AMERICAN JOURNAL OF EDUCATION AND LEARNING
ISSN: 2996-5128 (online) | ResearchBib (IF) = 9.918 IMPACT FACTOR
Volume-3| Issue-5| 2025 Published: |30-05-2025|

THE ROLE OF NANO-LEARNING IN DEVELOPING DIGITAL COMPETENCE AMONG FUTURE ENGLISH LANGUAGE TEACHERS

https://doi.org/10.5281/zenodo.15427318

Moydinova Elmira Kamariddinovna
PhD, Associate Professor
Uzbekistan State World Languages University
Email: mirlife645@gmail.com
ORCID 0009-0009-2794-6721

Annotation

This study investigates how nano-learning, a microlearning strategy involving short, focused learning units, contributes to developing digital competence among pre-service English language teachers. Given the growing integration of technology in educational environments, equipping future educators with digital skills is essential. This research explores the application of nano-learning in teacher training programs and its effectiveness in enhancing digital literacy, pedagogical digital competence, and overall teaching efficacy in digitally mediated classrooms.

Keywords

nano-learning, digital competence, pre-service teachers, English language education, microlearning

Annotatsiya

Ushbu tadqiqot nano-ta’lim – qisqa, maqsadli o‘quv birliklarini o‘z ichiga olgan mikroo‘rganish strategiyasi – ingliz tili yo‘nalishidagi bo‘lajak o‘qituvchilarning raqamli kompetensiyasini rivojlantirishdagi rolini o‘rganadi. Ta’lim muhitida texnologiyalarning tobora kengroq integratsiyalashuvi sharoitida kelajakdagi o‘qituvchilarni raqamli ko‘nikmalar bilan qurollantirish muhim ahamiyatga ega. Ushbu tadqiqot nano- ta’limning o‘qituvchilarni tayyorlash dasturlariga qo‘llanishi va uning raqamli savodxonlik, pedagogik raqamli kompetensiya hamda raqamli muhitdagi dars samaradorligini oshirishdagi ta’sirini o‘rganadi.

Kalit so‘zlar

nano-ta’lim, raqamli kompetensiya, bo‘lajak o‘qituvchilar, ingliz tili ta’limi, mikroo‘rganish

Аннотация

AMERICAN JOURNAL OF EDUCATION AND LEARNING
ISSN: 2996-5128 (online) | ResearchBib (IF) = 9.918 IMPACT FACTOR
Volume-3| Issue-5| 2025 Published: |30-05-2025|

В данном исследовании рассматривается, как нанообучение – стратегия микрообучения, включающая короткие и сфокусированные учебные единицы – способствует развитию цифровой компетентности у будущих преподавателей английского языка. С учетом растущей интеграции технологий в образовательную среду, оснащение будущих педагогов цифровыми навыками становится крайне необходимым. Исследование изучает применение нанообучения в программах подготовки учителей и его эффективность в повышении цифровой грамотности, педагогической цифровой компетентности и общей эффективности преподавания в цифрово-опосредованных классах.

Ключевые слова

нанообучение, цифровая компетентность, будущие учителя, обучение английскому языку, микрообучение

1. Introduction

The rapid advancement of educational technologies has transformed pedagogical practices and required a parallel evolution in teacher competencies. For English language teachers, in particular, integrating digital tools into language instruction is no longer optional but essential. Digital competence – defined as the confident, critical, and responsible use of digital technology for learning, work, and participation in society (European Commission, 2017) – is thus a core skill for educators.

Recent educational paradigms emphasize *microlearning* approaches, and one such innovation is *nano-learning* – short, targeted instructional segments typically under 10 minutes. These modules are increasingly recognized for their potential to foster skill acquisition, retention, and flexible learning. While previous studies have explored microlearning in professional development, limited research addresses the impact of nano-learning specifically on *pre-service English teachers' digital competence.*

This study aims to fill that gap by examining how nano-learning strategies can be integrated into teacher education programs to prepare digitally competent English teachers.

2. Literature Review

2.1 Digital Competence in Language Teacher Education

Digital competence encompasses a range of skills including information literacy, communication, content creation, safety, and problem-solving in digital environments (Ferrari, 2013). For English language teachers, it involves not only

using digital tools for instruction but also critically selecting, adapting, and creating materials for diverse learners.

Elmira Moydinova emphasizes the urgent need for educators to adopt digital tools and practices to meet the demands of contemporary learners. The paper outlines several targeted strategies aimed at enhancing teacher effectiveness through the integration of technology.

One of the core focuses is on *creating digital content*, where Moydinova highlights the importance of equipping teachers with skills to design interactive and multimedia-rich materials that engage students across various learning styles. This includes using platforms that support video, audio, animations, and gamification to enhance instructional delivery.

The paper also underscores the value of *online collaboration* as a tool for fostering active communication and teamwork among students. Moydinova discusses how virtual learning environments and communication platforms (like Google Classroom, Zoom, and Microsoft Teams) can support peer-to-peer learning and teacher-student interaction.

Another key strategy is the use of *digital assessment tools*. Moydinova encourages the integration of formative and summative digital assessments to monitor student progress more effectively. She points out that tools like Kahoot, Quizizz, and Google Forms allow for instant feedback and data-driven instruction. Together, these strategies contribute to the broader goal of strengthening educators' *digital competence*, aligning with frameworks such as DigCompEdu, and preparing teachers for the challenges of modern classrooms (Moydinova, 2024).

The **DigCompEdu** framework (Redecker, 2017) outlines key competencies for educators in six areas: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence. Teacher training programs must align with such frameworks to prepare candidates for 21st-century classrooms.

2.2 Nano-Learning: Definition and Educational Potential

Nano-learning is characterized by its brevity, focus, and accessibility. It provides just-in-time learning, typically through videos, podcasts, infographics, or interactive quizzes. Unlike traditional e-learning, nano-learning is designed for mobile platforms and can be integrated into daily routines (Hug, 2005).

Benefits of nano-learning include:

- Increased engagement and retention (Ray & Deb, 2016)
- Time-efficient learning experiences (Buchem & Hamelmann, 2010)
- Support for self-paced and personalized learning

Research suggests that microlearning fosters *autonomous learning,* a key skill in teacher education.

2.3 Nano-Learning in Language Teacher Training

Language teacher training increasingly incorporates digital resources and mobile-assisted language learning (MALL). Nano-learning can be an effective tool to deliver targeted instruction on digital tools, lesson planning with technology, online assessment techniques, and ethical considerations of digital pedagogy (Kukulska-Hulme, 2020). However, empirical research on its effectiveness for pre-service teachers is limited.

3. Methodology

3.1 Research Design

This qualitative study employed a *case study approach* to explore how nano-learning modules affect digital competence development in pre-service English teachers. The study was conducted at a teacher training institute in Eastern Europe, using a blended learning model integrating nano-learning segments into a digital pedagogy course.

3.2 Participants

Twenty-five pre-service English language teachers (ages 20-24) participated. All were enrolled in a bachelor's degree program in English language teaching and had basic digital literacy.

3.3 Intervention

The intervention spanned *six weeks* and consisted of:

- Weekly nano-learning modules (5-10 minutes)
- Topics included: using LMS tools, digital assessment, online collaboration tools, creating digital content, and internet safety
- Follow-up reflective tasks and peer discussions

3.4 Data Collection

Data were collected through:

- Pre- and post-intervention surveys based on DigCompEdu self-assessment tool
- Semi-structured interviews
- Analysis of digital projects created by participants

3.5 Data Analysis

Survey data were analyzed using *descriptive statistics*. Interview transcripts and projects were subjected to *thematic analysis* to identify changes in perception and application of digital tools.

4. Results

4.1 Improvement in Self-Perceived Digital Competence

AMERICAN JOURNAL OF EDUCATION AND LEARNING
ISSN: 2996-5128 (online) | ResearchBib (IF) = 9.918 IMPACT FACTOR
Volume-3| Issue-5| 2025 Published: |30-05-2025|

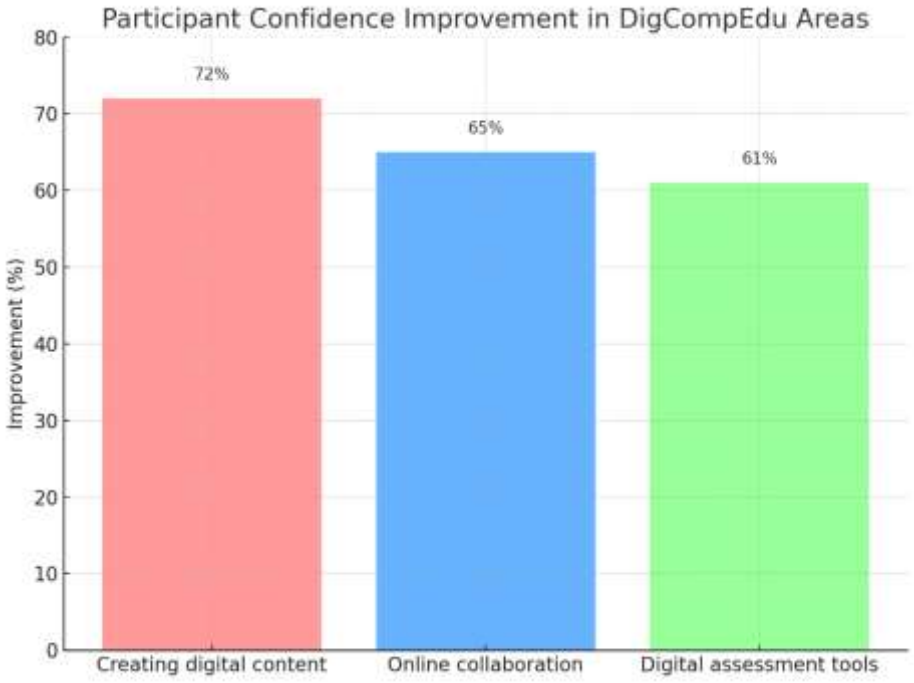
Participants reported increased confidence across all six areas of the *DigCompEdu (Digital Competence Framework for Educators)*. This framework outlines essential digital skills for teachers and trainers, aiming to enhance their effectiveness in technology-rich environments.

Following the training or intervention, participants showed a significant rise in self-perceived digital competence. The most notable improvements were observed in the following areas:

- **Creating digital content** – with a remarkable *72% improvement,* participants felt much more confident in designing and producing digital teaching materials.
- **Online collaboration** – reported a *65% improvement,* indicating enhanced ability to work with peers and students in virtual environments.
- **Digital assessment tools** – saw a *61% improvement,* reflecting better competence in using digital methods to evaluate student performance.

These results suggest a strong overall impact of the program, especially in the domains that are most directly related to digital pedagogy and student interaction.

(See Picture 1) for a visual representation of these improvements.



So, participants reported increased confidence across all six DigCompEdu areas. The largest gains were in:

- Creating digital content (72% improvement)
- Online collaboration (65% improvement)
- Digital assessment tools (61% improvement)

4.2 Engagement and Autonomy

Qualitative data revealed that nano-learning was perceived as *engaging,* "manageable in daily life," and "less overwhelming than lectures." Students appreciated the *bite-sized format,* allowing for repetition and reflection.

One participant noted:

"I used to avoid digital tools. But the short videos and interactive quizzes helped me see how simple and useful they are."

4.3 Application in Practice

Final digital lesson plans and projects incorporated various tools introduced in the modules, such as:

- Edpuzzle for interactive videos
- Padlet for brainstorming
- Google Forms for formative assessment

Interview data suggest that participants felt more prepared to design and deliver tech-integrated lessons.

5. Discussion

The findings suggest that nano-learning effectively supports the development of digital competence in pre-service English teachers. Its brevity and focus promote *incremental learning,* reducing cognitive overload often associated with digital training. This format is especially suitable for *teacher education,* where time constraints and curricular pressures are significant. The positive response aligns with constructivist views that emphasize learner agency and just-in-time access to resources.

Moreover, the results affirm earlier findings on microlearning's effectiveness in skill acquisition. This study extends those conclusions to the realm of language teacher preparation and offers a *practical framework* for embedding nano-learning into existing programs.

6. Conclusion

Nano-learning offers a promising strategy for fostering digital competence among future English teachers. Its flexible, modular design supports autonomous learning, increased engagement, and practical skill development. Integrating nano-learning into teacher education programs can help bridge the digital skills gap and prepare educators for the demands of contemporary classrooms.

Future research should explore longitudinal impacts and comparative studies between nano-learning and other professional development formats.

REFERENCES:

1. Buchem, I., & Hamelmann, H. (2010). Microlearning: A strategy for ongoing professional development. *eLearning Papers*, 21, 1–15.

2. European Commission. (2017). *Digital Competence Framework for Educators (DigCompEdu)*. Publications Office of the EU.

3. Ferrari, A. (2013). *DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe*. JRC-IPTS.

4. Hug, T. (2005). Micro learning and narration. In *Proceedings of Media in Transition* (MIT).

5. Kamariddinovna, M.E. (2022). THE STRUCTURE OF PROFESSIONAL COMPETENCE OF PRESCHOOL ENGLISH TEACHERS. *International Journal of Pedagogics*, *2*(07), 1-4.

6. Kukulska-Hulme, A. (2020). Mobile-assisted language learning [Revisited]. *Language Teaching*, 53(2), 157–182.

7. Moydinova, E. (2024). EFFECTIVE STRATEGIES FOR TEACHING IN THE DIGITAL AGE. In *Fergana state university conference*.

8. Ray, S., & Deb, S. (2016). Evaluating micro-learning as a modern training strategy. *International Journal of Applied Research*, 2(12), 492–495.

9. Redecker, C. (2017). *European Framework for the Digital Competence of Educators: DigCompEdu*. Joint Research Centre, European Commission.