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RESEARCH ARTICLE/ARAŞTIRMA MAKALESİ

Reusable Instruments for active learning-oriented online faculty development: Design frameworks, inventories and protocols[i]

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Abstract

Active learning is widely promoted in higher education, yet research and practice often suffer from limited transparency regarding the instruments used to design, implement, and evaluate active learning–oriented faculty professional development (PD). While many studies report positive outcomes, fewer provide sufficiently detailed descriptions of the pedagogical frameworks, inventories, lesson planning tools, and data collection instruments that enable replication or adaptation across contexts. This article addresses this gap by presenting a coherent set of research and design instruments developed and applied within a doctoral study and an associated qualitative case study of an asynchronous, microlearning-based faculty PD program. Grounded in constructivism and operationalized through Fink's Active Learning Design model, the instrument set includes: (a) Fink's active learning lesson plan flow and rubric (2003), (b) a low–moderate–high complexity Active Learning Inventory by van Amburgh (2007), (c) a microlearning-oriented MOOC design framework, (d) an online community of practice (CoP) design, and (e) semi-structured interview, observation, and reflection protocols adapted from evidence-based studies. Rather than reporting empirical findings, this paper documents the structure, purpose, and application logic of each instrument to support reuse, adaptation, and conceptual transfer by other researchers and instructional designers.

Aktif öğrenme odaklı çevrimiçi öğretim üyesi geliştirme araştırması yeniden kullanılabilir araçlar: Tasarım çerçeveleri, envanterler ve protokoller

Anahtar Kelimeler
Aktif öğrenme, uygulama topluluğu, öğretim üyesi geliştirme, çevrimiçi MOOC'lar, mikro öğrenme

Özet

Aktif öğrenme, yükseköğretimde yaygın olarak teşvik edilmektedir; ancak araştırma ve uygulama, aktif öğrenme odaklı öğretim üyesi mesleki gelişiminin tasarlanması, uygulanması ve değerlendirilmesinde kullanılan araçlar konusunda genellikle sınırlıdır. Birçok çalışma olumlu sonuçlar bildirse de, pedagojik çerçevelerin, envanterlerin, ders planlama araçlarının ve veri toplama araçlarının yeterince ayrıntılı açıklamalarını sunan çalışma sayısı azdır; bu da farklı bağlamlarda tekrarlanabilirliği veya uyarlanabilirliği zorlu kılmaktadır. Bu makale, bir doktora çalışması ve buna bağlı nitel bir vaka çalışması kapsamında geliştirilen ve uygulanan araştırma ve tasarım araçları setini sunarak bu boşluğu doldurmayı amaçlamaktadır. Yapılandırmacılığa dayanan ve Fink'in Aktif Öğrenme Tasarımı modeli aracılığıyla işlevselleştirilen araç seti şunları içermektedir: (a) Fink'in aktif öğrenme ders planı akışı ve değerlendirme ölçütü (2003), (b) van Amburgh tarafından geliştirilen düşük-orta-yüksek karmaşıklıkta Aktif Öğrenme Envanteri (2007), (c) mikro öğrenme odaklı bir MOOC tasarım çerçevesi, (d) çevrimiçi bir uygulama topluluğu (CoP) tasarımı ve (e) kanıta dayalı çalışmalardan uyarlanmış yarı yapılandırılmış görüşme, gözlem ve yansıtma protokolleri. Bu makale, ampirik bulguları raporlamak yerine, diğer araştırmacılar ve öğretim tasarımcıları tarafından yeniden kullanım, uyarlama ve kavramsal aktarımı desteklemek amacıyla her bir aracın yapısını, amacını ve uygulama mantığını belgelemektedir.

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[i] This study is derived from Mehmet Akın Bulut's doctoral thesis titled "A Case study: Training faculty to implement active learning strategies through a micro-learning based mooc professional development program."

INTRODUCTION

Active learning has become a central priority in higher education teaching and learning, with extensive evidence linking it to improved student engagement, conceptual understanding, and learning outcomes (Gosper et al., 2010). Despite this strong advocacy, faculty professional development initiatives aimed at supporting active learning adoption frequently struggle to produce sustained and observable changes in teaching practice, particularly in online and asynchronous formats (Brookfield, 2014). One contributing factor is methodological opacity (MArsden, 2019; Prager et al., 2019). Studies often report outcomes without sufficiently documenting the instruments used to design learning experiences, scaffold adoption, and evaluate implementation. Faculty PD research frequently focuses on participant perceptions or satisfaction while underreporting the pedagogical and methodological tools that mediate learning and transfer to practice. As a result, researchers and practitioners seeking to replicate, adapt, or extend successful PD models are often left without access to the design logic and instruments that supported those outcomes. This limitation is especially salient in active learning research, where conceptual clarity and alignment between theory, design, and practice are critical (Schlesselman, 2020).

The purpose of this article is to introduce and document a coherent set of instruments used in a doctoral study and a subsequent qualitative case study examining active learning adoption among faculty in an asynchronous, microlearning-based PD program supported by an online community of practice. The article does not present new empirical findings. Instead, it focuses on explicating the instruments themselves so that other researchers may benefit from using them directly or indirectly through adaptation and conceptual inspiration.

The scope of the paper includes pedagogical design instruments, instructional complexity classification tools, online learning environment design structures, and qualitative data collection protocols. Together, these instruments form an integrated toolkit for researching and supporting active learning–oriented faculty development in higher education.

Figure 1.
A thorough understanding of an active learning MOOC professional development

To avoid unnecessary repetition and improve conceptual economy, the manuscript now consolidates its discussion of constructivism, alignment, and active learning into a single integrative framing. Rather than reiterating these constructs across sections, they are treated as shared assumptions underpinning all instruments. This approach reflects established guidance in educational design research, which emphasizes coherence and alignment over repeated theoretical restatement (Biggs, 2001; Marsden, 2019). As a result, subsequent sections focus on how these concepts are operationalized through specific instruments rather than reintroducing their theoretical foundations. This article is intentionally positioned as an instrumentation-focused methodological contribution rather than an empirical report. Although the instruments were developed and applied within a doctoral study, the purpose of the present paper is not to report outcomes or evaluate

effectiveness. Instead, it documents the structure, alignment, and application logic of a coherent instrument system designed to support transparency, reuse, and adaptation in active learning–oriented faculty professional development. Framing the study in this way responds to calls for greater methodological clarity in educational research, particularly in design-oriented and qualitative traditions.

METHOD

Research Design

This study employed a qualitative, design-oriented methodology to document and operationalize a set of pedagogical, instructional design, and data collection instruments used to support and study active learning adoption in higher education faculty professional development. Rather than testing hypotheses or reporting empirical outcomes, the methodological focus of the study was on instrument design, alignment, and applicability. The instruments were developed, adapted, and refined within the context of a doctoral study that investigated an asynchronous, microlearning-based professional development (PD) program supported by an online community of practice (CoP). The methodological stance aligns with instrumentation-focused qualitative research, where the primary unit of analysis is the design and function of research and instructional tools rather than participant change scores. The study draws on constructivist epistemology and design-based reasoning, emphasizing ecological validity, contextual responsiveness, and coherence between theory, instructional design, and data collection.

Research Context

The instruments were developed and implemented in a higher education context characterized by small class sizes, mixed-mode instruction (face-to-face and online), and institution-wide use of a learning management system. Faculty participants taught primarily in the social sciences and were responsible for both teaching and research obligations, a context that informed the need for flexible, asynchronous professional development. The professional development program was delivered through a MOOC-style online platform, designed to support microlearning and peer interaction. The platform enabled asynchronous access to short instructional videos, infographics, discussion boards, and downloadable resources. The context was intentionally selected to reflect authentic conditions under which many faculty members engage in professional development, thereby supporting the practical relevance and transferability of the instruments.

Data Collecting Tools

Instrument development was guided by an adapted instructional design framework for asynchronous online courses, informed by established ADDIE principles and a MOOC-specific instructional design model validated for online learning environments. The framework structured instrument development across analysis, design, development, implementation, and evaluation phases, ensuring systematic alignment between identified needs, pedagogical goals, and data collection methods.

A multi-phase needs analysis informed the selection and design of instruments. This analysis included content analysis of student course evaluations, open-ended student surveys, faculty focus group discussions, researcher field notes, and a review of existing courses using an Active Learning Inventory. The convergence of these data sources revealed a consistent need for:

a) outcome-aligned active learning design,
b) scaffolded adoption of active learning strategies,
c) flexible, asynchronous professional development formats, and
d) opportunities for peer interaction and reflection.

These needs directly shaped the choice and structure of the instruments documented in this study.

To improve readability and reduce conceptual density, theoretical framing and instrument operationalization are clearly separated. Core learning assumptions-constructivism, alignment, and active learning as a design stance-are established concisely, after which the manuscript focuses on how these assumptions are translated into concrete planning, observation, and reflection tools. This

distinction reflects best practices in design-based and qualitative research, where theory provides orientation while instruments serve as the primary analytic and developmental units (Creswell & Miller, 2000).

Fink's Active Learning Design Instruments

Fink's Active Learning Design model served as the primary pedagogical framework guiding instrument development. Two core instruments were operationalized from this model:

1. a Fink-based active learning lesson plan flow, and
2. a Fink-based active learning rubric.

The lesson plan flow required instructors to articulate learning outcomes, align activities with those outcomes, specify interaction and feedback patterns, and incorporate structured student reflection. The rubric translated these components into observable criteria for lesson observation and self-reflection, with performance descriptors indicating low, moderate, or strong evidence of implementation.

These instruments were designed for dual use: as instructional scaffolds during professional development and as analytic tools during classroom observation and reflection.

Active Learning Inventory (Low–Moderate–High Complexity)

To support realistic and scaffolded adoption of active learning strategies, the study employed an Active Learning Inventory categorizing strategies into low-, moderate-, and high-complexity levels. Complexity was defined not only pedagogically but also logistically, considering preparation demands, time requirements, and classroom risk.

The inventory was used in three ways:

- ✓ to analyze existing courses on the learning management system,
- ✓ to guide faculty lesson planning during professional development, and
- ✓ to code observed classroom practices during lesson observations.

This instrument enabled a nuanced understanding of active learning adoption as a progression rather than a binary outcome.

Microlearning-Based MOOC Design Instrument

The professional development environment itself functioned as a design instrument. The MOOC was structured around microlearning principles, with each module consisting of short, single-objective learning units. Instructional materials included brief interactive videos, infographics, text summaries, and external resources, allowing participants to engage according to device access and time availability.

Microlearning design decisions were informed by pedagogical, technological, interface, evaluation, and institutional considerations. To prevent fragmentation, modules followed a consistent structure and sequencing logic, progressing from conceptual understanding of active learning to strategy selection, implementation, and evaluation.

Community of Practice Design

An online community of practice (CoP) was embedded within the MOOC through structured discussion boards. The CoP design emphasized shared domain (active learning), community (faculty participants), and practice (teaching implementation). Discussion prompts required participants to share experiences, design lesson components, and respond to peers, thereby integrating social learning into the professional development process. The CoP functioned simultaneously as a learning mechanism and a data source, enabling observation of peer interaction, shared meaning-making, and engagement patterns.

The instrument set integrates adopted, adapted, and newly developed components. The core active learning cycle is directly adopted from L. Dee Fink's model (Fink, 2003), while the low–moderate–high strategy classification draws on the Active Learning Inventory developed by van Amburgh et al. (2007). These frameworks were adapted to account for asynchronous delivery, faculty workload constraints, and qualitative observation needs. Newly developed elements include the interoperable alignment of lesson planning, observation, and reflection tools, as well as the microlearning-based MOOC architecture designed to function simultaneously as a professional development environment and a research instrument. To illustrate instrument functionality, brief examples are

embedded throughout. For instance, rubric criteria specify observable indicators of alignment and reflection (e.g., explicit lesson closure connecting activity outcomes to learning goals), while lesson plan templates require instructors to map each activity to intended outcomes and feedback mechanisms. Similarly, the Active Learning Inventory distinguishes between low-complexity strategies (e.g., minute papers) and moderate-complexity strategies (e.g., structured case discussions), providing faculty with concrete entry points for adoption. These examples are illustrative rather than evaluative and are intended to support understanding of instrument operation rather than report outcomes. Although the primary purpose of this article is to document instruments rather than report findings, the methodological coherence of the instrument set is demonstrated through its use in data collection.

Semi-Structured Interviews

Semi-structured interview protocols were adapted from evidence-based studies to examine faculty experiences with the microlearning-based PD, active learning adoption, and CoP participation. Interview questions addressed usability, motivation, perceived learning, barriers, instructional transfer, and perceptions of peer interaction.

Lesson Observation Form

Lesson observations were conducted using a structured observation form aligned with Fink's Active Learning Design model and the Active Learning Inventory. The form documented learning outcomes, strategy complexity, interaction and feedback patterns, student reflection, and observer notes. Ratings were recorded using a three-level evidence scale.

Participant Teaching Reflection Form

A parallel teaching reflection form enabled instructors to self-report their active learning implementation using the same criteria as the observation instrument. This parallel structure supported triangulation between observed practice and instructor interpretation.

Data Analysis

While this article does not report analytical results, the instrument system was designed to support qualitative content analysis through open, axial, and selective coding. Alignment across lesson plans, observations, reflections, discussion board artifacts, and interviews enabled methodological triangulation and strengthened credibility. Instrument credibility was supported through:

- ✓ peer debriefing with educational research experts,
- ✓ member checking with participating faculty, and
- ✓ triangulation across multiple data sources.

These strategies ensured that instruments were interpretable, coherent, and grounded in authentic teaching contexts.

All instruments were used with informed consent. Participation in the professional development and data collection activities was voluntary, and confidentiality was maintained through anonymization of participant identifiers. Ethical considerations also informed the design of learning materials, ensuring accessibility, inclusivity, and appropriate use of copyrighted resources.

By documenting the methodological architecture underlying active learning–oriented faculty professional development, this study provides a transparent and transferable set of instruments. The methodology demonstrates how pedagogical theory, instructional design, and qualitative research tools can be coherently integrated to support both faculty learning and rigorous educational research.

FINDINGS

Rather than presenting empirical outcomes, the section explicates the design logic, theoretical grounding, and functional role of each instrument within an integrated methodological system. Subsections are organized to move from underlying learning assumptions to concrete design tools and, finally, to their research and professional development applications. This reorganization aligns with recommendations for methodological transparency in qualitative and design-oriented research (Creswell & Miller, 2000; Miles & Huberman, 1994).

Constructivism as the Underlying Learning Theory

All instruments presented in this article are grounded in constructivist learning theory, which conceptualizes learning as an active process in which learners construct meaning by integrating new information with prior knowledge through interaction, experience, and reflection. Constructivist perspectives emphasize learner engagement, social interaction, authentic tasks, and reflective dialogue as essential conditions for deep learning (Good & Brophy, 1994). In the context of faculty professional development, constructivism implies that instructors must not only be exposed to pedagogical ideas but also engage in designing, practicing, reflecting on, and refining their teaching approaches (Hung, 2008). This orientation informed the selection and development of instruments that foreground alignment, experience, interaction, and reflection rather than passive content delivery.

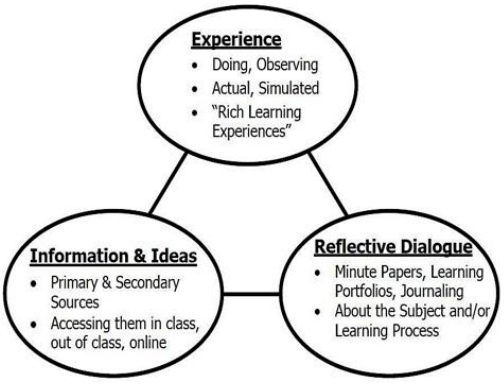
Active Learning as a Design Stance

Within constructivist pedagogy, active learning is understood not as a collection of isolated techniques but as a holistic design stance that aligns learning outcomes, learning activities, interaction and feedback patterns, and reflection (Fink, 2003). This distinction is critical, as many faculty members equate active learning with adding activities to lectures without redesigning lesson structure or instructional goals (Chi, 2009). To address this misconception, the instruments presented in this article are explicitly design-oriented. They operationalize active learning as a coherent instructional sequence, drawing primarily on Fink's Active Learning Design model (Fink, 2003), which served as the central pedagogical framework in the doctoral study.

Instrument Set 1: Fink's Active Learning Design Model

Fink's Active Learning Design model conceptualizes effective active learning as a cycle consisting of three interrelated components: (1) information and ideas, (2) experience, and (3) reflective dialogue. According to this model, active learning is complete only when learners are provided with aligned learning outcomes and content input, engaged in meaningful learning experiences with interaction and feedback, and guided through structured reflection to consolidate learning (Alravahi, 2012; Bulut et al., 2025).

Figure 2.
Fink's Active Learning Model (2003).



This model was selected because it offers a clear, evidence-informed structure for designing lessons that move beyond activity-based teaching toward coherent instructional alignment. In the doctoral study, Fink's model served both as a training framework for faculty and as an analytical lens for examining classroom implementation.

Fink-Based Active Learning Lesson Plan Flow

The first instrument derived from Fink's model is an active learning lesson plan flow designed to guide instructors in planning, implementing, and analyzing their teaching. The lesson plan flow requires instructors to articulate learning outcomes explicitly, design aligned learning activities, specify interaction and feedback patterns, and incorporate a deliberate reflection or lesson closure (Cadorin et al., 2017; Stewart, Houghton and Rogers, 2012). The lesson plan flow is structured to make alignment visible and observable. Rather than listing activities in isolation, instructors map

each activity to intended learning outcomes and indicate how students will engage with content, peers, and the instructor. Reflection is treated as a non-negotiable component rather than an optional add-on, reinforcing Fink's emphasis on reflective dialogue as essential to learning.

Fink-Based Active Learning Rubric

Complementing the lesson plan flow, a rubric grounded in Fink's model was developed to support lesson observation and self-reflection. The rubric includes criteria related to outcome alignment, active learning strategy use, interaction and feedback, and student reflection. Each criterion is accompanied by descriptors representing low, moderate, and strong evidence of implementation. This rubric serves multiple purposes: it supports systematic classroom observation, enables faculty self-assessment, and facilitates feedback conversations grounded in shared design language. In the doctoral study, the rubric supported triangulation between observation data and participant reflections.

Instrument Set 2: Active Learning Inventory (Low–Moderate–High Complexity)

While Fink's model provides a design framework, faculty often face practical constraints when attempting to implement active learning (van Amburgh et al., 2007). Time limitations, preparation demands, perceived risk, and classroom management concerns influence which strategies instructors feel able to adopt. To account for these realities, the study incorporated an Active Learning Inventory adapted from van Amburgh et al. (2007), which categorizes strategies by complexity. This inventory conceptualizes active learning adoption as a progression rather than a binary shift. By distinguishing between low-, moderate-, and high-complexity strategies, the instrument acknowledges that instructors may begin with feasible, low-risk approaches before moving toward more complex designs.

Figure 3.

Active Learning Inventory Tool (van Amburgh et al., 2007).

Complexity Level[1,*]	Code	Activity Description[2,3]
Low Complexity	A*	*Question & Answer:* Students orally respond to a question, comment, etc either ***voluntarily*** or by ***cold-calling.*** ****A1 and A2 denote simple knowledge / comprehension questions (recall) and generally are asked by instructor but limited or no time is provide for the student to process / respond. A1 denotes students responded to question / A2 denotes students were asked to respond AND given time but did not respond – will track A1 and A2 for numbers but not time as conducted in less than 1 minute. A3 denote a higher-order question, where students are provided time (>1 min) to process then respond. This does not include rhetorical questions.***
	B	*One-minute paper / Focused Listing / One Sentence Summary:* Short writing task designed to allow students to focus attention on a single important term, name or concept from a particular lesson / session
	C	*Think/Pair/Share:* Short, individual written response to a prompt/question; ***then*** instructed to share and discuss briefly with partner; ***then*** asked to share with larger group
	D	*Brain Dump / Free Write:* Short write in which students write down everything they know about an announced topic.
	E	*Muddiest Point:* At some point during or after an in-class presentation, students write a quick response to the prompt, "What was the muddiest point in _____?"
	F	*Misconception / Preconception Check:* Simple technique for gathering information on what students perceive they already know
	G	*Application Activity:* Written activity in which students apply 1-2 principles and concepts to real life situation
	H	*Student-Generated Questions:* Students create questions for quizzes or exams that are crafted to capture central elements of the course
	I	*Formative Quizzes / Surveys (Background Knowledge Probe):* Ungraded quizzes / surveys to determine comprehension
	J	*Computer Based Interaction Systems: (Personal response system)* Students participate in the lecture by responding to questions / statements via computers / wireless technology.
	K	*Self / Peer Formative Assessment:* Activities that require students to assess performance against applicable criteria; extend to offer specific suggestions for improvement
Moderate Complexity	L	*Small Group Presentations / Discussions:* Presentations / discussions of course material – led by ❑ ***Faculty*** vs. ❑ ***Student***
	M	*Role Playing / Simulations / Games:* Students and/or faculty performing specific roles for demonstration purposes Simulations / games include guiding principles, specific rules and structured relationships
	N	*Categorizing Grid / Pro-Con Grid:* Students are presented with 2-3 important categories (superordinate concepts) along with a scrambled subordinate terms, images, equations or other items that belong in one or another of the superordinate categories.
	O	*Defining Features Matrix / Memory Matrix:* Students categorize concepts presented according to presence (+) / absence (-) of defining features
	P	*Debates:* Small or large group structured exploration of central concepts, data, beliefs, values
	Q	*Peer Teaching:* Students teaching each other basic and/or intermediate levels of course materials or needed skills
	R	*Concept Maps:* Drawings or diagrams that show the mental connections that students make between a major concept presented and other concepts they have learned
High Complexity	S	*Cases:* Scenarios that require students to integrate their skills to solve problems that relate to course material
	T	*Cooperative Cases:* Scenario-based problem-solving activity using small groups to tackle specific questions/issues from larger list
	U	Jigsaw: Team-based: each member becomes subject matter expert in 1 of 4 areas selected from current course material. Each member teaches their subject matter.
	V	*Cooperative Learning / Problem Based Learning:* Students work together to learn course knowledge and to develop course skills.

Structure of the Active Learning Inventory

The inventory classifies active learning strategies into three levels. Low-complexity strategies require minimal preparation and short implementation time, such as brief think–pair–share activities or minute papers. Moderate-complexity strategies involve some preparation and typically require several minutes of class time, such as structured group discussions or short case analyses. High-complexity strategies demand substantial preparation and extended implementation time, including project-based learning, simulations, or multi-session collaborative tasks. In the doctoral study, this inventory was used both to analyze existing courses within the learning management system and to support faculty lesson planning and observation coding.

Research and Design Applications

The Active Learning Inventory functions as both an analytical and developmental tool. Analytically, it allows researchers to code observed teaching practices and track shifts in strategy use over time. Developmentally, it supports scaffolded PD design by helping instructors identify feasible entry points and plan gradual expansion of their instructional repertoire.

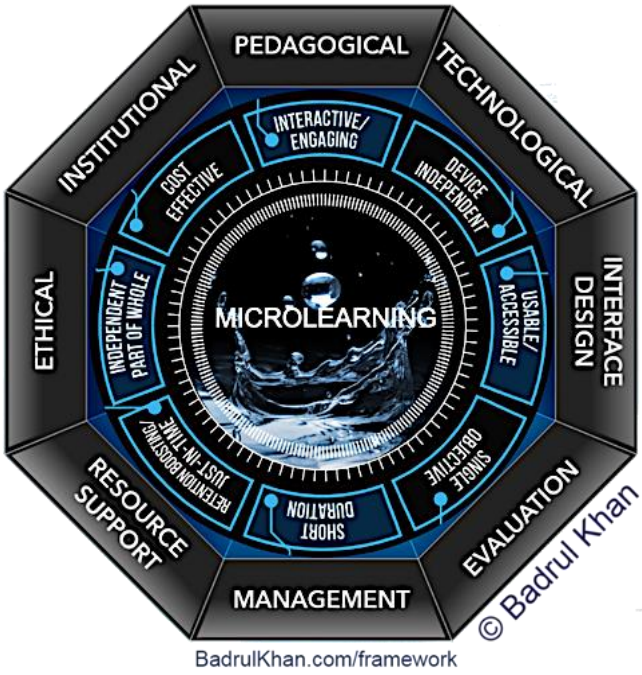
Because complexity is treated as logistical as well as pedagogical, the inventory provides a realistic framework for understanding faculty adoption trajectories rather than imposing uniform expectations.

Instrument Set 3: Microlearning-Based MOOC Design Framework

Microlearning is defined as short, single-objective learning units delivered in bite-sized formats, often digitally and asynchronously (Khan, 2019). In the doctoral study, microlearning was adopted to address faculty time constraints and to support flexible participation in PD.

Figure 4.

Micro-learning principles (Khan, 2019).



The microlearning framework was not treated as a collection of short videos alone, but as a structured design approach informed by pedagogical, technological, interface, evaluation, and institutional considerations.

Structural Components of the MOOC Instrument

The MOOC instrument included modular sequencing, short interactive videos (typically 2–3 minutes), parallel learning resources such as infographics and text summaries, and discussion-based activities serving as evidence of learning. Each micro-unit targeted a single learning objective and was designed to be completed independently while contributing to a coherent overall learning trajectory.

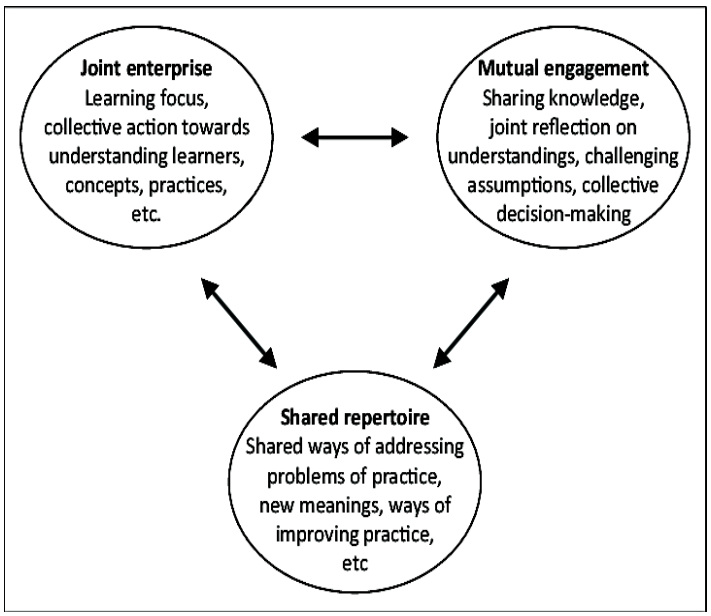
Design Principles and Transferability

The microlearning MOOC framework emphasizes coherence to prevent fragmentation, a known risk of microlearning environments. Consistent module structure, explicit learning goals, and recap elements were used to support cognitive continuity. The framework is adaptable across platforms and institutional contexts, making it suitable for reuse by other researchers and designers.

Instrument Set 4: Community of Practice Design

The PD program embedded an online community of practice (CoP) to support social learning and peer exchange. Drawing on Lave and Wenger's conceptualization (2011), the CoP was defined by a shared domain (active learning), a community of participants (faculty members), and a shared practice (teaching implementation).

Figure 5.
'Communities of practice: learning, meaning and identity' (Lave & Wenger, 2011).



Operationalizing CoP in Asynchronous Environments

The CoP was operationalized through structured discussion prompts, peer sharing of lesson plans, and reflective exchanges within the MOOC platform. Discussion boards functioned simultaneously as learning activities and data sources, supporting both participation and research analysis.

Figure 6.
Faculty Development Introduction

Figure 7.
Active Learning Mooc Introduction

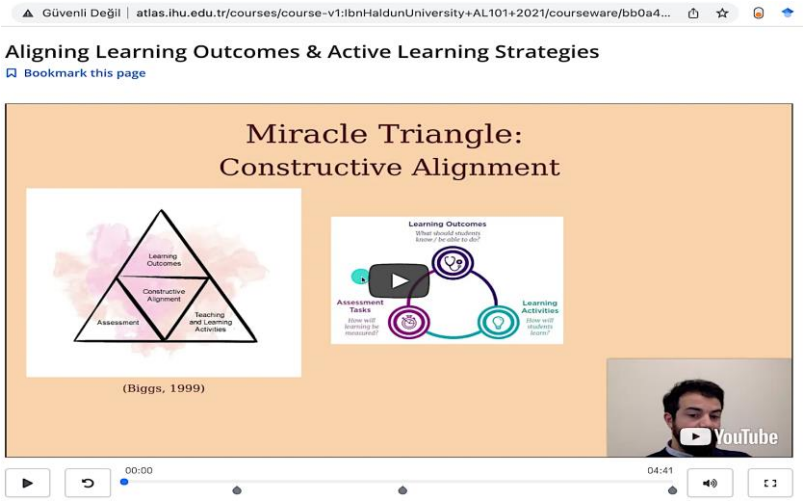
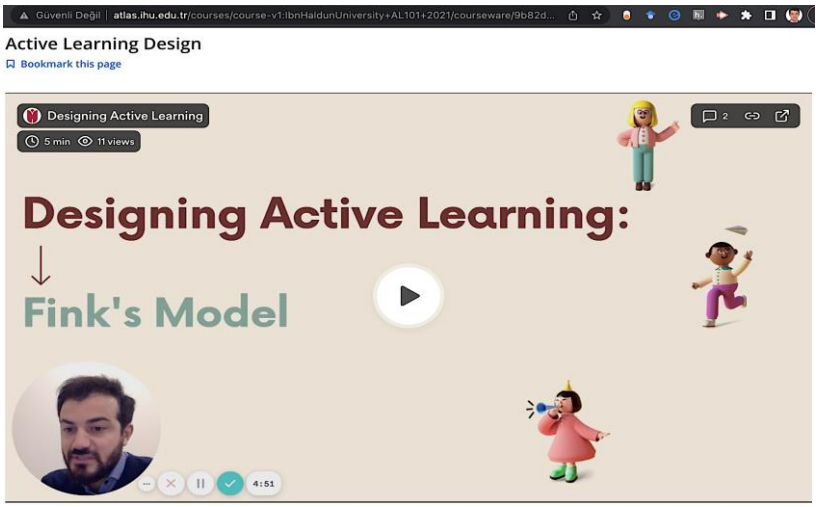


Figure 8.
Active Learning thru Fink's Model



Design Considerations and Reuse

The CoP instrument highlights the need for facilitation, participation norms, and structured interaction windows to sustain engagement in asynchronous settings. While flexible, the design acknowledges that community participation does not emerge automatically and must be intentionally supported.

Semi-Structured Interview Protocols

The study employed semi-structured interviews (Tharayil et al., 2018) adapted from evidence-based research to examine faculty experiences with active learning adoption. Questions addressed usability, motivation, perceived learning, barriers, and transfer to teaching practice.

Lesson Observation and Reflection Forms

Lesson observation forms grounded in Fink's model were used to document classroom implementation, while participant teaching reflection forms mirrored the observation criteria to support self-assessment. Together, these instruments enabled triangulation between observed practice and instructor interpretations.

Figure 9.
Fink's Active Learning Lesson Plan

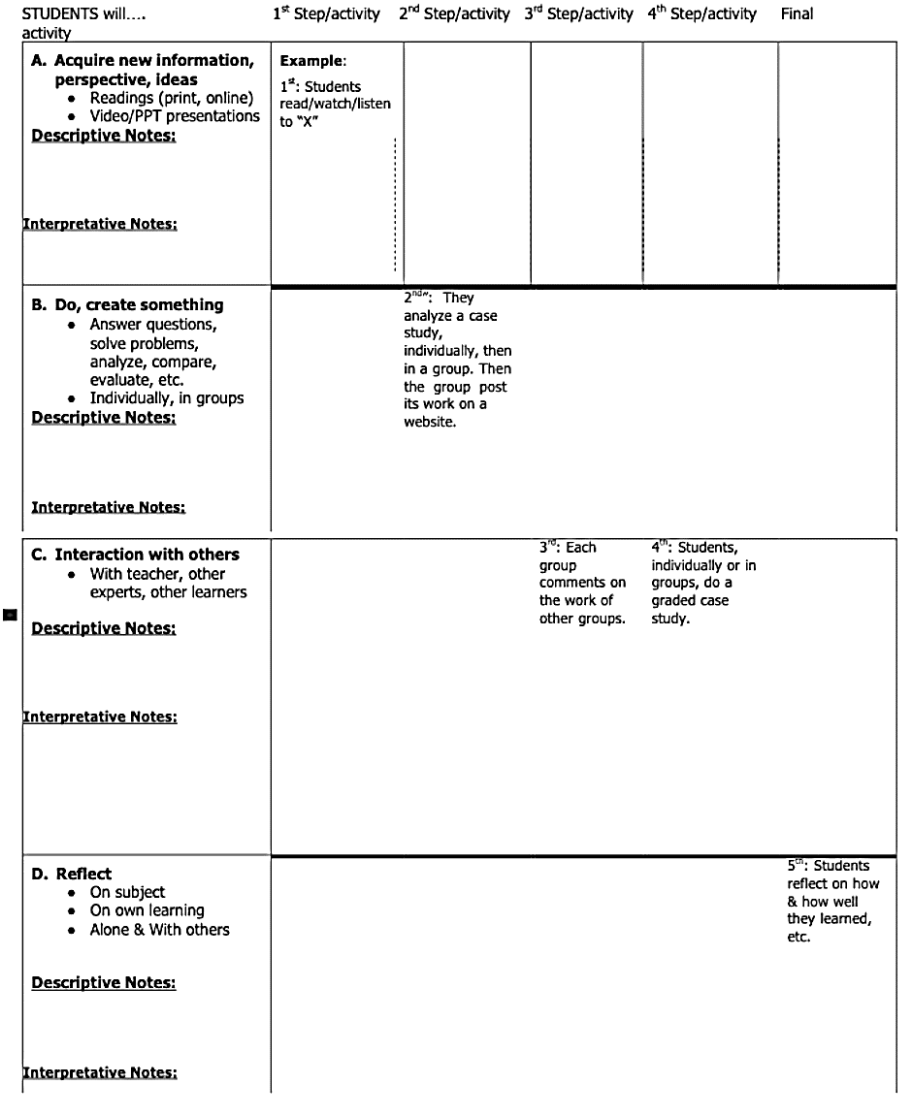


Figure 10.
Fink's Reflection Rubric

Criterion	What the component looks like:	Ideas for where to look and examples of what to look for (not all need to be present):	
Learning Activities	**The "classroom" is a dynamic place and takes advantage of evidence-based practices.**		
	It is clear that **classroom activities, assessments, and learning objectives are aligned**. In other words, the classroom learning activities directly support the assessments and help prepare students for them. 1) Goal alignment	• Not all classroom activities may be evident in the syllabus but there is some indication of the day-to-day structure of the learning environments. Red flags might include: exclusive use of a traditional lecture format when critical thinking is an objective; little reflective writing when self-discovery is an objective; canned homework assignments or multiple-choice tests when problem solving is an objective.	S M U
	The **learning activities are derived from evidence-based practices.** 2) Active Learning Strategy	• The instructor relies on pedagogical strategies and classroom activities that have some basis in the literature to support their efficacy.	S M U
	The **learning activities are likely to actively engage students** in a variety of ways. 3) Interaction/Feedback (self-feedback / peer-feedback / group-feedback) 4) Reflection (what/why/how I have learned)	• Students have opportunities, for example, to discuss course material, work individually and in groups, teach each other, solve problems, debate concepts, simulate scenarios, and/or reflect—individually and collectively—about the meaning of their learning experiences. Individual class periods involve multiple modes of instruction and varied activities.	S M U

DISCUSSION and CONCLUSION

This instrumentation-focused study documented an integrated set of tools for designing, supporting, and researching faculty adoption of active learning within an asynchronous, microlearning-based professional development (PD) environment. The contribution is methodological. It clarifies how active learning can be rendered designable and observable through coordinated instruments, rather than treated as a loosely defined set of "engagement techniques." The instrument system draws its coherence from constructivist assumptions about learning as meaning-making through experience, interaction, and reflection (Good & Brophy, 1994), and operationalizes those assumptions using a structured active learning design cycle (Fink, 2003).

Active learning becomes measurable when treated as a design cycle

A core strength of the instrument set is its shift from "activity presence" to "design integrity." In higher education teaching improvement efforts, active learning is frequently equated with adding activities into lectures, which can lead to participation without alignment. The instrument system counters that tendency by making constructive alignment central (Biggs, 2001) and by adopting Fink's sequence from information/ideas, then to experience, and next to reflective dialogue, and finally to the minimal logic of complete active learning (Fink, 2003).

By anchoring planning (lesson plan flow), evaluation (rubric and observation form), and self-report (reflection form) to the same constructs, the study provides a replicable way to judge whether active learning is enacted as an aligned cycle rather than as isolated techniques. This alignment also strengthens qualitative interpretability: when the same criteria structure lesson plans, observations, and reflections, researchers can meaningfully compare instructional intentions with classroom enactment.

Strategy complexity supports a realistic model of adoption

Faculty adoption of active learning is shaped by instructional risk, preparation time, and lesson-time constraints. The Active Learning Inventory's low–moderate–high complexity categorization supports this reality by treating "complexity" as a practical implementation variable, not only a pedagogical one (van Amburgh et al., 2007).

Methodologically, the inventory adds two benefits. First, it enables researchers to code what kind of active learning is attempted, rather than merely whether it occurred. Second, it supports scaffolded PD design: faculty can begin with low-complexity strategies and expand toward more demanding approaches as planning capacity and confidence increase. This approach avoids framing adoption as all-or-nothing and makes it easier to document trajectories of change in ways that are both rigorous and sympathetic to institutional constraints.

Microlearning enables access but requires coherence engineering

The microlearning MOOC environment was chosen as an explicit response to faculty workload and time scarcity, consistent with microlearning's emphasis on short, single-objective learning units (Khan, 2019) and its use for ongoing professional development (Buchem & Hamelmann, 2010).

At the same time, microlearning creates predictable design risks: fragmented attention, shallow engagement, and reduced conceptual continuity when content is distributed across many small units. Khan's microlearning principles highlight that microlearning should not be reduced to "short content," but requires coherent pedagogical and interface design as well as purposeful evaluation and management structures (Khan, 2019). In this study, coherence was addressed by sequencing content from foundational definition and alignment toward more complex strategy use and interaction patterns, rather than delivering disconnected tips. This sequencing logic parallels concerns in instructional design that misalignment between needs, outcomes, and learning tasks undermines effectiveness (Biggs, 2001). The implication for other researchers is that microlearning must be reported and analyzed as an instructional design decision with cognitive consequences, not merely as a delivery convenience.

Online CoP features are not self-sustaining without facilitation structures

The community of practice (CoP) instrument was intended to embed social learning into asynchronous PD. CoP theory emphasizes learning through participation in a shared domain and

practice (Lave & Wenger, 2001; Wenger, 2011). However, virtual CoP participation is often fragile without facilitation and norms that support reciprocity and sustained engagement. Prior work on teacher learning and PD similarly highlights that collaboration and self-regulation demands can shape participation patterns (Butler et al., 2004). In asynchronous formats specifically, the absence of pacing and accountability can leave interaction uneven even when discussion spaces exist. The methodological implication is straightforward: researchers should not treat "having a discussion board" as equivalent to "having a CoP." Instead, CoP must be operationalized through prompt design, participation expectations, facilitation rhythms, and observable interaction patterns such as elements that should be documented as part of the instrument system.

Instrument coherence strengthens trustworthiness and transferability

A final contribution is the methodological coherence that supports qualitative rigor. The instrument system was designed to enable triangulation across observations, reflections, interviews, and artifacts (Anzul et al., 2003). Trustworthiness strategies used in the originating study—peer debriefing, member checking, and triangulation—are consistent with established qualitative validity guidance (Lincoln & Guba, 1985; Creswell & Miller, 2000; Miles & Huberman, 1994). For researchers, the key takeaway is that transparency is not only about listing instruments, but about showing how they align to shared constructs. When instruments speak the same conceptual language (e.g., Fink alignment and reflection; inventory complexity), transferability improves because other researchers can adapt the system without losing the logic that makes the tools function together.

While microlearning offers clear advantages for faculty professional development—particularly flexibility and accessibility—it also introduces design trade-offs that warrant critical consideration. Fragmentation of content, reduced opportunities for sustained engagement, and shallow processing are documented risks when microlearning is treated merely as short-form content delivery rather than as a coherent instructional design strategy (Buchem & Hamelmann, 2010; Khan, 2019). To mitigate these risks, the MOOC design documented here emphasizes sequencing, conceptual continuity, and reflective integration across micro-units. Similarly, online Communities of Practice (CoPs) do not emerge automatically through the presence of discussion boards. CoP theory emphasizes participation, shared practice, and identity formation, all of which require facilitation, norms, and accountability structures—particularly in asynchronous environments (Jean Lave & Etienne Wenger, 2001; Wenger, 2011). Without intentional design, participation may remain uneven or superficial, limiting the community's learning potential.

Conclusion

This study advanced methodological clarity in active learning and faculty development research by documenting a transferable instrument system for designing and studying active learning adoption in asynchronous PD. Grounded in constructivist learning assumptions (Good & Brophy, 1994) and operationalized through Fink's active learning cycle (Fink, 2003), the instrument set makes active learning observable through alignment, experience, interaction/feedback, and reflection. Complexity-based classification of strategies provides a realistic adoption scaffold (Van Amburgh et al., 2007), while microlearning design is framed as a purposeful instructional strategy that must be engineered for coherence (Buchem & Hamelmann, 2010; Khan, 2019). Social learning through community of practice features is treated as a designed and facilitated mechanism rather than an automatic outcome of online discussion spaces (Lave & Wenger, 2001; Wenger, 2011).

By providing instruments that are pedagogically aligned and methodologically interoperable, the study supports replication, adaptation, and cumulative research. Future work can extend this toolkit across disciplines and institutions, compare alternative accountability and facilitation structures in asynchronous CoPs, and further validate how instrument-guided active learning design influences sustained instructional practice over time.

Implications for Researchers and Designers

Although the instruments were developed within a specific institutional context, they are intentionally designed for adaptation. For example, the lesson plan flow and rubric derived from Fink's active learning model may be simplified for short workshops or expanded for semester-long faculty learning communities. Similarly, the Active Learning Inventory can be recalibrated to reflect

discipline-specific constraints, such as laboratory safety requirements or studio-based instruction, by redefining what constitutes logistical and pedagogical complexity (van Amburgh et al., 2007). Microlearning module length, sequencing, and assessment expectations may also be adjusted based on faculty workload norms, institutional culture, and delivery modality, supporting contextual responsiveness without compromising conceptual alignment.

The instrument set may be used holistically or selectively, depending on research goals. By documenting tools rather than only outcomes, the article contributes to methodological transparency and supports replication, adaptation, and cumulative knowledge building in active learning and faculty development research. Rapidly-emerging artificial intelligence (AI) era is another point of consideration for novel studies that could examine faculty development initiatives.

Limitations and Future Directions

Several implementation-related limitations should be acknowledged. First, faculty workload and competing institutional responsibilities constrained the depth and consistency of engagement with both microlearning modules and community discussions. Second, observation and rubric-based evaluations are inherently interpretive and may reflect observer bias despite alignment and triangulation efforts (Lincoln & Guba, 1985). Third, the MOOC and CoP designs are partially platform-dependent, meaning that technical affordances and constraints may shape how instruments function in other learning management systems. Finally, disciplinary norms and cultural expectations regarding teaching may influence how active learning and participation are interpreted, underscoring the need for contextual adaptation rather than direct replication. Although the instruments were field-tested within a doctoral study, they were developed in a specific institutional context and may require adaptation for other disciplines or cultural settings. Future research could further validate the instruments quantitatively or examine their long-term impact on teaching practice. AI-focused research could also take place in order to study faculty behaviors in educational domains.

Conflict of Interest

The author declared that there is no conflict of interest.

Ethical Statement

This research was conducted with the decision of Ibn Haldun University Ethics Committee numbered E-71395021-605.01-9653.

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AI disclosure statement

Artificial intelligence (AI) tools were employed solely for language editing during the preparation of this manuscript. The author has carefully reviewed and verified all content, and he accept full responsibility for the integrity and accuracy of the final version.

References

Alrawahi, N. (2012). The impact of using Fink's active learning model on grade 10th Omani female students' selfregulated learning strategies. *International Journal of Psychology*, *47*, 293.

Anzul, M., Ely, M., Freidman, T., Garner, D., & McCormack-Steinmetz, A. (2003). *Doing qualitative research: Circles within circles*. Routledge. https://doi.org/10.4324/9780203448502

Biggs, J. (2001). The reflective institution: Assuring and enhancing the quality of teaching and learning. *Higher Education, 41*, 221–238. https://doi.org/10.1023/A:1004181331049

Brookfield, S. D. Responding to students' resistance to learning. In *The skillful teacher: On technique, trust, and responsiveness in the classroom*; Jossey-Bass, A Wiley Brand: San Francisco, CA, 2015; pp. 227–238 ISBN 978-1-118-45029-1.

Buchem, I., & Hamelmann, H. (2010). Microlearning: A strategy for ongoing professional development. *eLearning Papers, 21*(7), 1–15.

Bulut, M. A., Adıgüzel, T., & Kaya, M. H. (2025). Exploring views and experiences of faculty members' participation in an asynchronous online program: Using a micro-learning format and CoP framework. *Innovations in Education and Teaching International*, 1–17.

https://doi.org/10.1080/14703297.2025.2532056

Butler, D. L., Novak Lauscher, H., Jarvis-Selinger, S., & Beckingham, B. (2004). Collaboration and self-regulation in teachers' professional development. *Teaching and Teacher Education, 20*, 435–455. https://doi.org/10.1016/j.tate.2004.04.003

Cadorin, L., Bagnasco, A., Tolotti, A., Pagnucci, N., & Sasso, L. (2017). Developing an instrument to measure emotional behaviour abilities of meaningful learning through the Delphi technique. *Journal of advanced nursing*, *73*(9), 2208-2218.

Chi, M. T. (2009). Active- constructive- interactive: A conceptual framework for differentiating learning activities. *Topics in cognitive science*, *1*(1), 73-105.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice, 39*(3), 124–130. https://doi.org/10.1207/s15430421tip3903_2

Fink, L. D. (2003). What is significant learning. *University of Oklahoma Significant Learning Website, Program for Instructional Innovation at the University of Oklahoma*.

Good, T., & Brophy, J. (1994). *Looking in classrooms* (6th ed.). HarperCollins.

Gosper, M., McNeill, M., Phillips, R., Preston, G., Woo, K., & Green, D. (2010). Web-based lecture technologies and learning and teaching: a study of change in four Australian universities. *Australasian Journal of Educational Technology*, *26*(8).

Hung, H. T. (2008). Teacher Learning: Reflective Practice as a Site of Engagement for Professional Identity Construction. *Online Submission*, *5*(5), 39-49.

Khan, B. H. (2019). Microlearning: Quick and meaningful snippets for training solutions. *International Journal of Research in Educational Sciences, 2*(2), 275–284.

Lave, J., & Wenger, E. (2001). Legitimate peripheral participation in communities of practice. In *Supporting lifelong learning* (pp. 121–136). Routledge.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.

Marsden, E. (2019). Methodological transparency and its consequences for the quality and scope of research. In *The Routledge handbook of research methods in applied linguistics* (pp. 15-28). Routledge.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.

Prager, E. M., Chambers, K. E., Plotkin, J. L., McArthur, D. L., Bandrowski, A. E., Bansal, N., ... & Graf, C. (2019). Improving transparency and scientific rigor in academic publishing. *Journal of neuroscience research*, *97*(4), 377-390.

Schlesselman, L. S. (2020). Perspective from a teaching and learning center during emergency remote teaching. *American Journal of Pharmaceutical Education*, *84*(8).

Stewart, A. C., Houghton, S. M., & Rogers, P. R. (2012). Instructional design, active learning, and student performance: Using a trading room to teach strategy. *Journal of Management Education*, *36*(6), 753-776.

Tharayil, S., Borrego, M., Prince, M., Nguyen, K. A., Shekhar, P., Finelli, C. J., & Waters, C. (2018). Strategies to mitigate student resistance to active learning. *International journal of STEM education*, *5*(1), 7.https://doi.org/10.1186/s40594-018-0102-y

Van Amburgh, J. A., Devlin, J. W., Kirwin, J. L., & Qualters, D. M. (2007). A tool for measuring active learning in the classroom. *American Journal of Pharmaceutical Education, 71*(5), 85. https://doi.org/10.5688/aj710585

Wenger, E. (2011). *Communities of practice: A brief introduction*.