AMERICAN RESEARCH JOURNALS
An Academic Publishing House

H5P Technology using Interactive Study Questions to Promote Student Engagement and Learning in a Family Nurse Practitioner Program

Maureen Courtney, APRN, BC-FNP, PhD

Associate Professor, University of Texas at Arlington, College of Nursing and Health Innovation.

Graduate Family Nurse Practitioner (FNP) students must master considerable content that is complex in nature and comprehensive in scope (AANP, 2022). The majority of my college's courses are online and most are accelerated with durations of five to eight weeks, which can be a challenge for students. Faculty are committed to using the most effective teaching-learning strategies to promote effective learning and are always searching for strategies to enhance learning.

To promote my students' learning, I joined a university fellowship named the Professional Learning Community (PLC) 2021-22. My goal was to learn more about a particular technology, H5P, that I was aware could support development of sophisticated, embedded question sets into a learning management system such as Canvas. Additional options were available in H5P including such things as branching scenario questions, matching questions, and case studies. Particularly attractive with H5P was it could be used by students asynchronously, meaning an individual student could use it at anytime 24/7. H5P technology and its many approaches were inviting because I believed the knowledge application and interaction opportunities it could provide to students would enrich their learning and future practice.

H5P is a free and open-source content collaboration framework based on JavaScript. H5P is an abbreviation for HTML5 Package, and aims to make it easy for everyone to create, share and reuse interactive HTML5 content. Interactive videos, interactive presentations, quizzes, interactive timelines and more have been developed and shared using H5P on H5P.org. (H5P, 2020). The software supports reusing strategies and these can be shared with other users if desired.

FNP students must have increased opportunities to practice applying critical knowledge to various patient scenarios. Using H5P, I believed that their engagement in ungraded, low-stakes assignments should improve their ability to master required knowledge, in contrast to participating in only high-stakes graded assignments as is the current case. I also hoped that, in the long term, additional practice with H5P interactive study questions could support FNP students to increase their competencies to care for patients in the real world.

I had observed in past courses that students enjoy and do better when presented with questions that are low stake. In the past, I have embedded multiple choice questions for discussion in weekly synchronous chats with the class. However, the technology for this was limited to polling and was not asynchronous. H5P technology could add opportunities, sophistication, and asynchronous ability not available to the course before. As I became more familiar with H5P technology, I also planned to be a potential resource for colleagues.

In the PLC fellowship, each individual developed a project; the goal of my project was to enhance student engagement in learning using H5P technology to create and embed interactive study questions. The specific purpose was to involve FNP students in meaningful, ungraded, online learning interactions using H5P innovations such as sophisticated style multiple choice questions and branching scenarios. I developed this approach to embed into a master's level nurse practitioner course in selected learning modules.

METHODS

During the fall semester, I learned to work within H5P during bi-weekly sessions with various consultants and peers in the fellowship. I also learned about other H5P strategies that colleagues in the fellowship were developing.

The research plan was to determine how use of the H5P tools affected student learning and student evaluation of their learning. The university IRB reviewed and approved the project.

I used embedded, ungraded H5P multiple choice questions for major content areas in the course. The intent was to provide students with a low-stakes practice activity to better learn the content. I discussed using this technology with other faculty members teaching in the course who expressed support. I also communicated the plan with the FNP Program

Director and the Graduate Program Director who were also supportive.

The research plan included:

Process Evaluation

1. Determine usage data for the H5P activities: % of users in each module, time spent in the H5P activity, and brief user comments per activity.

2. Document faculty time to develop and embed H5P tools.

Outcomes Evaluation

1. Compare quiz scores in two course sections using "H5P embedded" questions with the quiz scores from a "non-H5P" section to determine any differences.

2. Analyze end of course student evaluation attitude ratings and comments.

Another PLC fellow had developed a 25-item evaluation survey containing demographic variables, attitude variables, and recommendations/comments. (C. Spivey, personal communication, January 4, 2022). Some of the original items were modified and a few items pertinent to nursing were added by the author resulting in 28 items. The majority of the survey questions had been piloted in a previous course in another department (Economics) yielding useful evaluation results. H5P-provided student drill down reports at course conclusion were also used to obtain evaluation data.

I developed 85 multiple choice questions based on module learning objectives I labeled interactive study questions. I embedded these H5P questions proportionally in three of the five course modules (diabetes, hypertension (HTN), and coronary artery disease(CAD)/lipids). Each of these three modules already contained an 18 question graded quiz that I would use to compare quiz scores for students who used the H5P learning questions with the quiz scores for students in a prior course section that ran before the use of H5P embedded questions.

RESULTS

Outcomes Data

The independent samples t-test (Welsh version using unequal variances) examining the Coronary Artery Disease (CAD)/lipid quiz scores between users and non-users of the H5P embedded questions was statistically significant and higher for the users ($t(261) = 3.97$, $p = .001$). HTN quiz scores and diabetes quiz scores resulted in no significant differences between the groups.

All students (n=165) enrolled in two sections of the course with H5P questions voluntarily completed the interactive questions. Ninety-six percent of the students (n=158) responded to the evaluation survey. The student evaluation responses were overwhelmingly positive (see Table 1).

Table 1. *Summary of Key Survey Attitude questions*

Strongly Agree/Agree Ratings	Key Attitude Questions Highlights
98%	Added to the **quality** of the course
90%	**Immediate feedback** from the questions helped me understand the course material
95%	Answering the questions again, immediately after my first attempt, helped me **master** the course content.
98%	**Enjoyed** answering the questions more than taking standard Canvas quizzes.
94%	Ungraded practice questions helped me to **do better** in the course
98%	Interactive questions definitely **enhanced my learning**
93%	**Clinical decision-making skills were enhanced** by doing the interactive quizzes
87%	Interactive questions definitely helped me to **score better on the quizzes** than if I had not practiced with them.
94%	Interacting with the questions was a **good use of my time** in the course

In general, evaluation data showed students believed they did better in the course, their learning was enhanced, clinical decision-making skills were improved, questions were a good use of their time, and they did better on the graded quizzes having interacted with the questions.

Students also provided comments in the survey, some of which included:

- These interactive questions were the absolute best change that happened to this nursing program.

- I enjoyed the feedback from the questions. It honed-in on the subject matter was neglecting or overlooking.

- Love the questions. I did them several times.

- This was the first class that offered ungraded questions and answers that were related to the material needed for application and quizzes. Thank you for having them available and I would recommend them for all future classes. Great!

- II do hope you start doing these questions for every course. They helped me to bring the content together and allowed me to review what I needed.

- The interactive study questions were very helpful, and getting immediate feedback is beneficial.

Process Data

Students in the two courses completed all H5P questions and spent approximately 30 minutes per module. Many

repeated the questions raising their scores. They reported the questions were a good use of their time.

Faculty invested 10-12 hours learning to use H5P. However, part of that time was learning about additional H5P strategies that other fellows were going to use. Developing the multiple choice questions averaged approximately five hours. These are questions that can be re-used. Inserting the new questions into the Canvas course was extremely easy requiring just a few clicks per module to insert.

DISCUSSION

The use of H5P embedded interactive study questions in an FNP course was a striking success. The nine key survey attitude questions (Table 1) were rated strongly agree/agree **90%-98%** of the time, a result that was unanticipated and, in all respects, demonstrated the value of the H5P strategy. In general, evaluation data showed students believed they did better in the course, their learning was enhanced, clinical decision-making skills were improved, questions were a good use of their time, and they did better on the graded quizzes having interacted with the questions.

Faculty had not anticipated that students would respond so enthusiastically to working with the questions. Their strong encouragement to include this type of ungraded practice questions in all courses can support time and resources for faculty development regarding H5P technology. I recently taught a colleague to use H5P and embed her questions and it took less than one hour of my time.

Although it was anticipated that H5P question users might show better quiz performance than non-users, this occurred for only one of the three quizzes. The CAD/lipids quiz was statistically significant for users of the questions while two quiz scores showed no difference between users and non-users. It is of interest that 87% of students reported in the survey that the "Interactive questions definitely helped me to score better on the quizzes than if I had not practiced with them."

The robust enthusiasm reported by students for the interactive questions and their compelling recommendations to continue with and add H5P questions in all future courses is of far-reaching import. My college is planning a brief faculty development program to provide an overview of the H5P technology and its effectiveness in student learning.

CONCLUSION

New strategies to promote student learning and engagement are a faculty priority. In this project, the use of H5P technology was a significant learning advance for students based on process and outcomes data, especially the students' universal enthusiasm for the interactive study questions. Using H5P strategies embedded within courses was easily achievable and beneficial for student learning.

Faculty and their institutions must remain aware of new technologies that can improve student learning. This can be a challenge for busy faculty who may have limited resources to learn about these technologies. My university's strategy to create a year-long fellowship to learn about new teaching strategies was pivotal to producing this project and provided a vital faculty opportunity. In addition, universities could benefit from having designated committees to explore new technologies for pedagogy so they can remain at the forefront of promoting student success.

REFERENCES

1. American Association of Nurse Practitioners (2022, July 3). HTTPS://AANP.Org.

2. H5P. (2022, August 20). Create, Share, and Reuse Interactive HTML5 Content in Your Browser. HTTPS//h5p.org

3. Canvas (2022, August 10). HTTPS://Canvas.instructure.com