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ORIGINAL PAPER

TRANSLATION AND VALIDATION OF THE SATISFACTION WITH SIMULATION EXPERIENCE SCALE: CROSS-SECTIONAL STUDY

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Abstract

Aim: The aim of the study was to translate the Satisfaction with Simulation Experience (SSE) scale in Croatian language and examine whether the SSE scale was valid and reliable among Croatian nursing students. *Design:* In May 2020, a cross-sectional study was conducted at the University of Applied Health Sciences in Croatia. A 145 bachelor's degree nursing students participated in the study. *Methods:* To determine the instrument's internal consistency reliability, the Cronbach alpha coefficient was used. In addition, Confirmatory factor analysis, Bartlett's sphericity test, the Kaiser-Olkin statistic and Kolmogorov-Smirnov tests were used. *Results:* Cronbach's alpha coefficient demonstrated a high consistency of the Croatian version of SSE scale ($\alpha = 0.92$). The Kaiser-Meyer-Olkin (KMO = 0.895) and the Bartlett's sphericity ($p < 0.000$) demonstrate significant results. The confirmatory factor analysis CFA has yielded a three-factor structure of SSE scale. *Conclusion:* The Croatian version of Satisfaction with Simulation Experience scale (CRO – SSE) has shown adequate psychometric properties making it a suitable tool for examining the satisfaction of nursing students with the simulation experience in Croatian context.

Keywords: nursing students, satisfaction, simulation, SSE scale.

Introduction

Simulation-based education provides nursing students with opportunities to perform various clinical skills, without compromising the patient's safety (Kim et al., 2016). Simulations represent a well-known teaching tool, with elements of showing the most realistic clinical environment. Simulation learning provides a safe environment for learning and practicing psychomotor skills, team coordination, communication skills (Decker et al., 2008; Quail et al., 2016); encourages student for teamwork and allows repetition of an action without any risk for the patient, until a particular skill is fully mastered (Jeffries, 2007). In addition, students experience the simulated scenario followed by effective feedback and debriefing (So et al., 2019). According to Kelly et al. (2016) simulation scenarios are developed on relevant pedagogical frameworks, which provides an effective basis for learning experiences that have meaning and great impact on patient care. Simulated learning provides an effective link between the virtual world of teaching and the physical world of the patient.

Providing effective strategies that will enable students to transfer knowledge and skills acquired through simulation learning into practice is vital for the effective implementation of learning from simulation learning (Morley et al., 2019). There are various simulation materials and equipment available, such as: medium and high-fidelity manikins, task trainers such as intravenous arms and resuscitation torsos and anatomically correct, as well as highly sophisticated models that come with built-in software (Durham & Alden, 2008). The software is managed by a health care educator who can use it to assign various tasks and thus simulate the clinical environment.

According to Abozaid (2017), there are 4 types of medical simulation: training simulation, simulation with medium and high-fidelity manikins, standardized patient simulation, virtual reality simulation. Numerous studies have identified increased student satisfaction when the lecture is supplemented by simulations and many benefits have been described:

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- Students have the opportunity to be actively engaged in challenging clinical situations.
- They are exposed to time-limited and critical clinical scenarios that could only be passively observed in a 'real' clinical environment.
- They have the opportunity to integrate clinical skills, knowledge, critical thinking, professional communication, teamwork, physical assessment in a realistic but not in a dangerous environment.
- Students can learn from mistakes without compromising patient safety, and they are allowed to repeat the required skills over and over again.
- Debriefing and immediate feedback from educator can improve learning (Aebersold, 2018; Eyikara & Baykara, 2017; Kim et al., 2016; Levett-Jones et al., 2011).

Student satisfaction is an important aspect to enable engaged and meaningful learning and it is a measure of student engagement. (Levett-Jones et al., 2011; Williams & Dousek, 2012). It is associated with greater student engagement and greater motivation for learning (Baptista et al., 2014) and it has shown to have influence on student's academic performance (Levett-Jones et al., 2011).

The Satisfaction with Simulation Experience (SSE) scale was originally developed by Levett-Jones and her colleagues (2011) by examining differences in student satisfaction using medium and high-fidelity human patient simulation manikins. Authors reported that scale is valid and multidimensional instrument. It has been observed that only a few studies have previously reported on the psychometric properties of the SSE scale (Levett-Jones et al., 2011; Kwon & Yoou, 2014; Williams & Dousek, 2012). The SSE scale has not been translated to Croatian language and has not been validated among Croatian population. Since the simulation learning has proven to be an important teaching approach for preparing students for a real clinical environment (Zapko et al., 2018), it has benefit for students' performance in subsequent clinical practice (Kelly et al., 2016) and contributes to increased student satisfaction and self-confidence (Zapko et al., 2018), exploring the satisfaction with simulation experience among Croatian nurses' students is highly needed.

Aim

The aim of the research was to translate the SSE scale in Croatian language and examine whether the SSE scale was valid and reliable among Croatian nursing students.

Methods

Design

The cross-sectional study was conducted in May 2020 at the University of Applied Health Sciences (UAHS) in Croatia.

Sample

Participants were second and third-year bachelor nursing students. For the purpose of the research, the students of the second and third year of study were selected because they were the only ones to have taken part in a simulation training. Students attended courses on measuring vital signs, medication preparation and administration of intravenous medications and basic life support training. The students learned new skills in groups of 16 students. Students performed different simulated scenarios; each 10–20 minutes long. At the time of the survey, first-year students were not involved in a simulation training. The SSE scale was administered to 203 nursing students. Of the 203 nursing students eligible for inclusion, 145 participated in the study.

Data collection

After obtaining approval by the Ethics committee of the institution in which research was conducted, research team held meeting with the second and third-year bachelor nursing students. Students were informed about the research objectives and procedure and were invited to participate in the research. They have been informed that the research is anonymous and that they may terminate their participation at any time. Prior to the start of the research, students signed an informed consent form.

Description of study instrument the SSE scale

The SSE scale consists of 18 items (Table 1). Each of item were scored on a 5-point Likert scale (where 1 = strongly disagree and 5 = strongly agree). In previous study Cronbach's alpha coefficient proved satisfactory internal consistency (alpha 0.77) (Levett-Jones et al., 2011). Also, a three-factor structure were proven. Factor 1 (F1 measured by items 1–9) was named debriefing and reflection; Factor 2 (F2 measured by items 10–14) was named clinical reasoning and Factor 3 (F3 measured by items 15–18) was named clinical learning. Each of factors proved high internal consistency: F1 = 0.94; F2 = 0.86; F3 = 0.85. The summery scores range from 18 to 90 points for the entire SSE 18 items. The written approval for the use of the questionnaire was obtained from the authors of the original SSE instrument (Levett-Jones et al., 2011).

Table 1 Original SSE scale (Levett-Jones et al., 2011)

Item number	Question
Debrief and reflection	
1.	The facilitator provided constructive criticism during the debriefing
2.	The facilitator summarized important issues during the debriefing
3.	I had the opportunity to reflect on and discuss my performance during the debriefing
4.	The debriefing provided an opportunity to ask questions
5.	The facilitator provided feedback that helped me to develop my clinical reasoning skills
6.	Reflecting on and discussing the simulation enhanced my learning
7.	The facilitator's questions helped me to learn
8.	I received feedback during the debriefing that helped me to learn
9.	The facilitator made me feel comfortable and at ease during the debriefing
Clinical reasoning	
10.	The simulation developed my clinical reasoning skills
11.	The simulation developed my clinical decision making ability
12.	The simulation enabled me to demonstrate my clinical reasoning skills
13.	The simulation helped me to recognize patient deterioration early
14.	This was a valuable learning experience
Clinical learning	
15.	The simulation caused me to reflect on my clinical ability
16.	The simulation tested my clinical ability
17.	The simulation helped me to apply what I learned from the case study
18.	The simulation helped me to recognize my clinical strengths and weaknesses

SSE scale translation process

According to World Health Organization guidelines for process of translation and adaptation of instrument, the following steps were implemented: forward translation, expert panel back-translation, pre-testing with cognitive interviewing and final version of instrument (World Health Organization [WHO], 2020). In the present study, research instrument was translated from English to Croatian by two nursing PhD candidates and a nursing student independently. Two bilingual lecturers from the UAHS Department of Nursing examined the translated instruments. Afterwards, the expert panel (a group of lecturers from the UAHS Department of Nursing, along with original translators and experts with experience in instrument development and translation) held a meeting and discussed newly translated instrument and provided feedback. Following that, a back translation of the instrument was performed by an independent translator, a native English-speaking PhD lecturer, who had no knowledge of the questionnaire. Afterwards, the expert panel (listed above) held a meeting and discussed translated instruments and provided their observation. In conclusion, a preliminary version of Croatian version of SSE scale was made. A pilot test of Croatian version of SSE scale was conducted among group of 20 first year bachelor nursing students. There were no problems with interpretation due to the cultural differences in understanding the question. After the pilot test, revisions to the scale were not required.

Data analysis

Psychometric validation

Cronbach alpha coefficient (α) was used in order to measure internal consistency reliability of SSE scale. In the present study the overall α and the subscales α was measured. Cronbach's α values around 0.8 indicates good reliability (Field, 2013). In addition, Confirmatory factor analysis, Bartlett's sphericity test, the Kaiser-Olkin statistic and Kolmogorov-Smirnov tests were used. According to Field (2013), KMO represents the ratio of the squared correlation between variables to the squared partial correlation between variables with appropriate values > 0.5 (Field, 2013). In order to determine whether correlation matrix is significantly different from an identity matrix, a Bartlett's test of sphericity was performed. Values less than 0.05 were considered significant (Field, 2013; Schmitt, 2011).

Results

A 145 bachelor's degree nursing students participated in the study (74 second-year students and 71 third-year nursing students). The response rate for second-year students was 71.1% and for third-year 71.7%. There were 7 male (9.5%) and 67 female (90.5%) participants from second-year and 3 male (4%) and 68 female (96%) participants from third-year bachelor nursing programs.

Psychometric validation

Internal consistency reliability measured on the entire scale using a Cronbach's alpha coefficient was ($\alpha = 0.92$) demonstrating high internal consistency of CRO – SSE scale. A Cronbach's alpha coefficient for the subscales is: Factor 1 (CRO – F1 $\alpha = 0.90$), Factor 2 (CRO – F2 $\alpha = 0.84$), Factor 3 (CRO – F3 $\alpha = 0.73$).

In CFA, the Kaiser-Meyer-Olkin (KMO = 0.895) and the Bartlett's sphericity (1436.257; $p < 0.000$) demonstrate significant results. A three-factor structure of the instrument was revealed (Table 2). Table 2 shows the results for the first three observed factors that cumulatively explain 60.7 % of the total variance, while the first factor lays the highest load and explains as much as 43.2% of the total variance.

In the factor loading matrix (Table 3), it can be observed that the three factors listed above contain the observed items. As the result of factor analysis, the items for each factor were rearranged, unlike the original tool. In Croatian version first factor named simulation learning (CRO – F1) contains following items: 10, 11, 12, 13, 15, 16, 17, 18; second factor named reflection on teaching (CRO – F2) items: 1, 2, 5, 7, 8; while the third factor named clinical learning (CRO – F3) contains items: 3, 4, 6, 9, 14.

The arithmetic means and standard deviations of the three factors are shown in Table 4.

Table 2 Results of confirmatory factor analysis of Croatian version of SSE scale (n = 145)

	Initial eigenvalues			Extraction sums of squared loadings			Sum rotation squares		
Component	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1.	7.786	43.255	43.255	7.786	43.255	43.255	4.982	27.680	27.680
2.	1.980	11.002	54.257	1.980	11.002	54.257	3.157	17.540	45.221
3.	1.160	6.445	60.702	1.160	6.445	60.702	2.787	15.482	60.702
4.	1.033	5.741	66.443						
5.	0.887	4.930	71.373						
6.	0.788	4.376	75.749						
7.	0.705	3.917	79.665						
8.	0.549	3.051	82.717						
9.	0.480	2.666	85.383						
10.	0.454	2.523	87.906						
11.	0.387	2.149	90.056						
12.	0.348	1.935	91.991						
13.	0.318	1.765	93.756						
14.	0.298	1.657	95.413						
15.	0.243	1.349	96.763						
16.	0.223	1.241	98.004						
17.	0.192	1.066	99.070						
18.	0.167	0.930	100.000						

Table 3 Results of factor loading matrix of Croatian version of SSE scale (n = 145)

	Component		
Item	**CRO – F1**	**CRO – F2**	**CRO – F3**
1.	0.035	0.766	
2.		0.513	
3.			0.623
4.			0.743
5.		0.652	
6.			0.493
7.		0.652	
8.		0.781	
9.			0.482
10.	0.721		
11.	0.783		
12.	0.779		
13.	0.857		
14.			0.571
15.	0.609		
16.	0.541		
17.	0.714		
18.	0.712		

CRO – F1 – simulation learning; CRO – F2 – reflection on teaching; CRO – F3 – clinical learning

Table 4 The results of arithmetic mean and standard deviation of the three factors of Croatian version of SSE scale (n = 145)

	CRO – F1	**CRO – F2**	**CRO – F3**
Arithmetic mean	3.96	4.2	4.3
Standard deviation	0.67	0.59	0.50

CRO – F1 – simulation learning; CRO – F2 – reflection on teaching; CRO – F3 – clinical learning

Discussion

Simulation learning has been an essential part of nursing education. It has many benefits related to ensuring best nursing practice for nurses' professional activity and patient safety. Student gain confidence in performance of various clinical skills before performing the same skills in the actual clinical settings (Smrekar et al., 2017). The results of the previous research stated that the SSE scale is a valuable tool for assessment the satisfaction of nursing students after a clinical learning experience through simulation (Guasconi et al., 2021; Levett-Jones et al., 2011). The current study's findings suggest that the Croatian version of the SSE scale met the required psychometric requirements among nursing students. The results of this investigation showed that the full CRO – SSE scale has high internal consistency, as well as three subscales, which is consistent with the findings of other similar studies on nursing students. Levett-Jones et al. (2011) conducted a validation study among Australian nursing students and reported satisfactory internal consistency ($\alpha = 0.77$) of SSE scale and each subscale ($\alpha = 0.94$; 0.86; 0.85). In the study conducted by Kwon and Yoou (2014) on paramedic students, Cronbach's alpha for the overall SSE scale was ($\alpha = 0.84$). Each of the subscales had high internal consistency, with Cronbachs alphas ($\alpha = 0.85$; 0.79; 0.91). Williams and Dousek (2012) conducted a study to examine the factor structure of the SSE scale and its validity for paramedic students. Authors reported Cronbach's alpha ($\alpha = 0.88$) for overall SSE scale and for sub scales ($\alpha = 0.88$; 0.80; 0.78). The SSE scale was also tested among Italian nursing students. The results demonstrate satisfactory values. Cronbach's alpha for the overall SSE scale was ($\alpha = 0.713$) (Guasconi et al., 2021).

The analysis of factor structure in present study identified three factors accounted for 60.7% of the total variance. A three-factor structure of the SSE scale was confirmed in several studies (Kwon & Yoou, 2014; Levett-Jones et al., 2011; Williams & Dousek, 2012). Due to the fact that in present study the items for each factor were rearranged unlike the original tool it is important to explain why such a result come out. This can be attributed to cultural specificity and the specificity of the sample.

Evaluating satisfaction with simulation learning is extremely important in the higher education process because it enables the collection of valid, concrete and specific information about student learning processes and provides constructive and meaningful feedback on student progress in specific aspects of learning and development during the educational process. Evaluating satisfaction with simulation learning has multiple benefits for all participants in the educational process. Evaluating students' satisfaction with simulation learning helps professors gather information about students' initial knowledge and experiences, possible misunderstood knowledge, student learning styles, motivation to learn, and teaching planning (professors can change the planned teaching strategy after finding that students show some typical errors or misconceptions), gaining insight into the effectiveness of their own work. The benefits of evaluating simulation learning satisfaction help students become aware of how effectively they learn and insights on how to learn, improve learning by developing their learning management skills, have better achievement because they receive continuous feedback on how they progress and learn effectively, they develop motivation to learn, confidence and positive self-image, they are more interested in success because they know how to achieve it. Most often positive outcomes of simulation learning highlighting the student's ability to make a mistake without compromising patient safety, skills can be repeated many times until they reach the required level of performance, active student participating in situations requiring prompt critical decision making and acting (such as simulated patient deterioration), integration of theoretical knowledge and practical skills in real time (Jeffries, 2007; Lapkin & Levett-Jones, 2011; Larew et al., 2006).

The SSE scale has demonstrated its reliability and validity, as well as its usefulness in teaching and learning. This scale can further be used to evaluate student's satisfaction among other health professions that practice simulation-based learning. Furthermore, the results obtained by this scale will have a benefit not only for educators but educational institutions as well, in an effort to provide and maintain consistent quality of education.

Limitation of study

This study has several limitations. The first limitation is that the sample of respondents is relatively small (Tabachnick & Fidell, 2007). Another limitation is that the study was conducted in a single institution with a convenience sample.

SSE scale offers a practical and usable instrument for teachers in nursing simulation education in their work with students. Given the small number of studies on the validation of the SSE scale, it is recommended that further studies examine the SSE scale from more different cultural contexts. Further research is needed to reach a consensus on the best simulation education in undergraduate nursing. More studies that are focused on the performance of knowledge and skills will contribute to knowledge about the effect of simulation in nursing education and practice.

Conclusion

Croatian version of the SSE scale has shown adequate psychometric properties, making it a suitable tool for examining the satisfaction of nursing students with the simulation experience in Croatian context. SSE scale could be an important instrument for evaluation of satisfaction with simulation experience, not only in nursing students' population, but related health professions as well.

Ethical aspects and conflict of interest

The study was approved by the Ethics committee of the UAHS (code: 251-379-1-19-02). Nursing student were informed about the aim of the research in writing. Written informed consent to participate in the research was obtained from participants.

The authors declare no conflicts of interest.

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Author contributions

Concept and design (MS, AMH), data collection (AMH, SLF, BK, BI, MT), data analysis and

interpretation (MS, AMH, SČ, BK, BI), manuscript draft (MS, AMH), critical revision of the manuscript (SČ, SLF, BK, BI, MT), final approval of the manuscript (MS, AMH).

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