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# The Skill Drip Approach: A Microlearning Framework for Faculty AI Literacy Development: A Concept Paper

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## Abstract

The rapid advancement of artificial intelligence (AI) is transforming education, creating new demands on faculty who must adapt pedagogical practices to evolving technologies. Many educators express curiosity about AI's potential yet lack structured, accessible pathways for professional growth. This concept paper proposes the Skill Drip Approach, a microlearning framework for faculty development that fosters AI confidence, curiosity, and competence through brief, practical learning segments. Grounded in cognitive load theory, andragogy, and heutagogy, the framework emphasizes low-barrier, just-in-time learning opportunities that integrate technical, ethical, and pedagogical AI competencies into daily teaching practice. The paper presents five core principles: cognitive manageability, self-determined engagement, practice-embedded learning, reflective integration, and scaffolded competency development. Their implementation is demonstrated through specific design features. A pilot implementation at a mid-sized public university in the northeastern United States demonstrates the framework's feasibility and initial outcomes, including increased faculty confidence, reduced anxiety, and emergent peer-to-peer learning. The paper concludes with implementation guidelines and institutional recommendations, offering higher education leaders a scalable, sustainable model for ongoing professional development adaptable to rapidly evolving technological contexts. This framework addresses a critical gap in literature by synthesizing cognitive science, adult learning principles, and AI literacy competencies into a theoretically grounded, practically feasible model specifically designed for faculty professional development in rapidly changing technological environments.

***Keywords:*** adult learning, artificial intelligence, higher education, instructional design, microlearning, professional development

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## Introduction and Background

Artificial intelligence is reshaping higher education, influencing course design, assessment, and faculty engagement. Tools such as ChatGPT and Canva Magic Write enhance creativity and efficiency, but also introduce uncertainty. Many faculty members remain interested in these tools but are uncertain about how to adopt them responsibly and effectively. Traditional professional development models, including workshops, webinars, and seminars, often fail to keep pace with technological change and to fit within the time faculty can dedicate to such training. Microlearning offers focused, hands-on experiences that can be applied right away, making it a valuable and efficient learning approach.

As noted earlier, recent surveys reveal that the majority of faculty remain at novice or intermediate levels of AI literacy (Digital Education Council, 2025), while institutional leaders themselves feel unprepared to provide guidance (AAC&U & Elon University, 2025). The American Association of Colleges & Universities (AAC&U, 2025) reported that 53% of academic leaders feel unprepared to help faculty use generative AI for teaching and mentoring. This gap between awareness and competence creates institutional risk: faculty may avoid AI entirely, ceding pedagogical decisions to students who use these tools without guidance, or adopt AI uncritically, failing to consider ethical implications or pedagogical appropriateness.

Traditional professional development models have proven insufficient to address this challenge. Darling-Hammond et al. (2017) found that professional development that is not sustained and that offers multiple opportunities for teachers to engage in learning around a single set of concepts or practices has a limited chance of transforming teaching practices. Workshops require synchronous attendance that many faculty cannot accommodate due to teaching schedules, research commitments, or caregiving responsibilities. Adults learn primarily when they need to learn, when their own experiences are acknowledged and leveraged, the content is relevant to their work, learning is authentic, and learners have some control over the learning experience (Knowles, 1984; Ong et al., 2022). Webinars provide information but rarely translate to behavior change, as participants lack structured opportunities for application and reflection (Desimone, 2009). Self-paced online courses require sustained time blocks, which are unavailable to working faculty. In addition, the rapid pace of AI development renders content obsolete quickly, creating a moving target that episodic professional development cannot track effectively.

The Skill Drip Approach was developed to address this challenge. Initially launched as short daily microlearning posts, it evolved into an institutional initiative within the Center for Teaching and Learning at a mid-sized public university. The series, *Skill Drip: AI Tips for Educators*, provides accessible daily professional development designed to build confidence and competence in using AI for teaching and learning. The purpose of this concept paper is to propose the Skill Drip Approach as a scalable and sustainable framework for faculty development. Grounded in adult learning and cognitive load theory, it promotes low-barrier, incremental learning that encourages faculty to explore, apply, and reflect on AI's pedagogical implications.

## Literature Review and Conceptual Foundations

***Microlearning: Principles and Evidence***

Microlearning supports efficient knowledge acquisition through brief and focused segments. Hug et al. (2006) describe microlearning as small, discrete learning activities that yield cumulative knowledge gains. The microlearning market is experiencing rapid growth, reflecting increased recognition of its effectiveness. In 2024, there were 1,550 million registered microlearning environments, a number expected to reach 2.96 billion in 2025 and continue growing at 13.5% annually through 2034 (Pappas, 2025). Studies indicate that microlearning can improve retention by 25 to 60 percent compared with other methods (Horvath, 2025; Microlearning, 2024).

Leong and Tern (2021) conducted a systematic review of microlearning trends. They found that its defining characteristics, brief duration, focused content, and immediate applicability, make it particularly well-suited for workplace learning, where time constraints and competing priorities limit engagement with traditional training. The format's modularity allows learners to access content when needs arise, supporting just-in-time learning that addresses immediate challenges. Microlearning's compatibility with mobile devices and asynchronous delivery enables learning within existing workflows rather than requiring dedicated time away from professional responsibilities (Leong & Tern, 2021). Research by the Learning Guild (Microlearning, 2024) confirms that microlearning effectively supports both knowledge acquisition and skill development when modules include active learning components such as application tasks and reflection prompts. Shah (2025) posits that, since Gen Z will make up more than 25% of the global workforce in 2025, focusing on short, flexible lessons improves engagement and knowledge retention among this demographic. These findings suggest that microlearning's theoretical advantages, alignment with cognitive load principles, and adult learning needs translate into measurable outcomes in professional development contexts.

***Adult Learning and Professional Development***

Microlearning aligns with Knowles' (1984) andragogical principles, emphasizing relevance, autonomy, and self-direction. This alignment is particularly relevant for adult learners, who are goal-oriented and seek immediate applicability of new knowledge to their work. Knowles identified several characteristics distinguishing adult learners from children: adults possess accumulated experience that serves as a foundation for new learning, they are motivated by internal rather than external factors, they prefer self-directed rather than dependent learning relationships, and they learn best when content addresses immediate problems or needs in their lives (Knowles, 1984). Professional development for faculty must honor these characteristics or risk low engagement and minimal impact on practice.

Research has demonstrated that adults learn primarily when they need to learn, when their own experiences are acknowledged and leveraged, when content is relevant to their work, when learning is authentic, and when learners have some control over the learning experience (Knowles, 1984; Ong et al., 2022). However, much faculty professional development fails to incorporate these principles. Darling-Hammond et al. (2017) found that professional development that is not sustained and that offers multiple opportunities for teachers to engage in learning around a single set of concepts or practices has a limited chance of transforming teaching practices. Effective professional development must be content-focused, incorporate active learning strategies, provide opportunities for collaboration, use models of effective practice, offer coaching and expert support, include time for feedback and reflection, and be sustained over time (Darling-Hammond et al., 2017). Traditional one-time workshops rarely meet these criteria, explaining their limited impact on instructional practice.

Microlearning modules can activate prior knowledge through reflection prompts or application exercises that connect AI concepts to existing pedagogical expertise. The short duration acknowledges the reality that faculty juggle many responsibilities, making long training sessions difficult to manage. Learning in small, manageable increments reduces barriers to participation and supports self-directed learning, allowing faculty to build competence while maintaining their teaching and research commitments. When delivered daily over extended periods, microlearning provides the sustained engagement that research identifies as essential for practice change while accommodating the time constraints that make traditional multi-day workshops inaccessible to many faculty.

### ***Self-Determined Learning: From Andragogy to Heutagogy***

The Skill Drip Approach extends beyond traditional self-directed learning by integrating heutagogy (Hase & Kenyon, 2000), which emphasizes self-determined learning. Self-directed learning focuses on learners taking responsibility for identifying needs, setting goals, and evaluating outcomes (Knowles, 1984), positioning the learner as manager of a learning process whose parameters and objectives are largely predetermined. Heutagogy goes further by positioning learners as agents who determine not only how they learn but what constitutes knowledge worth pursuing in the first place. In heutagogical approaches, learners develop capability (the ability to apply competencies in novel, unfamiliar situations), rather than merely acquiring specified competencies (Hase & Kenyon, 2000). This distinction becomes critical in rapidly evolving domains where the knowledge and skills needed tomorrow may differ substantially from those identified today.

In the context of faculty AI development, this distinction is significant. Self-directed learning might involve faculty choosing which AI tools to explore from a predefined list, determining their own pace and schedule, and assessing their progress against established criteria. Self-determined learning, by contrast, empowers faculty to identify emerging applications relevant to their unique disciplinary contexts, experiment with approaches not yet formalized in training curricula, recognize connections between AI capabilities and pedagogical problems their colleagues have not yet considered, and even challenge or redefine institutional assumptions about AI's role in teaching. The Skill Drip Approach supports this heutagogical stance by offering exploratory prompts instead of mandatory pathways, encouraging faculty to pursue tangential interests that arise during learning, valuing questions as much as answers, and recognizing the knowledge generated through faculty experimentation as equally legitimate as externally provided content. This positioning is essential for cultivating the adaptive expertise necessary in contexts characterized by uncertainty and rapid change.

### ***Cognitive Load Theory and Learning Design***

Cognitive Load Theory (Sweller, 1988) further supports the microlearning model's structure and provides a neurological rationale for design decisions. CLT distinguishes among three types of cognitive load: intrinsic load (the inherent complexity of the material being learned), extraneous load (unnecessary cognitive burden imposed by poor instructional design or presentation), and germane load (productive cognitive processing that builds schemas and understanding) (Paas et al., 2003). Effective instruction minimizes extraneous load, manages intrinsic load to match learner capacity, and maximizes germane load, the cognitive work that produces learning (Sweller et al., 2011).

Traditional faculty development often overwhelms participants by introducing multiple tools simultaneously, demonstrating numerous features in each tool, presenting information through dense slide decks or lengthy manuals, and providing examples that are disconnected from participants' teaching contexts. This approach creates excessive intrinsic load (too much novel information at once) while simultaneously generating extraneous load through information density, fragmented presentation, or irrelevant details. When cognitive capacity is exceeded, working memory becomes saturated, and learning suffers regardless of motivation or effort (Paas et al., 2003). Participants may leave workshops feeling overwhelmed rather than empowered, having retained little of the information presented.

The Skill Drip Approach limits scope to a single daily concept, deliberately constraining intrinsic load to manageable levels. This design choice aligns with well-documented limits of working memory, which can typically process only a limited number of novel elements simultaneously, approximately four chunks of information in the absence of existing schemas (Cowan, 2001). Extraneous load is minimized through a clear, focused presentation that eliminates peripheral information and maintains attention on core concepts. This approach frees cognitive resources for germane processing, allowing faculty to engage in meaningful elaboration, connect new knowledge with existing pedagogical understanding, consider applications to their specific teaching contexts, and plan concrete implementation steps.

The daily cadence inherent in the Skill Drip model leverages the spacing effect, a robust finding in cognitive psychology demonstrating that information encountered repeatedly over distributed intervals is retained more effectively than information presented in mass fashion (Cepeda et al., 2006). Spacing allows time for initial memory consolidation before subsequent encounters with material, strengthening retrieval pathways and promoting long-term retention. Additionally, the brief nature of each module prevents cognitive fatigue, maintains engagement, and allows faculty to process information. In contrast, their cognitive resources remain fresh rather than depleted by extended training sessions. This design honors both the cognitive science of learning and the practical realities of faculty work lives.

### *AI Literacy Frameworks: Competencies and Challenges*

AI literacy requires layered competencies (technical, ethical, and pedagogical) that cannot be developed through a single workshop or training session. Long and Magerko (2020) define AI literacy as a set of competencies enabling individuals to critically evaluate AI technologies, communicate and collaborate effectively with AI, and use AI as a tool across various contexts. Their framework identifies core competencies, including understanding what AI is, knowing what AI can and cannot do, recognizing AI's ethical implications, and applying these understandings appropriately in context. More recent frameworks have elaborated these dimensions specifically for educational contexts.

The EDUCAUSE AI Literacy Framework (Kassorla et al., 2024) identifies four key competency areas for higher education: technical understanding (how AI systems function, their capabilities and limitations), evaluative skills (assessing AI outputs for accuracy, bias, and appropriateness), practical application (using AI tools effectively for educational purposes), and ethical considerations (addressing bias, privacy, data security, and academic integrity). Technical competencies involve understanding how AI systems function, their capabilities and limitations, and the practical skills needed to use AI tools effectively in instructional contexts. Ethical competencies encompass awareness of algorithmic bias, data privacy concerns, intellectual property considerations, and the implications of AI-generated content for academic integrity and student learning (Schmelzer & Walch, 2025). Pedagogical competencies require faculty to reimagine teaching practices considering AI capabilities, determining when AI enhances learning, when it may diminish critical thinking or skill development, and how to prepare students for an AI-integrated professional world.

These three dimensions are interdependent: effective pedagogical integration of AI demands both technical facility and ethical judgment, while ethical reasoning about AI is strengthened by technical understanding of how these systems operate (Kohnke et al., 2025). A faculty member cannot thoughtfully evaluate whether to allow students to use AI writing assistants without understanding both how these tools function (technical) and how they might affect students' development of writing and critical thinking skills (pedagogical and ethical). Similarly, assessing potential bias in AI-generated content requires technical knowledge of how training data influences output alongside ethical frameworks for recognizing and addressing bias.

Despite growing recognition of the importance of AI literacy, faculty need manageable entry points that reduce intimidation, build foundational knowledge across all three competency areas, and foster the ethical awareness necessary for responsible implementation. Recent surveys reveal significant gaps between faculty awareness of AI's potential and their preparedness to integrate these tools effectively. The Digital Education Council's (2025) global faculty survey found that 40% of faculty feel they are just beginning their AI literacy journey, and only 17% are at an advanced or expert level. Concurrently, 59% of higher education leaders believed that graduates were not prepared for work in companies where proficiency with AI tools is important (AAC&U & Elon University, 2025). Most troublingly, 53% of academic leaders feel unprepared to help faculty use generative AI for teaching and mentoring (AAC&U & Elon University, 2025), suggesting that institutional leadership itself lacks confidence in supporting faculty development.

This gap between awareness and competence creates institutional risk. Faculty may avoid AI entirely, ceding pedagogical decisions to students who use these tools without guidance, or adopt AI uncritically, failing to consider ethical implications or pedagogical appropriateness. Many educators feel overwhelmed by the pace of AI development and uncertain about where to begin, particularly when technical expertise feels inaccessible or when institutional guidance remains ambiguous. Traditional professional development approaches have proven insufficient to address these challenges at the scale and pace required. Workshops require synchronous attendance that many faculty cannot accommodate due to teaching schedules, research commitments, or caregiving responsibilities. Webinars provide information but rarely translate to behavior change, as participants lack structured opportunities for application and reflection (Desimone, 2009). Self-paced online courses require sustained time blocks, which are unavailable to working faculty. Moreover, the rapid pace of AI development renders content obsolete quickly, creating a moving target that episodic professional development cannot track effectively.

What remains absent from current literature and practice is a theoretically grounded framework that integrates cognitive load principles, adult learning theory, and AI literacy competencies into a scalable, sustainable professional development model specifically designed for faculty in rapidly evolving technological contexts. Existing microlearning research has not explicitly addressed faculty AI development, and existing AI literacy frameworks have not articulated delivery mechanisms that honor faculty constraints while progressively building layered competencies. The Skill Drip Approach fills this gap by synthesizing cognitive science, adult learning principles, and heutagogical philosophy into a coherent framework operationalized through specific, replicable design features.

### *Theoretical Framework: The Skill Drip Approach*

The Skill Drip Approach synthesizes Cognitive Load Theory, andragogy, and heutagogy into a cohesive framework for faculty professional development. These theories complement one another: CLT guides structural design, andragogy informs learner autonomy, and heutagogy frames faculty as creators of knowledge. Together, they address distinct but interconnected dimensions of effective adult learning in complex domains: the cognitive mechanics of information processing, the motivational dynamics that drive adult engagement, and the epistemological positioning of learners as agents rather than recipients.

The framework rests on five interconnected principles:

**1. Cognitive Manageability** - This principle operationalizes Cognitive Load Theory by constraining the amount of new information presented in each learning episode. Working memory can hold approximately four chunks of novel information simultaneously (Cowan, 2001), meaning that professional development introducing multiple AI tools, numerous features, and complex pedagogical applications simultaneously exceeds cognitive capacity. The Skill Drip framework respects this limitation by focusing each 3–5-minute module on a single concept, tool, or application. This constraint is not a limitation but a deliberate design choice that enables deep processing rather than superficial exposure. By managing intrinsic load (the inherent complexity of AI concepts) and minimizing extraneous load (unnecessary information), the framework frees cognitive resources for germane load, which refers to the productive mental work of connecting new knowledge with existing understanding and planning classroom applications.

**2. Self-Determined Engagement** - This principle honors heutagogical philosophy by positioning faculty as agents who determine their own learning trajectories. Unlike mandated professional development that generates compliance-oriented mindsets and extrinsic motivation, Skill Drip offers optional participation that fosters intrinsic motivation and genuine curiosity.

Faculty choose whether to engage, when to engage, which concepts to explore deeply, and which tangential interests to pursue. This autonomy reduces resistance and anxiety while increasing ownership of learning outcomes. The framework validates both structured engagement (following the daily sequence) and self-directed exploration (investigating related concepts independently), recognizing that adult learners bring diverse needs, preferences, and starting points to professional learning.

**3. Practice-Embedded Learning** - Every module connects explicitly to teaching practice through actionable tasks that faculty can implement immediately. This principle addresses a persistent limitation of traditional professional development: the gap between knowledge acquisition and classroom application. Adult learners seek immediate applicability (Knowles, 1984), yet many professional development programs defer application to some future implementation phase that never arrives. Skill Drip eliminates this gap by embedding the application within the learning experience itself. Faculty do not simply learn about AI tools; they use them to generate discussion prompts, create rubrics, design accessible materials, or develop assignment scaffolds for courses they are currently teaching. These mastery experiences build self-efficacy more powerfully than vicarious learning or verbal persuasion (Bandura, 1997).

**4. Reflective Integration** - Metacognitive reflection transforms information consumption into critical engagement. Each module concludes with prompts encouraging faculty to consider implications, identify tensions, surface questions, and evaluate appropriateness for their specific contexts. These prompts might ask: How might AI-generated content differ from what I typically create? What perspectives might be missing? How would my students respond? What ethical concerns arise? This reflective practice positions faculty as evaluators rather than mere adopters of technology, cultivating the critical stance necessary for responsible AI integration. Reflection also creates feedback loops that inform future module development, as faculty questions and concerns surface topics requiring deeper exploration.

**5. Scaffolded Competency Development** - AI literacy requires layered competencies in technical, ethical, and pedagogical domains (Kassorla et al., 2024) that cannot be developed simultaneously without risking cognitive overload. The framework sequences content developmentally, establishing technical foundations before introducing ethical complexity, then integrating both within pedagogical applications. This scaffolding helps faculty understand how AI systems function before evaluating their ethical implications and determining appropriate classroom uses. Importantly, later modules revisit earlier concepts with increasing sophistication, creating a spiral progression that deepens understanding rather than merely adding separate skills. The integration of technical, ethical, and pedagogical dimensions within individual module models the holistic thinking necessary for effective AI use in education.

### *Five Principles Summary*

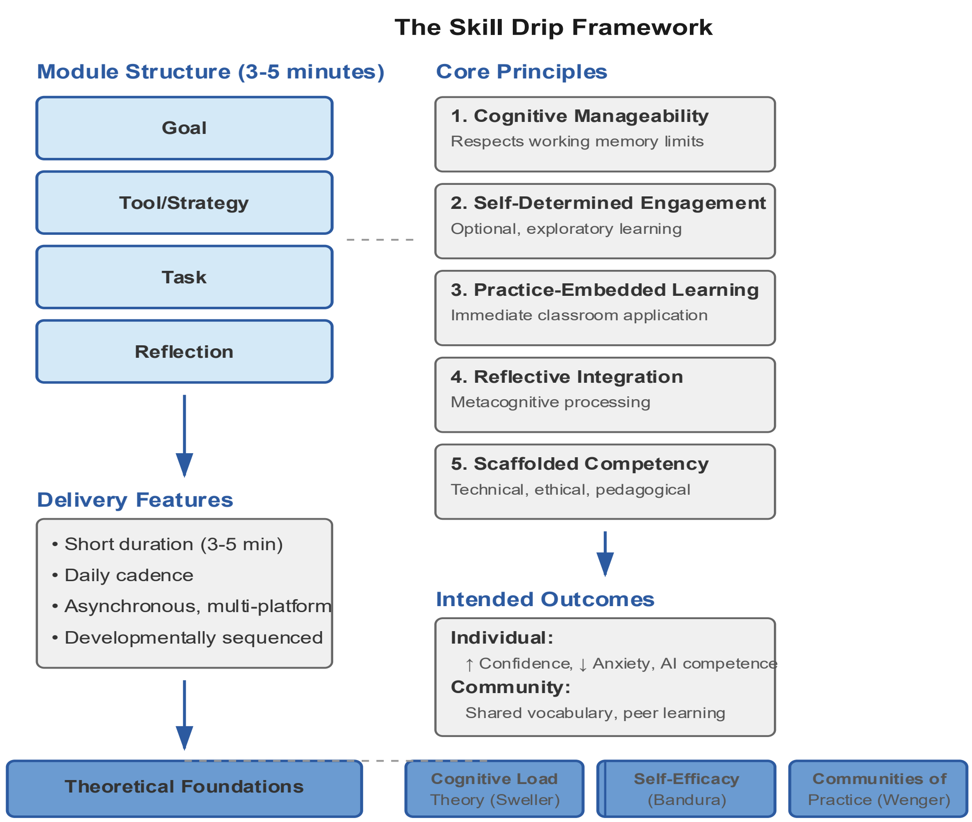
These five principles work synergistically rather than independently. Cognitive manageability enables reflective integration by preventing cognitive overload that would preclude metacognition. Self-determined engagement supports practice-embedded learning by allowing faculty to select applications aligned with their current teaching challenges. Scaffolded competency development builds upon cognitive manageability by introducing technical foundations before layering ethical complexity. Together, these principles create a learning environment that is simultaneously supportive and challenging, structured yet flexible, guided yet autonomous.

The principles are reflected in specific design features. The 3–5-minute microlearning format supports cognitive manageability. The daily cadence applies the spacing effect to enhance retention. The four-part structure (Goal, Tool, Task, Reflection) promotes both application and reflection. Asynchronous, multi-platform delivery respects self-determined engagement, while developmental sequencing across 30 days establishes scaffolded competency development. Figure 1 illustrates how these theoretical foundations inform design decisions that produce outcomes at individual, community, and institutional levels.

The Skill Drip framework synthesizes multiple theoretical perspectives into a cohesive professional development model, as illustrated in Figure 1. The framework's architecture comprises three interconnected layers: structural elements (module components and delivery features), conceptual principles that translate theory into practice, and anticipated outcomes across multiple organizational levels. This integration of Cognitive Load Theory, Self-Efficacy Theory, and Communities of Practice creates a theoretically robust yet practically feasible approach to faculty AI literacy development.

***Figure 1***

*The Skill Drip Framework*



## Discussion, Evidence, and Analysis

The Skill Drip Approach functions as both a conceptual framework and a practical model for ongoing professional development. This section presents evidence from an initial pilot implementation that demonstrates the framework's feasibility, surfaces preliminary outcomes, and identifies refinements for future iterations. While not a formal research study, this pilot serves as proof of concept, illustrating how theoretical principles translate into practice and produce observable results worthy of broader adoption and investigation.

### *Pilot Implementation: Structure and Delivery*

A pilot was conducted at a mid-sized public university's Center for Teaching and Learning during Spring 2024, involving a 30-day series titled *AI Tips for Educators*. Each microlearning module followed a consistent four-part structure: a clear learning goal, an introduction to an instructional tool or strategy, an actionable task faculty could complete in 3-5 minutes, and a reflective prompt encouraging critical evaluation. Content was delivered through two primary channels, the institution's learning management system (Brightspace) and LinkedIn, to maximize accessibility and reach faculty within their existing professional spaces. This dual-platform approach recognized that faculty have varied digital habits; some prefer institutionally housed resources while others engage more readily with professional social media.

Topics progressed developmentally across three phases, as shown in Table 1. Week 1 established technical foundations with modules that introduced generative AI concepts, explained how large language models work, and taught effective prompting strategies. Week 2 continued building technical competence with tool comparisons and advanced prompting techniques while beginning to surface limitations and appropriate use cases. Week 3 shifted to ethical considerations, focusing on academic integrity, algorithmic bias, and data privacy. Week 4 culminated in pedagogical applications that demonstrated how faculty could use AI to generate discussion prompts, provide feedback, develop rubrics, and create accessible content. This sequencing allowed participants to build conceptual understanding before confronting complex ethical questions, reducing the cognitive dissonance that can occur when educators are asked to evaluate technologies they do not yet understand.

**Table 1**

*Sample Module Progression from 30-Day Pilot Implementation*

| Week | Phase | Example Modules | Core Focus |
|---|---|---|---|
| **1** | Technical Foundations | What is Generative AI?<br>How LLMs Work<br>Effective Prompting Basics | Building conceptual understanding |
| **2** | Technical Foundations | Tool Comparison (ChatGPT, Claude, Gemini)<br>Prompt Engineering Advanced<br>Understanding AI Limitations | Developing practical skills |

| Week | Phase | Example Modules | Core Focus |
|---|---|---|---|
| **3** | Ethical Considerations | AI and Academic Integrity<br>Understanding Algorithmic Bias<br>Data Privacy Concerns | Fostering critical evaluation |
| **4** | Pedagogical Applications | AI for Discussion Prompts<br>AI-Assisted Feedback<br>Creating Accessible Content with AI | Implementing in practice |

*Note.* The table outlines a sample four-week progression for a 30-day pilot, moving from foundational understanding to applied pedagogical use. Adapted from internal CTL records (2024).

***Pilot Outcomes: Faculty Responses***

Faculty feedback indicated greater willingness to experiment, reduced anxiety about AI, and appreciation for the series' approachable tone. Participants described the format as manageable and energizing, noting that it "fit perfectly into my morning routine" and "made AI feel less intimidating." Several faculty members noted that the low-stakes format gave them "permission to try things without feeling like I needed to be an expert first", a critical shift from the performance anxiety often associated with technology adoption in academic contexts. The brief daily engagement created what one participant described as "positive momentum," where small successes-built confidence for more ambitious experimentation.

Notably, informal peer discussions emerged organically, suggesting a shift from the consumption of externally provided professional development to collaborative knowledge-building among colleagues. Faculty began sharing their own discoveries in departmental meetings, comparing experiences during office conversations, and seeking each other out to troubleshoot challenges. Several participants created their own variations of module activities, adapting tasks to their disciplinary contexts and sharing them with peers. This peer-to-peer learning extended beyond the structured modules themselves, indicating that the intervention catalyzed broader cultural shifts around AI dialogue.

***Analysis: Understanding Outcomes Through Theoretical Lenses***

These outcomes align predictably with the framework's theoretical foundations, validating the integrated approach. Faculty confidence increased because the framework created what Bandura (1997) terms mastery experiences, small, achievable successes that build self-efficacy more powerfully than vicarious learning or verbal persuasion. Each completed module, each successful application of a new AI tool, and each positive result from AI-enhanced materials reinforced faculty beliefs in their capacity to integrate AI effectively. The low-stakes format reduced performance anxiety, a known inhibitor of self-efficacy development, allowing faculty to experiment without fear of public failure or professional judgment. The reflective prompts facilitated Bandura's cognitive processing of success experiences, helping faculty attribute positive outcomes to their own growing capabilities rather than to external factors such as the simplicity of tools or luck.

Reduced anxiety stemmed directly from cognitive manageability. By limiting information to digestible segments, the framework prevented cognitive overload, a trigger of anxiety in professional learning contexts. Faculty could process, apply, and consolidate knowledge before encountering new concepts, creating a sense of control rather than overwhelm. The predictable structure provided cognitive scaffolding, allowing faculty to know what to expect each day and reducing the extraneous cognitive load associated with navigating unfamiliar formats. The optional participation model further reinforced agency. Faculty engaged out of genuine interest rather than obligation, fostering the intrinsic motivation that sustained participation beyond external incentives.

The emergence of peer-to-peer learning reflects the dynamics of Wenger's (1998) communities of practice. As faculty encountered shared content, they developed a common vocabulary (shared repertoire), enabling more sophisticated conversations than generic "AI in education" discussions allow. Faculty began referencing specific tools, techniques, or ethical considerations introduced in modules, creating shorthand for complex concepts. This shared language facilitated mutual engagement, faculty sought each other out to compare experiences, troubleshoot challenges, and share discoveries. Over time, a joint enterprise emerged as collective sense-making about AI's role in teaching evolved into a shared project rather than an isolated individual concern. The framework did not impose collaboration to form these communities; instead, it catalyzed them by providing shared experiences that allowed communities to develop organically.

Critically, the framework's design anticipated and addressed common barriers to the adoption of professional development. The brief duration fits within existing workflows rather than requiring dedicated time blocks. The daily cadence encourages habit formation as faculty integrate module engagement into their regular routines, such as morning preparation periods, planning times, or commutes. The multi-platform delivery met faculty where they already worked, reducing friction. The actionable tasks ensured that learning translated immediately into practice, generating the relevance adult learners seek. These pragmatic design choices, informed by adult learning principles, proved as important as the pedagogical content itself.

### *Critical Evaluation: Limitations and Refinement Opportunities*

We identified several considerations that institutions should address when adopting this approach. First, engagement rates declined after the initial two weeks, suggesting the need for periodic variation in format or interactive elements to sustain momentum. The novelty effect wore off, faculty workloads increased mid-semester, and the developmental sequencing meant later modules presupposed engagement with earlier content, creating barriers for those who missed sessions. Future iterations should incorporate engagement-sustainment strategies, such as periodic interactive elements (e.g., optional synchronous discussions, gamification elements, or peer-sharing showcases) and modular pathways that allow entry at multiple points rather than assuming linear progression.

Second, faculty across disciplines expressed varying levels of relevance for specific topics. Engineering faculty found technical modules too basic, while humanities faculty wanted more discipline-specific applications. Business faculty sought examples relevant to professional programs, while education faculty needed distinctions between K-12 and higher education contexts. This variation suggests value in creating discipline-specific pathways or tiered tracks (foundations, intermediate, advanced) that allow faculty to self-select appropriate entry points. Alternatively, a "choose your own adventure" model offering multiple daily options could increase perceived relevance while maintaining the framework's core structure.

Third, the pilot revealed gaps in institutional infrastructure that microlearning alone cannot address. Faculty developed confidence and skills, but encountered unclear policies when implementing AI in courses. Questions arose: Can students use AI on assignments? Must AI use be disclosed? How should syllabi address AI? What constitutes academic integrity violations versus appropriate AI use? These policy vacuums created implementation anxiety, undermining the confidence-building that the framework achieved. This finding underscores that faculty development initiatives, regardless of format, must be accompanied by institutional clarity and support structures. Centers for teaching and learning cannot build faculty AI literacy in isolation; registrars, academic integrity offices, instructional technology units, and academic leadership must provide aligned support.

Fourth, assessment of learning remained informal. While qualitative feedback indicated positive outcomes, the pilot lacked pre- and post-measures of AI knowledge and confidence, as well as classroom observation data documenting behavior change. Future implementations should incorporate assessment mechanisms that capture not only satisfaction but also knowledge gains, confidence development, and actual changes in teaching practice. This data would strengthen evidence for the framework's effectiveness and identify which design features produce which outcomes for which faculty populations. Mixed-methods research designs that combine quantitative metrics (completion rates, confidence scales, knowledge assessments) with qualitative data (interviews, focus groups, classroom observations) would provide a comprehensive understanding of the framework's impact at the individual, community, and institutional levels.

Despite these limitations, the pilot demonstrates that microlearning can foster individual mastery and collective engagement when designed according to sound learning principles. The framework's feasibility, requiring primarily staff time for content development with minimal technological infrastructure, positions it as a viable alternative to resource-intensive traditional professional development models. The positive initial outcomes warrant broader implementation and more rigorous evaluation to determine long-term effects on faculty confidence, teaching practices, and ultimately, student learning.

## Recommendations and Conclusions

### *Scalability and Adaptability Across Contexts*

The Skill Drip Approach offers a scalable, adaptable model for faculty development across higher education contexts, from small liberal arts colleges to large research universities, and from community colleges to graduate institutions. Institutions can begin with themed 30-day series, such as AI Integration, Assessment Design, Universal Design for Learning, or Open Educational Resources, and then expand to broader programs that address emerging pedagogical challenges. The modular design enables customization based on institutional priorities, disciplinary needs, and faculty readiness levels. Institutions early in their AI adoption journey might begin with foundational technical literacy, while those with more experienced faculty could focus on advanced applications or ethical frameworks for responsible use.

Delivery platforms can vary based on existing institutional infrastructure and faculty preferences. While the pilot used Brightspace and LinkedIn, institutions could deliver content via email distribution lists, Slack channels, Microsoft Teams, internal social networks, or combinations of these. This technology-agnostic approach reduces implementation barriers and increases the likelihood of sustained engagement by integrating with faculty's existing digital workflows. The framework's flexibility extends to pacing as well. At the same time, the pilot used consecutive weekdays, institutions could adapt to weekly modules, semester-long sequences, or intensive summer programs depending on context and goals.

### *Formalized Recognition and Faculty Leadership*

Institutions may formalize participation through micro-credentials or digital badges that recognize engagement and achievement while maintaining intrinsic motivation. These credentials might be tiered: bronze for completing a 30-day series, silver for completing multiple series and demonstrating classroom application, and gold for faculty who contribute their own modules or mentor colleagues. Such recognition systems serve multiple purposes: they validate faculty effort in tangible ways that can be included in tenure and promotion portfolios, they create visible markers of institutional commitment to professional learning, and they provide data points for tracking participation across departments or colleges. However, credentials should be carefully designed to avoid reducing intrinsic motivation or fostering compliance-oriented mindsets. The most effective approaches frame credentials as documentation of growth rather than as the primary goal, ensuring that curiosity and pedagogical improvement remain central motivations.

Faculty who complete the Skill Drip series often become informal ambassadors, introducing concepts to colleagues and advocating for institutional support structures. Institutions should leverage this momentum by creating pathways for faculty leadership. Participants could join advisory groups to inform future content development, serve as discipline-specific facilitators to design modules for their fields, mentor new participants through optional discussion sessions, or contribute to institutional repositories of AI-enhanced teaching materials. This distributed leadership model ensures content remains grounded in authentic teaching contexts, builds institutional capacity beyond initial implementation, and positions faculty as knowledge creators rather than knowledge consumers.

### *Administrative Support and Institutional Alignment*

For administrators, Skill Drip offers a low-cost, high-engagement professional learning structure that aligns with institutional missions of innovation, inclusivity, and teaching excellence. Unlike traditional faculty development models that require significant investment in external consultants, full-day workshops, or course releases, Skill Drip primarily requires staff time for content development and minimal technological infrastructure. The brief, asynchronous format respects faculty autonomy and accommodates diverse schedules, addressing equity concerns for part-time faculty, those with caregiving responsibilities, or those at satellite campuses who may face barriers to attending synchronous events.

However, administrative support must extend beyond mere endorsement of the initiative. Deans and department chairs should actively participate in the Skill Drip series themselves, modeling engagement and signaling institutional priority. Resource allocation decisions, including funding for educational technology, policies governing AI use, and guidelines for evaluating AI-enhanced teaching in promotion decisions, must align with the competencies being developed through faculty learning initiatives. Without this alignment, faculty may develop interest and skills but lack institutional permission or infrastructure to implement innovations. Administrators should also ensure that related support services (instructional design, educational technology, library resources) are prepared to assist faculty in implementing new approaches learned through Skill Drip modules.

### *Embedding Ethical Reflection Throughout*

Ethical reflection should remain central to all Skill Drip content, woven throughout rather than isolated in separate modules. This integration means more than including occasional ethics modules; ethical considerations should be incorporated into technical and pedagogical discussions. A module on using AI to generate discussion prompts should include reflection on whether AI-generated questions adequately represent diverse perspectives or inadvertently reinforce biases present in training data. A module on AI writing assistants should prompt consideration of how such tools affect students' development of critical thinking and written communication skills, competencies central to liberal education. A module on AI-assisted grading should raise questions about algorithmic bias, transparency, and the relational dimensions of feedback that AI cannot replicate.

This ethical framing positions faculty not merely as tool users but as educational decision-makers responsible for evaluating technologies through pedagogical and humanistic lenses. Institutions should also create mechanisms to surface ethical dilemmas that arise during faculty experimentation, such as discussion forums, office hours with instructional designers or educational technologists, or case study sessions in which faculty analyze challenging scenarios together. These structures normalize uncertainty and position ethical deliberation as an ongoing practice rather than a problem to be solved once and forgotten. The goal is not to provide definitive answers to complex ethical questions but to cultivate dispositions of critical reflection, ethical awareness, and responsible innovation.

### *Implementation Toolkit: A Roadmap for Adoption*

Institutions adopting the Skill Drip framework should follow these sequential phases:

**Phase 1: Foundation (Months 1-2)**

- Identify a content lead (instructional designer, faculty developer, or technologically proficient faculty member) and secure an institutional sponsor (dean, provost, or CTL director)

- Conduct faculty needs assessment through brief surveys or focus groups to identify priority topics, preferred delivery platforms, and current confidence levels
- Select delivery platform(s) based on faculty preferences and existing institutional infrastructure.
- Develop first 30-day module sequence with clear learning objectives, actionable tasks aligned with faculty work, and reflection prompts for each module.
- Create a communication plan including recruitment strategy, ongoing engagement messaging, and feedback collection methods.
- Establish baseline metrics: How will success be measured? (participation rates, confidence levels, teaching practice changes, student outcomes)

**Phase 2: Pilot Launch (Month 3)**

- Recruit 20-50 volunteer faculty representing diverse disciplines, ranks, and experience levels.
- Launch 30-day series with daily notifications/reminders through chosen platform(s)
- Monitor engagement metrics weekly: Who is participating? When do drop-offs occur? Which modules generate the most engagement or questions?
- Collect qualitative feedback at Day 15 (midpoint check-in) and Day 30 (conclusion)
- Host optional synchronous wrap-up sessions for community building, reflection, and celebration of learning.
- Document lessons learned comprehensively: What worked well? What did not? What surprised implementers? What would be done differently?

**Phase 3: Iteration and Refinement (Month 4)**

- Analyze pilot data: completion rates, feedback themes, engagement patterns, demographic participation.
- Revise modules based on faculty input: Which were too basic? Too advanced? Most useful? Least relevant? What was missing?
- Develop a second series on a related topic or create tiered tracks (beginner, intermediate, advanced), allowing varied entry points.
- Identify faculty champions from the pilot group willing to advocate for broader participation or contribute to content development.
- Secure additional institutional support: Can certificates or badges be offered? Will participation be recognized in annual reviews or promotion processes?

**Phase 4: Scaling and Sustainability (Months 5-6)**

- Expand to a broader faculty population with refined content and lessons learned applied
- Establish regular cadence: Will series be offered quarterly? Semesterly? Continuously with rotating topics?
- Integrate with other faculty development initiatives rather than positioning as a standalone effort
- Create sustainability plan: Who will develop future content? How will currency be maintained as technologies evolve? What ongoing resources are needed?
- Build comprehensive assessment mechanisms: pre/post surveys, focus groups, classroom observations, student outcome measures.

**Resource Requirements:**

- **Staff time**: 0.25-0.5 FTE for initial content development during first series creation; 0.1 FTE for platform management and communication; 0.1 FTE for ongoing iteration and content updates
- **Technology**: Learning management system or email distribution system (typically already available at institutions); optional badge/credentialing platform ($500-2,000 annually)
- **Faculty time**: 3-5 minutes daily for 30 days for participant engagement; optional 2-4 hours for facilitators leading discussions or mentoring peers.
- **Timeline**: 6 months from conception to scaled implementation with refinement
- **Budget**: Minimal direct costs if leveraging existing infrastructure; primary investment is allocated to staff time.

### *Future Research Directions*

Future research should examine the long-term effects of the Skill Drip Approach on faculty confidence, teaching practices, and student learning outcomes to provide evidence of effectiveness beyond immediate participant satisfaction. While self-reported confidence increases and behavioral indicators, such as experimentation frequency, provide valuable formative data, sustained impact requires documentation of how faculty teaching practices evolve over semesters and years. Critical questions include: Do faculty who complete the Skill Drip series make substantive changes to course design, assessment approaches, or instructional strategies? Do these changes persist and deepen over time, or do faculty revert to prior practices once immediate support ends? How do discipline, institutional context, or prior technology experience moderate outcomes?

Mixed-methods research designs could analyze engagement metrics (completion rates, time spent on modules, interaction patterns) alongside qualitative data from reflective responses, interviews, focus groups, and classroom observations. Such studies would illuminate not only whether Skill Drip works but also for whom, under what conditions, and through what mechanisms. Comparative research examining outcomes across different institutional types (research universities versus community colleges), disciplinary contexts (STEM versus humanities), and delivery formats (LMS versus social media) would help identify best practices and necessary adaptations.

Critically, research must also examine unintended consequences and limitations. Does the brevity of microlearning sometimes result in superficial understanding that leads to problematic applications? Do certain faculty populations, such as contingent faculty without institutional email access or faculty at under-resourced institutions, face barriers to participation that reproduce existing inequities? Does emphasis on individual faculty development inadvertently obscure the need for systemic institutional change? Honest examination of these questions will strengthen the model and prevent uncritical adoption that fails to address its limitations.

Student outcome research presents methodological challenges but is essential for demonstrating educational value. Researchers might compare student performance, engagement, or satisfaction in courses taught by faculty who participated in AI-focused Skill Drip versus those who did not, while controlling for relevant variables (discipline, course level, class size). Qualitative studies could explore students' perceptions of how faculty AI use affects their learning experiences, whether positively through more personalized feedback, diverse learning materials, or efficient processes, or negatively through concerns about privacy, authenticity of assessment, or diminished human interaction. Such research would help calibrate faculty development efforts toward approaches that genuinely enhance student learning rather than merely increasing faculty comfort with new technologies.

## Conclusions

The Skill Drip Approach represents both a theoretical contribution and a practical solution to a pressing challenge in higher education. Theoretically, it advances understanding of how to integrate cognitive load theory, adult learning principles, and heutagogical philosophy into coherent professional development frameworks explicitly designed for rapidly evolving technological contexts. The framework demonstrates that brief, focused learning experiences need not be superficial. When grounded in sound learning science and intentionally designed, microlearning can simultaneously foster the development of complex competencies across technical, ethical, and pedagogical dimensions.

Practically, the framework offers institutions an actionable alternative to traditional professional development models that often fail to produce lasting change. Its low resource requirements, flexibility in delivery methods, and respect for faculty autonomy and expertise make it feasible even for under-resourced institutions facing budget constraints and competing priorities. The framework's modular structure enables large research universities, small liberal arts colleges, community colleges, and graduate institutions to implement Skill Drip while tailoring content to their unique missions, student populations, and institutional cultures.

The framework's transferability extends beyond AI literacy to any emerging pedagogical challenge requiring ongoing faculty learning. The five core principles of cognitive manageability, self-determined engagement, practice-embedded learning, reflective integration, and scaffolded competency development, together with their corresponding design features, provide a replicable template that supports faculty in developing new competencies in complex, uncertain domains through sustained and manageable learning experiences. Future Skill Drip series could address universal design for learning, open educational resources, culturally responsive teaching, trauma-informed pedagogy, inclusive assessment practices, or whatever pedagogical innovations emerge in the years ahead. The framework is not bound to AI; rather, it offers a sustainable structure for ongoing professional learning.

As higher education navigates unprecedented technological disruption, institutions cannot afford to treat faculty development as episodic or optional. The Skill Drip Approach demonstrates that meaningful professional learning need not be resource-intensive or disruptive to faculty work lives. By honoring what research tells us about how adults learn, respecting the cognitive constraints that shape learning effectiveness, and positioning faculty as knowledge creators rather than knowledge consumers, the framework cultivates not just specific AI competencies but broader dispositions (curiosity, critical evaluation, ethical awareness, and willingness to experiment) that will serve institutions well regardless of which technologies emerge next or how long current tools remain relevant.

In this sense, Skill Drip offers more than a strategy for AI literacy; it provides a sustainable model for ongoing faculty learning adaptable to whatever pedagogical challenges higher education faces in the years ahead. The framework's ultimate value lies not in any introduced tools or techniques, but in building institutional capacity for continuous learning, fostering cultures of innovation and experimentation, and positioning faculty as adaptive experts who can navigate change with confidence and ethical grounding. By demonstrating that professional development can be simultaneously rigorous and accessible, sustained and manageable, faculty-centered and institutionally strategic, the Skill Drip Approach charts a path forward for institutions committed to supporting their educators in an era of perpetual transformation.

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