

## Psychological Reaction in Role Playing Games for Medical Safety: Educational Effect of Multitask Games

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### PURPOSE

For medical safety training, we studied the educational effect of gaming simulation that is often used in risk management and cultural-exchange programs. Fujihara (2007) described gaming simulation as a process where a given problem is solved under given rules by exchanging information among participants and making appropriate decisions in a virtual environment simulating reality.

In clinical care, several simultaneous tasks in a given short time are potential factors triggering various human errors. We designed a game with multiple problems including built-in error factors for nurses to experience the difficulties in a virtual clinical scenario. Error reactions and learning experience of nursing students were analyzed to improve the game for medical safety training.

### METHODS

Twenty-four student nurses at A university were divided into four groups, each group consisting of six participants (three nurses, one patient, one evaluator, and one confirmer). The following tasks were assigned to the groups. The three nurses were asked to sort medicine for patients, to plot a graph, and to assess the patient while one of them responds to patient requests. A nurse interrupted by a patient is to transfer his/her duties to the next nurse. In sorting medicines, groups compete for time and accuracy. Different quantities of several drugs and pills are to be prepared from a prescription. First, a nurse copies the name and quantities of the medicine to individual bags, and puts each medicine in bags from complicated medicine trays. A patient interrupts a nurse with questions and requests. An evaluator rates the behavior of the nurses on five levels (very good/good/fair/poor/very poor: 5/4/3/2/1). The last participant confirms the sorted medicines with the prescription.

**Measures:** The following items were checked.

1. Agreement in name (1–1) and quantities (1–2) between the sorted medicines and the prescription (0–100%), 1–3.  
Quality of nurses attitude toward patients (0–100%) during four interruptions.
2. Effect of the game experience.
  - 2–1. Participants evaluate self-awareness of medical safety.
  - 2–2. Participants were asked to describe their impressions after playing each role and learning experience in the game.
  - 2–3. Nurses were also asked to describe the difficulties caused by interruptions.

### RESULTS

#### 1. Accomplishment of each group

Accuracy in names and quantities of sorted medicines and quality of attitude were 75–75–50% (group 1), 100–50–70% (group 2), 100–100–75% (group 3) and 100–0–85% (group 4), respectively. The groups with higher scores in attitude tended to have lower accuracy in quantity of medicine.

#### 2. Learning experience by participants

(1) *Awareness of medical safety:* Evaluation of the following items increased appreciably after the game. Values in the parenthesis are *t*-values ( $df=20$ ), and an asterisk denotes the confidence level (i.e., \* $p<0.05$  and \*\* $p<0.01$ ). Difficulty in multitask: I became aware that difficulty increases when I have to do several things simultaneously (3.30\*\*). It is difficult to take over a duty (5.40\*\*). Possibility of errors: Handwriting has a higher possibility of introducing errors (3.23\*\*). Confirmation by two people may not eliminate errors (4.54\*\*). Behavior under stress: When I am nervous, I cannot communicate well (2.50\*). It is necessary to smile when I take care of patients (3.87\*\*). Knowledge to prevent an accident: I know basic concepts to prevent accidents (2.59\*). I know basic techniques to prevent accidents (3.08\*\*). I know how to organize a team to prevent accidents (2.50\*). Safety consciousness: I might cause a medical accident (3.49\*\*). It is difficult to always be aware of my own errors (2.39\*\*).

(2) *Learning experience through the game:* Participants described the learning experience as follows. "It is difficult to accomplish the duty under stress such as being required to respond politely to patients." "It is hard to finish the task after several interruptions." "I made a mistake even though I tried hard not to." "I could not take notes, and it is difficult to communicate accurately." "I realized my lack of experience." "There is always danger in medical scenarios." "Individuals cannot be perfect, and teamwork is necessary." These freely described learning experiences were classified into 19 categories, judging from their similarity. Then, the descriptions were analyzed using numerical method III by Hayashi (Fig. 1).

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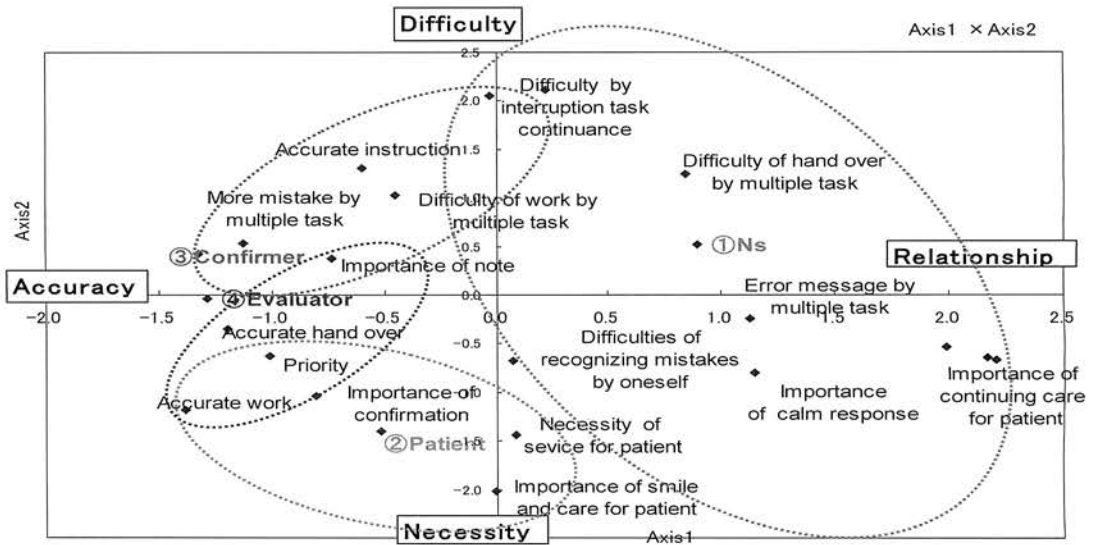


Fig. 1. Learning from gaming simulation experience.

There was a total of 57 data items, and the average number of data items for each person was 2.85 ( $SD : 0.91$ ).

The first axis seems to correlate with accuracy-relationship; the second axis, with difficulty-necessity. Students realized the counterbalance between accurate action and fulfillment of needs, and that between individual duty and response to a patient. Learning experience varied among participants, depending on their roles.

(3) Nurses became more conscious about teamwork, and patients realized various needs in clinical settings. Evaluators and confirmers paid more attention to accuracy of each action. In the general impression of the game, many participants stated that they could not detect mistakes without experiencing the virtual medical scenarios.

## DISCUSSION

We analyzed the game experience in terms of errors and working stress in the environment to determine the significance of the learning experience in medical scenarios of the multitask game.

1. We confirmed that errors occurred in sorting medicines. These errors were more in quantity than sorting itself. Duty requiring continuous attention may have caused mistakes in quantity whereas the results may depend on the difficulty in identifying medicine. Groups counterbalancing accurate sorting and care for patients exhibited obvious conflict. Careful attitude may vary among individuals in the groups, resulting in a change in the threshold.

2. Stress in a work environment: The multitask game caused conflict in nurses resulting in distraction and decline of attention in the virtual clinic. The role-playing game reasonably simulated the error occurrence in an actual work environment.

3. Awareness of errors and prevention: The game was designed to make participants realize how errors are triggered.

The participants became well aware of triggering mechanisms after the game. They also realized how interruptions affected attention, actions, and emotions. The educational effect of the game seems to be reflected in general impressions of the participants.

4. Gaming simulation and medical safety education: Participants experienced difficulties of accomplishment and transfer of duties in the multitask game. They learned how errors occurred easily in a clinical scenario without fear, threat, and/or rejection. No student rejected the case study of accidents, but rather they enjoyed the learning experience. Furthermore, after experiencing how errors readily occur, they realized the importance of confirmation and making notes to take measures against errors. This learning experience helps in building up confidence and effective measures. In addition, receiving requests from a patient or making requests as a patient made nurses consider how they should respond to patient requests.

Nurses should not be allowed to experience failure in an actual clinical environment, but failure in a game can be repeated. Conditions can be modified, and the game may be designed for education with strong impact on recognition, emotion, and action, unlike conventional classroom case studies. We propose to use the games in effective and dynamic measures for medical safety.

## REFERENCE

Fujihara, T. 2007 *Gaming simulation of interpersonal relationship*. The first edition, Kyoto: Kitaoji Shobo. (in Japanese)\*

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