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Original Article

Exploring factors that motivate nursing students to engage in skills practice in a laboratory setting: A descriptive qualitative design

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ABSTRACT

Objectives: The aim of this study was to explore factors that motivate students to engage in skills practice in a laboratory setting, and to identify their motivation types and the regulatory styles.
Methods: Semi-structured interviews were conducted with 23 nursing students from three universities between November 2017 and January 2018. A thematic analysis was used to identify factors associated with students' motivation to engage in skills practice in a laboratory. The types and the regulatory styles of student motivation were identified based on the self-determination theory.
Results: Seven motivating factors were identified. These factors included the students' desire "to acquire the skills necessary to work as a nurse", the "desire to improve skills in preparation for clinical practicum", and their felt "obligations to patients as a nurse". Moreover, "the impetus to study arising from the objective evaluation of oneself and others" and "wanting to pass the skills examination" motivated the students to engage in skills practice. A "learning environment that facilitates students' learning" and the "supportive involvement of educators" facilitated their learning. Based on the self-determination theory, the students were found to embrace extrinsic motivation with four regulatory styles of motivation, namely integrated, identified, introjected, and external regulation.
Conclusions: Nurse educators should understand the motivating factors of students, and help students embrace a more internally controlled motivation by helping them envision their future careers as nurses, and by fostering their ethical duty to care for patients.

What is known?

- Autonomous learning should be promoted to increase nursing students' ability to perform nursing skills.
- Motivation plays an important role in initiating, regulating, and sustaining students' learning.
- Few studies have explored students' perspectives to identify factors contributing to their motivation to learn nursing skills.

What is new?

- Nursing students tend to embrace extrinsic motivation with different styles of motivation regulation.
- Students' motivation is partially determined by the values and obligations they hold toward nursing.
- Internal and external evaluations of self and others also contribute to their motivation.

1. Introduction

The environment surrounding the current healthcare institutions has been rapidly changing. While advancements in medical technology have enabled care for patients with complex health issues [1], the public's heightened awareness of healthcare services has led to a greater demand for safe and quality care. The

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advent of new diseases in a state of economic recession has also posed huge challenges to medical institutions as to how to devise and offer cost-effective patient care. The public expectations of the medical services have always been high, and the expectations of nurses are no exception. In order to respond to the public's demands, nurses should be equipped with competence to care for patients, which is defined as the ability of a nurse to effectively apply a combination of personal attributes, knowledge, skills and judgment, in order to meet the standards required in daily practice [2]. An ability to perform nursing skills is an essential component of nursing competence.

The ability to perform nursing skills is cultivated in the process of providing patient care as a means to solve patient health-related problems in a clinical practice, following the acquisition of necessary knowledge and skills in a skills laboratory. In a skills laboratory, students are provided with the knowledge and principles related to nursing skills. Based on these, students practice their skills in an environment which imitates a clinical setting. Furthermore, in the process of practicing nursing skills in the laboratory, students experience how patients might feel about being provided with nursing care by playing the role of a patient. In other words, the skills laboratory not only allows students to acquire an ability to accurately perform nursing skills, but also helps to deepen their understanding of patients. In addition, the skills laboratory offers opportunities for students to practice their skills without affecting patients' rights to receive safe care [3]. If at all possible, students' ability to perform nursing skills should be acquired through clinical practice. However, the difficulty in securing the necessary number of hospitals for clinical practicum due to the increasing number of nursing universities in Japan hinders students from performing nursing care on patients [4]. Protecting patients from incompetent practice also limits the opportunities for students to perform nursing care [5]. This situation cannot be dismissed, and in order to ensure nursing students have the necessary ability to adequately perform their nursing skills, effective learning in the skills laboratory needs to be ensured.

1.1. Literature review

To improve students' learning in the skills laboratory, nursing students are encouraged to learn autonomously throughout the entire process of their learning, i.e., before, during and after the skills laboratory classes. Autonomous learning is a proactive form of learning in which an individual is self-determining and regulates his/her learning behaviors and process based on his/her standards, and without the control of others [6,7]. Students need to progress through their learning journey with enthusiasm for an extended period of time by connecting one piece of information or a skill to another, integrating new information/skill into existing knowledge schema, and applying acquired knowledge and skills safely in a laboratory [8]. Motivation plays an important role in initiating, regulating, and sustaining their learning journey. This is because motivation determines all aspects of activation and the intention of one's actions, such as the amount of energy to be invested, and the direction and persistence of actions [9]. However, existing studies have shown that nursing students' motivation to learn nursing skills in a laboratory setting is only moderate, i.e., scores on motivation tend to be around the middle in motivation scales [10,11].

Ryan and Deci [12] maintain in their self-determination theory that individuals exhibit different types of motivation. The types of motivation fall along a continuum from amotivation at one end, through extrinsic motivation, to intrinsic motivation at the other end, depending on how individual motivation is triggered and regulated [13] (Fig. 1). Amotivation is a state in which an individual lacks intention to act. Extrinsic motivation, in the middle of the motivation continuum, is regulated by four different external sources with varying degrees of external/internal control. Behaviors arising from "external regulation", the least autonomous regulation of motivation, are based on external forces such as rewards and punishment. Behaviors emanating from "introjected regulation" are more internally controlling than external regulation, but have an external perceived locus of causality, as they are based on avoiding the feelings of guilt, shame and fear of disapproval by others so as to attain ego-enhancement. A somewhat internal form of motivation regulation is "identified regulation". Individuals whose actions are regulated through identification consciously value their behaviors as personally important, as their behaviors lead to their desired goals. The last form of extrinsic regulation is "integrated regulation", the most autonomous form of extrinsic motivation. An individual with integrated regulation assimilates the value of extrinsic behaviors into their own value systems and personal goals, but their motivation does not come from inherent interest and enjoyment of engaging in such behaviors. Interest, enjoyment and inherent satisfaction with engagement represent intrinsic motivation, the opposite end of the motivation continuum. Behaviors arising from intrinsic motivation are self-determined, thus deemed as the most autonomous form of motivation [9,12–14].

In an attempt to identify effective approaches to enhancing the autonomous learning of students, studies have been conducted to explore the factors that promote students' motivation in nursing as well as in other disciplines. Across disciplines, the utility value intervention, in which students receive or are asked to produce examples of how useful a given class is, has been identified as an effective approach to heightening students' interest in a class [15,16]. Supporting students' autonomy in learning has also been found to contribute to increasing students' learning motivation [17–20]. In addition, the use of multimedia [21], virtual reality [22], and a revised curriculum with pedagogical enhancements (e.g., the use of clicker questions in class, demonstrations during lectures, and in-class problem-solving opportunities, etc.) [23] has been found to improve students' motivation or interest in classes.

In nursing education, small group work was found to be an effective teaching method to enhance students' knowledge and skill development in nursing education [24]. Practicing on a simulated patient is also reported to be a useful way to motivate students [25]. In addition, a simulation-based practicum, consisting of three sections—prerequisite learning, scenario implementation, and debriefing—was found to be successful in increasing student' motivation to learn [26]. In a classroom setting, problem-based learning [27], case-based learning [28], and learner-centered teaching [29] have been identified as effective teaching methods to improve students' learning motivation.

While many studies have been conducted to identify means to promote students' motivation, the focus is often placed on specific teaching approaches. In other words, there has been under-investigation of the types of motivation students have along the amotivation-intrinsic motivation continuum, how they regulate their motivation, and what factors promote their motivation. Motivation is a need arising from the inner self [7], and is internally processed [30]. Therefore, the types of motivation students embrace and how they regulate these largely depend on the students themselves. This means that whatever teaching approach educators use to increase students' motivation, there is no guarantee that students will respond to it. Indeed, a study by Jang et al. [17] showed that students' engagement in learning could be explained more by students' individual differences such as goal orientation and motivational beliefs (86% of variance explained) than by the instructional styles educators used (14% of variance explained). This finding suggests that the sources and regulatory

styles of learning motivation need to be explored from students' perspectives before effective teaching approaches are in place. Although there are some studies that explored students' experiences of learning nursing skills [3], these did not explore what factors students were motivated by, or how. Understanding these motivational factors would allow nursing educators to implement more student-centered teaching approaches, thus facilitating students' autonomous learning.

1.2. Aim

This research is a part of a larger study that was aimed at identifying motivating factors of nursing students to engage in lectures, skills practice and clinical practicum. The aim of the present study was to explore factors that motivate students to engage in skills practice in a laboratory setting from the students' perspectives. The study also aimed to identify the types of motivation and styles of motivation regulation based on the self-determination theory.

2. Methods

2.1. Design

The study had a descriptive qualitative design [31] and used a semi-structured interview method.

2.2. Participants

Participants were recruited from three universities in Japan using purposive sampling. To explore wide and comprehensive perspectives of the students and to enhance the transferability of the findings, the students at a national, a prefectural and a private university, were invited to participate in the study. These students were in their second to fourth years of the study. The first-year students in these three universities were not invited to take part in the study, as two of the participating universities did not provide their first-year students with skills laboratory classes. Participants were recruited until the data saturation was achieved. Data saturation was determined by constant monitoring of the interview data by the second author.

2.3. Data collection

Researchers pre-selected students who met the inclusion criteria, and visited their classrooms. Then, the researchers provided verbal and written information regarding the purposes and procedures of the study, and the eligibility criteria for participation, and confirmed that ethical considerations would be taken into account. If students volunteered to participate, they were given the main questions to be asked in the interview, so that they had time to think through each question and reconsider their participation before the data collection took place.

A semi-structured interview was conducted with each participant between November 2017 and January 2018 in a private room of each participating university. At the beginning of the interview, the researcher explained the study purpose and procedures again, and then obtained written informed consent from each student. The participants were then asked to fill in a brief demographic questionnaire before the interview started. During the interview, the participants were asked "Among all skills laboratory courses you have ever undertaken in the university, please tell me which courses you have (or had) the most interest in and tried the hardest to understand." Then, the participants were asked the purposes and motives behind their hard work. This question was to explore whether or not students were intrinsically motivated to learn any skills in a laboratory and the factors associated with their motives. The participants were also asked what kinds of teaching approaches, class content, assessment methods, class atmosphere, and educator's attitude made them try to learn. These questions were to identify external factors contributing to their motivation. During the interviews, pseudonyms were used to ensure the anonymity of the participants. The entire interview session was audio-recorded with the permission of the participants. The interview lasted no more than 1 h.

2.4. Analysis

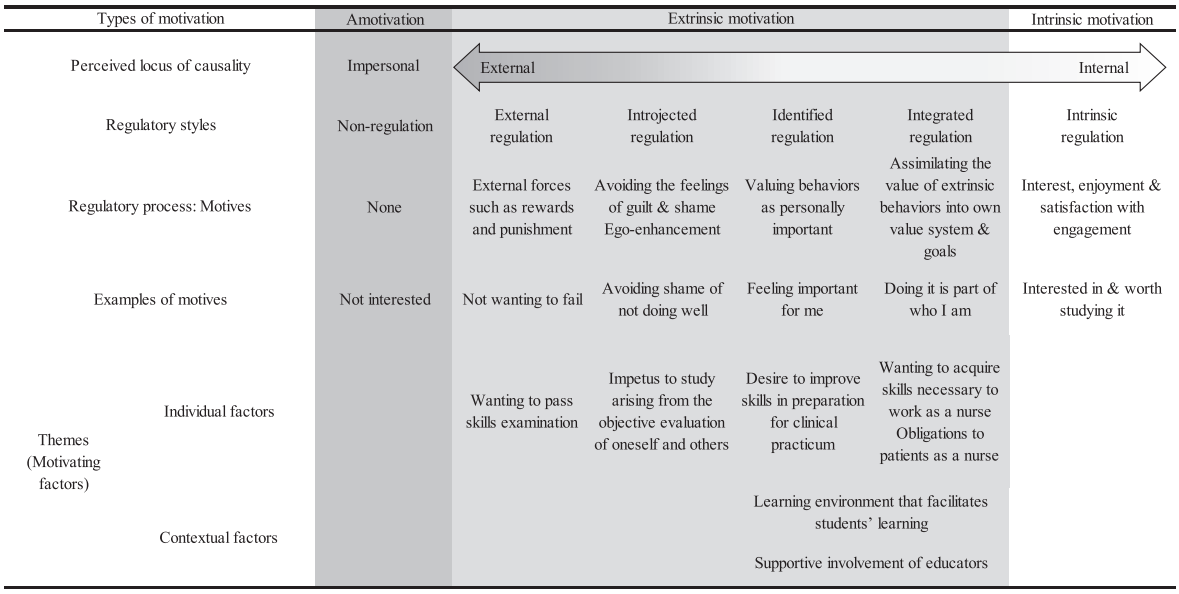
The audio-recorded data were transcribed verbatim, then the interview transcripts were read repeatedly to understand the meanings of the students' responses. A thematic analysis was used to identify factors associated with students' motivation. In this analysis, students' utterances which described the factors associated with their motivation to engage in the skills laboratory classes were extracted first. Then, the codes were assigned to each excerpt through comparing and contrasting the meanings with those of other excerpts. Based on the similarities and the differences between the assigned codes, categories were formed by integrating meaningfully compatible codes. The same procedures were repeated to form themes from meaningfully congruent categories [32]. Finally, the identified themes were compared with the motivation framework proposed by the self-determination theory [9,12] to identify the types and the regulatory styles of students' motivation. In this process, the definition and regulatory process (i.e., motives) of each of the regulatory styles (Fig. 1) were compared with the meaning of the themes to identify which theme corresponded to which regulatory style. Based on the identified regulatory styles, the types of motivation were determined based on the motivation continuum proposed by the self-determination theory. The results of the comparison will be presented in the discussion section.

2.5. Rigor

The whole analysis was conducted by three research team members (YN, KY & YT) who were not involved in the data collection and thus were blind to the participants. Blinding helps prevent the influence of researchers' bias and preconceptions when interpreting the interview transcripts. Therefore, the credibility of the findings can be enhanced [33]. During the analysis, the research members discussed the appropriateness of their assigned codes and grouping of the codes/categories carefully by writing down the rationale for each step. If any disagreement occurred during this process, it was resolved by discussion among the research members. Upon the completion of the analysis, the output was examined by the principle investigator (MT) and another experienced research member (TI) so as to ensure the validity of the analysis.

2.6. Ethical considerations

As has been stated, the purpose and the procedures for data collection were explained to the participants prior to the data collection. The participants were told that their participation in the study was voluntary, and if they declined or withdrew from the study, they would not suffer any academic disadvantage. They were also informed that the data would be anonymized using pseudonyms, and would not be used for any other purposes except for this study. Finally, ethical approval was granted from the Institutional Review Boards of all the participating universities (Reference Number of 170004 for Yasuda Women's University, E–914 for



Note: The part of the figure is created based on Ryan & Deci (2000, 2017) [9, 12].

Fig. 1. Themes incorporated into the self-determination theory.
Note : The part of the figure is created based on Ryan & Deci (2000, 2017) [9,12].

Hiroshima University, and 17MH048 for Prefectural University of Hiroshima) before the study began.

3. Results

A total of 23 participants were recruited: seven from the national university, five from the prefectural university and 11 from the private university (Table 1). The mean age of the participants was 20.82 ± 0.98, and 11 participants (48.83%) were in their fourth year of the study, followed by nine (39.13%) in the second year and three (13.04%) in the third year. Due to the clinical practicum period, the recruitment of the third year students was difficult, which resulted in the small number. Among the 23 participants, four were male (17.39%) and 19 were female (82.61%).

Upon the completion of the analysis, seven themes, 17 categories, and 112 codes were identified which described the factors associated with nursing students' motivation to engage in skills practice in the laboratory setting. Although the students came from three different universities, there were no remarkable differences in the themes and categories identified among the students.

3.1. Theme 1: wanting to acquire skills necessary to work as a nurse

This theme consists of two categories: "wanting to develop the skills necessary for a nurse" and "valuing the content of classes close to real nursing practice". The students were motivated to engage in the skills practice because they felt that they had to be furnished with the basic skills that are necessary as a nurse to care for patients. A student stated, "*My mom is a nurse, and she told me that there were many nurses who did well in school, but were not of any use in practice. I don't want to be seen like that … I want to be competent in practice, so I have started to study hard.*" (ID = 6). Inevitably, the laboratory classes that provided the skills used for real nursing practice were appreciated by the students. For example, one student stated, "*I think what we do in the classes can be useful in the future, so I was motivated to work hard …*" (ID = 8). This theme illustrates that the students' attachment of values to nursing skills promoted their learning.

3.2. Theme 2: desire to improve skills in preparation for clinical practicum

This theme consists of two categories: "desire to brush up nursing skills in preparation for clinical practicum" and "recognition of the skills necessary for the clinical practicum". Apart from their final goal of becoming a competent nurse, some students were concerned about a more immediate goal, which was to perform well in the clinical practicum. Being able to assist patients in clinical practicum is important for the students, and some students expressed a strong anxiety about not being able to perform well in practice. One student said, "*I remember working hardest on the skills which we thought would be frequently needed in the clinical practicum.*" (ID = 9). Consequently, if skills practice was perceived by the students as being essential for the clinical practicum this fueled the students' motivation to master such skills. For example, a student stated, "*We knew we would have the clinical practicum waiting for us, so we said that we should be able to perform basic nursing skills at an acceptable level.*"(ID = 19). This theme describes how the students' desire to achieve their immediate goal of providing good care in the practicum facilitated their learning.

3.3. Theme 3: obligations to patients as a nurse

This theme comprises three categories: "awareness of performing invasive care", "awareness of the impact of their performance on patients", and "thinking of a family member who needed care". Students reflected on how their performance might affect patients, in particular when it came to using highly invasive skills. A student commented, "*Giving an injection may damage a patient's nerves … We had to do it precisely, so I concentrated as hard as possible (in the lab).*" (ID = 3). By being aware of the impact of their performance on patients, students felt a responsibility to practice until they felt comfortable with using their skills. Otherwise, they felt that they would harm patients. A student said, "*When facing a*

Table 1
The demographic characteristics of the students.

ID	Grade	Age(years)	Gender	Types of University	Desired careers
1	2	20	Female	The private university	Midwife
2	2	20	Female	The private university	Clinical nurse
3	2	19	Female	The private university	School nurse
4	2	20	Female	The private university	Clinical nurse
5	2	20	Female	The private university	Clinical nurse
6	2	20	Female	The private university	Clinical nurse
7	2	20	Female	The private university	Clinical or school nurse
8	2	20	Female	The private university	Clinical nurse
9	2	19	Female	The private university	Clinical or public health nurse
10	4	22	Female	The private university	Clinical nurse
11	4	22	Female	The private university	Clinical nurse
12	3	21	Female	The national university	Clinical or school nurse
13	3	21	Male	The national university	Clinical nurse
14	3	21	Female	The national university	School nurse
15	4	22	Male	The national university	Clinical nurse
16	4	21	Female	The national university	Clinical nurse
17	4	22	Female	The national university	Midwife
18	4	22	Male	The national university	Clinical nurse
19	4	21	Female	The prefectural university	Clinical nurse
20	4	22	Female	The prefectural university	Midwife
21	4	21	Female	The prefectural university	Public health nurse
22	4	22	Female	The prefectural university	Clinical nurse
23	4	21	Male	The prefectural university	Clinical nurse

patient, I'd be even more nervous if I had not practiced skills which I was not accustomed to performing. And then I would not be able to provide good care to the patient." (ID = 5). Some students worked hard, because they thought of a family member who needed care. One student said, "*A patient reminded me of my grandma (who was under nursing care), so I practiced hard.*" (ID = 10). The students felt a responsibility and an obligation not to harm patients, which heightened the value of studying nursing skills.

3.4. Theme 4: learning environment that facilitates students' learning

Five categories constitute this theme, and these are "an educational environment that allows self-practice", "an educational structure that allows students to receive advice, when needed", "instructions through demonstration by educators", a "learning environment aligned to a clinical setting", and "student-centered teaching". Students were motivated by opportunities to self-practice their skills repeatedly to improve their skills. A student stated, "*Online learning … Nursing skills cannot be improved by practicing only once (in the class). Being able to repeatedly watch online demonstrations was helpful (when practicing at home or practicing in the lab outside the class).*" (ID = 22). Receiving instruction and advice both within and outside the classes from educators also sparked their learning motivation, as illustrated by the following student's statement, "*Well, I appreciated teachers' opening up the lab for students and coming to help us when we were practicing out of hours.*" (ID = 13). Moreover, students expressed their motivation to learn when they watched the demonstration or role-play by an instructor. This was because demonstrations facilitated students' understanding of how to perform procedures. One student stated, "*It was easy to understand how to perform a procedure after watching a demonstration by a teacher.*" (ID = 21). The use of simulators, which helped to create realistic clinical settings, also helped the students' understanding, as represented by the following quote, "*Being able to listen to the lung sounds (of a simulator) helped me understand what the sound was really like, and it was fun.*" (ID = 1). Finally, student-centered teaching, where students are active participants in teaching and learning, motivated students' engagement in the lab. One student commented, "*I was very motivated by the learning methods where students could teach each other.*" (ID = 2). This theme highlighted how a facilitative environment helped students to execute their learning plan and to achieve their goals of acquiring nursing skills through autonomous learning.

3.5. Theme 5: supportive involvement of educators

This theme consists of two categories: "helpful instructions from educators", and "encouraging attitudes of educators". Students appreciated it when educators offered a piece of advice that enabled them to effectively perform a skill, helped students who were struggling, and created an atmosphere in which students could actively participate in the laboratory class. One student stated, "*I was motivated by a teacher who gave advice on how to effectively perform the nursing care we were practicing. We experienced a sense of accomplishment.*" (ID = 10). Students also appreciated it when educators encouraged them by giving realistic (and sometime critical) feedback. A student stated as follows, "*I was even more motivated when I was told by a teacher 'at such a level of skill, you cannot be of any use in a real clinical setting!' I saw the reality, and I realized I had to practice harder.*" (ID = 15). This theme illustrates how support and encouragement from educators can motivate students to study autonomously, and to achieve their learning goals.

3.6. Theme 6: impetus to study arising from the objective evaluation of oneself and others

This theme is made up of two categories: "being inspired by the learning attitudes of other students" and "recognizing their own learning needs and desire to fulfill them". Hard work and outperformance by peers stimulated the students to study harder, and this is illustrated by the following quote, "*Seeing other groups of students doing well encouraged me most.*" (ID = 13). Moreover, recognizing their own learning agenda motivated students to overcome their limitations through active learning. One student said, "*I know I am slower than other students in understanding. So, I was relieved if I read the textbook in advance and understood what we'd study, which gave me peace of mind.*" (ID = 8). Objectively

observing oneself and others enabled the students to evaluate their learning needs. Moreover, students' desire not to fall behind other students provided mental energy to fuel their learning motivation.

3.7. Theme 7: wanting to pass skills examination

The last theme contains one category, "to pass the exam". One student stated, "*My main reason for studying was to pass the exam.*" (ID = 11). The need to pass the practical examination, which contributes to the final grade for the laboratory class, motivated some students to study. In other words, they were motivated to avoid failure, i.e., to avoid punishment for not practicing enough.

4. Discussion

The results of the qualitative study identified seven motivating factors for students to practice nursing skills in the laboratory setting. Based on these findings, the regulatory styles and types of their motivation are discussed (Fig. 1).

Many students majoring in nursing enter university with the purpose of becoming a professional nurse. As such, students' learning objective is often congruent with their own personal goals and values, since professional knowledge bestowed by university education has future utility for them. The clinical placement is the gateway to the real world of nursing. Providing good care for patients in the clinical practicum is important for students, as it leads to their desired goal of becoming a nurse. Thus, motivation emanating from a desire to improve nursing skills in preparation for the clinical practicum is considered as a form of identified regulation of motivation [9,12]. On the other hand, wanting to acquire the skills necessary to work as a nurse, and obligations to patients as a nurse are considered as integrated regulation of motivation. This is because students motivated by these reasons study hard based on what they should do "as a nurse". In other words, they have assimilated their professional self-view, and have integrated a need to acquire nursing skills into their own value system and personal goals. Deci and Flaste [34] articulate that, at the autonomous stage of extrinsic motivation, individuals consider their surroundings as supporting their autonomy, thus they tend to assimilate externally imposed behaviors which they believe as necessary to achieve their desired goals into their own value/belief system. For these students, therefore, the opportunities for listening to the professional experience of nurses, observing a professional role model, or facilitating understanding of patients' experiences may be deemed effective teaching approaches to bring students to these stages, as students can recognize their future selves.

In addition to the above teaching approaches, the study identified that such external factors as a facilitative learning environment and supportive involvement of educators can improve students' motivation to practice nursing skills in a laboratory setting. The students are motivated if an educational approach is student-centered, and if the educational environment allows them to self-practice in a simulated clinical setting, to receive advice in a timely manner, and to learn through demonstration by educators. Haraldseid et al. [3] emphasize the importance of the learning environment, as an inadequate environment decreases the learning effectiveness of students. Ewertsson et al. [35] also reported that students perceived a teaching environment as encouraging if they had opportunities to practice their skills outside the designated class hours and with their peers. In addition, Reeve et al. [13] and Ryan and Deci [12] maintain that students who believe that their autonomy is supported by their surroundings tend to exhibit more internally controlled motivation. Hence, not only does the facilitative learning environment provide a physical space for students to practice their skills, but it also functions to promote students' motivation to practice nursing skills. In addition to the learning environment, educators' teaching approaches are also important in motivating students. The theme, supportive involvement of educators, illustrates the students' perceptions of educators as being receptive and supportive of their autonomy, and these types of educators' attitudes encourage their autonomous engagement in learning. Similar to the findings for other forms of teaching such as the lecture format [19,36–38], this study showed that the students were motivated by educators' supportive attitudes and enthusiasm for teaching when learning nursing skills. Indeed, Ryan and Deci [9] assert that fulfilling psychological needs for having autonomy and competence lead to individual motivation to engage. Thus, educators' supportive involvement, together with a facilitative learning environment, are effective in promoting students' motivation, as these assist their autonomous learning and increase their competence. Furthermore, such educator attitudes as being receptive fulfill students' need for social relatedness (i.e., feeling socially connected), which is another fundamental premise for human motivation [9,12]. Thus, these themes are considered as fundamental educational premises that promote internal control of students' motivation, such as the internalized or integrated regulation of students' motivation.

Another theme, namely the impetus to study arising from the objective evaluation of oneself and others, illustrates how the learning attitudes of fellow students as well as self-reflection engender mental energy for students to regulate their learning process. According to self-determination theory, this type of motivation regulation fits in introjected regulation of motivation. This is because the students' motivation arose from their attempt to avoid the feelings of shame and the fear of disapproval by others, and thereby attain ego-enhancement [9,12]. In a skills laboratory, where students practice their skills with other fellow students, students are exposed to an overt and covert comparison with others, and are often afraid of performing poorly in front of their peers [39]. Inevitably, they have to control the amount of effort they invest in improving nursing skills by incorporating external information and by judging their own abilities. This type of motivation regulation may be idiosyncratic to skills laboratory classes, where students can observe other students' performance while comparing it with their own. Thus, introjected regulation of motivation is promoted most effectively by practice in a small group, where students can easily compare themselves with others, and acquire both intro-and extrospection of themselves.

The last motivating factor emanated from the students' desire to pass the skills examination. The students with this type of motivation were interested primarily in passing the examination in order to obtain credit rather than having an interest in learning itself. Since the origin of their motivation is external, students' learning behaviors is said to arise from external regulation of motivation [9,12]. The external regulation is the least autonomous regulatory style among the four styles of extrinsic motivation [9,12]. This type of motivation regulation should be discouraged, as just aiming to pass the exam tends to drive students towards rote learning and memorization of learning content without deep understanding of the subject [40]. In order to help students move up to the next stages of motivation regulation, facilitating ego-enhancement or helping students to value their learning through envisioning their future career is necessary.

While the findings of this study showed that there were no students at the stage of amotivation, the findings also indicated that the students' motivation was largely determined by external factors (i.e., extrinsically motivated), although the degree of their internal/external control of motivation differed (Fig. 1). In other words, there were no students with intrinsic motivation, whose behaviors arose

from interest, enjoyment and inherent satisfaction with engagement [9,12–14]. Despite the fact that the nursing educators of the students made an effort to increase students' interest by adopting a wide variety of teaching approaches, as indicated by other studies i.e., small group work [24], a simulated patient [25], and a simulation-based practicum [26], these strategies were not sufficient to endanger students' intrinsic motivation. Perhaps nursing students' strong obligation to patients led them to consider learning as a duty rather than something enjoyable.

5. Limitations

While the present study identified the types and the regulatory styles of students' motivation, it is not certain what proportion of the students had each motivation type (i.e., amotivation, and extrinsic/intrinsic motivation) and regulatory style. Quantitative studies are necessary to answer such a research question. Moreover, further studies are needed to identify the factors that help students move up to the next stage of motivation regulation.

6. Conclusions

The present study identified types, regulatory styles, and factors associated with students' motivation to practice nursing skills in a laboratory setting from the students' perspective. Previous studies have tended to investigate the impact of teaching approaches, which are external to students, by focusing on educators' perspectives. Moreover, few studies have explored the types and the regulatory styles of students' motivation. However, it is students who determine whether or not they engage in the practice of nursing skills. Hence, students' autonomous learning cannot be achieved by emphasizing the perspectives of educators over those of students. Nurse educators should understand the motivating factors of students, and help students embrace a more internally controlled motivation by helping them envision their future careers as nurses, and by fostering their ethical duty to care for patients.

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CRediT authorship contribution statement

Yoko Nakayoshi: Formal analysis, Writing - original draft, Visualization. **Miyuki Takase:** Conceptualization, Methodology, Funding acquisition, Project administration, Validation, Writing - original draft. **Mayumi Niitani:** Investigation. **Takiko Imai:** Investigation, Validation. **Mari Okada:** Investigation. **Kumiko Yamamoto:** Formal analysis. **Yuri Takei:** Formal analysis.

Declaration of competing interest

The authors declare that there are no conflicts of interest.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.ijnss.2020.12.008.

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