EXPERIENCE EXCHANGE

The use of ChatGPT in nursing education: A novel approach to developing case studies

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ABSTRACT

Background: Recent changes in the NCLEX licensing examination, which now includes 3 case studies, has prompted faculty to further incorporate case-based learning into their courses. **Problem:** Case study resources are oftentimes geared toward higher level nursing students prompting faculty to invest in other resources and devote time re-writing them assuring suitability for novice nursing students.

Approach: With the availability of ChatGPT, faculty members now have a simple, cost-effective, resource for creating case studies appropriate for novice nursing students.

Outcomes: Using ChatGPT and an input prompt, the author created a case study suitable for beginning students that can be aligned with applying the phases of the clinical judgement measurement model.

Conclusions: Despite its infancy and limitations to use in nursing education, ChatGPT has the potential to save faculty time, and financial resources to create case studies.

Key Words: Case studies, large language model, ChatGPT, nursing education, clinical judgement development

1. INTRODUCTION

For some time now, nurse educators have been urged to move away from lecture-based approaches to teaching in the classroom and incorporate case-based learning.[1] Nursing education experts continue to recommend focusing the delivery of nursing content through a case-based approach. Case studies are an appropriate form of pedagogy in the first semester nursing courses as an adjunct to assist beginner students to understand and learn the clinical judgement process.[2] Due to the recent changes to the national licensing examination [NextGen NCLEX], there is a more urgent push to incorporate case studies in nursing courses. Although the NextGen NCLEX will continue to incorporate multiple choice and stand-alone test items, the new exam design incorporates three unfolding case studies to assess the candidate's ability to make safe, clinical decisions throughout the various stages of a client care encounter.[3] Case studies help guide students in applying content learned to real cases based on the examples they may see in clinical rotations as well as the real-world.[4] Therefore, the push is even greater now to incorporate case studies in first year nursing courses. Case study usage with students has shown beneficial in enhancing student knowledge and clinical judgement.[2, 5]

Oftentimes, case studies suitable for first semester students are not always readily available to faculty. Many pre-designed case studies oftentimes present client care scenarios that are more complex for a first-year nursing student and tend to be more suitable for upper level nursing courses. Another barrier faculty oftentimes encounter is the out of pocket

financial obligation to obtaining case studies. There are numerous case study books available for purchase, but faculty oftentimes require extra time to redesign them for first year students. Case studies are included in many textbook publisher packages, but they also oftentimes require editing by faculty who teach first year students. Again, this requires extra time and effort that is not often available to busy faculty.[6] Faculty who teach first year students need a way to develop case studies in a cost-effective, time saving manner. This is where ChatGPT is helpful in creating case studies suitable for use with first year students. There is a gap in the literature regarding the use of ChatGPT in nursing education focusing on the nurse educators' perspective. The reason for this could be the recent availability of multiple large language model products for public use. Another reason may include nursing faculty uncertainty of how large learning models could assist in the development of student learning activities. The majority of available literature regarding the use of large language models in nursing education currently focuses on the advantages and disadvantages to its use, and represents the viewpoint of student's use of large language models as compared to use by faculty.[7]

The purpose of this article is to provide educators basic guidance on developing case studies using large language models that are suitable for first year students.

2. WHAT IS A LARGE LANGUAGE MODEL?

A large language model is built to understand and generate human-like text based on the input it receives from the user, and can assist with answering questions, providing explanations, generating ideas, and simulating conversations on a wide range of topics.[8] Large language models have the potential for use by educators to create real-life, client interaction scenarios to assist students in practicing their communication and clinical judgement skills. large language models can aid in the design of case studies to include medical history, laboratory results, and diagnostic imaging studies.[8] large language models can also assist with creating educational materials such as lecture notes, quizzes, and client care plans.

Large language models, which are a form of artificial intelligence, utilize deep learning and machine learning techniques to analyze very large sets of data. These models are designed to excel at language-related tasks, allowing them to perform natural language processing tasks effectively. They can comprehend and generate human language text, providing accurate and coherent responses. There are some drawbacks to using ChatGPT that include, derived data that was trained on poor quality data sets. The program may generate bias or misleading results, and the program has the potential to cause

plagiarism.[8] It's important to remember large learning models are not meant to replace creativity and critical thinking. Most large language learning models provide a warning directly under the text entry box that states, "ChatGPT can make mistakes. Check important info."[8]

There is a no fee version of ChatGPT, all the user requires is a google email account. There is also another version, ChatGPT 4.0 with advanced user features that requires a monthly service fee. Although there are numerous large language models available today, for the purpose of this manuscript the author will focus on the use of ChatGPT.[8]

Despite the availability of other large language models, most researchers chose to use ChatGPT in their studies. Researchers provided no rationale as to their decision on the use of ChatGPT over other available large language models publicly available.

Research on the use of ChatGPT in nursing education is in its infancy. Because the use of ChatGPT is in the novice stage in nursing education, most of the available literature is of an anecdotal nature. Whereby, available literature describes the background and usefulness of large language models, how they might aid in the development of clinical judgment and problem-solving skills amongst students, benefits to nurse educators, and barriers to its use within the discipline of nursing practice and education. Other available literature pertaining to large language model use in nursing is primarily focused towards clinical practice and licensed nurses. Although the clinical practice literature is relevant to the discipline of nursing, it is not the focus of this article.

Research on the use of ChatGPT in nursing education highlights some effective strategies that are highly beneficial to nurse educators for developing course content, designing educational materials, and generating case scenarios. Dagci[9] noted that ChatGPT was effective for educators to create course content, whereby findings were significant between accessible references and reliability, as well as, a significant relationship between quality and reliability of accessible references. To assist with developing simulation scenarios, Vaughn[10] found that ChatGPT saved significant time, was easily accessible, and inexpensive. To encourage critical thinking and problem-solving skills. Goktas[11] incorporated Benner's novice to expert model along with ChatGPT to customize individualized learning experiences according to each stage of skill development.

Chang[12] described using ChatGPT in a physical exam course that looked at learning achievement, critical thinking, and learning satisfaction. It was felt that the use of ChatGPT amongst students promoted a personalized learning oppor-

tunity with the ability to assist and engage the learner in an active learning mode.

Despite the positive outcomes from these studies, there are limitations noted amongst them. Primarily, the use of small samples sizes along with studies that were conducted within an individual school of nursing or 1 specialization offered within the program.[9, 10, 12] Also noted was the text generated within ChatGPT was in English, therefore, noting the need for further research in this area integrating other languages besides English should be an area of focus. All studies agreed that the results derived from ChatGPT require further evaluation to assess for accuracy due to the potential for false or misleading information.[9–12]

3. TIPS FOR WRITING EFFECTIVE PROMPTS

Information derived from large language models such as ChatGPT are a result of data entered into the initial chat prompt by the user. The prompt can be thought of as a detailed series of words and phrases that assists ChatGPT to produce the information the user is seeking.[8] Users should aim to create a prompt that achieves the breadth and depth of the desired outcome. This means the more information you enter into the prompt, the more detailed the outcome data might be.

Users should base their prompts on their goal of the intended end product from ChatGPT.[8, 11] Is the aim to create a case study, multiple choice questions, or a presentation of information? The intended audience is another important aspect when building a prompt in ChatGPT. As with any learning activity, one must start with objectives. What is the expected outcome for the learner? Are your audience members novice ICU nurses, first semester students, or experienced hospice nurses? What setting will the scenario take place in? long-term care, acute care, home care, clinic? Lastly, one may wish to add into the prompt a request for discussion questions or multiple-choice questions with rationales provided to assist the student in understanding the reason for the correct answer and why the other options were incorrect.

4. EXAMPLE OF PRACTICAL USE

There are various large language model products available for use. The author chose to use ChatGPT to complete this exercise. Using ChatGPT, the author created a case study based on a fundamental concept oftentimes presented in a first semester nursing course. In the prompt window, the following text was entered: create a nursing case study suitable for a first-year nursing student. Make the case study about a 70-year-old male who is experiencing constipation. Replace the word complains with reports. Exclude nursing diagnosis and develop 3 multiple choice questions with rationales to

answers.

The author chose to exclude nursing diagnosis in the chat prompt. Although nursing diagnoses remain embedded in many nursing program, they are not universally used as originally intended as a standardized language, even in the United States where the NANDA nursing diagnosis list began.[13] Some nursing programs continue to teach the nursing process as a five-step ADPIE approach. The NCLEX-RN® and NCLEX-PN® no longer measures the candidate's knowledge of nursing diagnoses.[13] The derived case study is displayed in Figure 1. The multiple-choice questions are displayed in Figure 2.

5. DISCUSSION

ChatGPT created a short case study suitable for a first year or even a first semester student learning about bowel elimination. The results represent a case derived from the text placed into the chat prompt window. Educators may wish to add additional data such as, allergies, pets, children, religion, diagnoses, medications, surgeries, etc. to expand on the amount of information provided to students. The analysis of the ChatGPT derived case study is not meant to be all inclusive and is simply used to spark ideas and provide an example of a case study derived from ChatGPT and its possible use.

In reviewing the case study, it is presented by categories which include background, medical history, social history, current symptoms, and physical examination. It probably would have been more beneficial to change the initial prompt to describe symptoms of constipation instead of stating it as this would help the student in the analyze cues and generate hypotheses step of the clinical judgement measurement model (CJMM).[14] The nursing care plan portion of the case study could be withheld from students as this would be information faculty would want students to provide in the generate solutions step of the CJMM.[14] The interventions data may also be withheld to prompt students to provide this and other data to include in the take action step of the CJMM.[14] The case study can be read with students to begin to extract information that is appropriate for the recognize cues step of the CJMM.[14] To include the evaluate outcomes step of the CJMM faculty could include data related to a follow up visit with Mr. Doe and his healthcare provider which could indicate improvement, no change, or a decline in his condition.[14] There are other noted correlations faculty can see in the case study to assist in generating discussion questions for students. Students might look up the two medications listed and discuss if they have the potential to cause the symptoms presented in the case. Other questions for discussion might include a comparison of baseline vital signs

for an individual Mr. Doe's age with presented vital signs. Dietary and nutritional information can be used to prompt questions about the interrelationship of current dietary intake and how it relates to his presenting symptoms.

Patient Profile
- **Name**: Mr. John Doe
- **Age**: 70
- **Gender**: Male

Presenting Issue
Mr. John Doe is a 70-year-old male who presents to the clinic with reports of constipation for the past week. He states that he has not had a bowel movement in six days and feels bloated and uncomfortable.

Medical History
- Hypertension (controlled with medication)
- Type 2 Diabetes Mellitus
- Osteoarthritis

Medications
- Lisinopril 20 mg daily
- Metformin 500 mg twice daily
- Ibuprofen 400 mg as needed for pain

Social History
- Retired accountant
- Married to wife Rose for 33 years
- Smokes 10 cigarettes per day
- Drinks 1-2 glasses of wine per week

Dietary and Lifestyle Habits
- Typically consumes a diet low in fiber
- Drinks about 4-5 cups of coffee daily
- Limited physical activity due to arthritis pain

Physical Examination
- Vital Signs: BP 135/80 mmHg, HR 78 bpm, RR 16 breaths/min, Temp 98.6°F
- Abdomen: Distended, mild tenderness on palpation, no masses
- Bowel Sounds: Hypoactive
- Rectal Exam: No fecal impaction

Figure 1. Nursing case study: Constipation in a 70-year-old male

Question 1

Which of the following is the most appropriate initial dietary recommendation for Mr. John Doe to help alleviate his constipation?

A. Increase intake of red meat and dairy products.
B. Increase fiber intake by consuming more fruits, vegetables, and whole grains.
C. Increase coffee consumption to stimulate bowel movements.
D. Reduce water intake to prevent bloating.

Rationale: The correct answer is B. Increasing fiber intake by consuming more fruits, vegetables, and whole grains can help improve bowel movements and relieve constipation. Options A and C are not appropriate as red meat and dairy can worsen constipation, and excessive coffee can lead to dehydration. Option D is incorrect as adequate hydration is important for preventing constipation.

Question 2

Which of the following is a common side effect of ibuprofen that might contribute to Mr. John Doe's constipation?

A. Diarrhea
B. Increased urination
C. Gastrointestinal bleeding
D. Reduced bowel motility

Rationale: The correct answer is D. Reduced bowel motility is a common side effect of nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen, which can contribute to constipation. While gastrointestinal bleeding (C) is also a potential side effect of NSAIDs, it does not contribute to constipation. Options A and B are not commonly associated with NSAID use.

Question 3

Mr. John Doe's physical activity is limited due to arthritis pain. Which of the following recommendations would be most beneficial to help him manage his constipation?

A. Continue current activity level
B. Engage in gentle exercises like walking or swimming
C. Avoid physical activity to prevent pain
D. Increase use of pain medications to allow for more intense exercise

Rationale: The correct answer is B. Engaging in gentle exercises like walking or swimming can help improve bowel motility and manage constipation without exacerbating arthritis pain. Option A does not address the need for increased physical activity, while option C is not beneficial for constipation management. Option D is not advisable as increasing pain medication may lead to other side effects.

Figure 2. Multiple choice questions

6. LIMITATIONS AND DRAWBACKS

Faculty must be mindful of some of the limitations and drawbacks to the use of any large language models. First, large language models have the potential to generate bias as can be seen in Mr. Does' social history.[15] Mr. Doe is 70 years old and retired. Many individuals remain employed at and after the age of 70. Also, Mr. Doe lives with his wife may be seen as biased as many adults are in same sex relationships with their partner. To help rectify this, the user would need to expand on the initial prompt to include additional information.

A second limitation includes a large language models' ability to generate out-of-date or inaccurate information.[11] This is crucial particularly in the example case study where dosages of medications are listed. This could be a discussion question for students to investigate whether the dosages for each medication is in an acceptable range.

7. CONCLUSION

Despite its infancy and drawbacks to use, large language models present a promising pedagogical approach in the future of nursing education. Whether large language models will solely be used by faculty as a means for developing teaching and learning material, or if they will be also be used by students, there remains a critical warning for the need of guidelines on its use. It would be beneficial for both faculty and staff to have open and honest discussions regarding the use of large language models within the nursing program. First and foremost, would be educating faculty and staff on what large language models are, their potential use, and drawbacks. There would also need to be guidelines for its use by students. What do faculty and staff see students using large language models for? Would it's use by students solely be for obtaining information to build on knowledge about a particular topic? or would it also be used for developing care plans, case studies, or study guides? Beginning to incorporate any of the large language learning modules within a nursing program should not be undertaken haphazardly.

Reviewing the case study developed from ChatGPT, it is noted a simple, and cost-effective pedagogical tool can be generated in a time saving, economically friendly manner. The use of the case study method alongside the alignment of the 6 steps of the CJMM is a valuable combination to assist faculty to begin to help students understand and practice clinical judgement.

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The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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