use of educational media and technology (Knoblauch & Döller, 2025; Tondeur et al., 2025; Uyar, 2023).

The findings of the present needs assessment for the development of a PLE application, together with evidence from previous studies, provide important implications for the design of PLEs for student teachers. Previous research has shown that student teachers often use a variety of digital tools; however, meaningful and constructive in-

teraction remains limited. Self-regulation and reflective practices are frequently overlooked, while learners tend to focus more on information consumption than knowledge creation, thereby restricting professional dialogue, collaboration, and feedback within their PLEs (Cabrera Ramos et al., 2022; Li & Casey, 2026; Lim & Newby, 2021). In addition, learners are often encouraged to construct their own PLEs but receive limited guidance in goal setting and lack appropriate tools to support learning planning and self-monitoring (Lim & Newby, 2021; Sun & Xu, 2024). Accordingly, the design of a personal learning environment application should prioritize communication tools that facilitate interaction, discussion, and knowledge exchange between students and teachers, as well as among peers. The application should also provide features that support learners in setting learning goals, regulating and monitoring their own learning, accessing personalized learning support, and engaging in reflective practices. Such features can promote self-regulated learning and enhance learners' ownership of the learning process. Furthermore, to foster lifelong learning skills among student teachers, the PLE application should emphasize the development of fundamental learning skills, creative thinking, critical thinking, and problem-solving skills. These competencies are essential for enabling student teachers to adapt to changing educational contexts, engage in continuous professional learning, and sustain lifelong learning throughout their professional careers.

## ■ Conclusions

The study investigated the needs for developing a PLE application based on self-determined learning and learning contract approaches to enhance the lifelong learning skills of student teachers. The findings indicated that most student teachers rely on smartphones as their primary device for learning and everyday activities. In addition, social media platforms play a central role in communication and learning-related interactions.

Regarding the design of the PLE application, the findings suggest that it should be optimized for smartphone use and capable of integrating with social media platforms, which are widely used by student teachers for communication and learning activities. Communication tools that facilitate interaction between students and teachers, as well as among peers, emerged as the highest-priority need. In addition, the PLE application should provide features that enable learners to set learning goals, develop learning plans, access learning support, regulate their own learning, and engage in self-reflection. Concerning lifelong learning skills, the application should support the development of cognitive skills. At the same time, it should foster the development of soft skills and professional skills to support student teachers' continuous learning, adaptability, and professional growth.

## Implications

The findings provide several implications for the design and implementation of PLE applications for student teachers. First, designers of PLE applications should prioritize communication and collaboration tools that support interactions between students and teachers as well as among peers. The application should also include features that enable learners to set learning goals, monitor and regulate their learning, and engage in reflective practices. Second, instructors should design learning activities that encourage communication, feedback, collaboration, and knowledge sharing through the PLE application. Learners should be actively involved in goal setting, self-regulation, and self-reflection throughout the learning process. Furthermore, learning activities should be designed to foster cognitive skills, particularly creative thinking, critical thinking, and problem-solving, while simultaneously supporting the development of soft skills and professional competencies.

## Recommendations for Future Research

This study was limited to a needs assessment of a PLE application for student teachers. Future research should examine the effectiveness and impact of the developed PLE application on lifelong learning skills, self-regulated learning, and professional development among student teachers. In addition, future studies should explore the integration of artificial intelligence (AI) technologies within PLE applications. AI-based features, such as personalized learning support, learning analytics, intelligent feedback, and self-regulation assistance, may further enhance the effectiveness of PLEs and support student teachers in becoming lifelong learners.

## Ethics

This study involving human participants was approved by the Chulalongkorn University Research Ethics Committee Multi-Institutional Group, Set 2: Social Sciences, Humanities, and Fine Arts (Reference Number: 351/67). Written informed consent was obtained from all participants prior to their participation and for the publication of anonymized data. To ensure privacy and confidentiality, all identifying information was removed, and data were securely stored in compliance with institutional data protection policies.

## Declaration of Generative AI

The authors declare that generative AI tools, specifically Gemini and ChatGPT, were utilized exclusively for language polishing, grammar checking, and reference formatting. These tools were not used to generate any original ideas, conceptual frameworks, or data presented in this study. The authors rigorously reviewed all AI-assisted outputs and assume full responsibility for the integrity and originality of the final manuscript.

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## Declaration of Competing Interest

The authors declare that there is no competing interest in conducting this study.

## Author Contributions

**Ampon Chumyung:** Writing – original draft, Conceptualization, Data curation, Formal analysis, Investigation, Methodology. **Jintavee Khlaisang:** Writing – review & editing, Funding acquisition, Project administration, Supervision, Validation. **Worarat Pathumcharoenwattana:** Writing – review & editing, Funding acquisition, Project administration, Supervision, Validation.

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