Student Achievement of Course Learning Goals in an Asynchronous Distance Learning Course Redesigned Using Fink's Taxonomy of Significant Learning

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Abstract

Fink's Taxonomy of Significant Learning (FTSL) is an instructional strategy that provides an effective framework for (re)designing course learning experiences to achieve student-centered learning goals. Originally developed for in-person courses, little research exists around its application to effectively design distance learning (DL) courses. This study aims to evaluate if the online learning community can also utilize FTSL as a strategy for supporting online learners toward achieving significant learning goals. To address this aim, faculty applied FTSL during the redesign of an asynchronous DL general education course for undergraduates, which involved redesigning course learning objectives and goals, then realigning and revising the course assessments and learning activities. A deductive, manifest content analysis was conducted to measure achievement of course learning goals across all nine written course assessments (n = 40 student participants). Then, learning frequencies were quantified for each category of significant learning. Study findings indicate most student participants engaged in learning experiences related to five of the six categories within Fink's taxonomy several times throughout the semester, with higher frequencies of learning in categories for application, followed by the human dimension and foundational knowledge, then caring and integration. In conclusion, study findings support that applying FTSL during the course (re)design process also supports online learners toward achieving significant learning goals, with course assessments that include

analysis, aesthetic learning, and self-reflection as useful exercises for achieving said goals. Future research can build on this study by evaluating if online learners who achieve significant learning goals also experience long-lasting change relevant to the learner's life (i.e., engage in a significant learning experience).

Keywords: Fink's Taxonomy of Significant Learning, instructional design, distance learning, learning goals, higher education

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A recent review reported approaches for enhancing online learning experiences, such as strategies to strengthen course design, instructor presence, and student engagement (Wright et al., 2023). As it relates to course design, development of significant learning goals is an additional strategy that merits consideration for enhancing online learning experiences. According to L. Dee Fink, achievement of significant learning goals often leads to the learner experiencing long-lasting and meaningful change relevant to their life (Fink, 2013). As such, Fink's Taxonomy of Significant Learning (FTSL) is an evidence-based instructional strategy that helps instructors intentionally develop significant learning goals that support the design of impactful assessments, learning activities, and content. However, most studies have only evaluated the application of this strategy toward designing in-person learning experiences. As the online learning community continues studying innovative methods to enhance online instruction, evaluation of instructional strategies that support *all* learners toward achieving significant learning goals serves as an important area of research. Thus, this manuscript shares methods for (re)designing an asynchronous DL course by applying Fink's taxonomy, as well as reports findings from evaluating whether the redesign efforts supported online learners toward achieving significant learning goals.

Review of Related Literature

In backward design, instructors are prompted to consider the end goal of the course first, prior to the design of course assessments or learning activities. By focusing on the end goal, or what is "worthy of understanding" (Wiggins & McTighe, 2005, p. 17), instructors are better able to 1) align the assessments, or the evidence, to demonstrate that the desired end goal has been achieved and then 2) plan content and learning activities to support student success for the assessments. Thus, to ensure that any learning activity is worthy of teaching, the specifics of content and teaching method/strategies are planned after the identification of the desired end goal and assessment. Building upon backward design principles, L. Dee Fink proposed an instructional design model (termed "integrated course design") that highlighted the importance of the "inter-relatedness" (Fink, 2003, p. 2) of the traditional components of learning goals, course assessments, and learning activities (Fink, 2007). While backward design focuses on the order of the components, integrated course design focuses on examining that each component is "consistent with, and supports each other" (Fink, 2003, p. 5). By integrating these components, the model helps instructors develop a student-centered course that strengthens alignment of learning activities and course assessments with achievement of course learning goals. Two evidence-based taxonomies frequently applied to develop student-centered learning goals include Bloom's taxonomy (Anderson et al., 2001; Bloom et al., 1956) and FTSL (Fink, 2013).

Bloom's Cognitive Taxonomy

The original *Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook I: Cognitive Domain* (Bloom et al., 1956), more commonly known as Bloom's Cognitive Taxonomy (BCT) or just Bloom's Taxonomy, highlighted the cognitive learning domain, one of three distinct educational objectives originally described by Bloom and his colleagues (affective and psychomotor taxonomies were also described, although not as well known) (Bloom et al., 1956). BCT intended to create a clear classification of goals and objectives in order to categorize student behavior outcomes—"the ways in which individuals are to act, think or feel as the result of participating in some unit of instruction" (Bloom et al., 1956, p. 12). With student behavior as the basis for categorization, a taxonomy of six classes were

listed from behaviors that are thought to be on a continuum from the simplest to most complex. These classes include knowledge, comprehension, application, analysis, synthesis, and evaluation. Often viewed as a pyramid with the simplest behavior (i.e., knowledge) as the wide base, and the most complex behavior (i.e., evaluation) as the top peak, BCT is set up in a cumulative hierarchical format where achievement of more complex classes likely requires successful achievement of behaviors in the preceding simpler classes.

In an attempt to incorporate new research and an understanding of aligning student learning, curriculum planning, and assessment, Anderson et al. (2001) adapted the original BCT in *A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives.* As research indicated that educational objectives should describe what students are able to do (verb) with the knowledge they have retained or obtained (noun), a "verb-noun relationship" (Anderson et al., 2001, p. 295) was the guiding principle for the new taxonomy. Since the original BCT framework described student behavior and action, the six classes were easily adapted to define the verbs needed in the revision. These six cognitive processes were renamed to remember, understand, apply, analyze, evaluate, and create, in order to align with the action (verb) described. To effectively categorize knowledge or the noun dimension of learning objectives, four different subcategories were defined, including factual, conceptual, procedural, and metacognitive knowledge. Thus, one of the most notable changes of the revised work stems from this "verb-noun relationship," where instead of a list of hierarchal classes, the revised taxonomy is a two-dimensional structure integrating the cognitive process dimension with the knowledge dimension, known as the "Taxonomy Table" (Anderson et al., 2001, p. II). While a hierarchical structure of simple to complex behavior still exists in the new cognitive process dimension, the Taxonomy Table highlights that the classes are no longer cumulative but focuses more on the interplay of knowledge and cognitive function.

Fink's Taxonomy of Significant Learning

FTSL also describes six categories of learning, with each category capturing a different kind of significant learning (Fink, 2013). These categories reflect learning goals related to foundational knowledge, application, integration, the human dimension, caring, and learning how to learn (Table 1). Unlike BCT, which only includes the cognitive learning domains (Bloom et al. 1956), FTSL advantageously combined both cognitive (e.g., foundational knowledge and application) and affective learning categories (e.g., human dimension and caring). Furthermore, unlike the hierarchical structure of BCT, Fink's taxonomy is relational and provides opportunities for different kinds of learning to interact and possibly even synergize. As such, if a learning experience promotes interaction between different categories within the taxonomy, a significant learning experience that lasts beyond course completion is more likely to occur. Thus, two requirements are often identified for a significant learning experience: (a) learners engage with different kinds of learning (i.e. achieve different learning goals across the six categories) and (b) the learning that occurs supports long-lasting change relevant to the learner's life (Fink, 2013).

Table 1

Fink's Taxonomy of Significant Learning[a]

Domain	Learning goals aligned with this domain may help students:
Foundational Knowledge	Understand and remember principles, theories, facts, terminology, etc. related to a specific subject matter.
Application	Engage in critical, practical, or creative thinking, including the "doing" of skills such as analyzing, problem-solving, or creating new ideas.
Integration	Make or recognize connections between ideas, perspectives, or realms of life within or beyond the learning experience.
Human Dimension	Learn about oneself or about interacting with others, including human attitudes, values, and beliefs or social and cultural implications.
Caring	Reflect on changes in learner's feelings, interests, or values during the learning experience or begin caring about something new.
Learning How to Learn	Prepare to become lifelong learners through becoming self-directed learners or engaging in different forms of inquiry.

[a](Fink, 2012, 2013)

Several studies have applied Fink's Taxonomy when developing course learning goals for in-person courses. In 2008, Fallahi re-designed an in-person undergraduate life span development course by aligning course learning goals and assessments with each of kind of learning from Fink's taxonomy (Fallahi, 2008). When compared to a course designed with a traditional lecture approach, application of Fink's taxonomy helped students achieve learning goals related to Foundational Knowledge, Application, Integration, and the Human Dimension. Miners and Nantz also applied Fink's taxonomy to redesign an in-person undergraduate economics course. The instructors first re-developed course learning goals that aligned with each category of Fink's taxonomy, then re-designed assignments and course learning activities to support student learning across each category of learning. Collectively, these changes resulted in students experiencing new learning gains related to the Human Dimension, Caring, and Learning How to Learn categories, as well as students becoming more reflective learners (Miners & Nantz, n.d.). Lastly, several educators have called for applying Fink's taxonomy when designing medical school curriculums to encourage significant learning and help professional medical students develop necessary skills like critical thinking, reflection, empathy, and self-directed learning (Branzetti, 2019; Hurtubise & Roman, 2014).

Instructors have also applied Fink's taxonomy when (re)designing specific assessments delivered within in-person courses. In 2014, Dekissa and colleagues evaluated a personal leadership transformation assignment delivered in an undergraduate in-person course using Fink's taxonomy as a framework. The instructors found evidence that the assignment helped students engage in different kinds of significant learning and integrate leadership experiences in their individual lives (Dekissa et al., 2014). More recently, Sanchez and colleagues applied Fink's taxonomy when developing a classroom activity in an in-person criminal justice undergraduate course. Student responses indicated development of reflexive and empathetic thinking, which the instructors believed supported engagement in a meaningful learning

experience (Sanchez et al., 2020). Lastly, in 2020, Partido and colleagues designed a scaffolded course-long project using Fink's taxonomy as a framework for an in-person course enrolling undergraduate dental hygiene students. Most students perceived that the project supported achievement of learning goals related to all six kinds of learning, with greater emphasis on Foundational Knowledge, Application, and Learning How to Learn (Partido et al., 2020).

The Current Study

Since Fink first introduced the Taxonomy of Significant Learning in 2003, several studies have examined its use as a framework for (re)designing assessments or courses for in-person delivery, with most studies identified in our literature search published prior to 2020. The absence of recent studies involving evaluation of FTSL may suggest future innovation rests in use of this framework among different instructional delivery modalities, such as distance learning. In fact, little research exists for use of FTSL when designing online learning experiences. One known example involves using BCT and Fink's taxonomy to develop course learning goals for a Professional Pharmacy four-week, one-credit hour online elective (Pate et al., 2017). The instructors did not measure whether students engaged in different kinds of learning, but evaluation outcomes did indicate achievement of most curricular and course learning goals.

Although little evidence exists for use of Fink's taxonomy as an instructional design strategy for online courses, application of other evidence-based strategies have transferred effectively to online learning delivery modalities (Orr et al., 2021). As it relates to BCT, Churches helped adapt BCT to digital environments by developing *Bloom's Revised Digital Taxonomy*, which includes new digital verbs that reflect learning processes involving digital tools and digital learning activities (Churches, 2007). In addition, Williams and Katirai advocated for implementation of BCT when designing the structure of online learning experiences (Williams & Katirai, 2018), Milman provided examples for applying BCT to develop the "right" online discussion questions (Milman, 2009), and Pikhart and Klimova demonstrated improved student satisfaction upon redesigning a blended learning course using BCT (Pikhart & Klimova, 2019). Other studies demonstrate successful implementation of Universal Design for Learning (UDL) principles in distance learning courses (He, 2014), as well as provide strategies for applying UDL principles when designing online learning environments (Morra & Reynolds, 2010; Ostrowski et al., 2017). Lastly, more recent studies report outcomes from implementing evidence-informed student engagement strategies in online learning, including use of smart interactive tools to optimize online instruction (Wang et al., 2021), identification of best practice techniques to foster student self-efficacy and motivation to learn in online courses (Bedi, 2023), as well as use of varied interactive or active learning practices to enhance online learning effectiveness (Barnett-Itzhaki et al., 2023). Moreover, Basdogan and Birdwell recently discussed effective methods for transitioning active learning practices from traditional in-person classrooms to distance learning environments (Basdogan & Birdwell, 2023).

Based on the evidence presented within this literature review, we hypothesized that effectively applying FTSL during re-design of a DL course should also support online learners toward achieving significant learning goals. Thus, this research study aims to answer the following two questions:

1. Can asynchronous DL courses also use FTSL as an instructional design strategy for supporting student achievement of significant learning goals (e.g., the first requirement of a significant learning experience)?
2. Do online course assessments such as written response papers and written self-reflections support students achieving different kinds of significant learning goals?

Methods

Study and Course Design

This study was conducted in the Autumn 2021 offering of PHR3420, "Generation Rx: America's Drug-taking Culture" (further referred to as PHR3420). PHR3420 is a three-credit, 16-week asynchronous DL course offered as a general education (GE) course at a large, public university in the Midwest. In 2017, the faculty utilized backward design principles and BCT to design and develop this course, with the first offering during Autumn 2017 (Bloom et al., 1956; Wiggins & McTighe, 2005). Faculty designed five course objectives, which gave rise to fifteen specific course learning goals. Faculty organized the course into six modules, with the first and last module focused on orienting students to the DL environment and wrapping up the course, respectively. Modules 2–5 delivered most of the course learning activities and content.

In 2021, due to changes in the GE curriculum at the university level, the faculty reexamined the course design as well as course learning objectives and goals, as well as reviewed additional evidence-based instructional strategies. To achieve the revised GE curricular goals, the faculty elected to redesign the course by applying FTSL paired with the integrated course design model. An initial review of the original course learning objectives revealed that only two of the five objectives (and thereby seven of the fifteen course learning goals) aligned with any learning category in Fink's taxonomy (foundational knowledge and application). Thus, consistent with Fink's research, the faculty first redesigned the course learning objectives and goals to support learning across multiple categories from Fink's taxonomy (foundational knowledge, application, integration, human, and caring), then realigned and revised (as needed) the course assessments and learning activities (Table 2; learning activities not included).

Faculty kept the same type of course assessments in the redesign (written response papers called "Module Assignments" and written student self-reflections called "Journal Entries"), but elected to revise the assignment prompts to align with the revised learning goals. For example, Module Assignments involved students consuming an artistic expression of our drug-taking culture (e.g., podcast, song, poem), then writing their interpretation, analysis, and aesthetic response toward this work using instructor-produced prompts as guidelines. To support learning within the integration category, the analysis prompts were redesigned to help students make connections across different ideas or perspectives relevant to the module content. To provide learning experiences connected within the human dimension and caring categories, the aesthetic response prompts were redesigned to help students learn about themselves and others, as well as help them develop new feelings, beliefs, or values that led to them caring about a new idea. Journal entries involved students synthesizing and describing the personal value of their learning experience using instructor-produced prompts as guidelines. Teaching and learning activities each week included students engaging in online discussions, viewing instructor-produced interactive lecture videos, and reading scholarly articles and a nonfiction book. During the redesign, the prompts for both the journal entries and weekly discussions were redesigned to

provide additional integration, human, and caring learning opportunities through a similar redesign process. These mapping and redesign exercises provided an opportunity for course assessments and learning activities to possibly promote different kinds of significant learning, and thus help students achieve the course learning goals.

Table 2

Alignment of Course Learning Goals and Assessments Using Fink's Taxonomy of Significant Learning

Course Learning Goal[a]	Course Assessments[b]	Aligned Categories of Fink's Taxonomy
Describe human thoughts that drive self-medicating or other medication misuse behaviors.	Module 2: MA1, JE2	Foundational Knowledge
Examine how illness perceptions and health literacy, as well as personal, historical, and cultural factors, shape one's healthcare beliefs and medication experiences.	Module 2: MA1, JE2 Module 3: JE3	Application
Analyze how different types of media as well as social norms influence medication use.	Module 2: MA2, JE2	Application
Examine how personal and cultural factors, as well as social norms, influence the development of stigma and thereby shape a patient's medication experience.	Module 2: JE2 Module 3: JE3 Module 5: MA5	Application Integration
Reflect on your personal beliefs or attitudes about the stigma surrounding mental health conditions.	Module 3: MA3, JE3	Human Caring
Examine the business, health, and cultural factors that fuel medication misuse and the opioid epidemic in the U.S.	Module 4: MA4	Application
Reflect on your feelings, interests, and beliefs toward the opioid epidemic.	Module 4: MA4, JE4 Module 5: MA5	Application Human Caring
Connect ideas that can address the opioid epidemic across several levels (e.g., individual, family, community, societal).	Module 4: MA4	Foundational Knowledge Integration
Reflect on approaches, desires, or actions that support individuals engaging in health promotion behaviors.	Module 3: JE3 Module 5: MA5, JE5	Application Human Caring
Express feelings experienced toward yourself, or others' lived experiences, that connect with America's drug-taking culture.	Modules 2 – 5: MA1-5, JE 2-5	Human Dimension Caring

[a]Faculty developed five course objectives for PHR3420, which gave rise to 20 specific course learning goals. This table includes 10 of the 20 course learning goals as representative examples to demonstrate the alignment with Fink's taxonomy.

[b]Course assessments include both module assignments (MA) and journal entries (JE)

Study Participants

Undergraduate students enrolled in the Autumn 2021 offering of PHR3420; ages 18 and older were eligible to voluntarily participate in the study. The instructor of PHR3420 sent a recruitment email to all students on Day 1 and Day 4 of the course, inviting them to voluntarily participate in the research study. In both recruitment emails, a copy of the consent form for research was attached. On Day 7 of the course, students completed a survey as part of a course assignment; Question 1 of this survey provided information from the consent form, with the final text asking students to indicate whether they consented to voluntarily participate in the research study.

Out of 50 students enrolled in PHR3420, 41 students provided consent to voluntarily participate in the research study. One student was under 18 years old, leaving a sample size of 40 study participants. Table 3 reports the key demographic makeup of the study participants. Most participants reported majors related to health or medicine, the social sciences, or STEM (science, technology, engineering, math) disciplines. Most participants identified as female, White, and ranged in age from 18 to 22 years old. Although the course has no prerequisites, most participants self-reported as enrolled in their second, third, or fourth year of their undergraduate career.

Table 3

Key Demographic Variables of Study Participants (N = 40)

Variable	*n* (%)	Variable	*n* (%)
Majors[a]		**Age**	
Arts or Humanities	3 (7.5)	18–22	38 (95)
Business	1 (2.5)	23–29	2 (5)
Education	0 (0)		
Health or Medicine	22 (55)	**Gender**[a]	
Social Sciences	6 (15)	Female	32 (80)
STEM	14 (35)	Male	8 (20)
Vocational	0 (0)	Cisgender	3 (7.5)
Other	0 (0)	All other listed options	0 (0)
Undergraduate Class Rank		**Race & Ethnicity**[a]	
First Year	2 (5)	Asian American/Asian	5 (12.5)
Second Year	8 (20)	Black or African American	2 (5)
Third Year	12 (30)	White or European American	33 (82.5)
Fourth Year	15 (37.5)	Multi-Racial	2 (5)
Fifth Year or Older	2 (5)	All other listed options	3 (7.5)
Other	1 (2.5)		

[a]Study participants selected all that apply, allowing the total percentage to exceed 100%

Data Collection

As a DL course, assessments in PHR3420 were accessed and submitted through the university's Canvas-based learning management system; thus, initial submission included identifiers such as first and last name. To maintain participant privacy and confidentiality, each student was randomly assigned a generic label (Student 01, Student 02, etc.) that allowed the

pairing of student responses throughout the semester. For each assessment, once the due date had passed, the research team exported consented student responses and replaced any identifiers with the assigned generic label before storage and analysis. Five module assignments and four journal entries were assigned throughout the semester; thus, a total of nine course assessments were available for qualitative analysis from each study participant.

Content Analysis

Coding Framework

Since the posed research questions sought to determine if Fink's taxonomy can be an effective instructional design strategy for online learners, an *a priori* coding scheme based on each of the learning categories (Table 1) was utilized. Furthermore, to answer the research questions, this study required a systematic process to describe and quantify (Downe-Wamboldt, 1992; Krippendorff, 2018; Sandelowski, 1995) achievement of Fink's learning categories through student responses. Thus, a deductive content analysis process was used as the methodological framework (Elo & Kyngäs, 2008) and assessments were analyzed using the NVivo software. This software allowed for easy organization of the large data set and provided a useful audit trail as changes to the coding can be seen.

Codebook and Coding Guideline

The research team was made up of multiple investigators including two faculty members, a pharmacist teaching fellow, and a graduate student. To create the codebook and the guidelines, the senior faculty member, who had the most experience with the content, took each learning goal and its aligned category from Fink's taxonomy (Table 2) and provided definitions and examples for coding. Once the initial guidelines were created, the entire research team evaluated and discussed any disagreement or additional clarifications needed to create a consensus coding framework prior to the commencement of coding of student responses.

Data Coding and Coder Reliability

As multiple assessments were being evaluated throughout the semester, and because each assessment may align to a different course learning goal and thus a different portion of the coding framework, each assessment was separated as an individual "coding unit" to assess coder reliability. Therefore, the coding process described below is repeated for each assessment.

Based in the practical considerations of coder reliability (O'Connor & Joffe, 2020), and the limitations of a small research team, two main independent coders (coder 1 and coder 2) were responsible for data coding. First, to determine the reliability of the codebook, a small amount of the assessment (usually 5%) was informally and independently coded by coders 1 and 2. This initial double-coding helped to discover any obvious incompatibilities of the new assessment with the coding framework. If the code book was discovered to be incomplete, then additional definitions and examples were added to refine the framework before returning to the formal coding.

To establish coder reliability, 10% of the assessment was independently coded by coders 1 and 2. If 80% agreement was reached between the two coders, coder 1 became the primary coder and completed the remaining coding independently. However, if coders 1 and 2 could not

reach 80% agreement, a consensus approach was utilized where a discussion took place until a "negotiated agreement" (Campbell et al., 2013, p. 305) was reached between the coders and any necessary modifications to the codebook were made. When necessary, an additional research team member (coder 3) would be included in the discussion process to provide additional perspectives until a consensus could be reached. Once successful, a new set of assessments was randomly selected and independently coded by coders 1 and 2 to determine reliability. This process was repeated for the assessment until the coders could reach 80% agreement.

Quantifying Data

As students were evaluated based on their objective responses to each assessment, a manifest content analysis approach was utilized and the coding of each category was taken as is, with no interpretation of any underlying thoughts and/or ideas that may have been presented by the students (Bengtsson, 2016; Kleinheksel et al., 2020). To quantify the frequency that student responses were coded to a category of Fink's taxonomy, NVivo's matrix coding query was used to assess and identify the relationship. This matrix identified the number of times (or frequency) each study participant engaged in each category of learning from Fink's taxonomy for each of the nine course assessments. Microsoft Excel was then used to analyze the distribution of these learning frequencies. For example, for each of the six categories from Fink's taxonomy, a frequency distribution table was first generated that reported the frequency of learning experiences distributed across a bin size of three. Next, the relative frequency (reported as a percentage out of the 40 study participants) was calculated for each bin. This process was completed when analyzing the frequency distribution of learning experiences across all nine course assessments (reported in Results as Table 5 and Figure 1), as well as when analyzing this data across only the module assignments or only the journal entries (reported in Results as Table 6 and Table 7, respectively).

Trustworthiness of Data

To strengthen the rigor of our qualitative research and the trustworthiness of our research process, data interpretation, and reporting, the general criteria of trustworthiness as established by Lincoln and Guba (1985) was taken into consideration. First, the research team was made up of multiple investigators with different backgrounds including two faculty members that were classically trained benchtop scientists, a pharmacist teaching fellow, and a graduate student. This allowed for investigator triangulation as multiple perspectives were considered when formalizing the codebook and the coding of student responses. Second, coder reliability was assessed throughout the project (described above) and regular research team meetings occurred to discuss and reflect on potential changes to the codebook and coding guidelines. Lastly, peers outside of the research team from the university's center of teaching and learning (who had familiarity with FTSL) were consulted for debriefing and external auditing of the codebook and coding guidelines. Initial coding input from peers prompted the research team to consider the human and caring categories of learning more carefully within the reflective assignments.

Results

RQ1: Can asynchronous DL courses also use FTSL as an instructional design strategy for supporting student achievement of significant learning goals?

Because the course learning goals were developed by applying FTSL (Table 2), qualitative analysis of each course assessment determined if students achieved the course learning goals and thus engaged with the aligned category of learning from Fink's taxonomy. Table 4 identifies examples of this mapping exercise using representative coded excerpts from both course assessments (module assignments and journal entries). For example, in the second journal entry assignment, Student 05 described thoughts around medical distrust fueling self-prescribing and self-diagnosing (i.e., self-medicating) behaviors within the African American community. Expression of this idea supported this student engaging with the course learning goal, *"Describe human thoughts that drive self-medicating or other medication misuse behaviors."* Thus, it also supported the student engaging in a learning experience related to foundational knowledge, as it demonstrated an understanding of the term *self-medicating* and thoughts that promote this behavior. As a second example, Student 20 analyzed the strategies they do or do not implement to support the mental health concerns for themselves and others within Module Assignment #5. This response demonstrated the course learning goal, *"Reflect on approaches, desires, or actions that support individuals engaging in health promotion behaviors."* The response also connected with engagement in critical thinking (i.e., application learning), learning about oneself and interacting with others (i.e., the human dimension), as well as reflecting on their feelings and interest in the subject matter (i.e., caring).

Table 4

Example Mapping of Representative Coded Excerpts from Course Assessments

Example - Coded Excerpts from Course Assessments	Mapped Course Learning Goal[a]
Aligned Category: Foundational Knowledge	
"Institutional racism is prominent in our health care systems all across America. This is not only known but often felt by African Americans all over. Therefore they begin to lack trust in the healthcare system, and doctors. This can lead to self-prescribing and self-diagnosis, or to individuals just doing nothing about their health concerns. All of which are dangerous to the individual themselves." (Student 05, excerpt of self-reflection from Journal Entry #2)	Describe human thoughts that drive self-medicating or other medication misuse behaviors.
Aligned Categories: Application and Integration	
"Depression still carries some stigma in modern society and there is often shame associated with being depressed. This shame often prevents people from opening up to others about their experiences and ultimately not receiving the help they need to improve their life. America's drug-taking culture has recently shifted to a more pro-drug therapy mindset to treat depression. Not everyone has this mindset, but most healthcare professionals support drug therapy. If more people actively tried to support people with depression and create a safe space for dialogue, I think that more people would receive the treatment they need to get better." (Student 02, excerpt of analysis from Module Assignment #5)	Examine how personal and cultural factors, as well as social norms, influence the development of stigma and thereby shape a patient's medication experience.
Aligned Category: Application	
"Thirteen per cent believe pharmaceutical companies are to blame (Blendon &Benson, 2018). In "Drug Dealer," it is clear through the	Examine the business, health, and cultural factors

repeated lines "My drug dealer was a doctor, doctor/ Had the plug from Big Pharma, Pharma" (Macklemore, 2021) that the perception of the main contributors to the opioid epidemic are doctors and pharmaceutical companies. The public is missing a big part about the opioid crisis and its development. Pharmaceutical companies who spent millions in advertising and miscommunicating the addictive properties of their drugs plays one of the largest roles in the cause of opioid misuse." (Student 10, excerpt of analysis from Module Assignment #4)	that fuel medication misuse and the opioid epidemic in the U.S.
Aligned Categories: Human Dimension and Caring	
"My viewpoint has changed on how I view those struggling with drug addiction and substance use disorders. It's easy to quickly judge those who are struggling with these problems, but this class has taught me that addiction is not a choice it's a disease and these people need help rather than punishment. I have learned how important treatment is for these individuals and that more resources need to be in our communities to support and help these individuals." (Student 19, excerpt of self-reflection from Journal Entry #4)	Reflect on your feelings, interests, and beliefs toward the opioid epidemic.
Aligned Categories: Application, Human Dimension, and Caring	
"One health promotion behavior that we touched on a few times throughout the semester is safe medication practices. This entails taking correct doses of medication, storing prescriptions properly, disposing of them properly, and more. This is something that I try to practice but can get lazy with it over time as I do take long term prescriptions. In our drug culture discussions I have felt more empowered to keep up with this practice and in my future as a pharmacist it's something that I would like to promote to patients. Not only is it smart to practice this way but it promotes my mental health as well." (Student 09, excerpt of self-reflection from Journal Entry #5)	Reflect on approaches, desires, or actions that support individuals engaging in health promotion behaviors.
"This TED talk allowed me to reflect on my own interactions with friends who have depression, as well as how my friends interact with me when I have a depressive episode. Though I believe these interactions in my personal life lack some of Bernat's suggested methods for connecting with depressed people, I do think there are some effective aspects. In both situations in my life, I believe everyone interacted equally and indirectly affirmed that the lives of everyone involved were valuable. Further, I often do set boundaries when discussing with friends and letting them know I am there for support. Finally, my friends and I definitely use humor within discussions and coping, similar to Bernat's cadence within his TED talk." (Student 20, excerpt of aesthetic response from Module Assignment #5)	
Aligned Categories: Human Dimension and Caring	
"Reading this poem made me feel sympathetic for these patients that constantly must remember to take their meds. It made me realize that most of these patients probably feel trapped in their routines and experience the four themes [of a patient's medication experience] mentioned above, which also adds a tremendous amount of stress to their lives. I understand that the medications aid them in living healthier lives, but I feel concerned	Express feelings experienced toward yourself, or others' lived experiences, that connect with America's drug-taking culture

for their mental well-being after dealing with the negatives that come along with chronic medication use." (Student 16, excerpt of aesthetic response from Module Assignment #3)

[a]Each coded excerpt was mapped to the relevant course learning goals and the aligned categories of Fink's Taxonomy of Significant Learning.

Upon completion of this mapping exercise for all coded excerpts across all nine course assessments, quantification of this qualitative analysis revealed a frequency distribution of learning experiences within each category of FTSL (Table 5). Table 5 reports that student participants engaged with different kinds of learning across five of the six categories within Fink's taxonomy throughout the semester, including foundational knowledge, application, integration, the human dimension, and caring. For example, 100% of student participants (n = 40) engaged in a learning experience related to foundational knowledge, application, the human dimension, and caring at least once, and 75% of student participants engaged in at least one learning experience associated with integration learning. However, none of the student participants engaged in a learning experience related to the learning how to learn category.

Table 5

Frequency Distribution of Learning Experiences Within Each Category of Fink's Taxonomy of Significant Learning[a]

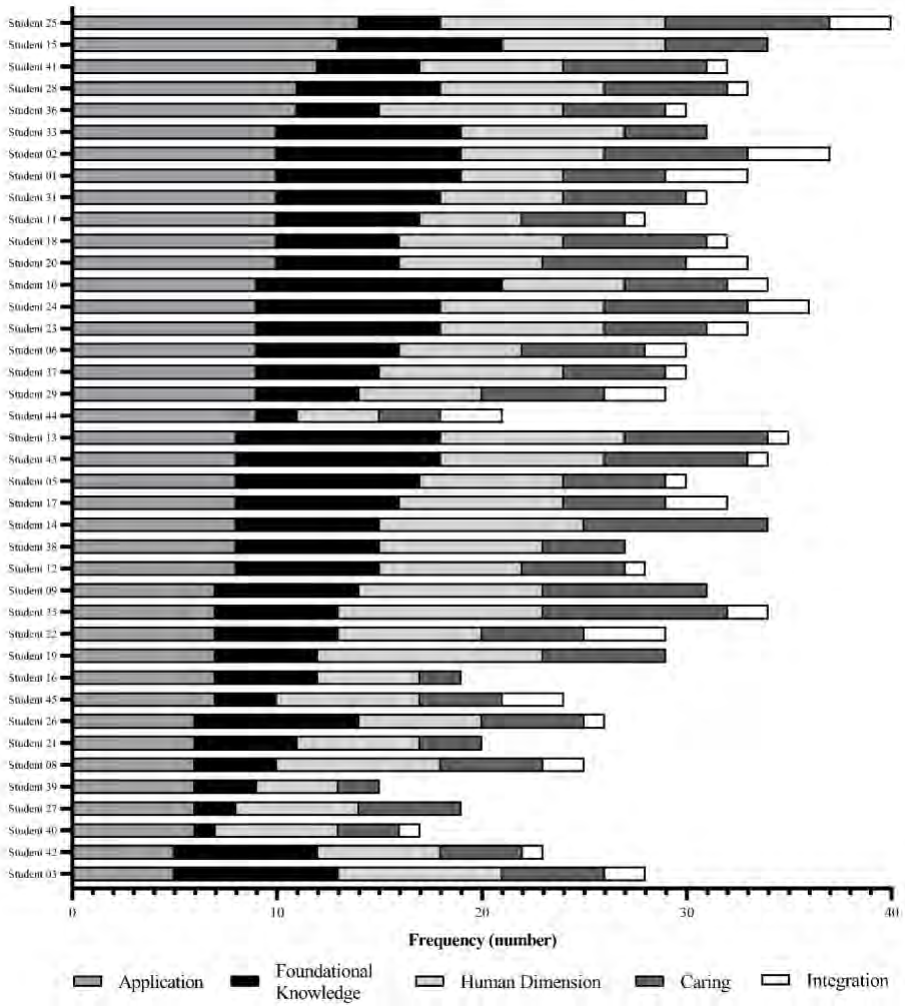
	% Student Participants (N = 40)					
Category of Learning	**0X**	**1-3X**	**4-6X**	**7-9X**	**10-12X**	**13-15X**
Foundational Knowledge	0	12.5	32.5	47.5	7.5	0
Application	0	0	20	50	25	5
Integration	25	67.5	7.5	0	0	0
Human Dimension	0	0	35	55	10	0
Caring	0	12.5	60	27.5	0	0
Learning how to Learn	100	0	0	0	0	0

[a]Students completed nine course assessments (five module assignments and four journal entries) throughout the sixteen-week semester.

Students also experienced each of these kinds of learning at different frequencies. For example, over half of student participants engaged with seven or more learning experiences that facilitated foundational knowledge (55%), application learning (80%), and the human dimension (65%), whereas over 80% of students engaged with learning experiences that connected with caring, but at a lower frequency of four or more times (Table 5). This finding is further emphasized upon examining a frequency distribution of individual student learning experiences within the five categories of observed learning (Figure 1). Across all student participants, the median frequency of learning experiences within each of the five categories of learning varied, with the median frequency for application learning the highest (n = 8), followed by foundational knowledge and the human dimension (each with n = 7), then caring (n = 5) and integration (n = 1) learning categories.

Figure 1

Frequency Comparison of Individual Student Learning Experiences Within Each Category of Fink's Taxonomy of Significant Learning. Chart that compares the number of times (frequency) individual students engaged with each category of significant learning across the nine course assessments. The categories of learning were sorted by median frequency, from left to right: application, foundational knowledge, human dimension, caring, integration.



RQ2: Do online course assessments such as written response papers and written self-reflections support students achieving different kinds of significant learning goals?

To further evaluate the types of online course assessments that contributed to the frequency of learning reported in Table 5 and Figure 1, we sorted the frequency of individual student learning experiences by assignment type. Table 6 reports the frequency distribution of

learning experiences across the five module assignments. Many students engaged with four or more learning experiences that facilitated learning related to foundational knowledge (85%), application (47.5%) and the human dimension (57.5%). In addition, over half of the students engaged with one or more learning experiences related to integration (62.5%) or caring (90%).

Table 6

Frequency Distribution of Learning Experiences Within Each Category of Fink's Taxonomy of Significant Learning Across the Module Assignments[a]

	% Student Participants (*N* = 40)				
Category of Learning	**0X**	**1-3X**	**4-6X**	**7-9X**	**10-12X**
Foundational Knowledge	0	15	62.5	20	2.5
Application	5	47.5	45	2.5	0
Integration	37.5	62.5	0	0	0
Human Dimension	0	42.5	57.5	0	0
Caring	10	80	10	0	0
Learning how to Learn	100	0	0	0	0

[a]Students completed five module assignments throughout the sixteen-week semester.

Table 7 reports the frequency distribution of learning experiences across the four journal entry assignments. Most students (92.5%) engaged in four or more application learning experiences, whereas a smaller percentage of students experienced learning related to the human dimension (40%) or caring (37.5%) at a frequency of four or more times. Many students also engaged in one or more learning experiences related to foundational knowledge (67.5%) or integration (42.5%), but several students did not engage in learning related to either of these categories in any journal entry assignment (32.5% for foundational knowledge, 57.5% for integration).

Table 7

Frequency Distribution of Learning Experiences Within Each Category of Fink's Taxonomy of Significant Learning Across the Journal Entries[a]

	% Student Participants (*N* = 40)			
Category of Learning	**0X**	**1-3X**	**4-6X**	**7-9X**
Foundational Knowledge	32.5	62.5	5	0
Application	0	7.5	75	17.5
Integration	57.5	42.5	0	0
Human Dimension	0	60	40	0
Caring	0	62.5	37.5	0

Learning How to Learn	100	0	0	0

[a]Students completed four journal entries throughout the sixteen-week semester.

In summary, upon examining learning experiences at a frequency of four or more, Tables 6 and 7 report some similarities and differences between the module assignments and journal entries. For instance, learning related to the application and human dimension categories were common for both assignment types. Conversely, at the higher frequencies, the module assignments may have uniquely engaged students in learning related to foundational knowledge, whereas the journal entries supported more students engaged in the caring learning category.

Discussion

The purpose of this study was to evaluate if the online learning community could also utilize FTSL as an instructional strategy for designing courses that supported online learners toward achieving significant learning goals. Despite the use of Fink's taxonomy when (re)designing assessments or courses for in-person delivery, little research exists for online learning delivery modalities. A key finding from this study was that applying Fink's taxonomy to redesign the course learning goals and assessments of an asynchronous DL course helped students engage with different kinds of learning across five of the six categories within Fink's taxonomy (foundational knowledge, application, integration, the human dimension, caring). A second key finding from this study was that course assessments that include analysis, aesthetic learning, and self-reflection exercises provided students with opportunities to engage with these different kinds of learning and achieve several significant learning goals. Collectively, study findings indicate that most student participants achieved the first requirement of a significant learning experience as identified by Fink—that learners engage with different kinds of significant learning (i.e., achieve different learning goals across the six categories of Fink's taxonomy).

According to Fink, learners do not need to experience each kind of learning within the taxonomy to achieve the first suggested requirement of a significant learning experience. However, moving learners beyond foundational knowledge and application learning increases the likelihood of a significant learning experience (Fink, 2013). As such, our redesign efforts focused on developing course learning goals that extended beyond foundational knowledge and application learning, but also included integration, human, and caring learning experiences. Out of the 20 specific course learning goals developed by applying Fink's taxonomy, zero goals aligned with the category learning how to learn. Thus, it is not surprising that study participants did not engage in this kind of learning throughout their course experience. However, out of the 20 specific course learning goals redesigned by applying FTSL, many aligned with one of the remaining five categories from Fink's taxonomy. For example, 9 of the 20 course learning goals aligned with application learning, followed by foundational knowledge (8 of 20), the human dimension (5 of 20), caring (5 of 20), and integration (4 of 20). This alignment also correlated with the extent to which students engaged with each of these kinds of learning on the course assessments, as most students engaged in four or more learning experiences related to application, foundational knowledge, the human dimension and caring throughout the semester.

Only 7.5% of study participants engaged in four or more learning experiences related to integration, despite at least four course learning goals aligning with this kind of learning. This finding may reflect that future course revisions should include strengthening the alignment between existing course assessments and the course learning goals that support learning within the integration category. Overall, our findings suggest that if the goals of a course reflect a significant learning experience, then intentionally designing that impact by pairing Fink's taxonomy with backward design principles is important.

It is also not entirely surprising that intentional alignment and application of Fink's taxonomy when completing each step of the backwards design model also fostered online learners toward achieving significant learning goals, as recent research indicates the important role alignment plays in designing effective online learning experiences (Baldwin et al., 2018; Jaggars & Xu, 2016; Martin et al., 2019). For example, Baldwin et al. (2018) examined the characteristics of six national and statewide online course evaluation instruments and their rubric and found that most instruments included criteria associated with the alignment of course assessment and learning activities toward the course objectives. The importance of course content alignment was echoed by Martin et al. (2019) in their qualitative analysis with award-winning online faculty members who underlined the importance of "systematic approach" and "alignment" to online course design. Thus, recent studies highlight how seamlessly content alignment, as described in backward design and integrated course design principles, has been adapted to online teaching and learning. This transition is possible because the basis of these principles does not dictate the specific assessment and learning activities best for online education but are focused on the connected or inter-relatedness of the learning activities and assessment to the learning goals (Fink, 2003; Wiggins & McTighe, 2005).

Effective alignment also involves developing assessments that support students achieving each course learning goal, then creating learning activities to support successful completion of said assessments. As it relates to this study, redesigning the assignment prompts in both types of course assessments (e.g., module assignments and journal entries) helped students engage with different kinds of learning within Fink's taxonomy. Journal entry assignments encouraged student-centered learning through learner–content interactions that consisted of self-reflection exercises using instructor-produced prompts as guidelines. Recent research discusses the value of self-reflective exercises in online learning, as these exercises encourage learners to deepen their understanding of key concepts, identify knowledge gaps, integrate concepts, as well as personalize their learning experience (Chang, 2019). Consistent with some of these themes, a resource developed by Fink identified self-reflection exercises as a method for measuring learning related to integration, the human dimension, caring, and learning how to learn categories (Fink, 2012). As it relates to this study, findings demonstrated that self-reflection exercises indeed promoted learning related to the human dimension and caring categories, but many students also demonstrated application learning in their journal entry assignments. In addition, some students demonstrated learning related to foundational knowledge and integration, but many students did not. Taken together, it may be that self-reflection exercises remain valuable for encouraging each kind of significant learning, but the design of the assignment may emphasize some kinds of learning over others. For instance, in our study, each journal entry assignment included instructor-produced prompts that aligned with specific course learning goals and thus specific categories of learning from Fink's taxonomy. As an example, in Journal Entry

#4, to achieve the revised learning goals listed in Table 2 that connect with application, human, and caring learning categories, we rewrote the assignment prompts to support students reflecting on the feelings and beliefs evoked when they hear the terms "opioid epidemic" or "drug addiction or substance use disorder." The revised prompts asked students to support their reflection with examples from the course materials or their own lived experiences, as well as to discuss how their feelings or beliefs had changed due to their course learning experience.

Module Assignments also encouraged student-centered learning through learner–content interactions that promoted critical thinking and aesthetic learning, as they involved students consuming an artistic expression of our drug-taking culture (e.g., podcast, song, poem, documentary), then writing their interpretation, analysis, and aesthetic response toward this work using instructor-produced prompts as guidelines. As it relates to critical thinking, Fink identified analysis exercises as an opportunity for students to engage in application learning, as they support students developing critical, practical, and creative thinking skills (Fink, 2013). Our study findings reinforce this idea, as many students engaged in several learning experiences related to application learning within the module assignments. In addition, these assignments also promoted learning related to foundational knowledge, suggesting that analysis exercises may also help students demonstrate an understanding of key ideas. As it relates to aesthetic learning, study findings also support a possible connection between aesthetic learning exercises and engagement in other kinds of significant learning, such as integration, the human dimension, and caring. Regardless of a course's learning goals, six characteristics or conditions that allow for more aesthetic learning experiences include connections, active engagement, sensory experience, perceptivity, risk taking, and imagination (Biscotte, 2015; Uhrmacher, 2009). In 2015, Biscotte (2015) published an article that advocates for teaching aesthetic experiences within a general education curriculum. Biscotte states, "a student undergoing an aesthetic experience connects and actively engages with an object in his or her environment by perceiving, not just recognizing, the object through sensory experience and venturing into the unknown by using imagination and taking risks that lead to many rich and often surprising connections" (Biscotte, 2015, p.247). While aesthetic learning may take many forms, in our study, we redesigned the aesthetic learning prompts to help students share how consuming the artistic work (e.g., the poem, song, documentary) made them feel, as well as imagine how the ideas expressed in the artistic work impacted others. For example, in Module Assignment #3, to achieve the relevant redesigned learning goals, the assignment prompts were redesigned to help students discuss the feelings, thoughts, and reactions to chronic medication use for the protagonist in the poem "The Orange Bottle." Students then compared their own feelings generated from reading this poem, with support from a self-reflection that further explained their thoughts and feelings about the impact of stigma associated with medication use for mental health conditions. Through aesthetic learning, we believe these exercises helped students develop new feelings, interests, or values about key concepts and ideas (e.g., caring) as well as helped them learn more about oneself and others (e.g., the human dimension). This study finding is among some of the first preliminary research connecting engagement in different kinds of significant learning with aesthetic learning experiences.

Despite these positive outcomes, this study had some limitations that must be considered. First, the generalizability of our study findings may be limited to other 100% asynchronous DL courses. However, we believe that implementing the course design principles identified in this

manuscript would yield similar outcomes even with synchronous, blended, or hybrid online delivery modalities. Second, we did not evaluate how the course learning activities (e.g., online discussions, viewing instructor-produced lecture videos, reading scholarly articles, and reading a nonfiction book) supported study participants toward achieving the learning goals for both the module assignments and journal entries. Designing effective learning activities is a key principle of the backward design model, and we assume these activities played an important role towards students achieving the course learning goals within the course assessments and engaging in the different kinds of learning from Fink's taxonomy. Third, we lacked the capacity to compare student responses before the course revision to the current data set. Thus, it is possible that elements of significant learning may naturally occur without intentionally redesigning the course using Fink's Taxonomy. Fourth, we did not stratify the data set by any one demographic and thus study findings may vary among some of these variables. Lastly, the trustworthiness of our study could have been enhanced if member checks were conducted to ensure that the results were accurate from the perspective of the study participants. In addition, because we lacked the capacity for member checks, our study focused on manifest analysis instead of latent analysis, which could have overlooked significant learning that was expressed in the interpretation of student responses.

Conclusion and Future Directions

In conclusion, key findings from this study support that when paired with the backward design or integrated course design model, applying FTSL during the course (re)design process also supports online learners toward achieving significant learning goals. Online course assessments that emphasize multiple kinds of learning from Fink's taxonomy consistently implemented throughout a grading term may increase the likelihood that these learning experiences overlap and possibly synergize to help promote a significant learning experience. Moreover, aesthetic learning exercises may serve as a useful tool for supporting learning related to the human dimension and caring categories. Despite the asynchronous online learning environment, study findings support that most students achieved the first requirement of a significant learning experience. This key finding is part of a larger research study that evaluated if the redesigned course experience also helped this same cohort of students achieve the second suggested requirement—that the different kinds of learning experienced (from the first suggested requirement) would support meaningful and long-lasting change relevant to the learner's life. Future efforts will focus on disseminating findings from this second part of the larger research study and thus help strengthen the body of evidence to support use of FTSL as an effective strategy for reaching in-person *and* online learners with significant learning experiences that change their lives in meaningful ways.

Declarations

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