Mobile education in nursing: Promoting peer-to-peer communication of clinical experiences with the “Advanced Practice” application.

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Abstract

Nurse practitioner students are educated to compose Subjective, Objective, Assessment, Plan (SOAP) notes, a method for consistent communication of patient case information. However, since student clinical experiences cannot be controlled, each student participates in a different variety of clinical patient conditions. This qualitative study evaluates the usability, functionality, and perceived value of “Advanced Practice”, a free and open source software mobile application designed to assist with peer-to-peer sharing of SOAP notes. Four nurse practitioner students were given access to the mobile application and interviewed within a focus group. Student responses suggest that the application is usable, works as expected and perceived valuable as a learning support or reference tool for professional examinations. Additional SOAP notes that could be recommended to support instructional content, content organization that fits the patient cases versus the nursing disciplines, and a commenting system were the primary recommendations.
Introduction

Nurse practitioner students are educated to compose clinical case studies in the organizational form of “SOAP” notes, an acronym for Subjective data, Objective data, Assessment, Plan. In these case studies, which are developed by the students throughout their program of instruction, students provide an analysis of their patient’s problem, a rationale for their working diagnosis, and reasoning behind the patient care plan. However, since student clinical experiences cannot be controlled, each student participates in a different variety of clinical patient conditions. Motivating students to review peer SOAP notes is a way to increase the student’s exposure to a variety of clinical conditions. Thus, a mobile application, “Advanced Practice” to support and promote a nurse practitioner student’s peer review and collaboration, was designed and developed. More specifically, the purpose of developing “Advanced Practice” was to 1) to create an infrastructure for students to securely share SOAP notes, 2) to increase engagement and critical thinking by adding simple interactivity and 3) to create tools that facilitate discussion and review of SOAP notes.

Advanced Practice is intended to afford students the opportunity to be both consumers and producers of information. This critical skill for the digital world is also a part of practice within the medical community. The experience of sharing case studies with peers and conducting meaningful discourse around clinical events is a practice typically reserved for graduates already employed in the professional healthcare provider field. Advanced Practice gives our students the opportunity to practice this experience and generate meaningful learning events for themselves and their peers.

We have conducted research to evaluate the mobile application Advanced Practice, in terms of usability of the interface, functionality, and users’ perceived value. Thus, this paper introduces the application and presents the preliminary findings of our research.

Literature Review

The Advanced Practice app is a new technology designed to support an educational environment amongst the nurse practitioner students, an approach of growing adoption within the educational technology field (Definition, 2008). Specifically, the application allows for the sharing of domain knowledge between nursing students. This exchange of experiences is a primary component for communities of practice (Wenger, McDermott, & Snyder), and access through a shared portal is critical to the success of electronic communities of practice specifically (Ho et al., 2010).

SOAP notes entered into Advanced Practice are organized in brief, self-contained, reusable, aggregated, and metadata tagged blocks known as Reusable Learning Objects (RLOs) (Beck 2010). This content structure has been seen as particularly effective with health science students (Childs, Blenkinsopp, Hall & Walton, 2005; Wharrad, Kent, Alcock & Wood, 2001) and is well adapted for mobile devices. However, to ensure the tools efficacy towards supporting a student-centric community of practice, it’s necessary to ensure accuracy, data entered by the students, application usability, and student and patient privacy (Demiris, 2006)(Richardson & Cooper, 2003).

Advanced Practice is designed using the Integrative Learning Design (ILD) framework. ILD is a broadly applicable cross-disciplinary framework that includes not only pedagogical approaches to instructional design and research, but also the integration of those elements into iterative technological development processes (Bannan-Ritland, 2003). ILD’s roots in instructional design, usage-centered approaches, and distribution to audiences beyond the target audience make for an appropriate fit towards development of a mobile learning tool within nursing. Advanced Practice and its subsequent design are highly supported by the combination of instructors and students identifying gaps and working with instructional designers to propose solutions. Usage-centered approaches and feedback loop processes focus on usability, identified by human computing interaction studies as a necessity for smartphone and tablet design. Finally, the program design is modular as to facilitate transfer to other academic fields interested in case study based applications.

Design

The application is structured with a typical linear progression, which is consistent with the SOAP case structure. Upon loading for the first time, the user must register for a username and password before they can login to the application (Figure 1). This authentication process and the secure storage of the cases are handled by the Appcelerator platform that the application is developed in. This security layer allows the application administrators to control who is allowed access to the SOAP database and which SOAP cases the user will be able to see. This functionality is intended to support student privacy while facilitating future research through content delivery control.
Once logged in, the student is presented with four categories of SOAP cases. These were selected by the team to reflect the primary educational tracts taken by students in the department. Below the categories is a list of case studies that the student can select and each case has a short 50-character description and case number (Figure 2). The short description is intended to inform the user of the SOAP case topic and for sharing case study recommendations by peers.

The research team decided to maintain a primarily text implementation of SOAP notes rather than incorporate multimedia elements for the following reasons:

- The addition of multimedia would have been a modification from the original assignment adding more work to an already tight curriculum. The researchers hope to explore and assess the potential educational value of this addition in future revisions.
- Mobile learning for nursing is still a young field and early implementation research still holds great value to the community’s body of knowledge.
- Patient privacy issues as they relate to multimedia need to be explored in greater depth and appropriate educational content delivered to ensure students are given proper guidelines.

When a SOAP note is selected, the user experience follows the traditional linear sections of subjective data, objective data, assessment and plan (Figure 3). One minor addition was made to the SOAP structure in order to create critical thinking moments during the case review. The application enables the user to decide the differential diagnosis or plan they would implement prior to seeing the author’s recommendation. Though the correct choice may be clear to the student writing the SOAP, this effort requires the student to consider plausible alternatives as well as point out misleading facts.

![Figure 3. Linear approach to displaying subjective, objective, assessment and plan.](image)

Instead of listing the choices within a paragraph as eliminated options, the previous static text implementation, the application creates discrete opportunities for critical thinking and selection. The learner receives immediate feedback on the appropriateness of their decision and is able to move forward to the next part of the case study (Figure 4).

![Figure 4. Users receive immediate feedback in Advanced Practice](image)
Technology

The Advanced Practice application is being developed as Free and Open Source Software (FOSS) due to its benefits for an unfunded educational technology project. FOSS development facilitates the applications adoption by reducing ownership issues and allows the project to potentially benefit from peer-to-peer development with other interested institutions. Appcelerator is used as the development platform due to its active development community and because it allows for cross-platform distribution including iOS, Android, and Web.

Context

Advanced Practice was designed in parallel with a class of nurse practitioners being introduced to the format and value of SOAP notes. Students who had previously taken the class and nursing faculty were the primary informers of the original design with current students as participants in evaluating the mobile application. Advanced Practice is being distributed by installing directly to participant devices or through the web interface. We anticipate submitting the first version to platform specific application stores by the end of 2013.

Research Design and Participants

The Advanced Practice application described above was implemented as a research tool in this study. At the beginning of fall 2013 semester, the application was introduced to nursing students, who were enrolled in a graduate level course. In total, 12 students were registered in the course. For the study, students were asked to voluntarily participate in using the application as part of their required practice working with SOAP notes. Students were not offered any incentives to participate except access to an early version of the mobile application. Four out of 12 students in the course volunteered. One student was female and three were male.

The participants accessed the application by either downloading it to their own mobile device (cell phone or tablet) or by accessing the mobile friendly web version. To measure Advanced Practice’s interface usability, functionality, and users’ perceived value, a survey and a 40-minute focus group was conducted.

Results

Interface usability

During the focus group, participants were asked about the pros and cons of using the application for reviewing SOAP notes. Students’ responses were generally positive stating that the application was convenient, easy to use and user-friendly. When asked about organization of the SOAPs, students were perplexed by the current categories used for classification. They suggested it would be helpful to have categories more refined, based on for example chief complaint instead of degree track.

Functionality

Participants were asked to discuss how they felt about maintaining access or expanding viewership access to the content. Students showed mixed opinions. Students recognized both the benefits and the challenges of expanding viewership. Students were receptive to the idea of expanded viewership as there would be more cases of greater breadth and depth. Students weren’t concerned if people outside of their class authored cases as long as the content was correct.

Some discussion developed around the value of complimenting textbook material with SOAP notes. One student cautioned that an emphasis should be kept on evidence based cases “instead of claiming something is right” such as in a textbook example. Students suggested a place for comments at the end of a SOAP for continued discussion around the topic.

User perceived value

When asked about utilizing this application within their coursework, students agreed that the tool did facilitate their learning. In particular, students recommended having an instructor identify SOAP notes relevant to textbook material to enhance course content, but that reviewing notes should not be graded. Generally, respondents suggested that requiring a grade for an activity within the application might deter students’ motivations towards the application as a learning tool. Overall students saw the app as greater facilitation to learning outside the classroom compared to current methods.

Students recognized the value in the application as a learning tool, but didn’t think it would be as useful once they graduated and entered the profession of nursing. However, with improvements to the application and more cases to select from, some students thought the application would be useful to review in preparation for their board
examinations. One student could foresee authoring and submitting a case based on their professional experience once in the workplace, especially if the case was unusual in nature.

Additional comments
At the end of the focus group, students offered some final comments on the application. Patient privacy was a concern that students wanted to see insured. Multimedia incorporated into a case was also thought to be beneficial for learning, e.g. the sound of an irregular heartbeat embedded in a case.

Discussion and Conclusion
Advanced Practice provides a contextualized learning experience that allows students to generate meaningful learning events to themselves and their peers. Nursing students often receive limited exposure to real world rare or unusual patient cases while learning textbook material. SOAP notes provide an avenue for complementary exposure through a contextualized learning experience. To realize this goal, the results indicate that we have further work and research to do.

Students would like to see categories refined beyond adult, geriatrics, pediatric, and women’s health. Organizing by chief complaint would allow students to use the application as more of a reference tool. It appears that there is a clear need to provide more meaning to SOAP notes outside of the actual material but within the category. This contextual information provides an impetus for a student to select and begin on-demand learning. One solution may be a feature in the application that allows the instructor to create and share a collection of SOAP notes pertinent to a topic being covered in class. Sub categories may be an additional solution toward adding greater value around a case. For example, a clinical student making a patient experience, at a later time, could look up the chief complaint to reinforce the topic with similar cases.

A place to leave comments on a case was also suggested by students. Having a dialogue around a case may further reinforce community of practice behavior. However, if the app is to foster conversation around each SOAP note then comments, which tend to be individually centered and fragmented (Lu & Churchill, 2012), may not be the best solution. Further research is required to test the potential value of a comment system and explore how the instructor could utilize this information within the class environment.

The connotation of grading deterred students’ attitudes towards approaching and using the application. Since students author content at one point, the rigor of the case may diminish as a student realized that their choices within a case would ultimately be evaluated and therefore creating lower level cases may be of a greater benefit to them. Currently, it is not in the design plan to grade students on the options they choose. However, the instructor would like to know who and how many cases are being accessed. Would this deter from a community of practice as the learning motivation moves towards being centered on points? This is a question to explore in future research.

References