Web-based Pedagogical Agent to Facilitate Critical Thinking
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Critical Thinking?

self-directed, self-disciplined, self-monitored, and self-corrective thinking, which presupposes assent to rigorous standards of excellence and mindful command of their use.
reflective and reasonable thinking that is focused on deciding what to believe or do
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CT Historical Background

Socrates
Ancient Greece

Buddhist logicians
20th century

Benjamin Bloom
20th century

Elder & Paul

The Mohist
350 BC

John Dewey
20th century

Paulo Freire
20th century
I cannot teach anything. I can only make people think.
Evaluation

Prioritize the interventions for a patient with heart failure.
CT Historical Background

- Socrates (500 BC)
- Buddhist logicians (2nd BC)
- The Mohist (350 BC)
- John Dewey (20th century)
- Paulo Freire (20th century)
- Benjamin Bloom (20th century)

Elder & Paul
"Thinking is not driven by answers but by questions. The driving forces in the thinking process are the questions."
Designing Instruction:
Our goal is to provide instruction that creates optimal learning situations.
A variety of strategies have been proposed to facilitate critical thinking.
Critical thinking is a desired outcome for higher education (Paul, 2004). Although critical thinking is described as an essential skill in nursing, not all new registered nurses meet these expectations (DelBueno, 2005).
Designing Instruction: Our goal is to provide instruction that creates optimal learning situations. A variety of strategies have been proposed to facilitate critical thinking.
With the growth of online learning in nursing, various strategies are needed to vigorously involve students in the instruction and encourage critical thinking.
Web Based Pedagogical Agents

One approach is to have the student use critical thinking skills to solve a problem by providing conditions of dissonance to trigger higher order thinking.

Agents can have both informational usefulness as a knowledgeable teacher, and affective interaction reflected in their social presence.

It is assumed that a pedagogical agent provides a social presence that may assist with the learning process.

Web based Animated Pedagogical Agents or Virtual Characters asking questions
Web Based Pedagogical Agents

Agents can have both informational usefulness as a knowledgeable teacher and affective interaction reflected in their social presence.

One approach is to have the student use critical thinking skills to solve a problem by providing conditions of instruction to trigger higher order thinking.

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Possesses the ability to provide personalization. Use specific pedagogical methods that may enhance online instruction.
Agents can have both informational usefulness as a knowledgeable teacher, and affective interaction reflected in their social presence.
Possess the ability to provide personalization
Use specific pedagogical methods that may enhance online instruction.

Agents can promote student motivation and engagement
Engender affective as well as cognitive responses that may facilitate critical thinking.
One approach is to have the student use critical thinking skills to solve a problem by providing conditions of instruction to trigger higher order thinking.
Animated pedagogical agents are virtual characters that facilitate learning in computer-based or Web-based environments.
It is assumed that a pedagogical agent provides a social presence that may assist with the learning process.
The purpose of this study was to evaluate the effectiveness of a Web-based motivational pedagogical agent on critical thinking among nursing students.

The role of the agent in the modules an expert motivational advisor.

Instruction consisted of a series of three patient case study modules. A nursing case study depicted a particular patient with a certain diagnosis and included a series of assessment data and diagnostic results. Information was relayed in an unfolding case study format.
The role of the agent

Motivation
The purpose of this study was to evaluate the effectiveness of a Web-based animated pedagogical agent on critical thinking among nursing students.
Instruction consisted of a series of three patient case study modules. A nursing case study depicted a particular patient with a certain diagnosis and relayed a series of assessment data and diagnostic results. Information was relayed in an unfolding case study format.
Methods:
This mixed methods experimental study used a pretest, posttest design with a control group. The convenience sample was comprised of 50 Associate Degree Nursing students in their final semester of the program. Random assignment resulted in 21 students in the control group and 24 students in the pedagogical agent group at the study’s conclusion.
Jane - Chest Trauma
Jesse - Shock
James - Spinal Cord Injury
Each modules consisted of:
Introduction to the case study
Series of slides with questions
The student needed to make some determinations and conclusions related to what was happening in the case study and decided upon the interventions for the patient in response to questions being asked. The questions and feedback was meant to be similar to the facilitation provided by the clinical instructor discussing the student’s patient.
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Instruction consisted of a series of three patient case study modules. A nursing case study depicted a particular patient with a certain diagnosis and relayed a series of assessment data and diagnostic results. Information was relayed in an unfolding case study format.

The role of the agent in the modules was an expert motivational advisor.

Examples:
- Jane - Chest Trauma
- Jesse - Shock
- James - Spinal Cord Injury

Series of slides with questions.
Chi-square analysis for each group revealed a significant difference for improvement of the critical thinking level and correct conclusion from pre-think-aloud to post-think-aloud scenarios responses.

Only the pedagogical agent group had a significant result of their appropriate evaluations. Neither group had a significant result for nursing diagnosis.
Chi-square analysis for each group revealed a significant difference for improvement of the critical thinking level and correct conclusions from pre-think-aloud to post-think-aloud scenarios responses.

Only the pedagogical agent group had a significant result of their appropriate evaluations. Neither group had a significant result for nursing diagnosis.
studies & Questions

also...

- Case studies improve critical thinking
- Questioning improves critical thinking
- The right type of questioning ....
Case studies improve critical thinking
Questioning improves critical thinking
The right type of questioning ....
Discussion

Case studies & Questions

Providing Positive Feedback

What does it mean...
Positive Feedback

Motivate...

Excellent!
What should you do first after taking the patient's vital signs and determining that the blood pressure is high in this specific situation?

Submit
Her lips are blue. What else should you assess?
The chest x-ray reveals a tension pneumothorax. When you assess the patient, what will you find with this diagnosis?

Submit
What does it mean?

Improvement may have been more dependent upon the students' own individual characteristics, and their interaction with the agent. If they required the hints and cues that would have been useful to them.

Discussion
Feedback may have been particularly useful to those at the novice or advanced beginner critical thinking level. If they required motivation, they would have found the agent useful.
Improvement may have been more dependent upon the students’ own individual characteristics, and their interaction with the agent. If they required the hints and cues that would have been useful to them.
Conclusion
Conclusion
The advantage of a pedagogical agent over a non-pedagogical agent environment showed promise.

It would seem that students who need more help with critical thinking ability may benefit more from the use of a pedagogical agent.

A pedagogical agent may provide a social presence and verbal responses to motivate students and encourage critical thinking.

A cognitive and social effects of the pedagogical agent appear to support the development of critical thinking for various forms of critical thinking.

The pedagogical agent should be able to provide messages that can affect the learner's performance through both verbal and non-verbal communication.

This can lead to an increase in inferential thinking and more effective learning.
• The advantage of a pedagogical agent over a non pedagogical agent environment showed promise.

• It would seem that students that need more help with critical thinking ability may benefit more from the use of a pedagogical agent.

• A pedagogical agent may provide a social presence and verbal responses to motivate students and encourage critical thinking.
• The cognitive and social effects of the pedagogical agent appear to provide some support for facilitating critical thinking that warrants further study.
• The pedagogical agent has the ability to deliver a message that can affect the learner’s motivation through both verbal and nonverbal communication thereby providing a social interface (Baylor, Kim, Son, & Lee, 2005).
• Web-based pedagogical agents provide a potential innovative teaching practice applicable to nurse educators in the academic setting.
Suggestions
• May need to incorporate into curriculum over a longer period of time.
• Refinement of modules: Possible answers of students and responses of agent and Multiple choice vs. fill in
• Variable environment: Multiple modules for students at different levels of critical thinking and Performance support that gradually diminishes.
Students that find learning complex would be early in the program.
• Utilizing the modules at the beginning of the nursing program rather than the end.
• Other uses for animated pedagogical agents: Socialization to the role of the nurse
• Communication with the patient, other nurses, & other healthcare personnel: Taking a patient history, Giving end of shift report, Report to the physician
References:

References Cited


Ma, X. (2008). The skills of teacher’s questioning in English classes. International Education Studies, 1, 92-100


Publication

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