



Designing ANDE Through Iterative User-Center Development

Background and Context

[Adult Numeracy in the Digital Era \(ANDE\)](#) is a technology-enhanced, standards-aligned numeracy course designed to meet the needs of adult learners and their instructors. The project was structured in four phases: development, feasibility testing, impact study, and dissemination, and aimed to produce a flexible, research-informed curriculum grounded in the College and Career Readiness Standards (CCRS Levels C and D). The intervention design combined instructional modules with professional development supports that emphasized classroom community, mathematics discourse, productive mindsets, and effective study habits. In partnership with the Pennsylvania Department of Education (PDE), the team implemented the course across diverse ABE programs ranging from urban to rural and in settings that were hybrid, online, and in-person.



The Challenge of Fit

The project confronted a central problem: designing a curriculum that could accommodate the extraordinary variation in adult education contexts. Learners brought with them a wide spectrum of goals, prior math knowledge, digital literacy skills, and availability to attend classes. Open enrollment policies created churn in attendance, with longer courses especially vulnerable to attrition. Instructors also varied widely in math training, pedagogical preparation, and time available for lesson planning. These variables led to inconsistent pacing, uneven integration of technology, and differing interpretations of instructional routines.

Against this backdrop, the ANDE team faced a design challenge: how to remain true to adult learning principles and evidence-based mathematics instruction while also creating a course that was flexible enough to work across highly diverse learners, instructors, and program structures. A rigid one-size-fits-all design would not succeed; instead, the intervention needed to adapt to real-world conditions without losing coherence or rigor.

The Strategy: User-Centered Design Cycles

To navigate this challenge, the team adopted a user-centered design (UCD) process. The approach built upon an initial scan of research on adult learning and mathematics pedagogy but prioritized ongoing engagement with instructors and learners. Through interviews, focus groups, design meetings, classroom observations, and bi-weekly coaching calls, project staff collected systematic feedback on course content, structure, and instructional supports. These insights were reviewed during internal team huddles and translated into concrete refinements to curriculum modules, professional development structures, and digital literacy and mindset supports.

Early design work mapped an existing community college quantitative reasoning course to CCRS Levels C and D. From there, the development team, working with consultants and partners such as PDE and World Education, selected 36 high-leverage CCR standards, organized into eight modules spanning roughly ten weeks of instruction. Lessons were built around 90-minute learning cycles and designed for hybrid or multimodal delivery.

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Iteration in Response to Early Findings

Early implementation data highlighted persistent challenges. Learners struggled with attendance across a ten-week course. Instructors, often working with limited time and training, had difficulty maintaining consistent pacing and integrating digital components. Attrition patterns underscored the risk of losing momentum over extended course cycles.

Commented [1]: I'm not sure what we mean by persistence in this context that isn't captured by attendance.

In response, the team restructured ANDE into four shorter mini-courses, each lasting about five weeks. This modular architecture gave programs greater flexibility and provided learners with tangible milestones that improved motivation and completion rates. The Fall 2023 UCD cycle zeroed in on understanding why pacing, engagement, and attendance remained difficult and worked directly with instructors to co-design solutions. Adjustments included refining professional development materials to better support instructional pacing, expanding digital literacy supports to ease learners into online components, and introducing additional strategies to strengthen learner belonging and growth mindset.

Outcomes and Lessons Learned

The iterative UCD process enabled the ANDE project team to evolve from a promising but ambitious initial design into a more practical, flexible, and responsive intervention. By embedding cycles of feedback and adaptation throughout development, the team ensured that the curriculum was reflective of both theoretical models of adult learning and of the lived realities of classrooms. The result was a curriculum package that remained grounded in evidence while being viable for implementation in a wide range of adult education contexts.

Key Takeaways

The ANDE experience demonstrates that designing for “fit” in adult education requires flexibility, modularity, and responsiveness to on-the-ground conditions. A curriculum grounded in adult learning principles and CCR standards must also account for variable learner persistence, diverse instructor readiness, and program constraints. Iterative user-centered design cycles provided the essential mechanism for ensuring alignment between research-informed goals and the practical realities of adult numeracy instruction.