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Student-designed Texts and Classroom Mediation: A UX Analysis of Clinical Nursing Simulations

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ABSTRACT

This experience report draws on a unique pedagogical context—clinical nursing simulations—to examine how student texts can mediate a classroom exchange. Focusing on 52 student handoffs, I analyze frequency of text use, correlation between text use and student talk, and the impact of a text's content on its mediating role. This methodology centers student texts and in the process, reimagines possibilities for UX pedagogy and assessment.

KEYWORDS

ACM proceedings, user experience, simulation, nursing, qualitative methods

1 INTRODUCTION

As students move into professional work contexts, their writing will no longer be composed for an instructor with a grade as the goal. Instead, their texts will mediate workplace activities and interactions with colleagues, clients, and others. Indeed, usability research in technical communication scholarship has typically focused on this relationship between professional texts and workplace systems, while lamenting the challenges of creating

authentic opportunities for students to learn usability in the classroom [1, 2]. In contrast, this experience report calls for more attention to the ways in which student texts already mediate classroom activities. To demonstrate a usability methodology for studying student writing, I analyze the role of two student texts— individual paper notes and a collaborative white board chart—in a unique pedagogical context: patient handoffs in clinical nursing simulations.

During clinical nursing simulations, a group of students provide patient care in a structured scenario while interacting with a range of complex technologies, including a robotic manikin, medications database, and telemetry machine. During the patient handoff, an outgoing group of students explains key patient information to an incoming group, preparing them to enter the classroom system with cues from their written texts. Thus, my analysis is informed by three related research questions:

- 1) How frequently are student-designed texts used during handoffs?
- 2) Does text use correlate with certain types of student talk?
- 3) How does a text's content impact its role in mediating student handoffs?

This report demonstrates how simulations center student users and texts by positioning them as contributors to a classroom system, helping scholars to reimagine the possibilities for user experience (UX) pedagogy and assessment. In addition, the patient handoff is one of the most critical and perilous moments in health communication and there is little consistency in how it is practiced [3]. Thus, this report also builds on existing knowledge on the characteristics of nursing handoffs, adding a pedagogical perspective to recent studies that explore how writing and electronic documentation can influence handoff effectiveness [4, 5].

2 LITERATURE REVIEW

As UX research has become central to scholarship and teaching in technical communication, conceptions of user-centered design have proliferated. Overall, usability research aims to account for a wide range of phenomenon related to how users interact with texts and technological systems—from cognitive, emotional, social, and embodied experience to environmental surroundings and impacts [6, 7]. Given my interest in how students collaboratively design and interact with their texts, recent work that foregrounds users as active contributors to technological systems are relevant [8].

In addition, the simulation suite itself, as well as the robotic manikin, shape student action and are a critical consideration in evaluating student texts. Thus, Rivers and Söderlund's [9] call for decentering the human in UX research is helpful in accounting for the influence of objects and environments. Finally, my research focuses not just on textual content, but also on embodied interactions with writing and the environment, including analysis of gaze and gesture. This interest aligns with recent methodological work that aims to capture embodiment in UX [10, 11].

2.1 UX Pedagogy

Though UX is a frequent topic of study in technical and professional communication classrooms, there is little research on best practices for implementing usability testing in classroom settings [1]. Several exceptions include Chong's [12] research on technical communication service courses, Scott's [13] examination of service learning, Reilly's [14] research on bibliographic practices, and Swarts and Slattery's [2] work on writing assessment. Chong [1] calls for more scholarship on classroom practices, expressing concern that current technical writing textbooks recommend perfunctory user testing, including "quick-and-dirty" checklists, and that students seem predisposed to simplify usability testing (p. 24).

This report offers a close examination of classroom practices in which student texts guide activity and thus can be evaluated for their efficacy for other student users. Like Swartz and Slattery [2], I argue that usability testing can offer new approaches to writing assessment that are more “transparent and systematic” because they are grounded in student experience and observable outcomes (p. 192).

2.2 UX in Healthcare

Finally, UX is becoming a frequent topic of exploration in rhetoric of health and medicine research as well as in healthcare scholarship. Meloncon [15] has called for a reframing of UX as patient experience design (PXD) and a mirroring of patient experiences with healthcare materials. Meanwhile, St. Amant [16] has applied PXD to international contexts, calling for a prototyping methodology to design health communication for diverse global contexts. Finally, Gouge [17] has drawn on theories of speculative usability to highlight improvisational exchanges in patient discharge communication.

Shifting the focus to usability and the provider, nursing scholarship has studied UX of nursing professionals with electronic healthcare record software [18, 19] and students in simulation contexts [20, 21]. Across both contexts, student-designed texts have been overlooked. This is an oversight because ultimately, this analysis can help to bridge research in UX, technical communication, and writing studies. It can also help value the role student writing can play in mediating interactions within healthcare instructional contexts.

3 METHODS

This report draws on data from a year-long ethnographic study of clinical nursing simulations. Research included observations and video recordings of over 80 simulations covering three different scenarios (geriatric, medical surgical, and pediatric), focal student interviews, and collection of student writing.

3.1 Field Context

The simulation suite is designed to look like a typical hospital room, with a large bed in the center featuring a robotic manikin patient. The manikin can breathe, blink its eyes, and speak through a voice box that is connected to a microphone used by the simulation instructor in the next room. A telemetry machine exhibits the patient’s heart rate, temperature, and vital signs. Meanwhile, students can find a pulse, check for eye dilation, check for capillary refill, and listen to the manikin’s lungs. The room also features a medications database, a medicine cart including the physician’s orders, and several large white boards that are used to chart patient care. Like a typical electronic health record, the white boards are the primary resource for sharing patient information across teams. In addition, students carry individual notes with them, adding relevant information from conversations with the patient, their team members, or other providers.

Before the start of their simulation, students receive a brief orientation to the room and are given an opportunity to design a template for charting as a full group. The simulation then proceeds in three parts, with teams of two to four nurses caring for the patient for approximately 20 minutes while the patient’s condition worsens. For example, a young male patient who has just had bilateral femur surgery after a car accident develops a clot in his right leg that eventually moves to his lungs, necessitating that he be moved to the emergency floor. In between each shift, students from both the outgoing and incoming teams participate in a handoff conversation. These conversations range from two to ten minutes in length, with the outgoing team explaining its care and cuing potential concerns and the incoming team asking follow-up questions.

3.2 Coding

My analysis draws specifically on transcription and coding of 52 student handoffs. I marked the beginning of a handoff when one student among two participating groups started reporting patient information and the end when the last comment was made before the outgoing group departed. After transcribing all of the handoffs

and segmenting them by clause, I used open coding to develop categories. Ultimately, I coded for three categories of talk: data (56% of turns), professional (26%) and conversation (17%). Descriptions of the codes are available in Table 1.

Table 1: Codes for Hand-off Talk Type

Code	Definition
Data	Clauses that describe (without valuing) information about the patient’s physical or non-physical condition. Can include descriptions of patient care and questions about a patient’s state.
Professional	Clauses that require nurses to interpret data using nursing knowledge. This includes evaluating results, directing future actions, and giving causal explanations
Conversation	Clauses that are neither data nor professional, including greetings and talk that orients students to the patient and room.

My second coding tier focused on students’ multimodal engagement with texts and objects in the simulation room through gesture or gaze. I returned to the video recordings of handoffs to document when talk turns (segmented by clause) were paired with gestures to people or objects in the room or were spoken while looking at a source. I coded each turn for gesture (often pointing or indicating with the hand). Gestures could be towards the board, an outgoing student, an incoming student, the patient, the speaker’s body, or the environment.



Figure 1: Gesture-Board, Source-Notes

In addition, I coded each turn for source, meaning where a student’s gaze was fixed during a talk turn. Source codes included the board, students’ notes, an outgoing/incoming student, the patient, and the environment. A single turn could have a different code for source and gesture (see Figure 1). 39% of turns included a source and 14% of turns included a gesture.

3.3 Analysis

After coding all of the handoff turns, I organized data in order to understand patterns both across simulations and between them. For each individual handoff, I tracked the total number of turns and the number and percentage of instances of each code. This allowed me to identify patterns and anomalies between simulations. I also compared medians of codes across all three simulation scenarios: geriatric, medical-surgical, and pediatric. Using medians ensured that my findings were not influenced by outliers. Finally, I compared the co-occurrence of codes across simulations.

4 RESULTS

4.1 Patterns in Source Use and Gesture across Three Simulations

My first tier of analysis focused on the prominence of texts in student's handoffs. I examined the percentage of turns that relied on the board or notes as a source, the median number of turns per simulation that included a gesture to the board, and the total number of verbal references to a text. As I describe in the discussion, this section models three different ways to account for engagement with a student-designed text by drawing on multimodal coding of video data.

As shown in Table 2, the percentage of handoff turns that included the board as a source was fairly consistent across all three simulations, with a slight rise during the second medical surgical simulation. Student's reliance on their notes was highest in the second simulation. Overall, the board was used more often as a source. There were multiple anomalous handoffs with heavy board or notes use, including an instance where the board was the source for 72% of talk turns, and one where notes were the source for 75% of talk turns.

Table 2: Median Percent Text Use Across Three Simulations

Simulation	% Board	% Notes
Geriatric	7	0
MedSurg	14	12
Pediatric	9	0

Gestures were used in a smaller percentage of overall turns. The median number of gestures to the board across all simulations was 1. The most gestures to the board in a single handoff was 14 and there were many handoffs with no gestures to the board.

Verbal references to a text were even more uncommon than gestures, so to track these I tallied the total number of references to either the board or physician's orders for each type of simulation (see Table 4). References to the board were slightly more common on average than references to physician's orders. The last simulation included the most verbal references to a text out of all three.

Table 3: Total Verbal References to a Text

Simulation	Board	Orders	Total
Geriatric	5	6	11
MedSurg	3	2	5
Pediatric	8	6	14

4.2 Correlations between Source Use and Talk Type

My second tier of analysis examined whether using the board or notes as a source correlated with certain types of handoff talk (data, professional, or conversation). I compared the percentage of total turns for each type of talk that used the notes or board as a source.

Table 4: Percentage of Talk Type Turns that Used a Source

Talk %	Board %	Notes
Professional	10	5
Data	18	18
Conversation	13	10

Table 4 demonstrates that the talk type that used student texts the most was “Data,” which used the board and notes for 18% of total turns each. Conversation talk used sources the second most; professional talk used them the least. Meanwhile, professional talk had the biggest discrepancy between source use—relying twice as much on the board (10%) than as on notes (5%).

4.3 An Example of Textual Mediation

By identifying patterns in source use and gesture across simulations, I was able to more easily identify anomalous simulations and consider what could be learned from them about textual content and UX. For example, one geriatric simulation was near median in terms of both its length (46 turns) and the percentage of professional (20%), data (67%), and conversation talk (13%). However, it was exceptional in that 61% of total turns used the board as a source and 13 turns included gestures to the board. It also included an instance of verbal reference to the board, when one outgoing student commented, “Um under the notes [section] we've got a couple of new orders” and then read off the orders.

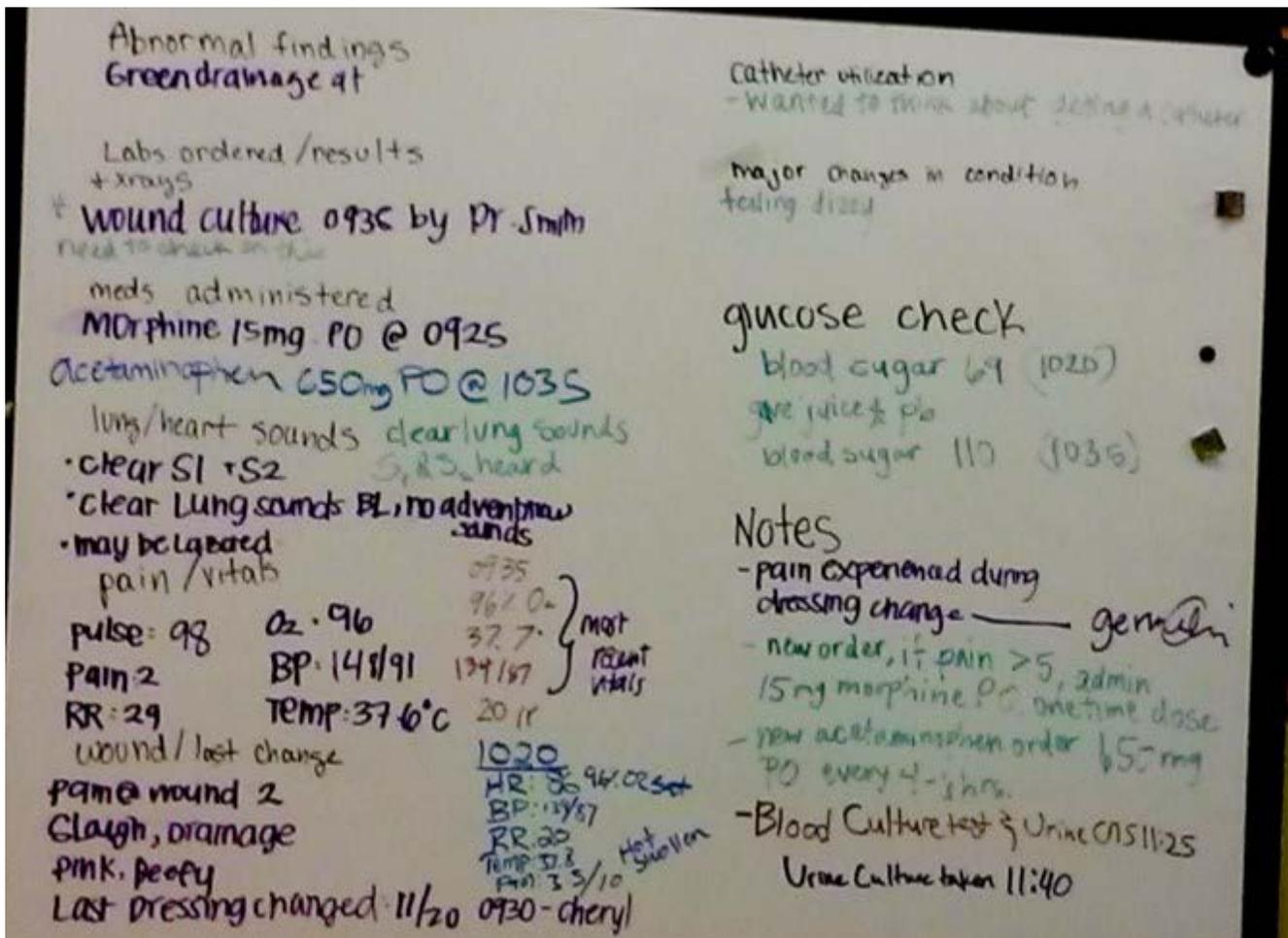


Figure 2: Student White Board Chart

An examination of the board itself in comparison to other student charts showed several distinctions. First, in addition to typical sections where students could record vital signs, it also included sections for “abnormal

findings,” “labs ordered/results,” “catheter utilization,” “major changes in condition,” “glucose check,” and a general “Notes” section for other important information. These sections are all tailored specifically to the patient, a geriatric diabetic patient who needed wound care.

In addition, by coding notes on the board as either professional notes or data notes, I found that seven notes demonstrated professional nursing knowledge, either in the form of positive/negative evaluation or directives for the incoming group:

- 1) Abnormal findings: Green drainage
- 2) New order, if pain >5, admin 15 mg morphine
- 3) Wound culture: Need to check on this
- 4) Clear lung sounds BL; no adventitious sounds
- 5) Clear S1 and S2
- 6) Clear lung sounds
- 7) [Breathing] may be labored

Across all of the boards used during geriatric simulations, the average number of notes demonstrating professional knowledge by board was 2.75. Thus, this group’s board was well above average.

During the student handoff, students stood around the board and used it to report on medications given and needed, dressing care, food given, blood glucose levels, and the possibility of catheter insertion. By using categories that were contextually tied to this specific patient and included professional knowledge in board notes, the board became a vital resource for the handoff conversation itself.

5 DISCUSSION

This experience report has put student-designed texts center stage in an exploration of UX during simulated nursing handoffs. I offered three categories for examining the prominence of student texts in mediating the handoff, including gaze, gesture, and verbal reference. Ultimately, finding patterns in textual mediation is useful to identify anomalies for further analysis.

I also considered correlations between the type of text used and the type of talk. As nursing students develop in their programs, a key part of their learning involves moving from memorized data (i.e. “this medication has these side effects”) to being able to prioritize, evaluate, and make professional decisions based on data. The finding that twice as much professional talk emerged through working with the collaborative group chart than through individual notes is an important one. Future work will delve more deeply into types of both professional and data talk to look for further correlations. I also coded professional talk as evaluative, directive, causal, and recall, and data talk as physical or non-physical. I will analyze correlations between these codes and text use.

In addition, future work will use the patterns from my initial analysis to continue delving into anomalous examples (both successful and unsuccessful). Preliminary analysis suggests that student positioning in the room (i.e. proximity to the board), textual organization, and textual content may all be contributing factors in determining the text’s role in mediating nursing student handoffs. This is in line with St. Amant’s attention to context in healthcare usability design. His calls to consider differences across cultural contexts offer future directions for this project as well [7, 16].

Taking a UX view of student texts within a classroom system offers a new standard for evaluating their writing. Rather than imposing existing criteria on student work—often drawn from real-world situations with different goals—instructors can evaluate how a students’ design impacts the texts’ role during classroom action. They might consider questions like:

- 1) How prominent was the text during a group’s conversation?
- 2) Did the text promote a desired kind of professional talk?
- 3) What features of the text effectively supported student negotiation of the task? Which features inhibited success?

Of course, instructors will need to have access to student conversation, ideally in the form of video recording or live observation in order to answer these questions. While simulations are an admittedly unique context, students could also create navigational texts for working with course platforms, library databases, multimodal assignments, etc. Recording groups using these texts in action would then provide a means for evaluating their role and effectiveness in mediating group activity.

Ultimately, this experience report offers a preliminary model for studying UX of student-designed texts using multimodal analysis. My hope is that it convinces others in myriad technical writing contexts to consider the valuable insights available through such an approach and to build on the insights introduced here.

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