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NSMU: A Reflection Model for Nursing Students Practicing with High Fidelity Simulation

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High Fidelity Simulation is a teaching tool that has become increasingly popular in nursing education because of its useful function that enables students to develop conceptual understanding and practical skills in nursing practices; including leadership, critical thinking, self-efficacy and self-confidence. Unlike human patients, limitations exist when practicing with a manikin. It is therefore important to develop a reflection model which can help students think more about the content, practices and other possible concerns. To serve this need, this study analyses the NSMU model that helps nursing students to think about their performance and improve clinical skills by themselves after practicing with HFS. In addition, it seeks to understand nursing students' perceptions towards this reflection model. The analysis of nursing students' interviews reveals that a range of positive perceptions can be gained after using the NSMU model. This includes the perceptions that this reflection process is an effective tool to think about actions in order to realise possible mistakes; a tool that helps refine nursing practices and promotes remembering through reflective writing, as well as a tool that helps reinforce their understanding through post-reflection discussion.

Key words: *Reflection model, High Fidelity Simulation, Nursing education, NSMU.*

Introduction

In nursing education, simulation is an approach that is widely used as it provides opportunities for nursing students to practice their clinical skills through various real-life situational experiences. High Fidelity Simulation (HFS) is a teaching tool that has become increasingly popular in nursing education (Maneejak and Yasri, 2018: 104). It is comprised of full scale computerised manikins who respond immediately upon the actions of practitioners. Further, these manikins can be programed to provide realistic patient responses to students' actions and is able to provide a high level of interactivity of manikins to practitioners (Maneejak and Yasri, 2016: 7).

Reflection is an essential step, in the HFS practice, (Mayville, 2011: 35) which Meakim et al. (2013: 312) define as an activity that occurs after practicing with the simulation and is normally conducted by instructors. It is a session in which students can reflect on their thinking process that affects their performance on the simulation (Mayville, 2011: 35). Furthermore, it is believed to help students correct their mistakes and identify clinical problems (Kuiper & Pesut, 2004: 383).

This process of learning requires interpersonal communication (Buykx, et al., 2011: 689) alongside intrapersonal reflection. In general, it is managed by instructors who act as facilitators and advise students through discussion. However, it can also be a self-regulated learning process in which students govern their progress of performance and their improved understanding. Boet, et al. (2011: 1380) compare students' self-reflection with reflection led by experienced instructors by providing a videotape that records students' action during practicing with a manikin. Participants in the students' self-reflection group observed their performance and discussed it among themselves with no aids from experienced instructors. In contrast, participants in the other group received feedback from experienced instructors during observation. The results showed statistically significant improvement in the post-test score in both groups. This study showed that nursing students have the ability to undergo reflection which is as equivalently as the reflection of nursing instructors.

Reflection provides time for students to reflect on their action immediately after practicing with the HFS (Lederman, 1992: 145; Thiagarajan, 1992: 169) and enables them to verbalise the thinking process of their actions and failures to their peers and/or instructors. It has been revealed that nursing students rate reflection as the most useful part of the HFS experiences (Gordon and Buckley, 2009: 491). Many also claim that they have more confidence in caring for patients after reflection (Van Heukelom, Begaz, and Treat, 2010: 94). Apart from this, from a psychological point of view, many explain that reflection immediately after simulation

is important because it helps them relieve their stress after intensive practice and merge their experience to their knowledgebase (Cantrell, 2008: e21).
In order to make reflection as useful as possible, Buykx, et al. (2011: 689) suggest that beneficial reflection outcomes emerge from the well-constructed reflections. Henry (2004: 4) also states that attentively constructed reflection empowers students to see their endeavour. For this reason, a good reflection model is essential for students and instructors to reconsider the action and establish nursing knowledge effectively (Dreifuerst, 2009: 111).

So far, Reflection models that are used in reflection sessions have been developed in various forms. However, they are more appropriate for nursing instructors to use than nursing students themselves (Neill, BCom, and Wotton, 2011: e167). In addition, it is rather difficult for students to understand and reflect immediately after practicing with the simulation, by themselves using those existing models (Jabarullah and Hussain, 2019). Furthermore, no evidence shows that ethical concern in nursing is a component of any existing reflection models (Yazdanjoo & Fallahpour 2018). Therefore, a new reflection model will be constructed to solve these existing drawbacks.

The NSMU Model

This reflection model is developed from two educational frameworks. One is the SHARP model, proposed by Ahmed et al. (2013: 958-959), which has been extensively used in both medical and nursing fields. It is found to be an effective and efficient means of improving performance feedback in the operating room. In addition, it is believed to foster a positive culture of debriefing and performance improvements within surgery. It prompts learners to first set learning objectives (S), reflect how it goes (H), address concerns (A), review learning points (R) and plan things ahead (P). All of these five aspects are important for students who practice in simulation. However, it requires some specificity and precision for learners to think about what aspects of nursing practices should be completed; such as nursing content, ethical concerns or other necessary managerial aspects for improvement. Therefore, the SHARP model is our starting point to further develop the NSMU model which keeps all the essential aspects intact but elaborates the aspects of reflection more explicitly (Yuhan,et.al 2018).

The other framework is the Teaching-With-Analogies" model, known as TWA (Glynn, 1995: 24-25). This model highlights the four principles of access, mapping, evaluation and learning from analogy. However, its useful suggestion is that when dealing with a simulated object, there are always some aspects that are not completely compatible with the real object. In other words, practicing with a manikin has some disadvantages as it is not completely the

same as a human patient. Therefore, the TWA model emphasises that care should be taken to focus on deep, structural similarities where possible; while the notion of examining unmapped differences is also particularly important. This leads to the idea of integrating what might be unmapped between human patients and the manikin in the NSMU model, and what nursing students should take into consideration before working in wards.

The NSMU model has been developed to help students to achieve the reflection task. It comprises nursing content (N), specific concerns (S), managerial improvement (M) and un-mapping (U). The N section is related to nursing content, referring to any forms of clinical and practical knowledge that students learn from the HFS activities. Basically, this is the section where nursing students summarise the main practices they work in the simulation. In addition, the S section aims to reflect on practical and ethical issues that may arise during practicing with the HFS. More specifically, here they can link practices with a manikin to human patients. What they can do with the manikin and what extra concerns they have to be concerned with when dealing with human patients. There are certain things that they can do with the manikin with no harm which is not the case for human patients. The M section is related to various procedures for delivering nursing tasks as well as teamwork processes. It aims to help them write down a summary of the nursing practices which in turn can help them remember what to do and in what order. In addition, it prompts them to think about what they can improve in the future to make their nursing practices most efficient (Zheng, 2018). Finally, the U section points out certain things that can be done with manikins with no harm, but are not the case for human patients. This is different from the S section as it focuses more on physiological responses and conditions that the manikin attempts to imitate, which is not completely identical to human responses. So, in this part, nursing instructors are of importance to guide nursing students through the tasks.

Research Method

The objectives of this study are to develop a reflection model, that helps nursing students to see their performance and improve clinical skills, by themselves after practicing with HFS, and this research seeks to understand nursing students' perceptions towards this reflection model.

Second year nursing students who had no experience of HFS were invited to participate in this study. Information about the HFS activity and the NSMU reflection model was explained to them before they started the activity. They practiced fundamental nursing skills with the HFS for 5-10 minutes. After they finished the activity, the students were asked to write individual reflection using the NSMU model for 5 minutes. They then had a chance to discuss

the tasks with peers, led by a nursing instructor, for around 15 minutes. Eleven nursing students were randomly invited to one semi-structure interview to express their attitude toward the NSMU model.

All interview records were repeatedly listened to and transcribed. All transcripts were critically read and analysed by comparing and contrasting approaches. Common and differing perspectives of the participants to each question were drawn from their narratives. In order to find common themes, similar statements given by the participants were grouped into categories. In addition, the researcher tried to search for descriptions by individuals who tend to describe experiences somewhat differently in order to detail the range of perceptions of the relationship. Finally, the common themes and interesting individual differences were discussed in this written report.

This research was approved to be conducted by the Institutional Review Board (Faculty of Nursing, Mahidol University). All participants were informed about the purposes and methodology of the study. They were free to sign the consent form to participate and able to withdraw their participation at any time during the study. Names of participants were kept confidential and coded by pseudonyms to prevent direct identification.

Results

The analysis of nursing students' transcripts reveals that a range of positive perceptions can be gained after using the NSMU model. This includes a perception that this reflection is an effective tool to reflect on actions in order to realise mistakes, a tool that helps refine nursing practices, a tool that promotes remembering through reflective writing, as well as a tool that helps reinforce their understanding through post-reflection discussion.

Realizing Mistakes

After practicing with the HFS, the students said that they could reflect on their actions that occurred during the simulation, especially reflecting on what they did incorrectly. For example, *"I could repeatedly think about my mistakes and realised what I shouldn't have done." (S001)* and *"Self-reflection pointed out my mistaken actions which I wouldn't be able to think of when I was handling with the manikin." (S006).* In addition, the NSMU model helps them realise what they should do and should not do when taking care of patients. *"The reflection model guides me to think through about my performance after practicing. It shows my fault and what should be improved." (S002)*, and *"My actions in the HFS room was revealed more clearly by self-reflection." (S007).*

One of the reasons for this is because the model gets them to think in different aspects according to the N, S, M and U sections. This clear separation helps them realise what mistakes have been done. *"Self-reflection signifies both correct and incorrect clinical performances. It reminds me concerning the errors and planning for better performance in the future. This form is perfect because it has sections that separate clearly such as nursing content, specific concern and managerial improvement." (S009).*

The model helps them reflect on mistakes that have occurred. This benefits them because, when performing the HFS task, everything went by so quickly and thus the participants did not have enough time to reflect on their own actions. However, the reflection period using the NSMU model helps students to think back about their own action and organise their thoughts properly. *"After the training, I wouldn't immediately know my mistakes. But this model got me thinking about the errors I did and that should be improved." (S003), "After practicing, I would be able to think about what I missed and how to improve it. This form reorganises my thought and points out both obvious and non-obvious actions." (S005).*

The model helps them classify their actions more critically and orderly. All of the student participants heavily emphasised mistakes that were made in the simulation, as they perceive that their responsibility embraces no tolerance for mistakes with others' life. For example, *"I did not recognise my actions right after the training with the HFS but this form reflects my actions and rearranges my thinking process." (S008),* and *"Self-reflection recalls my mistakes and enlightens ways of improvement. If these were to be ignored, I would not have been able to improve myself and my performances." (S010).*

Refining Nursing Practices

Not only learning from what they have done incorrectly, the reflection model also provokes their sequential thoughts in terms of what they can do in the future to make their practice even better. The contribution of this is given to the S (specific concerns) and the M (managerial improvement) parts in particular.

More specifically, some of the interviewees pointed out that the NSMU model gets them to think about the work process and how to get better in the future. *"I have learned about work process in nursing practices from the reflection." (S002)* and *"After practicing, I would be able to think about what I missed and how to improve it. This form reorganises my thought and point out visible and invisible actions." (S005).* In addition, it is explained that the idea to improve future practices is systematically built through the reflection model. *"Self-*

reflection obviously shows my mistakes. It helps reorganise my ideas and plan for the future if I had any chance to improve it again." (S004).

Remembering More Precisely by Writing

Some of the participants discussed that the NSMU is unique in terms of its reflection style that does not only adopt spoken reflection, but also written reflection. Advantages of a written reflection are believed to help nursing students to remember nursing practices more precisely as well as to organise their thoughts carefully.

More specifically, a writing process is viewed by the participants as a useful tool to boost remembering. As few participants said that *"Writing makes me remember more effectively." (S001). "Reflection by writing form helps me remember." (S004).* The NSMU model helps them review their thinking more properly.*"Reflection in the writing form helps me remember because I could review my thinking process while I was writing." (S003).* In addition, more effective memory is believed to be retrieved by the way in which the model gets students to rearrange their thinking process; *"Reflection by writing helps me reorganise my ideas." (S007).* Also, *"It helps rearrange my thinking process." (S008).* Consequently, rearranging ideas can bring about effective remembering as it can be reread in the future;*"I would not forget what I wrote when read it again." (S007).*

In addition, it is believed that by having a written record, students can solve future problems that are similar to the ones they faced in the simulation. *"Writing and recording can help me in the future when I face with the same situation, I would know how to solve the problem." (S005).* Finally, writing is a process where students interact their thoughts with their hand. Time that allows for this action to take place is believed to be very useful as it helps them to be able to properly sequence the events that happened; *"Reflection by writing provides times for sequencing events in order." (S009).* Also, it is more preferable to write and speak from what is written, rather than impromptu reflection; *"Reflection by writing is better than reflection by speaking because it helps me rearrange my thought before I say any out." (S010).*

Reinforcing Peer-Discussion

According to the reflection, using the NSMU model, the nursing students do not only reflect on their own, but come to share with peers who practice the same HFS activity, supervised by a nursing instructor. It is evident that the nursing students hold a positive view of peer

discussion. As a few of them mentioned that *"I was able to learn when my friends were sharing what they did and learned." (S004)*. The more diverse views are shared, the more the nursing students learnt what a proper practice should be like and otherwise. For example, *"When my friends reflect, they have different points of view that I can digest before using." (S006)*. The peer feedback helps them see what they potentially miss; *"After I reflected by myself and received feedback from my friends, I could see my practice more clearly because peers saw something that I missed." (S003)*. Furthermore, some ideas would be reinforced by peers as well as the supervisor; *"When I and my friends reflected on the same thing and pointed out the same mistake, it means that my mistakes should be definitely corrected in some way to become better. After the lecturer confirmed that, I would remember and try to improve my performance." (S008)* and *"I thought reflection from peers is important because they shared correct and incorrect actions that I did in the HFS room. In the end of the class, nursing instructors would summarise all knowledge and inform proper nursing practices that I should do." (S010*).

Discussion

Reflection can be done in different forms, ranging from individual to collective reflections. Much difference can be found in the means to reflect, ranging from speaking to writing, and even the integration of different communication means. This study shows that an effective reflection should be done structurally and orderly. The reflection method used in this study adopts the NSMU model which is developed particularly in this study. This reflection model concerns its usefulness in the context of High Fidelity Simulation (HFS) in which nursing students practice nursing skills with a manikin. Since the practice with the manikin can be limited, for practical reasons, it is important to make use of discussion. However, discussion can be less useful if it is done with no certain direction. Deepika and Brundha (2017: 971) point out that passive learners can be left out cognitively as they feel that there is no need for them to think much as other active learners, who are more extrovert, will respond anyway.

In order to prepare all learners to be ready for discussion, this study proposes the NSMU model for individual reflection first. In this initial step of reflection, nursing students can have their quiet time to think in 4 different aspects. First, they can reflect on the N part or nursing content that they think they learn from the simulation. Second, they can reflect on the S part which is specific concerns. They can raise any points that they think are concerns that they have to emphasis which could be nursing content, nursing practices and else. The third part prompts nursing students to think further how to improve their action in the future as it gets the reflectors to think what managerial improvement can be done in the future. Finally, due to the limitation of HFS which is not fully identical to human responses, there exist some

aspects which cannot be unmapped between HFS and human responses. This U part is to take consideration to particular practices that nursing students have to know, basically from nursing instructors, before they begin to put their practices to real patients in the future.

Another characteristic of this model is to get students to write before they share. Self-reflection by individual writing is one reflection method that is useful for learning in nursing students, as Kuo, Turton, Cheng and Lee-Hsieh (2011: 144) claim that students learn to help patients through writing reflection. Through this process, it shows that the nursing students were satisfied with the NSMU model for reflection because it helps students to reflect their actions, feeling, and thinking when they faced with the scenario in the HFS room. It helps them to organise their ideas before writing when interacting with the model. After practicing with the HFS, students would know whether they missed something or they did any mistakes in the HFS room.

In addition, the writing step in the reflection model has received positive feedback from the nursing students. Not only writing to reflect their own actions, the nursing students were able to speak out what they think afterwards which is also another strengthen of this reflection process perceived by them. This is to ensure that when they first write, they end up having something share in the verbal discussion. No one will be left silent in the reflection process just because they think they have nothing to say. In addition, after writing, they can speak which make them remember easily. This positive side can be explained by research that reviews that speaking and writing can increase memory span (Grabowski, 2005: 7).

Finally, the positive feedback of the NSMU model can be arisen from the reflection with other peers and the nursing supervisor. Reflection by instructors is important for process of learning with the HFS (Kang & Yu, 2018: 70). As nursing students can receive certain guides from nursing instructors to confirm their correct actions and suggestion to improve their nursing practices. They need information from the supervisor to help them become more confident if they have a chance to practice with the HFS again or practice with the real patients in the hospital. The requirement of nursing students is same as nursing instructors

Conclusion

Reflection has been adopted in education for the purpose of meaningful and deep learning in which learners are able to think about their actions, experiences as well as content they learn. This allows learners to reorganise their existing knowledge and assimilate new learning experiences and information in the existing knowledge. However, reflection cannot be done

effectively without a well-defined guideline which can help learners reflect on relevant issues and main focuses of the content.

When practicing with manikins, nursing students have to concentrate on nursing practices and responses from the manikins, which require them to react promptly and to multitask. Therefore, it is crucial for students to be able to reflect on what they have done and learned from the HFS practices.

The NSMU model has been developed to help students reflect on four certain areas comprising of nursing content (N), specific concerns (S), managerial improvement (M) and unmapping (U). The N section concerns clinical and practical knowledge that students learn from the HFS activities. The S section concerns practical and ethical issues related to human patients, that may arise during practicing with the HFS. The M section is related to various procedures for delivering nursing tasks as well as teamwork processes. Finally, the U section points out certain things that can be done with manikins, with no harm, that cannot be done with human patients.

This study reveals that a range of positive perceptions can be gained after using the NSMU model, which includes a perception that this reflection is an effective tool to reflect on actions in order to realise mistakes, a tool that helps refine nursing practices, a tool that promotes remembering through reflective writing, as well as a tool that helps reinforce understanding through post-reflection discussion. It is highly recommended, for other nursing instructors and other teaching professions related to practices with manikins, to adopt or adapt this reflection model and maximise the learning of students.

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