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Learning and Engagement in Continuous Professional Development Through E-Learning Platforms

Ugnė Savanevičiūtė and Gabija Savanevičiūtė

HRpulsus, Kaunas, LT50143, Lithuania

ABSTRACT

Although significant emphasis is placed on continuous learning, most research focuses on formal education or non-formal education that aims to develop general competencies. Meanwhile, there is a lack of research on the development of professional competencies. General competence development focuses on broad, transferable skills applicable across various contexts, while the development of professional competence is focused on developing specialized, role-related expertise and acquiring technical knowledge in a specific field. Moreover, professional competence development on e-platforms requires addressing specific needs to ensure engagement in continuous professional development. The use of a personalized learning approach is one of the key factors to ensure engagement in continuous professional development. Personalized learning emphasizes the tailoring of content to align with individual learners' goals, roles, and skill levels, incorporating different layouts, presentation styles, and learning methods that can be selected based on the learner's specific needs. The paper aims to investigate the linkage between the elements of personalized learning and engagement in continuous professional development through e-learning platforms. In doing this, the quantitative data were collected from questionnaires distributed among customs and international trade professionals using simple random sampling. The study revealed that among customs and international trade professionals, the dominant learning style is kinesthetic, which emphasizes the need for creating highly interactive, practical, and task-oriented activities. The findings also highlighted customs and international trade professionals' preferences for content elements, e-learning platform functionalities, information sources, and other elements of personalized learning that enhance their engagement in continuous professional development.

Keywords: Personalized learning, Engagement, Continuous professional development, E-learning platforms

INTRODUCTION

The evolving demands of lifelong learning extend beyond formal qualifications, encompassing informal, situational, and social learning approaches that emphasize continuous professional development (Pylväs and Nokelainen, 2022). In professions such as customs, where rapidly changing regulatory frameworks require not only understanding but also accurate interpretation and decision-making, professionals must continuously update

their competencies. Effective learning systems must therefore promote engagement by delivering personalized learning experiences tailored to individual needs through suitable methods and formats.

In academic literature, personalization in learning often focuses on the diversity of learners, considering their knowledge levels and personal characteristics. While much research examines these factors in the context of school-age or university students, there is limited exploration of personalization for adult professionals seeking career development. Studies highlight the use of machine learning classification algorithms to create learner clusters based on content complexity, preferred learning methods, and the need for external guidance (e.g., mentoring). Adaptive learning, supported by virtual assistants, has demonstrated positive impacts on learning outcomes, satisfaction, motivation, and engagement.

Given the theoretical insights and the existing customs professionals' continuous development model, which already includes curated and frequently updated learning materials, the integration of a personalized and adaptive learning module represents a significant opportunity for system expansion. However, validating these personalized learning elements and assessing their impact on professional engagement remains essential. This paper aims to explore the linkage between personalized learning and engagement in continuous professional development through e-learning platforms. Specifically, it seeks to: (a) determinate personalized learning elements within an adaptive learning system and (b) evaluate their influence on engagement among customs professionals with diverse profiles.

THEORETICAL INSIGHTS ON LINKAGE BETWEEN PERSONALIZED LEARNING AND ENGAGEMENT IN CONTINUOUS PROFESSIONAL DEVELOPMENT THROUGH E-LEARNING PLATFORMS

Personalized Learning Concept

Personalized learning extends beyond the adaptation of learning content to embrace a holistic approach where the pace, methods, and objectives of learning are tailored to meet individual learner needs. According to Peng et al. (2019), personalized learning involves optimizing both learning tempo and instructional methods to align with unique learner preferences. This includes differentiation in learning goals, instructional strategies, and content sequencing based on individual requirements. Furthermore, personalized learning fosters learner engagement by creating environments conducive to active participation and interest (Li, 2015; Mötteli et al., 2023).

Grounded in constructivist learning theory, personalized learning posits that learners construct knowledge through experience and social discourse, integrating new information with prior knowledge (Pande & Vijayakumar Bharathi, 2020). This paradigm shift is essential for continuous professional development (CPD), particularly in specialized fields such as customs, where professionals benefit from easily accessible, relevant content delivered through methods tailored to their learning styles. However, while personalized learning has been extensively studied in formal youth education (O'Donnell et al., 2013; Mosier, 2018; Walkington & Bernacki, 2020),

research specific to its application in CPD is sparse (Shemshack & Spector, 2020; Bernacki et al., 2021).

Elements of Personalized Learning

Peng et al. (2019) identify several core elements of personalized learning, including individualized learning paces, self-directed choice of methods, and content alignment with individual goals. To effectively personalize learning systems, several key elements are essential. One such element is learning content, which consists of materials tailored to an individual's capabilities and interests, and is delivered through various formats, such as text, videos, and interactive tasks (Zanker et al., 2019). Another important aspect is the learning methods, which can range from traditional instructor-led approaches (Lim et al., 2019) to self-directed learning (Curran et al., 2019). These methods also include project-based, collaborative, and individual learning, all of which can be applied in both live and digital formats. A third element, system adaptability, focuses on the need for e-learning platforms that support customizable interface designs and functions, ensuring user-friendly interactions (Sungwoo et al., 2022). These personalized learning elements contribute to enhancing the effectiveness of Continuing Professional Development (CPD) by addressing specific professional needs and promoting autonomy in learning. For instance, self-directed learning enables professionals to set their own goals and strategies, fostering a sense of responsibility and better alignment with personal development objectives (Curran et al., 2019).

Engagement in E-Learning Platforms

Learner engagement within e-learning environments is characterized by cognitive, emotional, and behavioral investment (O'Brien & Cairns, 2016). It reflects the depth of a learner's involvement in the educational process and can be assessed through various methodologies. Behavioral metrics, such as analyzing the time spent on platforms and the frequency of visits, provide a quantitative measure of engagement, as demonstrated by Perotti et al. (2024). Additionally, neurophysiological methods, including eye-tracking and electrodermal activity (EDA), allow for a more nuanced understanding of learner interaction with content. Complementing these are self-reported data collected through surveys, interviews, and diaries, which offer insights into the subjective experiences of learners, a practice supported by Nonis et al. (2020).

While engagement metrics offer quantitative insights, they must be complemented with qualitative data to understand factors driving online learning participation. Factors influencing engagement include the social presence of instructors and opportunities for personalized interaction (Mosier, 2018; Åkerfeldt et al., 2024). For instance, real-time instructor responsiveness and individual attention significantly enhance satisfaction and participation.

Personality traits, such as conscientiousness and agreeableness, correlate with training success in live settings (Ng, 2018). However, online learning

demonstrates different dynamics, with neuroticism inversely linked to satisfaction (Baruth & Cohen, 2023). Despite these findings, utilizing detailed sociopsychological profiling in e-learning is limited due to logistical and practical challenges, including the complexity and intrusiveness of data collection instruments.

Demographic criteria such as age, gender, and professional experience influence learning preferences. Newton and Miah (2017) highlight that experienced professionals may favor abstract analyses, whereas younger learners may gravitate towards sensory and kinesthetic methods. Similarly, gender differences suggest women prefer collaborative and discussion-based learning, while men often lean towards individual problem-solving approaches.

The VARK model classifies learners as visual, auditory, reading/writing-preference, or kinesthetic. Understanding these styles enables tailored instructional designs that maximize learning efficiency. For example, visual learners benefit from charts and diagrams, while kinesthetic learners engage better through hands-on activities (Nazempour & Darabi, 2023; El-Sabagh, 2021).

Enhancing Engagement Through Personalization

Customized learning environments, responsive to individual profiles, are crucial for fostering engagement in CPD. One effective strategy is dynamic content delivery, where material formats are tailored to suit learner preferences. For example, interactive videos cater to visual learners, while podcasts serve auditory learners (Zanker et al., 2019). Instructor interaction also plays a significant role, with real-time feedback and acknowledgment of individual contributions helping to strengthen social presence and motivation (Mosier, 2018). Furthermore, adaptive systems that utilize algorithms to recommend resources based on user behavior and preferences can significantly enhance engagement and satisfaction (Sungwoo et al., 2022). These strategies, when combined, offer a robust approach to fostering a more personalized and engaging CPD experience.

Realizing personalized learning in CPD involves challenges such as unequal access to resources, varying levels of learner initiative, and limitations in platform adaptability (Dumont & Ready, 2023). Addressing these challenges requires collaboration between instructors and learners, ensuring clear communication of needs and expectations. Despite these obstacles, personalized e-learning holds immense potential to revolutionize professional development by delivering tailored, engaging experiences that resonate with diverse learner profiles. By bridging personalized learning and engagement, e-learning platforms can empower professionals to achieve continuous growth, ultimately enhancing their performance and contributions in specialized domains.

Materials and Methods

A quantitative research method using a questionnaire was applied in this study to examine the linkage between personalized learning and engagement

in continuous professional development through e-learning platforms. Data were collected from individuals working in customs and international trade sectors, using primary sources. The survey targeted a probabilistic sample to ensure statistical validity. The survey was conducted in September and October of 2024. A total of 431 respondents participated, of which 53 incomplete questionnaires were excluded, leaving 378 valid responses for analysis.

The study employed a custom-developed questionnaire grounded in scientific literature, consisting of 52 indicators grouped into nine key areas. Demographic questions were formulated by the authors to capture respondent characteristics such as work profile and experience. Questions on engagement evaluated the frequency of platform use for work-related information searches and training participation were based on Peng et al. (2019) and Ismail et al. (2023) as were personalized learning element dimensions like information search, learning methods. Dimensions encompassing training seminars, and system interaction were based on Hwang and Kim (2022), Ouajdouni et al. (2021), Wang et al. (2007). Learning styles were measured using the VARK scale.

Most questions used a 5-point Likert scale due to its ordinal properties and ease of use, with additional open-ended questions providing qualitative insights. The questionnaire's reliability was ensured through Cronbach's alpha and validated using factor analysis. Statistical analysis, including descriptive statistics, correlations, and discriminant analysis, were performed with IBM SPSS Statistics 29.

Findings

To identify potential clusters of customs professionals based on their preferences for specific personalization elements, discriminant analysis was used. This method allows the selection of a variable to form group classifications (functions) without prior classifications. In this process, combinations of variables related to each personalization element are created. These functions include linear combinations of variables such as V, A, R, K, and other demographic data associated with the respective statements mentioned earlier. Each coefficient indicates the influence of a variable on a particular function.

For example, the analysis revealed that individuals who read articles can be categorized into three profiles:

- **Function 1** (71.1% explains the choice to read articles; Canonical Correlation: 0.609 - the strongest relationship between independent variables and group membership):

  - Greatest positive influence: Visual learning style (0.818).
  - Greatest positive influence: Age (0.692).

- **Function 2** (23.8% explains the choice to read articles; Canonical Correlation: 0.407):

  - Greatest positive influence: Age (0.770).
  - Greatest positive influence: Reading/Writing learning style (R) (0.666).

- **Function 3** (5.0% explains the choice to read articles; Canonical Correlation: 0.200):

  – Greatest positive influence: Gender (0.759).

Given that Function 1 significantly better explains the choice to read articles than the others, it can be concluded that respondents who exhibit a visual learning style and are of older age are more likely to read articles.

The following summary present more concise results, emphasizing the most prominent functions.Reading legal acts is explained by the first function at 55.7% (Canonical Correlation: 0.524), indicating that the greatest positive influence comes from work experience (0.901) and kinesthetic learning style (–0.500). Case analysis is explained by the first function at 53.5% (Canonical Correlation: 0.414), showing that age has the greatest positive influence (0.872). The use of chatbots, such as Chat GPT, is explained by the first function at 52.9% (Canonical Correlation: 0.466), demonstrating that the greatest positive influence comes from the kinesthetic learning style (0.809), while the greatest negative influence comes from the reading/writing learning style (–0.828). This indicates that respondents with a kinesthetic learning style are more inclined to use chatbots, but only if they do not also exhibit a reading/writing learning style. Watching podcasts is explained by the first function at 56.3% (Canonical Correlation: 0.470), showing that the greatest positive influences are work experience (0.909) and the visual learning style (0.898). Watching videos is explained by the first function at 70.7% (Canonical Correlation: 0.525), indicating that videos are more likely to be watched by men (0.911) with a visual learning style (0.711). Participation in forums is explained by the first function at 56.2% (Canonical Correlation: 0.498), showing that older customs professionals (0.862) are more likely to participate in forums.

In e-learning, the personalization elements of learning methods, such as lecture effectiveness, are explained by the first function at 43.6% (Canonical Correlation: 0.398), showing that the greatest positive influence comes from work experience (0.936). The effectiveness of discussions/forums is explained by the first function at 44.7% (Canonical Correlation: 0.468), indicating that forums and discussions are suitable development methods for individuals with an auditory learning style (0.753) and those with greater work experience (0.677). However, they are not suitable for individuals with a reading/writing learning style (–0.673). The effectiveness of group work is explained by the first function at 52.8% (Canonical Correlation: 0.354), showing that the greatest negative influences are work experience (–0.778) and the reading/writing learning style (–0.605). The effectiveness of individual tasks is explained by the first function at 60.6% (Canonical Correlation: 0.456), demonstrating that the greatest positive influences are the kinesthetic learning style (0.912) and work experience (0.812). The effectiveness of real-time learning is explained by the first function at 60.1% (Canonical Correlation: 0.468), with the greatest positive influence being the kinesthetic learning style (0.691) and the greatest negative influence being the auditory learning style (–0.713). The effectiveness of learning at one's

own convenience, such as by downloading training materials, is explained by the first function at 45.0% (Canonical Correlation: 0.456), showing that the greatest positive influences are the kinesthetic learning style (0.583) and the visual learning style (0.580), while the greatest negative influence is the auditory learning style (–0.551).

The personalization elements of training/seminars, such as the importance of lecturer recognition in choosing e-learning courses, are explained by the first function at 100% (Canonical Correlation: 0.991). The greatest positive influences are the kinesthetic learning style, work experience, and auditory learning style, while the greatest negative influence comes from the visual learning style. The importance of course price in choosing e-learning courses is explained by the first function at 70.9% (Canonical Correlation: 0.462), showing that the greatest positive influence is the kinesthetic learning style (0.722), while the greatest negative influence is also associated with the kinesthetic learning style (–0.671). The importance of course duration in choosing e-learning courses is explained by the first function at 59.2% (Canonical Correlation: 0.620), indicating that the greatest positive influence is the kinesthetic learning style (0.811), while the greatest negative influence comes from the auditory learning style (–0.931). The importance of the opportunity for interactive communication with the lecturer and/or colleagues is explained by the first function at 64.3% (Canonical Correlation: 0.448), showing that the greatest negative influence is work experience (−0.921). The importance of conducting courses in one's native language is explained by the first function at 56.1% (Canonical Correlation: 0.492), with the greatest positive influence being age (0.667) and the greatest negative influence being the kinesthetic learning style (–0.647).

CONCLUSION

After analyzing the scientific literature, the choice of learning styles model was justified, and the elements of personalization potentially influencing professionals' engagement in continuous learning on the e-platform were clarified: personalization elements for information retrieval; learning method personalization elements; training personalization elements; system interaction personalization elements.

Respondents, representing the general population of customs professionals, exhibited combinations of several learning styles. In only a few cases was a single learning style clearly expressed, and it was either visual or kinesthetic. Other commonly observed combinations were visual + kinesthetic and auditory + reading/writing. However, the most frequent combination was kinesthetic + auditory + reading/writing. Still, the dominant learning style was kinesthetic.

The main sources of information on work-related issues are legal acts and articles. This indicates a classic learning approach; however, it could also be influenced by the limited availability of learning resources. When evaluating the effectiveness of methods used in e-learning, respondents prioritize self-directed learning. The methods highly rated by the respondents and mentioned in comments indicate that they favor interactive learning methods, which aligns with the dominant kinesthetic learning style. One

of the most important factors influencing the choice of the e-platform was price and the ability to learn at a convenient time, thus prioritizing self-directed learning. In summary, regarding learning content and methods, it can be said that current methods are more focused on classical learning approaches, but respondents consider self-directed learning more effective.

Older individuals with a visual learning style tend to read articles, while those with a kinesthetic learning style prefer individual tasks. When choosing e-learning, it is important that it is conducted in Lithuanian, especially for those who do not have a kinesthetic learning style. Older people are often inclined to analyze case studies, participate in forums, and, with their kinesthetic learning style and extensive work experience, choose real-time learning, although this suits only those who do not have an auditory learning style.

For men, the duration of learning is important, and they emphasize the ability to learn at their own convenience, especially when downloading learning materials, when choosing e-learning. Men with a visual learning style tend to watch videos, while younger men value the certification upon completing the training.

More experienced individuals tend to read legal acts, watch podcasts (especially those with a visual learning style), and recognize the value of individual work if they have a kinesthetic learning style. Real-time learning is suitable for older individuals with a kinesthetic learning style who do not have an auditory style. The lecturer's reputation is important for those with substantial work experience, kinesthetic, and auditory styles, but weak visual learning styles.

Respondents with a kinesthetic learning style more frequently use chatbots, but only if they do not have a reading/writing learning style. Forums and participation in discussions are not suitable for individuals with a reading/writing style. Group work is an effective development method for older individuals with an auditory learning style. Additionally, learning duration is important for those with a kinesthetic learning style, but not for those with an auditory style.

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