



PRIMARY RESEARCH

Analysis of nursing student's experience of self directed learning for medication practices using NVivo11: Focusing on application of gamification

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Abstract

This study aimed to find out factors that the experiences of nursing students on medication practice and to enhance motivation and practice. We confirmed the contents of nursing students' experience and confirmed the significance of giving medication to nursing practice. The participants of the study were five nursing students. The contents of the interviews were analyzed by using Nvivo-11. The results of this study categorized experience about medication practice on nursing students. Among such factors were their efforts for self-directed practice, requirements for that and barriers to self-directed practice, and advice for applying gamification. It is identified as a hindrance that concerns whether the lacking model realism is the problem and whether the protocol is implemented correctly. The students said that it was most effective to take a practical training video on a smart phone and see it from time to time for a successful self-study. The results of this study allow for a comprehensive understanding of nursing students in a self-directed practice environment for learning medication. Based on the results of this study, it is expected that it will be used as basic data for the development of an effective self-directed training program for medication practices in the future.

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I. INTRODUCTION

The fundamental nursing practice ability considers correct attitude and habit formation as an important result of learning so that students can master nursing skills automatically without conscious effort through problem-solving through trial and error and repeated training of the technique [1, 2, 3]. In the fundamental nursing practice, the instructor has been trained to observe the learner's behavior on a one-to-one basis. It has consisted of a passive form of practice that involves modeling in the practice room or repeating fragmentary nursing skills [4].

Nursing students are faced with difficulties in solving the problems of their subjects due to their inexperienced nursing skills, lack of experience in clinical situations, and lack of adaptive ability after completing the curriculum [5, 6]. In nursing education, where clinical nursing skills and techniques are emphasized as much as the acquisition of knowl-

edge, the students are able to understand the actual situation of the target person and to take self-directed judgment or problem-solving ability out of the traditional, We are looking for a new education method to improve [7, 8]. The self-directed practice, which is suggested as a new practice education method, is a way to learn while learning the knowledge or function required by the student himself or herself without being overly interfered with by the professor. In Korea's nursing practice education, it is suggested as a realistic way to complement the lack of facilities and training expenses. However, in the case of self-directed training, research and interest are continuing on how to increase student's interest and learning satisfaction with important education [9].

The gamification announced in 2010 is a motivation method widely used in digital games, applying game mechanism to promote people's interest and immersion in activities [10].

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Gamification based on 'fun' and 'immersion' of game induces voluntary and active participation of participants and plays a role as a powerful incentive medium [11]. The class that applies gamification is not necessary to use game or game in class, but can be interpreted as using only some fun elements of game as a substitute for reality. It is shown in various educational fields that the learners, who are familiar with the environment of the game, are actively utilizing the empathy that can mediate fun and interest and help achieve the educationally meaningful goal [10, 11].

When gamification is applied to education, it is not just a fragmentary concept that gives points, rewards, and badges to the learning experience, but it also uses game-based skills and thinking to attract people, motivate them, and help solve the problems [12]. Therefore, in the nursing education, students will find out what problems they have by analyzing and evaluating their own nursing practice. Students will also be encouraged to practice their skills on a recurring basis, encourage interest and involvement, and encourage active, self-directed learning [9]. It is expected that students will be able to receive enhanced nursing education by improving their self-directed ability and self-directed learning ability [9].

Although gamification techniques are used in the management of the society as a whole, there are no examples that are used as a strategy for medication nursing self-directed practicing program. Therefore, in order to strategically apply the gamification theory to the nursing self-directed practicing program for nursing students, it is necessary to confirm factors of students' experience of medication nursing practice. Based on the diverse experiences of educators, qualitative research methodologies that find out the factors in the subject's experiences and stories are useful to confirm their needs in various directions. Therefore, in-depth interviews were conducted with nursing students who had experience in self-directed nursing practice, and those factors were derived based on qualitative analysis methods using a computer. In this study, we used Nvivo11, the qualitative data analysis software based on grounded theory, to improve the reliability of the research process by organizing interview data. The results of this study can be used to provide basic data for the development of self-directed training program for medication practices program reflecting students' needs and to provide a new direction of nursing education through the latest science and fusion.

II. LITERATURE REVIEW

A. Definition of Gamification

Gamification is a noun of the word "Gamify" and introduces the elements of the game into fields that are not related to play, that is, diversification fields other than games. The game has fun elements that motivate or play the person who plays and has a commitment to the game. The Entertainment Software Association (ESA) in the United States said 72 percent of US households play games and 29 percent of over-age groups play in 2011, which means games are no longer just for kids. Increasingly, people of all ages are enjoying their games in their spare time, and games are now more than just fun. Gartner Group, a consulting firm, predicts that 70% of the 2000 global organizations in 2014 will leverage applications with the concept of gamification, and that by 2015, more than 50% of organizations managing innovation processes will play the innovation process [13, 14].

Since a few years ago, there was a lot of opportunity to see the word "gamification". In the subway, you can often see the scene where you are immersed in the smartphone game, regardless of whether you are in the subway or not. The method applies the "immersive" structure that this game will bring to other fields (operation, marketing, education, etc.). This is "gamification". Google Trends has seen a dramatic increase in gamification since around 2011, but similar concepts (serious games, ARG, etc.) exist in the past and are not new concepts [10, 11].

Nevertheless, the reason for the increase in the keyword gamification is that the introduction of gamification into the business has increased the number of successful cases. It is not just a mere buzzword, but it can also be seen in recent years that various sites and books have been published as examples of corporate applications. Also, the main features of gamification are simple rule (goal), ranking (competition), badge (compensation), etc., but all of these are the means to increase players' motivation or interest. In other words, it is noteworthy that gamification is used for motivational purposes [11].

B. Use of Gamification in Education

You can actually experience "failure" and "success" through the game, but this is closer to learning through experience than learning knowledge. Especially, the 'attention' obtained from his failure is more useful than the contents written on the textbook to the student. In order to play the game in the role play format while sharing a colorful and fun game, you always need to check the 'Attention' of the student. In addition, by taking courses related to their

work contents, students can not only study qualifications but also give a sense of relevance 'R' to the practical and learning contents. In role play, I experienced a failure in the first round, but in the second half round, I am refining the process maturity and accumulating success experiences of every round, leading to confidence 'C'. This makes it possible to obtain 'S' with high satisfaction. In many cases, they are positively motivated by a "positive sense of accomplishment" rather than "learning to learn from forced oppression", such as the recommendation of a supervisor [15, 16, 17]. Professors are not only educating their knowledge but also promoting the field of "learning" according to the needs of each action and scene as a planner [14]. This method of gamification is expected to be meaningful as a new method that can be used as a concept of self-learning beyond the meaning of simple memorization or experience in nursing practice education.

There are not many cases where gamification is used in nursing education. In addition, it is predicted that there will be meaning in practical training, but the example is not applied. It is necessary to understand the meaning of the practice that the students think before the use of gamification in the nursing practice education in which the keywords, such as motivation, repetition learning, and confidence, are meaningful and to study the gamification method suitable for the meaning.

Therefore, in this study, it is necessary to analyze the experiences of students in nursing practice, especially medication nursing practice which has high importance and difficulty, and extract the necessary elements for application of gamification which is recommended as a new strategy.

III. METHODOLOGY

A. Sample and Data Collection

The subjects of this study were five college students attending Nursing Department of T University in Busan. The specific criteria of the subjects are as follows:

(1) A nursing student who understands the purpose of the research and agrees to participate voluntarily, (2) Basic nursing (including practical training) course Nursing students who have completed at least 6 credits, (3) Nursing students who are trained in medication nursing theory and practice.

For the recruitment of the subjects, a public announcement with the purpose and method of the research was posted on the bulletin board approved by IRB for two weeks, and five students voluntarily participated in the study. Interviews were conducted from June 22, 2017 to July 4, 2017. At the appointed time with the research subjects, we met at the

professor's lab and conducted 1:1 in - depth interviews with semi - structured questionnaires to see students' thoughts, problems, and opinions on medication nursing education. At the time of the interview, there was no time limit, so that

the story of the research participants was fully communicated. The interview time was 20 to 30 minutes for each subject.

B. Research Data Input and Analysis Method

The collected data were analyzed using a computer program. Qualitative data analysis using computer programs is known to facilitate qualitative analysis by improving accessibility of data, saving time for analysis, and providing a system for organizing and structuring data. In addition to this, it is possible to improve the accuracy of the data through the analysis of the data, the accuracy of the data analysis, the flexibility of the analysis process and the possibility of modification, the integration of the data, the improvement of the insight, and auditability of the data. It is said that it has the effect of increasing the validity and reliability [18]. In this study, the recently developed Nvivo11 was used as a qualitative analysis program. Nvivo11 is a program based on the grounded theory. It has data, indexing system, and theoretical work functions to categorize and organize data in a step-by-step and efficient manner based on the original text of the research participants [19].

In this study, we used Nvivo11 to create 1. project, 2. create document, 3. create node, 4. create attribute, 5. link data, 6. coding, 7. create dataset, 8. view relationship between data, 9. make model, 10. Data search, and 11. result reporting [20]. After the project was created, the transcripts of the interviews were converted into Nvivo11 data through the document creation, and the meaningful words, phrases, sentences, paragraphs, or ideas found while reading the data were categorized into nodes. While continuing to read the data, the documents corresponding to the existing nodes are categorized into existing nodes, and if there are no nodes matching the documents, a new node is formed to categorize the documents. I have structured the relationship between the nodes by forming the child node and the parent node simultaneously with the formation of the primary node and then gradually forming the hierarchical relationship between the nodes. In this process, the coded data are opened and the original data are repeatedly read, from the top to the top of the hierarchy, while refining the structure finely. I tried to maintain a flow of exploring the relationship between the data and the ideas of the tasks by utilizing the function of linking data-linking documents related

to nodes. Using the data, ideas, and stored information obtained through this, we derived the final model by looking at the relationship between documents, nodes, and attributes through Show & Assay tool.

C. Ethical Considerations

All procedures were carried out with the approval of the institution's IRB to protect the interests of the investigator (TUIRB-2017-001). The researcher explored the purpose and method of the study, the anonymity of the research, the voluntary consent and rejection of the research, the potential for giving up, the potential advantages and disadvan-

tages verbally and in writing, and conducted in-depth interviews.

IV. RESULTS

From the interview data, the categories related to nursing self-directed practice experience of nursing college students and meaningful statements corresponding to each node are shown in Figure ???. From the perspective of the research participants, there were three categories of experience in medication nursing practice: 1. Barriers for self-directed practice, 2. what they need for self-directed practice, and 3. what they prepared for self-directed practice.

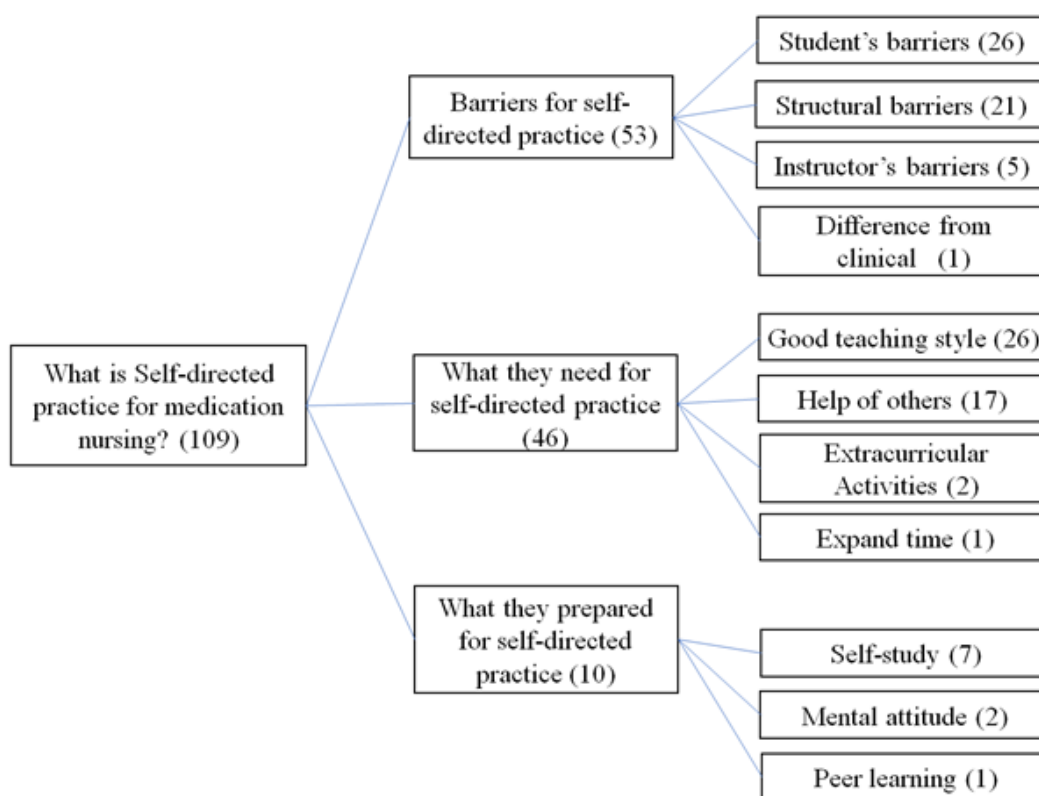


Fig. 1. Categories related to self-directed practice experience of medication

The number shown in Figure 1 is the ratio of the meaningful statements of each node among the total 109 statements.

The following is a summary of the respondents' statements according to the order of weight of responses and the comparison with previous studies.

In this study, students' barriers and good teaching style were the most important factors, accounting for 23.9% of the total protection factors. In other words, students had the greatest significance in recognizing the problem of themselves and seeking solutions.

A. Students' Barriers

The student had the highest rate of 'forget the professor's demonstration' and 'trembling' as the obstacle factors. Tests are often mentioned in the statements in 'Trembling'. Self-directed practice is emphasizing the strong real meaning of preparing for the practice test.

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"When I take a test, when I take a medication test, I feel more

nervous ... The aseptic is important, but I do not know it. I asked my friends to take another look at it, like a situation drama, like as test ... ", "a lot of trembling."

B. Good Teaching Style

Students identified their disadvantages and commented on good teaching methods as a way to overcome them. There is a lot of statements about the visual education methods of shooting their own videos, and there was a strong sense of 'effective', which means praise as an effective method. It strongly implied that there is no limit to where it is, 'no matter where' it is.

"It's very helpful...", "Practice test day, I feel better once I see what I did by hand rather than memorizing the protocol. We

continued to watch videos when practicing key skills in clinical practice. I have everything on my smart-phone', "I see things in my eyes, I see motions rather than reading books.". "I can practice study at home," "Just because everyone is holding a smart-phone, I can see right away. What is this? It was the best when I wondered..."

C. Structural Barriers

Equipment and environmental issues were addressed in structural barriers. A statement of equipment-related issues was 16.5% of the total statements. The biggest indication of equipment problems is the 'lack of reality', accounting for 9.2% of all statements.

TABLE 1
FREQUENCY OF CODING FACTOR

Categories	Coding	Frequency (%)
Student's barriers	26	23.9
Good teaching style	26	23.9
Structural barriers	21	19.3
Help of others	17	15.6
Self-study	7	6.4
Instructor's barriers	5	4.6
Extracurricular activities	2	1.8
Mental attitude	2	1.8
Expand time	1	0.9
Peer learning	1	0.9
Total	109	100.0

"It's different from theory, for example, it's hard to locate because I'm actually going to a friend differently than when I was theoretically learned in IM or IV and injected into a model", "I think it's best to put the medicine on the person, so that the safety of the person is the top priority. But when I pierce an injection needle on model, I think I cannot learn the senses when I give the injection to the real person." "It is not possible to swell the skin by putting medication on the model. Also, the skin of the model has already been inflated, so I have to take out the liquid inside it, but it does not work well... I did not know whether I did it properly or not..."

In addition, there was a statement that when the model was practiced, there was no training effect on the selection of anatomical sites because there were many areas of needles or feeling of use.

"Sometimes when I look at the model, here it is, here ... I've been here the other day, so here you are ...", "There are lots of handprints and it looks like black parts (laughs). There are many things you can find to find easily. When I was practicing

IV, there were a lot of holes in the blood vessels. I cannot more know the anatomy in the real world. I was worried about it."

D. Help from Others

When students were doing self-directed practice, they mentioned that they were helped by their colleagues rather than a professor or lecturer. Role-play and practice with each other tell whether they are performing properly in the evaluator's standpoint.

"I was a student with such an idea that I was very inferior in my case, I was not interested in studying, and 'Why are you going to school?' I did not want to do the least damage to the staff in this situation.", "It was good to be able to get feedback from each other while discussing with each other.", "When practicing, it was good to practice with a smart colleague, a colleague who could teach me."

E. Self-Study

This category listed the methods that students have pre-learned when they are doing self-directed practice. Examples include 5 Rights, anatomy, fundamental nursing, learning from own videos, medication calculation, and pharmacology.

F. Etc

In addition to the above, there was mention about the instructor's barriers, including lack of lecturers, extracurricular activities with additional learning needs through extracurricular activities, mental attitudes that require self-effort, and expanded operation of labs.

"If it is the case, it is better to put out-of-curricular program in school apart from self-directed practice in extra-curricular class, and to run program with assistant teacher or seniors. Tutoring is also a good way to learn from their colleagues or seniors during the semester."

V. DISCUSSION AND CONCLUSION

The purpose of this study is to analyze the experience of self-directed practice in nursing college students who have completed the basic nursing curriculum and experienced theory and practice related to medication nursing. Nursing students who need to acquire skills as well as knowledge and attitudes in order to become a nurse require a lot of time and effort to perform basic nursing practice correctly. It is a challenge and burden for nursing college students to learn and practice accurate procedures that are standardized on the basis of knowledge, and the need for nursing care for new nurses or the need for thoroughly trained nurses. Therefore, the proportion of the nursing education is very high, and self-directed practice programs, such as the self-directed training program, are being put into practice in order to improve the practical education. In particular, medication nursing is an important nursing technique that students and new nurses carry out most frequently but have frequent mistakes and cause patients to have discomfort, phlebitis, and shock [21]. Many nursing students are spending a lot of time and effort to practice medication nursing skills, but reports continue to report that they do not have the desired experience they want.

In this study, students' experience of giving meaningfully was a student's barriers. The students were calling for tremor in the field of practice where they had not been practicing, and they said that they forgot about the demonstration. There was also a high rate of mentioning ways to overcome their barriers or disadvantages. It was important for the students' experience of medication nursing practice

to resolve their disadvantages in a positive way by recognizing their own difficulties and making efforts to overcome them. In other words, the results of this study are different from the results of the previous research that the difficulty of the nursing practice is mainly dealt with, which means that the students themselves try to be an important motive

in the development of the self-directed practice program for the students.

The third most meaningful experience was the structural barriers. In this section, equipment-related and environment-related issues were highlighted, with particular attention to equipment-related issues. The role of the subject in the practice that students experience is largely replaced by the human model. In reality, practicing people is not allowed as a matter of safety, so many students practice medication nursing on human models. In this section, students pointed out that the reality of people and other models is not realistic. When the model is practiced, the anatomical position of the model differs from that of the human. When the anatomical position is found, there is a lot of holes or dark regions in the model, the blood vessel looks too easy and the differences between the human model and the patients. Therefore, it is necessary to develop a game strategy to enhance the learning effect as well as a method to enhance the reality when developing a self-directed practice program. The fourth mention is help from others. Most of the helpers were colleagues. The students were overcoming the difficult process by relying on each other as a support system. In previous research, team activity (team task) was perceived to college students as a burden and stress due to conflict among team members. However, in this study, unlike previous studies, new results were obtained that each other is perceived as support system. This result is consistent with the results of previous research that the learning effect is high in cooperative learning [22]. Fifth, students talked about their experience of doing prior learning on their own, including the 5 rights of medication, learning how to learn anatomy and theories in advance, or learning how to watch video that shows how you practice. The effect of shooting video or video has been shown in many studies. In particular, in the self-directed practice program, video shooting using a smartphone is similar to the results of stimulating students' interest and curiosity, affecting performance satisfaction [23, 24], and improving communication skills [24]. Other than that, the students have said that they are willing to work hard and that their efforts are more important than anything else.

Structural problems, such as student barriers, self-effort,

and lack of reality in the model, help received from others, and prior learning, can be seen as a key element in students' self-directed practice. When developing a self-directed practice program in the future, development of a scenario considering the above factors should be prioritized.

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