# Student Nurse Practitioner Communication Skills when using Electronic Health Record (EHR) during Health History Taking

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Abstract

Nurse practitioner students, recently instructed on Electronic Health Record (EHR) use, were videotaped in the Clinical Simulation Lab at the University of Vermont conducting a health history interview with a standardized patient in February 2012 (n=20). Using OD LOG software, time spent typing and talking, typing only and looking at computer without talking were measured. Both observers in the study completed a 10-point checklist of communication skills during the videotaped visit to evaluate the students' strengths and weaknesses, and the student's placement of the laptop computer was recorded. Out of all communication skills, students scored the lowest on completing those associated with health information technology use. Of the time spent taking the health history, nearly a third was spent engaging solely with the computer. Although instructed to position the computer so that the patient could view the screen, only three students positioned the computer in a way that both they and the patient could see the chart. It is important for future research to be conducted to develop a best practice for implementing use of health information technology into both undergraduate and graduate curriculums.

*Keywords:* electronic health record (EHR), health information technology, graduate nursing students, patient communication

## Introduction

Among the recent changes in health care, the Health Information Technology for Economic and Clinical Health Act (HITECH) is pushing clinicians and hospitals to use EHRs to better the quality and efficiency of patient care. Renovations to The American Recovery and Reinvestment Act signed by President Obama in February of 2009 included legislation that will transform medical practice and revolutionize how patient information is acquired, communicated, accessed and stored. The HITECH Act wants all medical practices to make the switch to electronic health records by the year 2014 in hopes that meaningful use health information technology can make health care more evidence-based, organized, and less prone to mistakes (Wilson, 2009). Under the United States Department of Health and Human Services, the Office for Civil Rights is responsible for enforcing HIPAA (Health Insurance Portability and Accountability Act) under this act, strengthening individual's rights to the privacy and access to their own health information (U.S. Department of Health and Human Services).

The HITECH Act will distribute approximately $19 billion to guide and promote widespread adoption of EHRs, $17 billion of which is available for physicians and hospitals, along with monetary incentive for meaningful implementation of an electronic system. Physicians who submit electronic invoices to the government will be reimbursed at a higher rate than those who do not submit invoices electronically (Wilson, 2009). It is important to now develop, test and implement "Best Practices" for communication skills when using EHRs, starting at the educational level (Blumenthal & Tavenner, 2010).

Medical, Nursing and Health Science universities have to meet accreditation standards and increase healthcare informatics competencies of nursing students in order to participate in clinical rotations. Faculty must incorporate technology into the curriculum and ensure that

students are capable of using electric documentation effectively and skillfully (Nickitas, Nokes, Caroselli, Mahon, Colucci & Lester, 2010). Because of this advantage, staff in larger physician practices, large hospitals, and teaching hospitals are more advanced in using EHRs (Pollard, Neri, Wilcox, Volk, Williams, Schiff, Ramelson & Bates, 2012). Despite the impending transformation of health technology, a change that is already underway, a review of recent literature reveals that future health care providers, such as nursing and medical students, do not have enough exposure to EHR training during their undergraduate education (Kushniruk, Borycki, Joe, Otto, Armstrong, Ho, 2012). Regardless of the efforts to increase meaningful use and implementation of EHRs, many challenges still stand in the way of their application (Borycki, Joe, Armstrong, Bellwood, Campbell 2011). All students, who are expected to work in an environment involving the daily use of health information technology, such as the electronic health record, there is a need to integrate this technology directly into their undergraduate education (Kushniruk, Borycki, Joe, Otto, Armstrong, Ho, 2012).

## Review of the Literature

As our health care system is constantly evolving and improving, technology has become a basis of medicine and patient care. By 2014, under the terms of the Democrats' 2009 economic stimulus law, according to the Office of the National Coordinator for health Information Technology (HITECH), all Americans are supposed to have an electronic health record (U.S. Department of Health and Human Services). By the time the current new graduates of university nursing programs start working in the field, they will need to be fluent in this software. Health care providers who have been in the field for years have to accommodate to these technological advances as well. It is well documented in the literature that communication is central to quality and patient-centered care, and most communication is transferred through written documentation (Laramee, Bosek, Kasprisin & Powers-Phaeuf, 2011).

The transition from written paperwork to an electronic database is one driven by a multitude of forces. Electronic health and medical records are environmentally friendly, as organizations nationwide are implementing "green" practices. EHRs are structured, efficient, save time in patient encounters, and facilitate coordination of care and communication among health care teams (Laramee, Bosek, Kasprisin & Powers-Phaeuf ,2011). Many hospitals have implemented EHR incentive programs, which award practitioners with monetary compensation for using EHRs appropriately in their practice and demonstrating meaningful use of technology (EHR Incentive Program). This program has paid out over twenty five million dollars to 500 eligible health care providers nationwide (Murphy, 2010).

While this transition is a very forward-moving one, introduction of EHRs can be challenging and may result in caregiver errors (Yudkowsky, Galanter & Jackson 2010). In the study "Learning From Within to Ensure a Successful implementation of an Electronic Health

Record", nurses report that using a computer for documentation is "boring and repetitive" and that they increase the risk of breaching patient confidentiality (Laramee, Bosek, Kasprisin & Powers-Phaeuf 2011). In a study conducted at Fletcher Allen Health Care Hospital in Burlington, Vermont, nurses identified the EHR as "cumbersome [and] time consuming, leaving less time for patient care" (Laramee, Bosek, Shaner-McRae & Powers-Phaneuf, 2010). Studies reveal that data entry and retrieval errors are common using electronic records and that clinicians have trouble communicating effectively with their patients with the introduction of a computer into the patient-clinician dyad (Yudkowsky, Galanter & Jackson 2010).

According to Ida Orlando's Nursing Process Theory, the role of the nurse is to find the patients immediate needs and meet them while validating his/her understanding of the patient's needs. A patient in distress is a patient whose needs have not been met during the nursing-client experience. Nursing actions directly or indirectly provide for the patient's immediate need (Orlando's Nursing Process Theory). In the provider-patient-computer relationship, time spent on the computer equals less time interacting with the patient, thus not meeting their immediate need for intervention and attention. The interpersonal relationship described in Peplau's Interpersonal Theory depicts a therapeutic relationship between the nurse and the client, a dyad, respectively (Application of Interpersonal Theory in Nursing Practice). The interpersonal focus on Peplau's theory enforces that the nurse attend to the interpersonal process occurring between them and the client (Application of Interpersonal Theory in Nursing Practice). With a computer entering this dyad, a triad is now formed between the clinician, the computer, and the client. Since the computer requires a vast amount of concentration and attention, the therapeutic clinician-client relationship is interrupted by a third party. Attention paid to the computer takes

time away from the patient, who will experience distress as their needs are not being completely met.

In primary care settings, research has been done to understand electronic health records role in practice and to develop effective strategies for meaningful implementation of this system (Goetz-Goldberg, Kuzel, Feng, Deshazo & Love, 2012). A longitudinal qualitative case study of six primary care practices in Virginia surveyed and interviewed 38 staff members on their interpersonal relations with patients and use of the computer over a sixteen-month period. Staff reported ease in retrieving patients' records, storing information, coordination of care and office operation, but difficulties with costs, lack of knowledge about the EHR software, technical difficulties, and with the transition of the office from paper to electronic (Goetz-Goldberg, Kuzel, Feng, Deshazo & Love, 2012). They also noticed a major disruption to patient care during software upgrades and difficulty using performance tracking and other quality functions on the EHR (Goetz-Goldberg, Kuzel, Feng, Deshazo & Love, 2012). Similar conclusions were drawn in Susman's results, where she notes that the electronic health record is designed for provider convenience rather than patient convenience (Susman, 2012). In this study patients report feelings of the clinician repeating himself and asking similar questions over and over again, thus disengaging the patient from the teamwork between the computer and the clinician (Susman, 2012).

Alternatively, less is known about HER's impact on the efficiency of outpatient care (Chen, Garrido, Chock, Okawa & Liang, 2009). Kaiser Permanente, the largest non-profit health care system in the United States, has conducted numerous studies on the use of electronic health records in their practice. KP implemented an inter-disciplinary HER that was available to both inpatient and outpatient systems, along with labs, pharmacies and other ancillary systems in

2004. This system provides secure patient-provider messaging through an online database of personal medical records where physicians, technicians and patients alike can communicate (Chen, Garrido, Chock, Okawa & Liang, 2009). In a retrospective observational study examining the impact of KP's electronic health record system on outpatient, urgent care, emergency department visits, external referrals, scheduled telephone visits and secure patient-physician emailing system, it was found that there was a 26.2% decrease in the annual total office visits over four years (Chen, Garrido, Chock, Okawa & Liang, 2009). There was a notable increase in scheduled phone visits and secure messaging between 2004 and 2007. ED and urgent care use increased during this time period, but because that increase only represents five percent of the volume of the decrease in total office visits, it is wrong to assume that the swell suggests a shift from office visits to emergent outpatient care settings (Chen, Garrido, Chock, Okawa & Liang, 2009). KP had developed their own electronic system called KP HealthConnect, but before its implementation, some branches of KP, for example in Hawaii, had already been accustomed to their other electronic system, Clinical Information System (CIS) (Chen, Garrido, Chock, Okawa & Liang, 2009). A common theme amongst the literature involves staff getting used to a certain system and the difficulty that comes with transitioning from either paper to electronic, or from old electronic records to new ones.

In primary care settings, it is integral to document thoroughly as there are often no preexisting records on patients that come through the door. Electronic health records make it easy for outpatient clinics, hospitals and primary care doctors to communicate with each other in an efficient manner. In a study with a sample population of 1088 physicians in outpatient practices, 85% of them used their own single method to document, that being note-taking, directly documenting into the EHR, et cetera. 60% of those providers used a software template

while 38% of them dictated their own method. Physicians affiliated with academic medical centers or based at a hospital who have been using the HER system longer were more likely to dictate than use templates. Overall, physicians predominantly used single method of visit note documentation rather than flowsheet or note templates and were satisfied with their approach (Pollard, Neri, Wilcox, Volk, Williams, Schiff, Ramelson & Bates, 2012).

Education on how to use the EHR is implemented in nursing and medical curriculums, but while most students know how to access and navigate the EHR, there is still trouble including the patient in the documentation process. In a pilot study examining Medical Student's usage of the EHR, 88% of the students were able to explain to the patient why they were using the computer, but they failed to identify critical clinical information embedded in the flowsheets. Retrieval errors were attributed to ineffective EHR searching techniques to inability to focus on the EHR while interacting with the patient and vice versa. Future implications for this study included further investigation on ways to improve student navigation through the EHR with greater ease and success (Yudowsky, Galanter & Jacksion, 2010) .

The Alliance for Clinical Education (ACE) represents a multidisciplinary group of educational leaders from different medical domains that address issues in undergraduate clinical medical education (Alliance for Clinical Education). The ACE conducted a national survey attempting to better understand both the prospects and challenges of integrating electronic health records into the standard curriculum of medical students. The survey included 24 questions about the HER, and clerkship directors/educators who were all members of the ACE organization were asked to comment about their experience and observations of students using EHRs. 346 surveys were completed from 129 schools. 74% of respondents use electronic health records, and 87% of students have direct access to inpatient charts. Faculty felt that it was easier

to read, that they had more ease accessing important information and reviewing their students' notes, and that EHRs "help students be organized [and] thorough". Overall, faculty found start up to be "very painful", "cumbersome", "too much information" and time consuming, taking away from teaching time "because [it] takes faculty a long time to document—long notes harder to review/edit". They noted that "templates make patients all look [the] same", making more leeway for mistakes. Having to navigate through a program "distances [and distracts] students from the patient", and rather has them rely on the computer for information instead of talking directly to the patient.

There have been efforts towards improving electronic health record navigation in a student setting in the form of an application called iCare v. 1.0 (Wyatt, Li, Indranoi & Bell, 2012). This program was made to guide and coach students through usage of the electronic health record while tracking their progress. Students and clinical preceptors and instructors are able to look back and evaluate their navigation efficiency (Wyatt, Li, Indranoi & Bell, 2012). The Alliance for Clincal Education (ACE) is a "multidisciplinary group formed in 1992 to enhance clinical instruction of medical students", as well as their fluency in electronic records and documentation (Alliance for Clinical Education). In a study conducted by this alliance, practice guidelines were implemented for medical students including (a) Students must document in the patient's chart and their notes should be reviewed for content and format, (b) students must have the opportunity to practice order entry in an EHR-in actual or simulation patient cases-prior to graduation, (c) students should be exposed to the utilization of the decision aids that typically accompany EHRs, and (d) schools must develop a set of medical student competencies related to charting in the EHR and state how they would evaluate it (Hammoud, Dalrymple, Christner, Stewart, Fisher, Margo, Ali, Briscoe & Pangaro, 2012).

It is understood that little research has been done on undergraduate and graduate implementation on health information technology, but there is also a lack of integration of EHRs into undergraduate medical and nursing education. Students need to be exposed to a range of EHR competencies before graduation, so they can elicit effective use of health information technology in the workplace (Kushniruk, A., Borycki, E., Joe, R., Otto, T. Armstrong, B. Ho, K. 2012). For the future, further research should focus on the variation of different physician's use of the HER and the quality of documentation resulting from those differences (Pollard, Neri, Wilcox, Volk, Williams, Schiff, Ramelson & Bates, 2012). Commonly throughout the studies, little attention was paid to the time spent on the computer and the positioning of the computer in relation to the patient.

## Methods

### Participants

All students were graduate students and registered nurses, some more experienced in the field of nursing than others. The sample population had a mix of students who graduated with an undergraduate B.S. in Nursing, and some students who did not and are a part of the Master's Entry Program in Nursing, therefore having no clinical experience as an RN. The students with RN experience have varied clinical skills, as some have been nurses for a number of years and some only one year. This disparity was blinded to the observer, adding strength to the validity of the results. Students were recruited for the study based on the following criteria: whether their health history visit was recorded and accessible and whether they chose to allow their tapes to be used for research or not. Each student met privately with the PI, where she explained the study and had them sign the research informed consent form that can be found in Appendix ***. In the tapes, all students had standardized patients with a common problem, being either a sore throat or stress incontinence.

### Design and Procedure

Nurse practitioner students, recently instructed on Electronic Health Record (EHR) use, were videotaped in the Clinical Simulation Lab conducting a health history interview with a standardized patient in February 2012 (n=20). This study was done using cross sectional observation on this existing sample of instructional video tapes which were recorded as an evaluation tool.

Using OD LOG software, the following times were recorded by two observers: a. student typing and talking, b. student typing only, c. student looking at computer without talking, and d. total time of student history taking interview. The PI calculated these times by pressing "hot

keys" on the keyboard for each category to find the amount of time spent doing each of the three categories. By holding down "1", the time spent typing and talking was measured. By holding down "2", the time spent typing only was measured. By holding down "3", the time spent looking at the computer without engaging the patient as measured. The PI could at any time switch which number she was holding down, and seconds would be recording to whichever category the student fell into at that point in the visit. It was up to the PI to discern whether the student's attention was directed towards the computer or towards the patient. The OD LOG measured total time of visit on its own, as the system stopped once the video stopped. Each time was calculated for the mean and range. Times spent using the computers were then added and a percent of the total interview was calculated.

$$\frac{a+b+c}{\text{Total time spent on health history}} = \text{amount of time spent utilizing EHR}$$

Both observers completed a 10-point checklist of communication skills during the videotaped visit to evaluate the students' strengths and weaknesses. The checklist used to evaluate the communication skills of each student was the same checklist used by the standardized patient in the videos. This checklist included a series of categories that demonstrated the student's capability to conduct a successful health history interview and to communicate with the patient effectively, as shown in Table 1. These categories were rated "Done", "Unsatisfactory", or "Not Done" by the PI and the faculty member in each of the 10 communication skills for all 20 students. "Done" was given if the student completed the task. "Unsatisfactory" was given if the student forgot to complete the task then remembered, or if the task was poorly executed. "Not Done" was given if the task was not completed. The percent of Done, Unsatisfactory and Not Done were recorded and the categories with the most frequently Done, Not Done, and Unsatisfactory were calculated.

These checklists completed by the standardized patient at the time of the experience were compared to the checklist of the observer for inter-rater reliability. A master checklist was generated with the results of the PI, the faculty member and the SP's rating of the students' communication skills. The results for each category were then compared between the PI and the SP, then the PI and the faculty member, and percentages of agreement were calculated. Inter-rater reliability between observers was 0.84 (Spearman's Correlation Coefficient) for OD LOG time recording and 0.80 for communication skills checklist.

The student's placement of the laptop computer was recorded. The observers' assessment of "positions computer so patient can see screen" from the communications checklist was also recorded for each position to determine the position's validity and accuracy.

## Results

The mean group total interview time for obtaining history of present illness was 10.67 minutes. Of this time, a total of 4.11 minutes was spent: typing and talking (76.56 seconds) typing only (88.35 seconds) and looking at computer not talking (82.2 seconds) for a total 30.6% of this visit. Overall, there was 84% (0.84) inter-rater reliability; for typing and talking, there was 81% (0.81), and for typing only (0.78) and looking at PC without talking (0.54), correlations were less strong. Loopholes in this measurement include the preciseness of the timing of the PI's pressing of the "hot keys" (? How do I word this) and time spent fidgeting around before or during the visit. The times calculated with the OD Log involved multiple stops and starts within them, so the frequency of these periods of "typing without talking" were not documented, only the total time spent "typing without talking" was. In Table 1, the individual and total times of students are documented.

74.5% agreement was found between the standardized patient rating of the student and the video taped observers', proving statistically insignificant. Therefore, the SP rating was kept separate from the analysis described previously. 80.5% agreement was found between the PI and the faculty member's observations. The categories that students excelled in most were scored 100% "Done"; "introduces self/role to patient" and "establishes rapport". Hand washing prior to patient contact was completed by 95% of the students, while 5% initially forgot to wash their hands then soon remembered mid-way through the physical exam. 92.5% of students used open-ended questions, 5% scored "unsatisfactory", and 3%, only one student, did not use open-ended questions at all. 92.5% paid attention to the patients' modesty and comfort and 7.5% did so unsatisfactorily. All students completed this category, whether the score was "satisfactory" or "unsatisfactory". 85% of students had good eye contact and 15% did so unsatisfactorily. 85% of

students closed the visit appropriately, 12.5% scored an "unsatisfactory" for not reviewing or summarizing the visit. Only 3% failed to complete this category. 77.5% of students educated patient about computer use, and 15% did not. 7.5% did so unsatisfactorily. Only 70% of students explained long periods of typing to the SP, and the remaining 30% was distributed evenly between "not done" and unsatisfactory" at 15% each. 62.5% of students positioned the computer so the SP could see the health history documentation, which was the category that scored the lowest among students. 12.5% of students tried to position it well, or did at certain points during the interview, but scored an "unsatisfactory" for this category. Only 3% did not complete this category.

Communication skills were rated as follows: 100% of students introduced themselves and established rapport, 95% washed their hands after computer use and prior to patient contact, 92.5% asked open ended questions and attended to modesty and comfort, 85% kept good eye contact and closed the visit appropriately, 77.5% educated patient about the EHR and computer use, 70% explained long periods of typing and 62.5% positioned the computer so the patient could see it. ***? Figure 1 displays the computer position used by three students who were scored "Done" by the observers for "computer positioned so patient can see screen" on the checklist.

In Figures 1 and 2, examples of the positioning of the computer-patient-student triad are diagrammed. It is important to note that the chair where the NP student sits in swivels, so the student could be facing the computer and facing the patient at different moments in the interview. Most often, students asked patients if they could see the screen, and a lot of the positioning was based on personal preference of the SP and of the student. The most accurate position is that of Figure 2, where the students who used this position all received "Done" on the

"computer is positioned so patient can see" category from the PI and the faculty member. Only three students chose this position. The most popular position among the students was that in Figure 2, but was only scored 62.5% "Done" on the checklist. 8 students (40%) used this position. The rest of the students used different positions that were not statistically significant.

## Discussion

The results from this study have aimed to identify novice communications skills using the EHR when used in a simulated patient visit by nurse practitioner students. Out of all communication skills, students scored the lowest on completing those associated with computer and EHR use. Of the time spent taking the health history was more than a third was spent on the computer, and nearly two thirds of that time was spent without communicating to the patient at all. Although instructed to position the computer so that the patient can view the screen, few students were able to fully accomplish this during this encounter.

This group of students has been working with electronic health records for three years, and this was their first time implementing them into taking a health history with a standardized patient. At the novice level, a lot of the focus is geared towards documenting rather than communicating and building rapport with the patient. This grouping of videos showcased students at a novice level; this was their first time collecting a health history using an electronic health record and integrating the computer into the patient-caregiver relationship. Attention must be paid to the low scoring categories (good eye contact, educate patient about computer use, explain periods of typing and positions computer to see), as they all have to do with the implementation of an EHR into practice. Students do not intuitively know how to utilize technology, so EHR education needs to be integrated into undergraduate and graduate nursing curriculums.

Few students were skilled enough, at the novice level, to type and talk simultaneously. More time was spent without talking, either spent browsing the PC or just typing, to avoid error and to make sure all questions on the electronic checklist have been covered. These moments of silence should reinforce the need to explain long periods of typing/browsing and educate the

patient on the computer use. The computer acted as a sort of crutch for many students, as it prompted them to gather a thorough history rather than students choosing relevant questions to ask. Most histories were done in a disorganized fashion, jumping from "When was your last menstrual period?" to "do you drink red or white wine?", and much information was gathered that was not pertinent to the presenting problem.

In this study, only the first experience of the student using the HER was measured. Future research should be done on mapping the progress of these students. The sample size in this study was small (n=20). For future research, a larger sample size should be studied in an observation longitudinal study. Since the PI was blinded to whether the students were new-graduate registered nurses, in the MEPN program, or long time nurses gives this study validity.

It may be valuable for students to watch the videos and self-evaluate themselves to better their communication skills and integration of the computer into their practice. It should also be noted that different settings call for different best practices. These videos are suitable for primary care settings and clinics, while such a lengthy health history might not be appropriate for an acute care setting or hospital. For the academic environment, an electronic health record application called iCare v. 1.0 was developed to allow students to enter and retrieve data while tracking their performance over time. As a result of Wyatt, Li, Indranol and Bell's study, the most recent versions of iCare have features that help and coach users in navigating the system efficiently (Wyatt, Li, Indranol & Bell, 2012). This program would benefit a novice population of students, but they would have to be weaned off in order to develop their own organization skills while maneuvering through the EHR they end up working with. Efforts by the Alliance for Clinical Education are also being put into play; ACE recommends that medical schools develop a standard set of EHR competencies in which students must achieve in order to graduate to ensure

they are ready for clinical practice. In their previously mentioned study, ACE recommends that accreditation bodies like the Liason Committee for Medical Education utilize more specific educational directive standards regarding electronic health records to ensure compliance with educational principles in order to make sure that the necessary training and resources are available.

The idea of clients "paying for face time" with their doctors is one that is affected by the use of electronic health records. It is ideal for every patient to be entitled to personalized attention, and some patients feel as though the experience of a triage visit is "rushed" and computer centered rather than patient centered (Murphy, 2010). Many flowsheets on different EHR software that are used in primary care have the same template for each patient, whether their conditions are the same or not. There are also a number of flowsheets to choose from that are condition-specific. For example, in EPIC PRISM software, the health care provider is able to choose data flowsheets specific to their patients needs (PRISM: Fletcher Allen's Electronic Health Record). In a study conducted at HMO giant Kaiser Permanente, it was found that the meaningful use of electronic health records helped significantly reduce A1C levels and LDL cholesterol in close to 170,000 patients with diabetes (ANNALS OF INTERNAL MEDICINE ARTICLE***). The electronic health record was able to promote better monitoring and risk-factor control among patients with diabetes due to its thorough nature and organized layout.

As previously mentioned, little has been formally researched about a "best practice" for the positioning of the computer. Kaiser Permanente has developed a LEVEL technique to enhance the interaction between the patient and the practitioner, Meaningful use of EHRs involves more than just their implementation—it is important to maintain a high standard of rapport and interpersonal ideals with a client (Physician Exam Room EHR Etiquette). The

acronym LEVEL encompasses a series of things to consider for health care providers when using a computer: let the patient look on, maintain eye contact with the patient, value the computer, explain what you are doing to the patient, and log out (Physician Exam Room HER Etiquette).

With the introduction of the EHR into the patient-provider encounter, careful attention must be paid to development of interpersonal communication skills for students and clinicians alike. These results provide an avenue for discussion to understand how to instruct a novice provider on mastery of these necessary skills and to develop "Best Practices" for health information technology.

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Appendix A

Table 1

*Communication Skills Checklist*

| | Done | Unsatisfactory | Not Done |
|---|---|---|---|
| Introduces self/role to patient | | | |
| Establishes rapport with patient | | | |
| Washes hands | | | |
| Pays attention to modesty and comfort | | | |
| Attention to modesty and comfort of patient | | | |
| Maintains good eye contact | | | |
| Educates patient about computer use | | | |
| Positions computer so patient can see screen | | | |
| Explains long | | | |

| | | | |
|---|---|---|---|
| periods of typing | | | |
| Closes visit appropriately | | | |

Table 1

Table 2

*Calculated Times Of Each Student Spent Utilizing The Computer*

| Randomized Student No. | Typing and Talking Times (seconds | Typing Only Times (seconds) | Looking at PC Not Talking Times (seconds) | Total Health History (seconds) |
|---|---|---|---|---|
| 2346 | 20.0 | 41.0 | 16.1 | 248.0 |
| 4346 | 63.2 | 96.5 | 67.5 | 684.0 |
| 3316 | 107.4 | 93.2 | 88.7 | 917.0 |
| 5316 | 37.1 | 19.6 | 52.2 | 551.0 |
| 2245 | 15.7 | 111.1 | 143.9 | 782 |
| 3245 | 16.8 | 74.0 | 12.0 | 877.0 |
| 4245 | 36 | 136.9 | 81.0 | 708.0 |
| 5245 | 29.9 | 105.2 | 25.8 | 712.0 |
| 2216 | 34.7 | 123.3 | 47.4 | 655.0 |
| 3216 | 80.1 | 188.0 | 159.9 | 952.0 |
| 4216 | 16.9 | 6.9 | 73.4 | 237.0 |
| 5216 | 27.4 | 101.4 | 138.8 | 770.0 |
| 3146 | 32.5 | 75.6 | 125.3 | 647.0 |
| 2146 | 12.4 | 68.9 | 95.0 | 647.0 |
| 4146 | 26.2 | 101.8 | 124.7 | 529.0 |
| 2117 | 96.3 | 103.0 | 61.9 | 695.0 |

| | | | | |
|---|---|---|---|---|
| 3117 | 39.6 | 88.5 | 73.5 | 452.0 |
| 5117 | 35.1 | 55.4 | 92.5 | 459.0 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Table 2

Table 3

*Summaries, Averages and Ranges Of Time Spent On Computer*

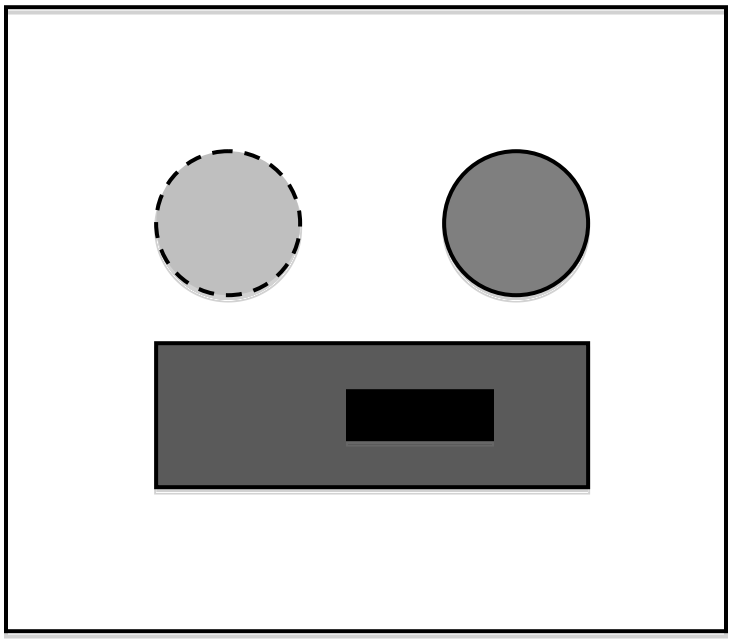
| | Typing and Talking Times (seconds) | Typing Only Times (seconds) | Looking at PC Not Talking Times (seconds) | Total Health History Times (seconds) |
|---|---|---|---|---|
| Total Sum | 727.3 | 1590.3 | 1479.6 | 11522.0 |
| Average | 76.6 | 88.4 | 82.2 | 640.1 |
| Minimum | 12.4 | 6.9 | 12 | 237.0 |
| Maximum | 107.4 | 188.0 | 159.9 | 952.0 |
| Percentages | 6.3% | 13.8% | 12.8% | 32.9% |

Total Time Spent On Computer: 3797.2

Percentage of Total Time Spent On Computer: 32.9%

Table 3

Figure 1



*Most Accurate Positioning of Computer*

Key:

= Standardized Patient

= NP Student

= Table

= Laptop PC

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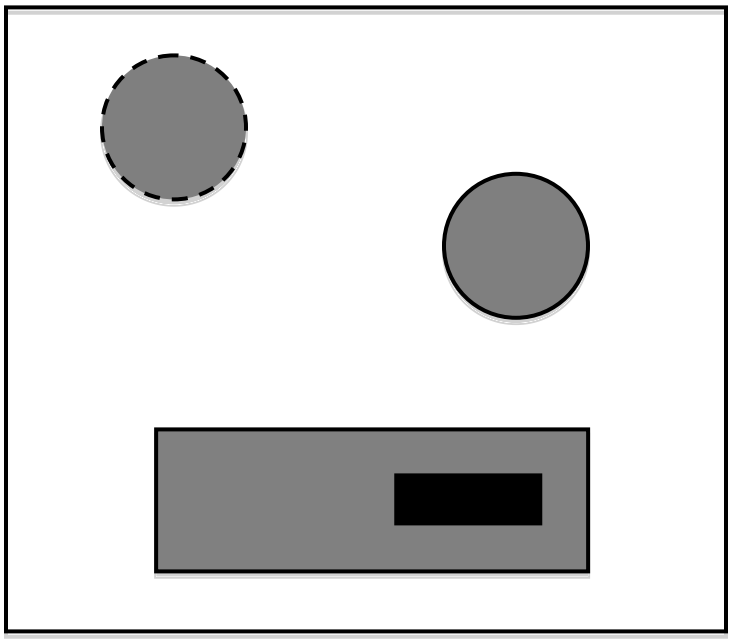
Figure 1

Figure 2



*Most Commonly Used Positioning of Computer*

Key: refer to Figure 1

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Figure 2

Appendix B

**Research Informed Consent**

Nurse practitioner students' ability to demonstrate effective EHR communication skills while maintaining patient satisfaction

Principal Investigator (PI): Clarissa Drill
UVM College of Nursing and Health Sciences
UVM Honors College
201-674-1514

**Purpose**

You are being asked to be in a research study of student EHR communication skills because you have previously been recorded in a simulation environment conducting a health history with the health provider/patient/computer triad. This study is being conducted at The University of Vermont under the Honors College and Nursing program. **Please read this form and ask any questions you may have before agreeing to be in the study.**

In this research study, I would like to utilize your previously recorded tapes of EHR use on standardized patients in the simulation lab. I would be grading the success of the EHR by noting the geography (student has back towards patient, student is at eye level with patient, student adjusts screen, etc.) and the student/patient/computer triad relationship (student introduction, introduction of the computer, good eye contact with patient, etc.).

**Study Procedures**

If you agree to take part in this research study, you will have agreed to give me permission to use your previously recorded tapes of EHR documentation from the simulation labs for research purposes.

**Risks and Benefits**

As a participant in this research study, there may not be any direct benefit for you; however, information from this study may benefit other people now or in the future. There are no known risks at this time to participation in this study. You will not be paid for taking part in this study.

**Confidentiality**

All information collected about you during the course of this study will be kept confidential to the extent permitted by law. You will be identified in the research records by a code name or number. Information that identifies you personally will not be released without your written permission. When the results of this research are published or discussed in conferences, no information will be included that would reveal your identity.

If photographs, videos, or audiotape recordings of you will be used for research or educational purposes, your identity will be protected or disguised.

**Voluntary Participation/Withdrawal**

Taking part in this study is voluntary. You have the right to choose not to take part in this study. If you decide to take part in the study you can later change your mind and withdraw from the

study. Your decisions will not change any present or future relationship with the University of Vermont or its affiliates, or other services you are entitled to receive.

**Questions**
If you have any questions about this study now or in the future, you may contact Clarissa Drill at cmdrill@uvm.edu or at 201-674-1514.

By signing below, I have acknowledged and read all of the above information and have agreed to be a part of this study.

First and last name (printed): _____

Signature: _____

Date: _____