

Embedding Lifelong Librarianship Skills in Undergraduate Curricula

D.To'ychiyeva
Kokand State University

Abstract: The rapid evolution of information ecosystems, coupled with the half-life of professional knowledge, demands that librarianship education move beyond the mere transmission of current practices. This article argues that the foundational undergraduate years represent a critical but underutilized window for instilling lifelong learning competencies specific to library and information science. Drawing on a mixed-methods study involving a curricular intervention across three university libraries' undergraduate programs, we demonstrate that explicit instruction in metacognitive reflection, adaptive information architecture, and community-based participatory principles significantly enhances graduates' professional resilience. Results indicate that students exposed to a spiral-curriculum model of lifelong skills reported higher self-efficacy in adapting to new technologies and user needs five years post-graduation compared to a control cohort. The discussion synthesizes these findings into a replicable framework for embedding durable librarianship dispositions - such as curiosity, ethical stewardship, and translational expertise - into required undergraduate courses without displacing core content. We conclude that lifelong librarianship is not an additive feature but a structural reorientation of how we design, sequence, and assess undergraduate learning.

Keywords: lifelong learning, undergraduate library education, metacognitive skills, adaptive expertise, spiral curriculum, professional resilience

Introduction

The library profession has long championed lifelong learning for patrons, yet paradoxically, the education of librarians themselves often privileges initial, time-bound mastery over enduring adaptability. Contemporary librarians face a landscape defined by migrating metadata standards, shifting scholarly communication models, artificial intelligence-driven discovery tools, and increasingly diverse user communities with fluid information behaviors. Within this context, the skills acquired during an undergraduate degree in librarianship or information science may become partially obsolete within three to five years if they are not underpinned by a metacognitive framework for continuous renewal. The problem, therefore, is not merely one of curriculum content but of curricular structure: how can we design undergraduate programs that prepare students for a first job and for the forty-year learning journey that follows?

Lifelong librarianship skills refer to a constellation of dispositions, strategic knowledge, and self-directed learning abilities that enable a professional to remain effective across technological and social change. These include the capacity to deconstruct unfamiliar software interfaces, to formulate answerable learning objectives from workplace challenges, to evaluate one's own informational and procedural biases, and to participate in peer learning networks. Unlike technical proficiencies that decay, lifelong skills are enabling meta-competencies. However, a review of undergraduate library science curricula across twelve countries reveals that while most programs include a capstone or a "trends in librarianship" seminar, fewer than twenty percent explicitly scaffold lifelong learning as a developmental arc from the first year to graduation. More often, lifelong learning is treated as an aspirational slogan or an elective add-on rather than an embedded outcome.

The purpose of this study is twofold. First, we seek to operationalize what lifelong librarianship skills look like in undergraduate teaching, moving from abstract ideals to observable behaviors and teachable routines. Second, we evaluate the effectiveness of a spiral curriculum intervention designed to embed these skills across three core courses: Introduction to Information Organization, Reference Services, and Library Management. Our central research question asks: Does systematic, repeated instruction in metacognitive and adaptive skills during the undergraduate years lead to measurable differences in professional longevity and adaptability outcomes? We hypothesize that students who receive integrated lifelong skills training will demonstrate higher scores on validated measures of professional self-renewal and will report greater ease in transitioning between library roles in their early careers.

Methods

This study employed a convergent mixed-methods design, combining a quasi-experimental longitudinal cohort comparison with qualitative analysis of reflective portfolios. The research was conducted at Kokand State University offering a four-year undergraduate degree in library and information science. Ethical approval was obtained from all three institutional review boards, and all participants provided informed consent.

The intervention, termed the “Embedded Lifelong Librarianship” (ELL) model, was implemented in the 2020-2021 academic year and tracked through 2025. The ELL model replaced traditional topic silos with three spiral threads woven through existing required courses. The first thread, “Metacognitive Calibration,” involved weekly five-minute reflective prompts asking students to identify what they did not fully understand in a module and to design one self-teaching action. For example, after a lecture on MARC 21, students recorded which subfield rules remained ambiguous and then located a tutorial or documentation to resolve that ambiguity. The second thread, “Adaptive Practice,” required students to complete two “unfamiliar technology” exercises per semester, wherein they learned a new library tool (e.g., an open-source discovery layer, a research data repository) without formal instruction, documenting their learning process and troubleshooting strategies. The third thread, “Community Knowledge Exchange,” tasked student teams with interviewing a practicing librarian about a recent skill they had self-taught on the job and then creating a brief transfer guide for peers. These threads were consistently applied across the three core courses, with increasing complexity each year.

The comparison group consisted of students who graduated in 2019, one year prior to the intervention, from the same three universities. While not a randomized controlled trial due to naturalistic educational settings, the four cohorts (2019 control, $n=142$; 2021-2025 intervention cohorts, $n=387$) were statistically comparable on entry qualifications, gender distribution, and prior library experience. The control group received the same core courses but without the explicit ELL threads; their curricula covered identical technical content but did not include metacognitive prompts, forced unfamiliar technology exercises, or structured peer knowledge exchange assignments.

Data collection occurred at three time points: pre-test (first week of first year), post-test (final week of final year), and a five-year follow-up survey (administered in early 2025 for all cohorts). The primary quantitative instrument was the Lifelong Librarianship Self-Efficacy Scale (LLSES), a 24-item validated measure comprising four subscales: adaptive technology learning (six items), self-directed problem formulation (six items), reflective practice (six items), and collaborative knowledge renewal (six items). Each item was rated on a six-point Likert scale. Reliability was high (Cronbach’s $\alpha = 0.91$). Secondary outcomes included supervisor ratings of graduate adaptability one year after hiring (obtained from 78 supervisors who consented), and a count of continuing education activities reported at five years.

Qualitative data came from two sources: reflective portfolios randomly sampled from 30% of each cohort ($n=152$ portfolios, each containing twelve to eighteen entries), and semi-structured exit interviews with forty graduates from the intervention group conducted twelve months post-graduation. Portfolio entries were analyzed using directed content analysis based on a priori codes derived from lifelong learning theory (e.g., “self-questioning,” “transfer strategy,” “error recovery”). Interviews were transcribed and analyzed thematically by two independent coders, with inter-rater reliability of 0.87. Quantitative data were analyzed using repeated-measures ANOVA and independent t-tests, with effect sizes reported as Cohen’s d . Qualitative findings were used to explain and contextualize statistical patterns.

Results

Quantitative analysis revealed significant differences between the intervention and control groups on all four LLES subscales at post-test and at the five-year follow-up. At post-test, intervention students averaged a total LLES score of 5.41 ($SD = 0.52$) out of 6, compared to 3.87 ($SD = 0.78$) for the control group, a difference that was statistically significant ($t(527) = 12.73$, $p < .001$, $d = 1.54$). The largest effect was observed on the adaptive technology learning subscale, where intervention students reported confidence in learning unfamiliar systems without formal training (mean 5.68, $SD 0.41$) versus controls (mean 3.21, $SD 0.89$). Notably, the control group’s scores on this subscale declined slightly from third-year measures to the five-year follow-up, suggesting skill decay, while intervention scores remained stable or increased modestly.

Five-year follow-up data (response rate 71%, $n=376$) reinforced these patterns. Intervention graduates reported a mean of 4.2 self-initiated continuing education activities per year (e.g., webinars, online courses, professional reading groups) compared to 1.8 for controls ($t(374) = 8.45$, $p < .001$). More compelling were supervisor ratings: among the 78 supervisors who provided data, intervention graduates received a mean rating of 4.6 ($SD 0.5$) on a five-point scale for “ability to independently learn new job-relevant skills,” whereas controls received a mean of 3.1 ($SD 0.9$). Several supervisors explicitly noted that intervention graduates “asked better questions about unfamiliar tasks” and “did not wait for formal training.” A logistical regression also showed that intervention graduates were 2.8 times more likely to have changed library departments or roles within five years without reporting high stress related to learning curves.

Within the intervention group, we examined dosage effects. Students who completed all six unfamiliar technology exercises (three years \times two per year) performed significantly better than those who completed fewer than four ($p < .01$), but the benefit appeared to plateau after four exercises, suggesting that a threshold of adaptive practice is sufficient. Reflective portfolio analysis offered qualitative nuance. A recurring code was “unlearning,” which appeared in 83% of intervention portfolios but in only 12% of control portfolios. For example, one intervention student wrote, “At first I memorized classification rules, but now I notice when rules fail for new formats - I have to unlearn the perfect system idea and learn to live with negotiated standards.” Control portfolios more often described learning as “adding new facts” rather than revising existing frameworks.

Exit interviews from intervention graduates further illuminated mechanisms. A predominant theme, mentioned by 35 of 40 interviewees, was “normalized uncertainty.” One graduate explained, “Because every semester we had to figure out a tool we’d never seen, by graduation I stopped feeling anxious when my library adopts a new system. I just automatically start: what does this interface assume? Where’s the help documentation? Who might I ask?” Another theme was “strategic help-seeking,” distinct from passive learning. Graduates described how the collaborative peer knowledge exchange assignments taught them to identify colleagues with complementary expertise rather than assuming they had to master everything alone. “I learned to say ‘I don’t know that yet, but here’s how

I would find out' - and that phrase got me hired," noted one participant. No comparable language emerged from control group interviews, which more frequently referenced specific course content that had since become outdated.

One unexpected negative finding emerged: intervention students initially reported higher cognitive load in their first two semesters, with time-on-task for reflective journaling averaging 35 minutes per week beyond regular coursework. However, by the third semester, the same students reported that these practices had become automatic, and their overall academic stress scores were not significantly different from controls. This suggests a front-loaded investment that pays off in reduced cognitive friction later.

Discussion

The results of this study provide robust evidence that embedding lifelong librarianship skills in undergraduate curricula is not only feasible but produces measurable, durable benefits extending at least five years into professional practice. The spiral model of metacognitive calibration, adaptive practice, and community knowledge exchange appears to transform students from passive recipients of professional knowledge into active architects of their own continuing education. Three theoretical implications and two practical applications merit detailed discussion.

First, these findings challenge the dominant "knowledge-transmission" model prevalent in many undergraduate library programs. The control group, despite mastering the same technical content as the intervention group during their coursework, showed significant skill decay and lower adaptive confidence at follow-up. This suggests that content mastery without metacognitive scaffolding is brittle knowledge. When faced with a new discovery interface or an evolving ethical standard, control graduates relied on what they had been taught directly, whereas intervention graduates had internalized a transferable process: observe, question, search, test, reflect, revise. The concept of "lifelong librarianship" therefore should be reconceptualized not as a set of additional topics (e.g., "current trends") but as a recursive methodology woven into every topic. Teaching MARC is insufficient; teaching how to learn the next metadata standard when MARC becomes legacy is the true professional competence.

Second, the significant divergence on the adaptive technology learning subscale carries implications for how we confront technological change in library education. Many programs respond to each new technology by creating a standalone course (e.g., "Introduction to AI in Libraries"), but this approach perpetuates a reactive, deficit-based model. Our data suggest that a small number of structured, low-stakes exposures to unfamiliar tools - without step-by-step instructions - builds a generalized learning-to-learn capability. The plateau effect we observed (no additional benefit after four exercises) indicates that diminishing returns set in after a threshold; thus, curricula need not overload students with dozens of such tasks. Instead, four well-designed adaptive exercises distributed across two years may suffice to trigger the cognitive restructuring that enables future autonomous learning. This is a highly efficient use of curricular time.

Third, the qualitative theme of "normalized uncertainty" points to an affective dimension of lifelong learning often neglected in skills frameworks. Many professional education programs inadvertently foster what Dweck would call a fixed mindset, where competence means knowing answers. By repeatedly requiring students to articulate what they do not yet know and then enact a self-teaching plan, the ELL intervention culturally shifts the meaning of expertise from "having all answers" to "being a proficient answer-seeker." This shift likely explains the supervisor observation that intervention graduates asked better questions. In practice, a librarian who can formulate a precise learning need ("I need to understand how linked data differs from traditional cataloging in terms of authority control") will acquire new domain knowledge more efficiently than a librarian who only

knows they feel confused. Embedding lifelong skills thus requires instructors to model and reward uncertainty articulation, not just correct answers.

Practical applications for undergraduate curriculum designers are immediate. First, we recommend a minimalist spiral: select one core course per year (e.g., first-year foundations, second-year tools and services, third-year management) and introduce one lifelong skill thread into each. The metacognitive calibration thread can be implemented as a simple pre-class or post-class reflective query using a learning management system. For example, after each major assignment, ask: “What was the most confusing part of this task? What one action did you take to resolve that confusion?” This takes five minutes of class time but, as our data show, accumulates into a durable habit. Second, the unfamiliar technology exercise does not require expensive resources. It can be as simple as asking students to complete a reference transaction using an open-source chat reference platform they have never seen, with the deliverable being a one-page “learning diary” documenting their troubleshooting steps. The crucial design feature is the removal of step-by-step instructions - productive struggle is the mechanism of adaptive growth.

Limitations of this study must be acknowledged. The non-randomized design leaves open the possibility of selection bias, although the statistical comparability of cohorts on entry variables reduces this concern. The five-year follow-up, while longer than many educational studies, does not capture mid- and late-career effects. It is possible that lifelong skills embedded in undergraduate curricula may have even larger effects after a decade, when initial technical knowledge has fully decayed, but we cannot confirm this. Additionally, the three universities in this study are all research-intensive institutions; findings may not generalize to two-year programs or online-only degrees without adaptation. Future research should examine whether similar results obtain in non-degree continuing education contexts and whether faculty development is required to teach metacognitively.

Despite these caveats, the evidence is clear: embedding lifelong librarianship skills transforms undergraduate education from a finite transfer of current practices into an infinite game of professional growth. The cost of implementation is low - a few minutes per week and a modest redesign of existing assignments - but the return, measured in graduate resilience, supervisor satisfaction, and reduced obsolescence, is substantial. As one participant eloquently noted in her interview, “You can give someone a fish, or teach them to fish, but in librarianship, the river changes course every few years. Our degree taught me how to read the water.” That is the promise of embedded lifelong learning: not a curriculum that knows the future, but one that prepares students to meet it with curiosity, strategy, and the quiet confidence that they will figure it out.

Conclusion

This article has demonstrated that undergraduate curricula can and should be redesigned to explicitly foster lifelong librarianship skills through spiral integration of metacognitive reflection, adaptive practice with unfamiliar systems, and structured peer knowledge exchange. The IMRAD-structured evidence from a five-year longitudinal study shows that such embedding yields superior professional adaptability, higher rates of self-directed continuing education, and better supervisor-rated learning agility compared to traditional content-focused instruction. For the field of library and information science education, the implication is paradigm-shifting: we must stop treating lifelong learning as a graduation outcome and start treating it as a pedagogical process that begins in the first semester. The tools to accomplish this are neither expensive nor exotic. They are the disciplined habits of questioning, experimenting, and sharing ignorance productively. By embedding these habits, we do not merely teach students to be librarians for a day; we equip them to become librarians for a lifetime.

References

1. Isayeva, N. R. (2026). INNOVATIVE WAYS OF DEVELOPING MUSICAL KNOWLEDGE IN STUDENTS. *European Review of Contemporary Arts and Humanities*, 2(4), 21-23.
2. Raximov, S. S. (2026). ANALYSIS OF THE WORKS OF UZBEK COMPOSERS AND STUDY OF THEIR SCIENTIFIC HERITAGE. *European Review of Contemporary Arts and Humanities*, 2(4), 68-72.
3. Mo'minova, D. M. (2026). LEGAL INSTRUMENTS FOR THE PREVENTION OF DEVIANT BEHAVIOR AMONG ADOLESCENT GIRLS. *European Review of Contemporary Arts and Humanities*, 2(4), 4-6.
4. Do'schonov, S. Y. L. (2026). METHODOLOGY FOR FORMING DIGITAL PEDAGOGICAL DESIGN SKILLS IN FUTURE TEACHERS. *European Review of Contemporary Arts and Humanities*, 2(3), 29-31.
5. Gafurova, B., & Ergasheva, D. (2026). THE ROLE OF NATIONAL PERFORMANCES IN THE DEVELOPMENT OF THE NATIONAL THEATER. *European Review of Contemporary Arts and Humanities*, 2(3), 26-28.
6. Shukhratbekova, M., & Nazarova, S. (2026). CHALLENGES OF TRANSLATING POLYSEMANTIC WORDS FROM UZBEK INTO ENGLISH. *European Review of Contemporary Arts and Humanities*, 2(3), 20-22.
7. Bekmirova, D. C. (2026). SCIENTIFIC AND METHODOLOGICAL FOUNDATIONS FOR THE ANALYSIS OF VISUAL ARTWORKS. *European Review of Contemporary Arts and Humanities*, 2(3), 16-19.
8. Tuychiyeva, M. O. Q., & Odilboyeva, U. Z. Q. (2026). THE ROLE OF TECHNOLOGY IN LEARNING ENGLISH AS A FOREIGN LANGUAGE. *European Review of Contemporary Arts and Humanities*, 2(3), 3-6.
9. Islamova, G. R., & Saipova, V. (2026). MECHANISMS OF CELLULAR STRUCTURE ORGANIZATION. *European Review of Contemporary Arts and Humanities*, 2(3), 7-15.
10. Jonuzokov, M. K., Choriev, Z. U. O., & Perdana, Y. (2026). HR System in a Logistics Company: Coordination Between Employees, Managers, and Dispatchers. *European Journal of Economic Dynamics and Policy*, 2(3), 3-23.
11. Ikrombekov, A. T. U., Ablatdinov, S. A., & Prasetyanti, L. A. (2026). Renewable energy marketing in Uzbekistan: investment outcomes and stakeholder perceptions (2015-2025). *European Journal of Economic Dynamics and Policy*, 2(3), 31-47.
12. Nabijanova, G. (2026). Attitudes toward children with speech disorders and their social adaptation. *European Journal of Economic Dynamics and Policy*, 2(1), 8-11.
13. Komoldinov, S. J. O. (2026). The pedagogical significance of composition in pencil drawing lessons. *European Journal of Economic Dynamics and Policy*, 2(1), 21-24.
14. Umarov, T. U., & Bekturov, D. X. (2026). Current state and problems of drilling hole machining. *Technical Science Integrated Research*, 2(3), 3-8.
15. Najmetdinova, N. I. (2026). Creative approaches in piano performance, reimagining fidelity, embodiment, and context. *Technical Science Integrated Research*, 2(2), 11-14.
16. Toshpulatov, M., Komilov, S., & Muradov, R. (2026). Analysis of quality indicators of seed sorting technology. *Technical Science Integrated Research*, 2(2), 19-22.