

Utilizing QR Codes to Teach Basic Cardiac EKG Interpretation

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Professional nurses work in an ever changing environment that requires quick access to information to improve patient outcomes. Nurse educators need to make an attempt to integrate real world technology into the classroom so students can become proficient in professional integration of various types of patient care technology. Nursing faculty implemented QR (Quick Response or Quick Read) codes to interpret basic cardiac EKG rhythms for students enrolled in a high acuity medical/surgical course. In the didactic portion of the course, students were introduced to cardiac concepts of pathophysiology, basic cardiac rhythms, disorders and diagnostic and laboratory test. Once the didactic content was complete, students participated in station rotations with QR codes. The lab component provided hands on application and set-up of the cardiac monitor and practice with cardiac EKG rhythm strip analysis on a live monitor. In clinical, students performed a focused cardiac and respiratory assessment on their assigned patient's and interpreted real time cardiac EKG rhythms with electronic documentation.

Utilizing QR Codes to Teach Basic EKG Interpretation

Professional nurses work in an ever changing environment that requires quick access to information to improve patient outcomes. Mobile smartphones have become an ever present technology within the healthcare industry. Nurses are now contacting healthcare providers via mobile smart phone technology to provide patient updates and changes in their conditions. Professional nurses must keep up to date on the ever changing medications and treatments ordered by providers for patients. The smart phone can be immediately accessed right at the point of care and numerous applications (apps) are available to provide evidence based information for nurses to enhance their quality of care.

Skiba (2011) explains that nurse educators need to learn how to utilize mobile smart phone devices as tools for learning. Educators need to make an attempt to integrate real world technology into the classroom so students can become proficient in professional integration of various types of technology. Parry (2011) states that “teaching mobile web literacy seems to me as crucial as teaching basic literacy.” He describes three principles to consider for promoting literacy of mobile devices.

- 1) Understanding information access. Nurse educators can accomplish this by simply having nursing students utilize their smartphones to look up patient’s complaints or diagnoses. In addition, treatment options and nursing interventions for care of particular diseases can be evaluated. Students are actively engaged in bedside patient care in the clinical component of their nursing courses and pre and post clinical discussions can further be facilitated by engaging students to look items up and access various apps to provide care.
- 2) Understanding Hyperconnectivity. Nurse educators can implement class exercises, such as, posting in class activities to Instagram or a class Facebook page during the actual class exercise. This facilitates active class activity discussion beyond the classroom.
- 3) Understanding the New Sense of Space. Educators can have students use their smartphone apps to journal or blog weekly clinical encounters, skills performed in the clinical setting and the variety of diagnoses they have cared for. In addition, numerous nursing and healthcare apps are available to facilitate active engagement to facilitate student’s mobile literacy learning within the classroom and clinical.

QR (Quick Response or Quick Read) App

Nursing faculty teaching a high acuity medical/surgical course wanted to implement an active learning strategy utilizing QR (Quick Response or Quick Read) codes mobile smart phone technology. A QR code is a two-dimensional matrix/bar code (Robertson & Green, 2012). Healthcare facilities are currently utilizing QR codes to facilitate patient education. Patient’s align their camera and smart phone bar scanner up to the bar code displayed in an educational pamphlet, flyer or in a book to access a quick link to the material.

Retail facilities display bar codes on products or on a computer screen to obtain discounts or additional information on products. Once the bar code has been aligned the camera snaps the code and it takes the user to a website or video with more information. Collins, Knowles, & Molnar (2012) utilized QR codes to actively engage students in the library orientation process. They found that students were eager to scan the QR codes to reveal the content and apply it.

DeSilets (2012) explains that QR codes will revolutionize nursing education. She states that potential uses include creating digital portfolios, assigning homework and polling the class after an educational activity. Siegle (2015) explains that numerous benefits exist with using QR codes, beginning with the ease of use. Students can access data quickly through their smart phones and the ease of creating a QR code through free downloads makes QR codes a nice option for financial savings with a decrease in handouts and printing. Based on the positive evidence found in the literature, nursing faculty teaching in a high acuity medical surgical course utilized QR code technology to teach Basic Cardiac Electrocardiographic (EKG) Rhythms.

Course Integration

Comptom, LeFrance and Van t Hoof (2012) explained that preparation of a QR code activity requires time and energy. Faculty requested that students download a free smart phone application two weeks prior to the activity. Those without a smartphone were advised that the activity would take place in pairs to alleviate stress if the student did not have a smartphone device. Faculty spent four hours preparing the codes for the ECG responses. Once they completed the ECG codes the activity was presented to fellow faculty for a trial use of the codes and editing of the slides.

Phase 1: Didactic

The didactic phase consists of a traditional class lecture of the principles of the electrical conduction system of the heart, pathophysiology, cardiac disorders, diagnostics, and nursing care of the cardiac patient. Prior to attending the structured lecture students read the lecture notes, the assigned textbook readings, and completed a quiz to assess their knowledge. The quiz served as an entry ticket to the classroom lecture.

Once the traditional lecture was completed the students were randomly assigned to work in pairs.

Individual six-second cardiac rhythm strips were displayed on an 8 1/2 x 11 paper and taped to the walls around the classroom. Each display included one cardiac EKG rhythm strip, the instructional steps to read the cardiac EKG rhythm and a QR code. Once the student interpreted the cardiac EKG strip the student scanned the QR code to compare their answers with the correct QR code answer. Course faculty served as facilitators during the activity to facilitate learning and answer any questions related to the QR code technology. In addition, the faculty facilitated the time management of the students at each display so every student had an equal opportunity to review each cardiac EKG rhythm strip. Upon the completion of the activity the faculty and students reviewed each answer and discussed the implications of each cardiac EKG rhythm strip.

Phase 2: Lab

The lab agenda included how to apply the cardiac monitor, completing and documenting a focused cardiac and respiratory assessment and interpreting the cardiac EKG rhythm strips. Low fidelity and high fidelity simulation was utilized at the different stations. Each station included a simulated patient, chart and cardiac EKG rhythm strip. Students completed a focused cardiac or respiratory assessment, interpreted the cardiac EKG rhythm strip and documented their findings. Once students completed all stations faculty reviewed each station scenario and facilitated discussion.

Phase 3: Clinical

Each clinical instructor was provided the didactic and lab materials. The clinical instructors assigned students a patient with a cardiac monitor and a related cardiac diagnosis. Students completed a head to toe assessment with a focused cardiac and respiratory assessment. Cardiac EKG rhythm strips were interpreted with the guidance and assistance of the clinical instructor as needed. Students documented an actual patient assessment and findings in the patient electronic medical record.

During post clinical conference, the clinical instructor reviewed cardiac rhythm strips and facilitated discussion based on the underlying pathophysiology, nursing process and medical care indicated. Throughout the course semester, the clinical instructor continued to expose students to

the care of the cardiac patient and interpretation of cardiac EKG rhythm strips.

Phase 4: Faculty evaluation

Today's nursing student's desire a more active learning environment, one that mirrors what their professional practice world will be like. QR code mobile smart phone technology will continue to enhance the way patients are provided information and care. The faculty witnessed student engagement and active student partner discussions of cardiac concepts and cardiac EKG rhythm interpretation. Freeman and Walsh (2013) concluded in a study of learning strategies that student's value active learning that exercises the student's mind and improves their thought process in addition to interacting with the instructor.

Benefits

The faculty and students were both engaged while the QR code activity was taking place. This active learning classroom activity served to generate engagement just like lab and clinical. The students desired a more active form of lecture and this provided a pre-class assignment that students became responsible for their own learning. Students were motivated to complete the pre-class ticket assignment because they were informed that they would be utilizing their smart phones QR code technology with permission while in class.

Another benefit included the ability to thread the content through the didactic, lab and clinical course components. The clinical faculty were also engaged in facilitating the students continued exposure and interpretation of the cardiac patient.

Challenges

The time involved in developing the cardiac EKG rhythm strip QR codes was a little time consuming but the long term benefit of having them completed was a success. This activity can now be utilized over and over again. Student's time management at each cardiac EKG rhythm strip display was prolonged due the discussions generated between the pairs. This was handled by the faculty facilitating continued rotation between each display.

In conclusion, the faculty plan to continue utilizing this activity in future courses. This initial pilot of QR code smart phone technology proved

to be effective for faculty and future goals are to collect research data from the students feedback and exam performance scores.

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