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Perceptions and utilization of a multimedia teaching strategy to prevent student nurse attrition

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A B S T R A C T

Untethered Lecture Capture (ULC) is a teaching method facilitating student classroom engagement while simultaneously creating audiovisual lecture capture (LC) resources. This single-site, convergent parallel mixed-methods study qualitatively described how nursing students with attrition risk factors perceived ULC influenced learning and quantified how such students utilized LC. Study participants (N=28) reported watching *most* LC resources (57.1%) and 42.9% watched *entire* LC videos from start to finish. Qualitative findings produced new evidence about untethered *faculty proximity* in the classroom and *ULC techniques* supporting in-class focus and post-class self-paced learning efficiencies. Findings help nurse educators prioritize instructional methods among students with attrition risk factors.

Keywords:
Attrition
Education innovation
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Technology affordances
Untethered Lecture Capture

Nurse educators at a baccalaureate nursing program in the Pacific Northwest region of United States (US) implemented Untethered Lecture Capture (ULC), a theory-guided, technology-enhanced classroom teaching strategy, to support active learning and academic success. Matriculated student nurse attrition at the author's nursing program is nine percent annually. Research is needed to understand effective classroom teaching strategies which enhance learning and promote retention among student nurse populations who have attrition risk factors. Nursing students who have attrition risk factors may experience benefits in classrooms where faculty utilize ULC methods. This research had two purposes: (1) quantitatively describe how nursing students with attrition risk factors used ULC multimedia digital recordings outside of class and (2) qualitatively describe student perceptions regarding ULC teaching methods and influence on learning. Such research is needed to evaluate teaching and learning practices which address the critical need to reduce attrition, retain diverse students and enhance workforce diversity.

Literature Review

It is essential to recruit and support diverse nursing students to create a workforce that more closely represents the population it serves ([National Academies of Sciences, Engineering and Medicine,](#)

[2021](#)). Attrition is higher among defined student nurse populations contributing to workforce diversity disparities ([Barbe et al., 2017](#); [Donnell et al., 2018](#); [Murray et al., 2016](#); [Petges 2019](#); [Smith-Wacholz et al., 2019](#)). Attrition is defined as a departure from the desired program of study or from the University ([Tinto, 2012](#)). Identified attrition risk factors include: (1) parents born outside the US, (2) student born outside the US, (3) first language not English (FLNE), (4) racial diversity not white, (5) first-generation college student (FGEN), and (6) Pell Grant recipient or Pell Grant eligible ([Barbe et al., 2017](#); [Donnell et al., 2018](#)). According to [Everett \(2022\)](#), students are at-risk for attrition due to financial challenges, family obligations, psycho-emotional stressors related to discrimination, anti-immigrant bias, political climate issues, and/or feelings of self-doubt or embarrassment when speaking up in class or with the instructor.

The preponderance of student nurse retention literature describes academic support services that supplement classroom instruction ([Barbe et al., 2017](#); [Donnell et al., 2018](#); [Murray et al., 2016](#); [Petges 2019](#); [Smith-Wacholz et al., 2019](#)). Specific academic support services include peer mentoring, resilience coaching, math and writing support tutors, and time management methods. Extending beyond support services, lecture capture (LC) has been described as a promising retention strategy.

The literature defines LC as using technology to digitally record live lecture ([Groen et al., 2016](#)). Recordings are converted into media files and uploaded to course management learning platforms. Reported benefits include the ability to re-watch LC multiple times, self-paced personalized learning, reduced note-taking anxiety, and

improved classroom focus (Groen et al., 2016; Hall & Ivaldi, 2017; Krautscheid et al., 2019). Additionally, FLNE students could specifically benefit from LC because they can study and translate at their own pace (Hall & Ivaldi, 2017; Rahman et al., 2017). One method for creating LC is via ULC strategies.

Untethered Lecture Capture

Untethered Lecture Capture (ULC) is a classroom strategy which integrates a whiteboard app (Explain Everything™) on a tablet (iPad™) with screen casting (AirServer Universal™) technology, permitting faculty to be untethered (Ingersoll & Riedy, 2015; Krautscheid et al., 2019) while simultaneously teaching and creating audiovisual LC resources. Mayer's (2008) Cognitive Theory of Multimedia Instruction (CTMI) provided theoretical guidance for developing ULC teaching strategies. Faculty simultaneously teach and record live lecture via the whiteboard app, creating audiovisual LC resources. While the literature describes ULC benefits among pre-licensure nursing students (Krautscheid et al., 2019), a gap exists about ULC utilization and perceptions among students who have attrition risk factors.

Research Methods

This single-site study employed a convergent parallel mixed method (Creswell & Plano Clark, 2018) research design aligned with the quantitative and qualitative research questions. Two types of data were concurrently collected and data was independently analyzed. Data were then analyzed as a whole to explore converging and diverging findings (Creswell & Plano Clark, 2018).

A non-experimental, descriptive cross-sectional survey design was used to collect both quantitative and qualitative data. The researcher-developed survey includes demographic data, quantitative ULC utilization questions and qualitative ULC perception questions. The survey instrument was reviewed by four doctoral prepared educators to establish content validity. An item-level content validity index (I-CVI) of 0.98 was calculated for the quantitative ULC utilization questions, meeting the I-CVI requirement as stated by Polit et al. (2007). Quantitative questions asked participants to: (1) report how much they watched ULC digital resources, (2) report ULC viewing preferences, and (3) report why they watched ULC resources. Quantitative data were exported from a Google Form survey into a Microsoft Excel spreadsheet and measures of central tendency and percentages were calculated.

Two qualitative questions were included in the survey to collect data about the second research question regarding student perceptions concerning ULC teaching methods and influence on learning. The qualitative, open-ended narrative prompts asked the following: (1) Now that you have participated in a class where the faculty utilized ULC teaching strategies, describe how ULC has influenced your learning and (2) describe a ULC educational experience that you felt was powerful in terms of supporting your learning. Qualitative responses were exported from a Google Form survey into a word document. Text data was cleaned by the primary researcher, removing inadvertent identifying information such as faculty or course names. The cleaned narratives were emailed to co-researchers via the secure University server email system. Descriptive content analysis procedures (Elo & Kyngas, 2008; Vaismoradi et al., 2013) were used to analyze the narratives. Three doctoral prepared researchers with qualitative research experience independently read the text data multiple times, seeking commonalities in language and redundancy in thought. Throughout the content analysis process, text segments from the data were classified as belonging to specific codes. A code book (MacQueen et al., 1998) was utilized throughout the iterative content analysis process to enhance dependability and reliability. Researchers collapsed codes into categories that shared general

meanings. To further enhance dependability and reliability, the researchers frequently returned to the data, checking text segments against category definitions. Researchers met to compare codes and categories, discuss variations and arrive at final agreement.

ULC Faculty Training

Four faculty (40%) volunteered to learn and implement ULC teaching strategies. Training was provided by an experienced nurse educator in collaboration with an academic technology staff member. The ULC training occurred during four, two-hour face-to-face faculty development sessions which included: (1) understanding Mayer's (2008) CTMI principles, (2) demonstrating technology use, (3) redesigning instructional resources to align with technology affordances and CTMI principles, and (4) discussing ULC practices supporting teaching and learning. Additional training, support, and troubleshooting were offered and provided by the experienced nurse educator and academic technology support staff as requested and as needed. ULC teaching strategies were in place for two semesters (fall 19 and spring 2020) and study data collection occurred during the third semester (fall 2020).

Sampling Strategies

Participants were recruited using a purposive, convenience sampling method. Academic site Institutional Review Board approval was obtained. Students enrolled in first-semester pre-licensure nursing courses (N = 83) received a recruitment email with a survey link. Survey completion constituted consent. The survey did not contain identifying information that could connect study participants with findings. Inclusion criteria: (1) age 18 years or older, (2) participated in a nursing course where faculty utilized ULC teaching methods, and (3) one or more attrition risk factors. Sixty-five students responded to the survey (78%). Twenty-eight of the respondents (43%) matched all of the inclusion criteria and these students comprised the study sample.

Findings

Participants (n = 28) identified having one or more attrition risk factors. Attrition risk factors included Pell Grant recipient or Pell Grant eligible (n = 15), FGEN college student (n = 15), one or more parent not born in the United States (n = 3), primary language spoken at home not English (n = 2), and student not born in the United States (n = 1). Demographic data: 25 (89.3%) females and 3 (10.7%) males with a mean age of 25.6 years and the primary ethnicity was white (n = 26; 92.8%).

Quantitative Analysis: Lecture Capture Utilization

All participants reported they watched LC recordings outside the classroom. Responses to questions about ULC utilization (Table 1) revealed 57.1% of participants watched *most* (50%–90%) ULC resources and 28.6% watched *every* ULC resource. Responses to questions

Table 1
Untethered Lecture Capture Recording Utilization

Utilization Options	Student Response (N = 28) n (%)
I watched <i>every</i> lecture capture resource -100%	8 (28.6%)
I watched <i>most</i> of the lecture capture resources (50%–90%)	16 (57.1%)
I watched <i>some</i> of the lecture capture resources (<49%)	4 (14.3%)

Table 2
Untethered Lecture Capture Viewing Preference

Viewing Preference	Student Responses (N = 28) n (%)
I typically watched the entire lecture capture from start to finish.	12 (42.9%)
I typically watched segments that I needed to watch.	7 (25%)
I typically watched either the entire lecture or just segments of the lecture.	9 (32.1%)

about ULC viewing preferences (Table 2) revealed 42.9% of participants typically watched *entire* ULC recordings from start to finish. Responses to questions about why participants watched ULC resources (Table 3) resulted in the following findings: (1) to fill in gaps in class notes (n = 25; 89.3%), (2) study for examinations (n = 25; 89.3%), (3) strengthen course concept comprehension (n = 25; 89.3%), and (4) seek answers to one's own questions (n = 14; 50%).

Qualitative Analysis: Untethered Lecture Capture: Influence on Learning

Participants provided typed narratives in response to the survey question, "how did ULC influence your learning?" Content analysis resulted in developing two categories: i.e., *enhanced classroom engagement* and *engagement outside the classroom*.

Enhanced Classroom Engagement

Two dominant subcategories emerged from the text data: *ULC techniques* and *untethered faculty*.

Text segments described *ULC techniques* that helped students stay focused during class, contributing to classroom engagement. The preponderance of data emphasized the impact of real-time faculty annotations and drawings on prepared slides via the whiteboard app. Dominant narratives included: "It is more engaging that the professor can write on the iPad. I appreciate the professor filling in notes on the PowerPoint in real time, it helps me stay focused"; "It has helped me to focus and see visually what I need to learn. Seeing them [faculty] writing while talking through things on the slide is very helpful"; "A major influence is how engaged the lectures are. When a professor uses ULC, I am able to watch them write ideas and processes in real time and I am more engaged."

Text segments also described *untethered faculty* and the influence of faculty proximity on classroom engagement. Faculty mobility enhanced student focus, promoted classroom interactions and encouraged students to ask questions. Exemplar text data included: "I felt more connected to the learning process. Having the ability to walk around the classroom kept me focused and facilitated conversations"; "Our professor was able to freely walk around, more of the class was able to share and contribute. Sometimes the first two rows are the only people who share. . .but ULC facilitates greater collaborative engagement"; and "It is easier to ask questions because . . . the classroom feels much more discussion oriented."

Table 3
Why Students Use Lecture Capture Resources (N = 28)

Survey Question (Select All That Apply)	Student Responses n (%)
To fill in gaps in my class notes	25 (89.3%)
To study for examinations	25 (89.3%)
To strengthen comprehension of core concepts	25 (89.3%)
To seek answers to my own questions (rather than emailing a friend or faculty)	14 (50%)

Engagement Outside the Classroom

Students described how ULC teaching methods promoted efficient and flexible learning opportunities after class. One dominant sub-category emerged from the data: *efficient self-paced learning*.

Text data described how LC facilitated *efficient self-paced learning*. Students stated: "When confused about a topic I'm studying, I'm able to go to a specific point in the lecture capture and get my questions answered"; "Being able to go back over the lectures at my own pace truly allowed myself to absorb the information at a far deeper level"; and "Lecture capture has made learning so much more accessible. Having the option to learn in my own time was the main factor in my success."

Merged Analysis

Quantitative and qualitative findings collectively describe student utilization and perceived benefits associated with ULC. Converging findings between data sets reveals students with attrition risk factors use LC multimedia digital recordings outside of class to study, strengthen understanding and promote efficient, self-paced learning. Additionally, the converging data reveals students perceive LC enhances accessibility to learning resources, permitting students to seek answers to one's questions on their own time and at their own pace. A qualitative finding that did not appear in the quantitative data was the combined influence that ULC techniques and untethered faculty proximity had on students in the classroom; i.e., enhanced student focus, student engagement, and classroom conversations, discussions and collaboration.

Discussion, Limitations, and Recommendations

This study identified new evidence about untethered *faculty proximity* inside the classroom. Content analysis resulted in rich understandings about untethered faculty proximity and student engagement. According to Groccia (2018), student engagement is defined as moving learners from passive recipients toward active learning which is identified when students are focused, discussing, sharing and questioning. Participants reported untethered faculty facilitated a collaborative classroom experience where students felt encouraged to ask questions. This is particularly important for FLNE students who have reported feelings of shyness, self-doubt and embarrassment when speaking in class (Everett, 2022).

Another key finding emerging from this study was *ULC techniques*, which were described as contributing to robust LC recordings and supporting *efficient self-paced learning* outside the classroom. Students with attrition risk factors reported watching *most* or *every* LC. Pell Grant eligible/recipients and FGEN students are financially independent, support dependents, commute, and typically work while enrolled in college courses (McCallen & Johnson, 2020; Mitchell et al., 2021). Such characteristics impose competing time demands hindering the ability to stay after class and ask questions, attend office hours and/or tutoring sessions. Thus, LC appears to promote studying flexibility and independence, providing academic support.

A thought-provoking finding was 42.9% of students reported watching the *entire* LC from start to finish (estimated 50 to 90 minute duration per LC). This finding indicates LC is a valued post-class learning resource among students who are managing competing time demands. However, this finding also suggests some students may not be using LC effectively. Nordmann et al. (2020) recommend learning is enhanced when students identify study goals, watch specific LC sections and take notes on problem areas rather than watching the full recording. Thus, a recommendation for faculty is to provide students with explicit education about effective LC use.

Outside the classroom, data collectively revealed unique benefits associated with ULC recordings. Specifically, integrating CTMI

principles with whiteboard app technology resulted in quality audio-visual LC which enhanced post-class studying efficiencies when compared with static slides, audio recordings, drawings on stationary whiteboards, and written class notes. These findings suggest ULC appears to offer more benefits than traditional LC. Specifically, ULC strategies overcome barriers such as classroom mounted cameras and wall-mounted whiteboards which restrict faculty mobility and limit whiteboard visibility during live lecture (Dommeyer, 2017; Groen et al., 2016; Rahman et al., 2017).

Study limitations included a small sample size (n = 28), a single-site study, and overrepresentation of white students (89%). According to the National League for Nursing (2018), 68.6% of nursing students enrolled in basic RN programs in the United States are white. As such, the reported limitations diminish generalizability. Simultaneously, the credibility of qualitative findings offers a catalyst for additional research and nursing education recommendations. Research recommendations include repeating this study at multiple sites with a larger and more diverse sample. Additionally, future research should include marginalized student populations such as LGBTQ+ students. Another research recommendation is to teach students how to effectively use LC resources and then conduct a correlational study measuring relationships between LC utilization and student academic performance.

Administrators and faculty strive to recruit, retain and graduate a diverse student population, contributing to a diverse post-licensure workforce. This research describes how students with attrition risk factors perceived ULC contributes to enhanced classroom focus and engagement while also enhancing post-class learning resource accessibility through multimedia LC videos. Nurse educators are encouraged to implement ULC as a promising classroom teaching strategy which is perceived to enhance learning among students who have attrition risk factors.

Declaration of Competing Interest

The authors declare no conflict of interest related to the conduct of this study. The authors received no funding to conduct this study.

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