

Cognitive Load Theory and eLearning of Crafts

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Craft education and training are important for preserving cultural heritage and fostering artisanal skills. Craft education and training are challenging since they introduce learners to a multifaceted world, where they must acquire skills, knowledge, and appreciation for cultural heritage. Balancing these learning objectives is a cognitive challenge.

eLearning

cognitive load theory

traditional crafts

education and training

guideline development

online learning

1. Introduction

Crafts represent a valuable repository of cultural heritage, encapsulating the wisdom and craftsmanship passed down through generations. These crafts encompass a diverse array of artistic, functional, and cultural practices, ranging from woodworking and pottery to textiles and basket weaving [1]. With their intricate techniques, cultural significance, and historical context, crafts stand as a testament to human creativity, innovation, and cultural preservation. In a world marked by rapid technological transformations, the preservation of crafts is of significance for their safeguarding [2].

Training individuals in crafts poses various challenges. It is of paramount importance to understand these challenges when trying to produce digital learning solutions that aim to support such goals [3]. The main challenge lies in preserving the authenticity of these crafts [4] while adapting to contemporary teaching methods. Other challenges are related to the nature of craft concerning the modern globalized environment [5]. These crafts are typically transmitted orally from one generation to the next, lacking a structured, written format that facilitates systematic education [6]. The absence of written records poses a significant risk of knowledge loss [7]. The mastery of crafts is a labor-intensive and time-consuming endeavor, with a dwindling number of individuals showing interest in apprenticeships. This decreasing interest in crafts raises concerns about their preservation [8]. Furthermore, the economic viability of these crafts remains limited, as they generally offer low financial returns [9]. Challenges also include the procurement of appropriate materials, adaptation to cultural changes, and the effective transfer of skills from experienced artisans to younger generations. Ensuring consistency in quality, addressing competition from mass-produced alternatives, and preserving the authenticity of crafts further complicate the training process. Moreover, access to markets, government support, and the revitalization of interest in crafts within communities are

critical factors [10]. These multifaceted challenges underscore the need for comprehensive training approaches in crafts, whether technology-assisted or otherwise, to safeguard these invaluable cultural practices.

2. Cognitive Load Theory

Cognitive load theory (CLT) is a foundational framework in educational psychology that underpins researchers' approach to designing effective eLearning experiences for crafts. CLT delves into the intricacies of how the human cognitive system processes information and how instructional materials' design influences the learning experience. The framework identifies three distinct types of cognitive load: intrinsic, extraneous, and germane. Intrinsic cognitive load relates to the inherent complexity of the subject matter, extraneous cognitive load pertains to the load imposed by ineffective instructional design, and germane cognitive load concerns the cognitive effort that leads to meaningful learning.

The core effects associated with CLT have a close relevance in eLearning contexts and include the Split-Attention Effect, which underscores the significance of not overloading learners with disparate sources of information [11]. The Modality Effect highlights how presenting information through multiple sensory channels can enhance comprehension and retention [12]. The Redundancy Effect emphasizes the negative impact of presenting the same information redundantly in different modalities [13]. In contrast, the Expertise Reversal Effect reminds researchers that what is effective for novices may not work for experts [14]. Researchers will also consider the Guidance Fading Effect, which suggests that as learners gain proficiency, guidance should be gradually reduced, and the Imagination Effect which underlines the power of mental imagery in learning [15]. The Self-Explanation Effect advocates for learners to articulate their understanding [16], and the Element Interactivity Effect [17] focuses on handling complex, interactive topics.

3. Craft Education via Online Social Platforms

Currently, there are several platforms dedicated to teaching crafts. For example, Craftsy is an online platform that offers video courses on a wide range of crafts, including knitting, quilting, sewing, and more [18]. Users can access pre-recorded classes taught by expert instructors. Udemy hosts a variety of online courses on crafts and DIY projects. Instructors from around the world create and offer these courses. While the quality and content can vary, it provides a diverse range of craft-related courses [19]. Skillshare is an eLearning platform that offers a wide range of courses, including those related to crafts and DIY. It is known for its creative and practical courses, with many focused on crafts. The Great Courses offers a selection of video courses, and they have offerings related to crafts. These courses are often taught by experts in their respective fields [20]. While not a dedicated eLearning platform, YouTube has a vast library of craft tutorials. Many artisans and crafters share their knowledge and skills through video tutorials [21]. This offers a wealth of free resources for those interested in crafts. Some craft schools and workshops have adopted eLearning and hybrid learning models. They offer both in-person and online classes, making craft education more accessible to a wider audience.

4. Moodle as an eLearning Platform

Moodle is a versatile open-source eLearning platform renowned for its rich feature set and widespread adoption in education and training [22]. Educators can seamlessly create and manage online courses, incorporating multimedia content, interactive assignments, and automated assessments. The user-friendly interface promotes easy navigation for instructors and learners alike. Moodle's flexible design allows for extensive customization with themes and plugins, ensuring it can be tailored to diverse educational needs. Its comprehensive gradebook and analytics tools facilitate learner progress tracking and performance evaluation. Moodle's robust security measures prioritize data protection, and its mobile accessibility caters to various devices, making it an excellent choice for modern eLearning. With a supportive global community and seamless integration capabilities, Moodle remains a top choice for educational institutions, corporations, and organizations worldwide [23].

5. Extending Learning Paradigms in Craft Education

In craft education, focusing on digital transformation while preserving the essence of craftsmanship and cultural heritage is important. The landscape of learning paradigms in craft education currently includes or has the potential to include in the future several novel learning approaches such as:

Blended Learning Models: craft education often thrives on hands-on learning, apprenticeships, and the transfer of practical skills from one generation to the next [24]. The fusion of practices with digital tools and platforms, such as Moodle, can create blended learning models that combine the tactile experience of crafting with digital resources.

Microlearning and Skill-Based Learning: As the educational landscape evolves, microlearning has gained prominence [25] in the context of crafts. Delivering skill-based modules in small, easily digestible segments through eLearning platforms is such a paradigm.

Gamification and Interactive Learning: Interactive and game-based learning approaches [26] can engage learners and make the process of acquiring craft skills more enjoyable. Gamified elements can encourage learners to explore the art of crafting while mastering skills in an immersive, enjoyable manner [27].

Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality(MR): New immersive technologies have a good track record in education and training and have been used in the field of Craft training [28][29][30][31][32][33][34][35]. eLearning as a digital form of education has the potential to support or be combined with immersive learning experiences with the benefit of being able to emphasize their ability to simulate real craftwork environments.

Personalized Learning and Adaptive Platforms: Personalized learning experiences tailored to individual learners can be facilitated in contemporary education.

Lifelong Learning and Cultural Preservation: craft education often extends beyond formal schooling, making lifelong learning essential.

References

1. UNESCO. Traditional Craftsmanship. Available online: <https://ich.unesco.org/en/traditionalcraftsmanship-00057> (accessed on 15 November 2023).
2. Partarakis, N.; Zabulis, X. Safeguarding Traditional Crafts in Europe. *Encyclopedia* 2023, 3, 1244–1261.
3. Zabulis, X.; Partarakis, N.; Demeridou, I.; Doulgeraki, P.; Zidianakis, E.; Argyros, A.; Theodoridou, M.; Marketakis, Y.; Meghini, C.; Bartalesi, V.; et al. A Roadmap for Craft Understanding, Education, Training, and Preservation. *Heritage* 2023, 6, 5305–5328.
4. Petts, J. Good work and aesthetic education: William Morris, the arts and crafts movement, and beyond. *J. Aesthetic Educ.* 2008, 42, 30–45.
5. Jena, P.K. Globalization of Indian handicrafts: A human development approach. *Orissa Rev.* 2008, 65, 19–25.
6. Hosfield, R.T. Modes of Transmission and Material Culture Patterns in Craft Skills; University of California Press: Berkeley, CA, USA, 2009; Volume 2, pp. 45–60.
7. Ionică, P. Traditional Crafts. *What About? Cult. Soc. Econ. Politics* 2022, 2, 51–59.
8. Sharmin, F.; Hossain, S.T. Revitalization of handloom communities for preserving the craft heritage of Bangladesh. *Urban Reg. Plan.* 2020, 5, 1–10.
9. Zbuc̄ea, A. Traditional Crafts. A Literature Review Focused on Sustainable Development. *Cult. Soc. Econ. Politics* 2022, 2, 10–27.
10. RICHES Project, European Policy Brief. Available online: https://resources.riches-project.eu/wp-content/uploads/2016/04/EUROPEAN-POLICY-BRIEF_Craft_final.pdf (accessed on 15 November 2023).
11. Schroeder, N.L.; Cenkci, A.T. Spatial contiguity and spatial split-attention effects in multimedia learning environments: A meta-analysis. *Educ. Psychol. Rev.* 2018, 30, 679–701.
12. Schüler, A.; Scheiter, K.; Schmidt-Weigand, F. Boundary Conditions and Constraints of the Modality Effect. *Z. Pädagogische Psychol.* 2011, 25, 211–220.
13. Chan, S.; Strickland, J. Examining the Multimedia Redundancy Effect among Education Majors: Assessing Pedagogical Usability of Instructional Videos. In *E-Learn: World Conference on E-*

Learning in Corporate, Government, Healthcare, and Higher Education; Association for the Advancement of Computing in Education (AACE): Morgantown, WV, USA, 2014; pp. 333–343.

14. Song, D. Expertise reversal effect and sequencing of learning tasks in online English as a second language learning environment. *Interact. Learn. Environ.* 2016, 24, 423–437.
15. Darejeh, A.; Mashayekh, S.; Marcus, N. Cognitive-based methods to facilitate learning of software applications via E-learning systems. *Cogent Educ.* 2022, 9, 2082085.
16. İltüzer, Y.; Demiraslan Cevik, Y. Effects of self-explanation on applying decision rules in an online learning environment. *Educ. Inf. Technol.* 2021, 26, 4771–4794.
17. Kala, N.; Ayas, A. Effect of instructional design based on cognitive load theory on students' performances and the indicators of element interactivity. *J. Turk. Sci. Educ.* 2023, 20, 468–489.
18. Craftsy. Available online: <https://www.craftsy.com/> (accessed on 15 November 2023).
19. Udemy. Available online: <https://www.udemy.com/> (accessed on 15 November 2023).
20. Thegreatcourses. Available online: <https://www.thegreatcourses.com> (accessed on 15 November 2023).
21. Skillshare. Available online: <https://join.skillshare.com> (accessed on 15 November 2023).
22. Dougamas, M. Moodle. Retrieved Online 2004, 27, 2004.
23. Al-Ajlan, A.; Zedan, H. Why moodle. In Proceedings of the 2008 12th IEEE International Workshop on Future Trends of Distributed Computing Systems, Washington, DC, USA, 21–23 October 2008; pp. 58–64.
24. Calvert, I.W. Investigating the One-On-One Master-Apprentice Relationship: A Case Study in Traditional Craft Apprenticeship; Brigham Young University: Provo, UT, USA, 2014.
25. Taylor, A.D.; Hung, W. The effects of microlearning: A scoping review. *Educ. Technol. Res. Dev.* 2022, 70, 363–395.
26. Adipat, S.; Laksana, K.; Busayanon, K.; Asawasowan, A.; Adipat, B. Engaging Students in the Learning Process with Game-Based Learning: The Fundamental Concepts. *Int. J. Technol. Educ.* 2021, 4, 542–552.
27. Habib, K.R. Designing Digital Art and Communication Tools Inspired by Traditional Craft; Department of Computer Science, School of Computing, National University of Singapore: Singapore, 2014.
28. Ringas, C.; Tasiopoulou, E.; Kaplanidi, D.; Partarakis, N.; Zabulis, X.; Zidianakis, E.; Patakos, A.; Patsiouras, N.; Karuzaki, E.; Foukarakis, M.; et al. Traditional Craft Training and Demonstration in Museums. *Heritage* 2022, 5, 431–459.

29. Stefanidi, E.; Partarakis, N.; Zabulis, X.; Adami, I.; Ntoa, S.; Papagiannakis, G. Transferring traditional crafts from the physical to the virtual world: An authoring and visualization method and platform. *ACM J. Comput. Cult. Herit.* 2022, 15, 1–24.
30. Carre, A.L.; Dubois, A.; Partarakis, N.; Zabulis, X.; Patsiouras, N.; Mantinaki, E.; Zidianakis, E.; Cadi, N.; Baka, E.; Thalmann, N.M.; et al. Mixed-reality demonstration and training of glassblowing. *Heritage* 2022, 5, 103–128.
31. Yang, H.O. Research on the Application of Interaction Design in the Digital Education of Traditional Crafts. In Proceedings of the International Conference on Human-Computer Interaction, Copenhagen, Denmark, 23–28 July 2023; Springer Nature: Cham, Switzerland, 2023; pp. 221–238.
32. Osman, S.; Zin, N.A.H.M. Proposed model for courseware development of virtual teaching and learning traditional craft. In Proceedings of the 2010 International Symposium on Information Technology, Kuala Lumpur, Malaysia, 15–17 June 2010; Volume 1, pp. 1–6.
33. Van Merriënboer, J.J.; Krammer, H.P. Instructional strategies and tactics for the design of introductory computer programming courses in high school. *Instr. Sci.* 1977, 16, 251–285.
34. Nimkulrat, N.; Oussoren, A.; Day Fraser, H.; Doyle, K. Collaborative Craft through Digital Fabrication and Virtual Reality. In Proceedings of the 4th Biennial Research Through Design Conference, Delft, The Netherlands, 19–22 March 2019.
35. Jimenez, I.A.C.; Nonis, F.; Olivetti, E.C.; Ulrich, L.; Moos, S.; Monaci, M.G.; Marcolin, F.; Vezzetti, E. Exploring User Engagement in Museum Scenario with EEG-A Case Study in MAV Craftsmanship Museum in Valle d'Aosta Region, Italy. *Electronics* 2023, 12, 3810.

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