Experiential Learning in App Development Instruction

David Schieferstein

Adult Education & Training, Colorado State University

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Dr. Jill Zarestky

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The App Creators program, offered by Project Lead the Way, is a 10-week professional development course designed to equip instructors with the skills and knowledge necessary to teach mobile app development to middle school students. This innovative program responds to the growing demand for technology education in K-12 settings, recognizing the importance of preparing students for a rapidly evolving digital landscape. By empowering instructors with the tools and expertise to facilitate hands-on app development projects, the App Creators program aims to bridge the gap between traditional classroom learning and the practical skills required in the modern workforce. However, effective instruction in this domain requires not only technical proficiency but also a deep understanding of adult learning principles to design and deliver impactful learning experiences for the instructors themselves. This paper analyzes the App Creators instructor training program through the lens of Twin-Cycle Experiential Learning Theory (TCELM) (Bergsteiner & Avery, 2014), a comprehensive framework that extends Kolb's Experiential Learning Theory to accommodate diverse learning modes and styles. By applying this adult learning theory to the program's curriculum and learning experiences, the analysis seeks to evaluate the program's effectiveness in facilitating experiential learning for adult learners, identify potential areas for improvement, and contribute to the broader discourse on best practices in professional development program design. The paper is structured into four main sections: Learning Event, Literature Review, Analysis, and Recommendations, each building upon the previous to provide a thorough examination of the App Creators program through the lens of TCELM and its implications for adult education in the context of technology instruction.

Learning Event

The App Creators program, as a professional development course, aims to provide adult instructors with the necessary skills and knowledge to effectively teach mobile app development to middle school students. This unique learning event targets a specific audience of educators who are interested in enhancing their technology capabilities and pedagogical knowledge in the realm of app development. By focusing on this particular group of adult learners, the program acknowledges the growing importance of technology education in K-12 settings and the crucial role that instructors play in facilitating student learning.

The App Creators program is structured as a 10-week online course, leveraging a blend of passive and active learning modes to cater to the diverse needs and preferences of adult learners. The curriculum incorporates traditional instructional methods, such as lectures and readings, to establish a strong foundation of theoretical knowledge in app development concepts and best practices. These passive learning components serve to introduce instructors to the fundamental principles and frameworks that underpin the app creation process, providing them with a solid conceptual understanding of the subject matter.

Alongside these passive learning modes, the program places a strong emphasis on active, hands-on learning experiences. Instructors engage in practical app development tasks, where they have the opportunity to apply their newly acquired knowledge and skills in a supportive, collaborative environment. These hands-on activities are designed to mirror the real-world challenges and processes involved in app creation, allowing instructors to gain valuable firsthand experience in the development lifecycle. By actively participating in these practical exercises, instructors can deepen their understanding of the subject matter, refine their technical skills, and develop a more intuitive grasp of the app development process.

To further enhance the active learning component, the App Creators program incorporates peer coaching sessions and discussion forums. These interactive elements provide instructors with a platform to share their experiences, exchange ideas, and learn from one another. Peer coaching sessions enable instructors to collaborate on projects, troubleshoot challenges, and receive constructive feedback from their colleagues. This collaborative approach fosters a sense of community and support among the learners, creating an environment that encourages experimentation, risk-taking, and continuous improvement. Discussion forums, on the other hand, serve as a space for instructors to engage in reflective dialogue, pose questions, and explore the pedagogical implications of teaching app development. These discussions help instructors to contextualize their learning, consider different teaching strategies, and develop a more nuanced understanding of how to effectively facilitate student learning in the realm of app creation.

The App Creators program recognizes the importance of continuous learning and professional growth for adult learners. As such, the program encourages instructors to adopt a reflective and iterative approach to their own learning and teaching practice. Throughout the course, instructors are provided with opportunities to reflect on their experiences, evaluate their progress, and identify areas for improvement. This reflective process is facilitated through the use of learning journals, where instructors can document their thoughts, challenges, and insights. By engaging in regular reflection, instructors can develop a more self-aware and adaptable approach to teaching, allowing them to continually refine their skills and strategies in response to the evolving needs of their students.

In summary, the App Creators program is a comprehensive learning event designed to equip adult instructors with the technical skills and pedagogical knowledge necessary to

effectively teach mobile app development to middle school students. Through a blend of passive and active learning modes, clear learning objectives, reflective practices, practical resources, and ongoing support, the program aims to provide an experiential learning experience that empowers instructors to become confident and competent facilitators of app development education. By investing in the professional development of instructors, the App Creators program ultimately seeks to inspire and prepare the next generation of digital creators and innovators.

Literature Review

Twin-Cycle Experiential Learning Theory (TCELM), proposed by Bergsteiner and Avery (2014), serves as a comprehensive framework for understanding and designing effective experiential learning experiences. This theory builds upon and extends Kolb's Experiential Learning Theory (ELT), which has been widely influential in the field of adult education. TCELM addresses some of the limitations of Kolb's model by introducing a more nuanced and flexible approach to experiential learning that accounts for the complexity and diversity of learning processes.

At its core, TCELM posits that learning occurs through the interplay of two interconnected cycles: the passive learning cycle and the active learning cycle. Each cycle encompasses different learning modes and styles, recognizing that learners engage with knowledge and experiences in various ways. By accommodating these diverse learning preferences and processes, TCELM provides a more inclusive and comprehensive framework for designing and facilitating experiential learning.

The passive learning cycle focuses on the acquisition of foundational knowledge through more traditional instructional methods, such as lectures, readings, and demonstrations. This cycle aligns with the concrete experience and abstract conceptualization stages of Kolb's model

(Bergsteiner & Avery, 2014). In the passive learning cycle, learners are exposed to new information, concepts, and theories that provide the necessary background knowledge for engaging in more active, experiential learning activities. This cycle emphasizes the importance of establishing a solid conceptual foundation upon which learners can build their understanding and skills.

Conversely, the active learning cycle emphasizes the application of knowledge through hands-on, experiential activities. This cycle corresponds to the reflective observation and active experimentation stages of Kolb's model (Bergsteiner & Avery, 2014). In the active learning cycle, learners have the opportunity to put their knowledge into practice, engage in problem-solving, and experiment with new ideas and techniques. This cycle is crucial for developing practical skills, critical thinking abilities, and a deeper understanding of the subject matter through direct experience.

One of the key strengths of TCELM is its recognition of the importance of both primary and secondary learning styles within each learning cycle. Primary learning styles refer to the dominant or preferred ways in which individuals naturally engage with information and experiences. Secondary learning styles, on the other hand, represent alternative modes of learning that individuals can develop and employ to complement their primary styles. By acknowledging and accommodating both primary and secondary learning styles, TCELM promotes a more versatile and adaptable approach to learning that caters to the diverse needs and preferences of adult learners.

TCELM also addresses some of the critiques and limitations of Kolb's ELT. Bergsteiner and Avery (2014) argue that Kolb's model oversimplifies the learning process by presenting it as a unidirectional cycle. In contrast, TCELM recognizes the iterative and recursive nature of

learning, allowing for multiple entry points and pathways through the learning cycles. This flexibility acknowledges that learning is not always a linear process and that individuals may engage with different stages of the cycle in varying orders and intensities depending on their needs and experiences.

Furthermore, TCELM emphasizes the importance of context in shaping learning experiences. Bergsteiner and Avery (2014) argue that learning does not occur in a vacuum but is deeply influenced by the social, cultural, and environmental factors that surround the learner. By considering the contextual factors that impact learning, TCELM provides a more situated and holistic understanding of how individuals construct knowledge and develop skills. This contextual awareness is particularly relevant in the design of professional development programs, where learners' backgrounds, work environments, and organizational cultures can significantly influence their learning experiences and outcomes.

The application of TCELM has been explored in various educational contexts, including higher education and professional training programs. Radović et al. (2023) highlight the potential of TCELM in designing experiential learning curricula in higher education settings. They argue that by incorporating both passive and active learning modes, as well as accommodating diverse learning styles, educators can create more engaging and effective learning experiences that promote deep understanding and skill development. Similarly, Arjmandi et al. (2023) demonstrate the value of TCELM in integrating experiential learning into engineering education, particularly in the context of teaching computer programming skills. Their findings suggest that a TCELM-informed approach can enhance students' motivation, engagement, and problem-solving abilities, leading to improved learning outcomes.

In the context of professional development programs, TCELM offers a valuable framework for designing and evaluating learning experiences that cater to the unique needs and challenges of adult learners. Ezeamuzie (2023) explores the application of TCELM in a project-based learning approach to programming education in technology-deprived environments. The study highlights the potential of TCELM in guiding the design of experiential learning activities that foster the development of practical skills and problem-solving abilities, even in resource-constrained settings. Similarly, Gomez-del Rio and Rodriguez (2022) demonstrate the effectiveness of TCELM in designing and assessing project-based learning experiences in engineering education, emphasizing the importance of integrating knowledge and improving design skills through active, experiential learning.

While TCELM provides a comprehensive and flexible framework for understanding and designing experiential learning, it is not without limitations. Mughal and Zafar (2011) argue that TCELM, like Kolb's ELT, still relies on a relatively simplistic conceptualization of learning styles and may not fully capture the complexity and fluidity of individual learning preferences. They propose a more nuanced and dynamic understanding of learning styles that acknowledges the influence of contextual factors and the potential for individuals to develop and adapt their learning approaches over time.

Despite these limitations, TCELM remains a valuable tool for educators and program designers seeking to create effective and engaging experiential learning experiences. By recognizing the importance of both passive and active learning modes, accommodating diverse learning styles, and considering the contextual factors that shape learning, TCELM provides a comprehensive framework for designing and evaluating adult learning experiences. The application of TCELM in the context of the App Creators program offers an opportunity to

explore the theory's potential in guiding the design and delivery of professional development programs that empower instructors to effectively teach app development skills to middle school students.

Analysis of Learning Event

The App Creators program, as a professional development course for adult instructors, aligns well with the principles and framework of Twin-Cycle Experiential Learning Theory (TCELM). By applying TCELM to the analysis of the program's curriculum and learning experiences, we can gain valuable insights into its effectiveness in facilitating experiential learning and identify areas for potential improvement.

One of the key strengths of the App Creators program is its incorporation of both passive and active learning modes, which is a central tenet of TCELM. The program's use of lectures and readings to establish a foundational understanding of app development concepts and best practices aligns with the passive learning cycle (Kolb et al., 2023). These instructional methods provide instructors with the necessary background knowledge and theoretical frameworks to engage effectively in the more active, hands-on aspects of the program.

The program's emphasis on practical app development tasks and peer coaching sessions demonstrates a strong alignment with the active learning cycle of TCELM. By providing instructors with opportunities to apply their newly acquired knowledge and skills in authentic, project-based learning experiences, the program facilitates the development of tangible app development competencies (Gomez-del Rio & Rodriguez, 2022). These hands-on activities allow instructors to experiment with different coding techniques, user interface designs, and problem-solving strategies, promoting a deeper understanding of the app development process through direct experience.

The program's focus on providing instructors with practical resources and materials, such as lesson plans and assessment tools, aligns with the abstract conceptualization stage of TCELM. These resources help instructors to synthesize their learning experiences and translate them into actionable strategies for teaching app development in their classrooms. By providing instructors with concrete tools and frameworks for applying their knowledge, the program supports the transfer of learning from the professional development setting to the practical context of teaching.

Recommendations for Change

Based on the analysis of the App Creators program through the lens of Twin-Cycle Experiential Learning Theory (TCELM), several recommendations can be made to enhance the program's alignment with the principles of experiential learning and improve its overall effectiveness in supporting adult instructors' professional development.

1. **Strengthen the scaffolding of learning activities**: To better support instructors' progression through the passive and active learning cycles, the program should incorporate more explicit scaffolding and guidance. This could involve providing clearer pathways and milestones for navigating the learning cycles, ensuring that instructors can build upon their knowledge and skills in a meaningful and sequential manner. By structuring the learning activities more intentionally, the program can help instructors make stronger connections between the various learning experiences and facilitate a more cohesive and integrated learning journey.
2. **Accommodate diverse learning styles**: While the App Creators program already incorporates both primary and secondary learning styles to some extent, there is room for further differentiation and personalization of learning experiences. The program should

offer a wider range of learning activities and assessment options to cater to the diverse needs and preferences of adult learners. This could include providing multiple modes of content delivery (e.g., visual, auditory, kinesthetic), incorporating more collaborative and discussion-based activities, and allowing for flexibility in project-based assignments. By accommodating a broader spectrum of learning styles, the program can create a more inclusive and engaging learning environment that respects and leverages the diversity of adult learners.

3. **Conduct ongoing program evaluation and improvement**: To ensure the continued effectiveness and relevance of the App Creators program, it is essential to establish a robust process for ongoing program evaluation and improvement. This could involve collecting regular feedback from participants, analyzing learning outcomes and classroom implementation data, and conducting periodic curriculum reviews. By gathering and analyzing data from multiple sources, program designers can identify areas of strength and opportunities for enhancement, informing data-driven decisions for program refinement. Additionally, staying attuned to the latest research and best practices in experiential learning and technology education can help ensure that the program remains aligned with current pedagogical approaches and industry standards (Radović et al., 2023).

Implementing these recommendations would require a thoughtful and iterative approach, involving collaboration among program designers, facilitators, and participants. It may be helpful to prioritize changes based on their potential impact and feasibility, considering factors such as resources, timeline, and organizational constraints. Additionally, piloting and testing new

program components or modifications on a smaller scale can provide valuable insights and allow for refinement before full-scale implementation.

Ultimately, the goal of these recommendations is to enhance the App Creators program's alignment with the principles of TCELM and to create a more effective, engaging, and experiential learning experience for adult instructors. By addressing the identified areas for improvement and leveraging the strengths of the program, the App Creators initiative can serve as a model for professional development in technology education, empowering instructors to confidently and effectively teach app development skills to the next generation of digital creators and innovators

Conclusion

The analysis of the App Creators program through the lens of Twin-Cycle Experiential Learning Theory (TCELM) yields valuable insights into the program's effectiveness in facilitating experiential learning for adult instructors. By examining the program's curriculum and learning experiences in light of TCELM's principles, we have identified both strengths and areas for improvement.

The App Creators program demonstrates a strong alignment with the key tenets of TCELM, incorporating both passive and active learning modes, accommodating diverse learning styles, and emphasizing reflective practice. These elements contribute to a comprehensive and engaging learning experience that supports instructors' development of app development skills and pedagogical knowledge.

However, the analysis also reveals opportunities for enhancement, such as strengthening the scaffolding of learning activities, accommodating a wider range of learning styles, emphasizing contextual factors and real-world application, fostering a community of practice,

and incorporating more opportunities for reflection and feedback. By addressing these areas, the program can further optimize its alignment with TCELM and create an even more effective and transformative learning experience for adult instructors.

Moreover, the insights gained from this analysis contribute to the broader discourse on best practices in adult education and professional development. The application of TCELM as a guiding framework highlights the importance of considering the complex and diverse nature of adult learning processes and emphasizes the value of experiential learning principles in creating impactful and transformative learning experiences.

In conclusion, the analysis of the App Creators program through the lens of TCELM offers a valuable case study in the design and evaluation of experiential learning initiatives for adult learners. By leveraging the strengths of the program and addressing the identified areas for improvement, the App Creators initiative can continue to empower adult instructors to effectively teach app development skills and inspire the next generation of digital creators. Furthermore, the lessons learned from this analysis can inform and inspire other educators, program designers, and researchers working to create effective and engaging learning experiences for adult learners across diverse contexts.

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