

# A study of evaluation methods for individual contribution in group work using a online tool for creating nursing care plan and pathological related diagram

Moe Fujii<sup>1</sup>, Akiko Williamson<sup>2</sup> and Munehiko Sasajima<sup>1</sup>

<sup>1</sup>University of Hyogo, 8-2-1, Gakuennishimachi, Nishi-ku, Kobe-shi, Hyogo, 651-2103, Japan

<sup>2</sup>Kobe University Hospital's Department of Nursing, 7-5-2 Kusunokicho Chuo-ku, Kobe-shi, Hyogo, 650-0017, Japan

## Abstract

Those who become nurses need to acquire the ability to develop the nursing process, and to this end, they are conducting an exercise in which they work in groups to create a nursing care plan and pathological related diagram. In this study, we address the issue that it is difficult for teachers to properly evaluate individuals when grading this exercise. We use an online tool for group work to create a nursing care plan and pathological related diagram, and to measure the contribution of each individual from the tool's log. Currently we are evaluating the model using log data from real nursing learners.

## Keywords

nursing care plan and pathological related diagrams, group work, evaluation of learners,

## 1. Introduction

Nurses are required to carry out a series of nursing processes, such as collecting patient information, clarification of assessment and problem, developing a nursing plan, implementing and evaluating the plan. In nursing education, in order to acquire this ability, nursing students and new nurses practice making a nursing care plan and pathological related diagram, which represents the nursing process in a graphical structure, individually or in groups. An example of a description of a nursing care plan and pathological related diagram is shown in Fig. 1.

This study focuses on an exercise in which learners work in groups to create a nursing care plan and pathological related diagram. In this case, it is not easy for the instructor to grasp all the efforts of each learner during the exercise and to provide appropriate guidance and evaluation for each individual. Appropriate evaluation of individuals in group work, not only in exercises of creating a nursing care plan and pathological related diagram, is considered to be related to the motivation of the learners to work. In addition to marking exercises, the instructor also has other tasks to perform, so it is important for the instructor to be able to evaluate the work of the learners. A method is needed to appropriately evaluate the individuals in the group without increasing their workload as much as possible. In this study, with the aim of supporting


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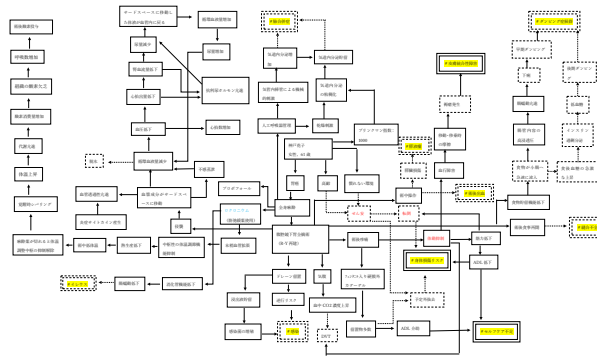
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✉ ad23w062@guh.u-hyogo.ac.jp (M. Fujii); wakiko75@med.kobe-u.ac.jp (A. Williamson);  
sasajima@sis.u-hyogo.ac.jp (M. Sasajima)



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**Figure 1:** A nursing care plan and pathological related diagram of gastric cancer.(in Japanese)

instructors in appropriately guiding and evaluating individual learners, we investigate a method for measuring the contribution of individuals in a group in the creation of nursing care plan and pathological related diagrams using an online tool, with which jointly developed with the Kobe University Hospital's Department of Nursing. Specifically, we developed a model to measure the contribution of individuals in group work, and calculated the contribution of each individual from the log data generated by the online tool. By calculating from the log data, we contribute to avoid increasing the burden on the instructor in the evaluation process.

## 2. Related Works

Not only nursing care plan and pathological related diagrams exercises, but also other nursing exercises are often conducted in a group format[1]. There are two main reasons for this. The first is that through group learning, students can acquire the skills necessary for future team nursing. The second reason is that nurses work in groups in actual nursing practice, and this has attracted attention as an educational method[2][3]. Group work has also been widely introduced outside the field of nursing education, but there are various discussions about the method of individual evaluation in group work. For example, there is mutual evaluation within the group, submission of work reports, final reports and comprehension tests, etc., and instructors evaluate individuals based on an evaluation model that combines these methods[4][5][6]. In addition, some studies have developed their own group work support systems and monitor learners' activities based on the use of these systems[6][7].

However, these methods place an additional burden on learners and instructors in terms of creating and scoring evaluation materials other than group work products.

## 3. Methods

In this study, a tool to support the creation of nursing care plan and pathological related diagrams called "CO-LAB NOTE" is used. The area where nursing care plan and pathological related diagrams are created is called a canvas, where nodes and node links are combined. A node is a rectangle that describes a condition or disease name, while a node link is an arrow line in a

single direction that represents the causal relationship between nodes. The tool allows multiple learners to edit at the same time. In addition, each time an operation is performed on the tool, log data is stored to show who performed what operation and when.

The flow of a nursing care plan and pathological related diagram exercise is as following: **(STEP1)**The instructor sets up a patient situation as a task for the exercise and gives it to the learners, **(STEP2)**Learners work in groups to create a nursing care plan and pathological related diagram using CO-LAB NOTE in response to the set task, **(STEP3)** When the learners have completed the nursing care plan and pathological related diagram, they submit it to the instructor as a PDF file, and **(STEP4)**The instructor evaluates the learner based on the submitted the nursing care plan and pathological related diagram and the learner’s efforts observed by the instructor during the exercise.

In this study, an approach is made to step4. Specifically, the work log of the learner’s creation of nursing care plan and pathological related diagrams using CO-LAB NOTE is passed to the individual contribution evaluation module. The module calculates the individual contribution by referring to the contribution model that has been created in advance. The instructor evaluates the learner based on these results.

In developing the contribution model, a definition of contribution needs to be considered. In this study, two definitions were used, which are described below. In definition 1, learners who performed many operations in the process of making the diagram were considered to have a high contribution, and the contribution was defined as the percentage of operations performed in the process of making it. In Definition 2, learners who were involved in the creation of the completed nursing care plan and pathological related diagram a lot were considered to have a high contribution, and the contribution was the percentage of the nursing care plan and pathological related diagram that was finally submitted by the individual. When Definition 1 was adopted, if a learner repeatedly performed meaningless operations, he or she would be placed at the top of the contribution level. To prevent this, we considered Definition 2. Meaningless operations here refer to those that are not directly related to the instructor’s grading of the content of nursing care plan and pathological related diagrams, such as changing the display position of a node to improve its appearance.

## 4. Results and Discussion

To evaluate the proposed model, we analysed log data from real nursing learners. We asked 20 groups of nursing students to use the tool in an in-class exercise at a nursing college in Japan and used their work logs as input data for the module. Table1 shows a result of one of the 20 groups, consisting of 6 members.

**Table 1**  
Contribution results in Experiment.

userID	contrib. model1	contrib. model2	userID	contrib. model1	contrib. model2
261	0.491	0.351	264	0.172	0.171
265	0.121	0.245	262	0.117	0.090
260	0.097	0.139	259	0.001	0.004

As a result of the analysis, it can be read that there is a large difference in the level of contribution. This is thought to be because the CO-LAB NOTE used in this study was only available for PCs, and not all of the nursing learners who participated in the experiment had PCs, so the roles were divided between them. Therefore, in the future, it will be necessary to organize the environment in which students can use PCs, to make the tool compatible with iPads and other devices in addition to PCs, and to improve the fact that the level of contribution cannot be measured correctly when the person who initiated the idea and the person who filled in the tool are different. In addition, the results of the evaluation of the model are currently being presented to the instructors, and we are waiting for feedback on the instructors' conventional evaluation criteria, the usefulness of the model, and the differences from the actual evaluation. Furthermore, as we were only able to measure contribution in terms of workload in this experiment, it is necessary to consider a model that also takes into account the content of the nursing care plan and pathological related diagram. For example, we are considering giving points to learners who created important keywords, or to the creators of the process of arriving at the correct nursing diagnosis name.

## 5. Conclusion

As a method of individual evaluation in group work, we proposed to measure individual contribution by creating group products using an online tool and analyzing their log data. Now, we have created a module for measuring individual contribution, verified that the module performs the expected behavior, and are analyzing the actual data. In the future, we will improve the module by organizing the evaluation criteria of the instructor and having the instructor check the results of the analysis.

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