

Investigation of the impact of simulation course on nursing students' views about simulation and attitudes towards learning

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Abstract— Objectives: The necessity of using innovative and active learning approaches in nursing education increases with each passing day. Nursing students' attitudes towards learning and their views on simulation, which is an effective learning method, are of vital importance. To examine the views of nursing students who take and do not take simulation course about simulation and their attitudes towards learning.

Methods: The experimental study with the post-test and control group was carried out with 138 nursing students studying in 3rd grade in a public university at the Faculty of Health Sciences Nursing Department and agreeing to participate in the study.

Results: When the opinions of the students participating in the study were evaluated, regarding the positive aspects of simulation, 71.9% of students who took the course and 69.4% of those who did not take the course supported the idea of using theoretical knowledge in practical skills; concerning the difficulties experienced in simulation applications, 62.5% of the group taking the course and 53.2% of those not taking the course said that the "The high number of students" was the topmost difficulty encountered; regarding the negative aspects of the simulation, 39.1% of the students who took the course and 29% of those who did not take the course stated that simulation requires allocating more time. The statement "More comprehensive and easily accessible simulation laboratories should be built up" was the highest recommendation proposed by 65.6% of the group taking the course and 61.3% of the students who did not take the course. In addition, it was detected that the scale scores of students' attitudes towards learning are quite close to each other and there was no statistically significant difference between students who took the course and those who did not ($p < 0.05$).

Conclusion: It was determined that the students who had theoretical knowledge and experience about simulation and the students who did not have theoretical knowledge had very similar opinions regarding simulation.

Keywords— Nursing education, nursing student, simulation, view, learning, attitude

I. INTRODUCTION

Simulation is one of the innovative approaches whose use in nursing education becomes widespread every day with the advances in technology based on the needs in the education process (1). The increasing number of students in educational institutions and the insufficiency of faculty staff require the use of innovative and active learning approaches in nursing education (2). Today, with the qualifications that should be gained within the scope of nursing education, the problems experienced in realizing clinical practices with real patients and the fact that the simulation can offer quality and safe learning environments reveal the necessity of using simulation in nursing education (3,4). In addition, simulation has become one of the main components of nursing education programs in countries such as America (5), South Korea (6) and Australia (7). Accordingly, simulation applications are used in areas such as developing nursing students' skills namely psychomotor, critical thinking, clinical decision making, problem solving and effective communication (8), reducing anxiety before clinical practice (9) and increasing their cognitive competencies (10), and it shows effective results. The effective results obtained from simulation practices are of great importance in achieving the learning outcomes targeted for graduation in nursing education (11).

When the studies evaluating the views of nursing students regarding simulation are examined, it is stated that the satisfaction level of the students concerning the simulation is high and find the simulation useful in terms of learning (12-14). However, in the studies examined, it is noteworthy that the students have the experience of simulation application but they do not have any theoretical knowledge about simulation (12,14-16). At the same time, studies investigating the effect of simulation on students' learning attitudes are very limited and similarly, the effect of having practical experience rather than having theoretical knowledge about simulation is analyzed (17). It is known that positive attitudes of individuals towards learning when faced with new situations affect motivation and academic success in a positive way (18). Therefore, it is thought that having theoretical knowledge about simulation, which is an innovative and interactive method, may

affect students' views on simulation and their attitudes towards learning.

II. MATERIAL-METHOD

a. Aim of the Study

The aim of the study is to examine the views of nursing students who take and do not take the simulation course and their attitudes towards learning.

(P) Population: Nursing students studying in the third grade,

(I) Intervention: Taking the Simulation Course in Nursing,

(C) Comparison: Comparing students' attitudes towards learning and their views about simulation,

(O) Output: Students' views about simulation and their attitudes towards learning,

(T) Time: Data were collected after the simulation course was completed in the academic year.

b. Type and location of the study

The study was designed in an experimental design with a post-test and control group and was carried out between December 2019-February 2020 at a public university.

c. Universe and Sample of the Study

The study universe is composed of 191 students studying in the third grade at the Faculty of Health Sciences, Department of Nursing in the fall semester of the 2019-2020 academic year. In the study, all students (69 students) who took the course "Simulation in Nursing", which is an elective course during the academic year, and randomly selected students (69 students) among 122 students who do not take the course, constitute the sample group (n=138). Accordingly, the research was completed with a total of 126 students (who take the course = 64, who do not take the course = 62) who agreed to participate in the study.

d. Data Collection Tools

In collecting the study data, the "Personal Information Form", "The Views Form Concerning Simulation" prepared by the researchers in line with the literature and "Attitude Scale Towards Learning" were used.

Personal Information Form: In the form, there are 8 questions regarding demographic features such as age, gender and last graduated school and students' experience of taking simulation lessons and simulation applications (12,13,15).

The Views Form Concerning Simulation: The form prepared by the researchers in line with the literature in order to evaluate the students' views about simulation consists of 31-item statements. In the form, students are asked to indicate their evaluations about the expressions using the 5-point Likert structure that moves from the "I totally agree" option to the "I totally disagree" option (12,14,16,19,20).

Attitude Scale Towards Learning: The scale developed by Kara (2010) is used to determine the attitudes of individuals towards learning. The scale consists of 29 positive and 11 negative items and each item is evaluated as 5-grade that moves from 1: I agree, 2: I rather agree, 3: I have no idea, 4: I disagree to 5: I totally disagree. Also the scale

consists of 4 sub-dimensions such as "The nature of learning", "Anxiety", "Expectation" and "Openness to learning". The Cronbach Alpha coefficient of each sub-dimension varies between .72 and .81, and the Cronbach Alpha coefficient calculated for the entire scale is .73.

The lowest and highest scores that can be obtained in each sub-dimension of the scale can be evaluated such as;

- The nature of learning: the lowest 7, the highest 35
- Anxiety Regarding Learning: The lowest 13, the highest 65
- Expectations Concerning Learning: The lowest 9, the highest 45
- Openness to learning: the lowest 11 and the highest 55.

The increase in the scores in the sub-dimensions is also interpreted as the increase in attitude towards learning (21).

e. Data Collection

The students, who had taken the Simulation Course in Nursing as an elective course in the academic year when the study had been conducted, was trained in line with the content composed of the subjects of the definition, history, types of simulation, simulation applications in our country, its use in the nursing education, simulation design and scenario preparation. Following the end of the theoretical teaching of the course, the students wrote a scenario in groups of 4 and experienced simulation application in the simulator with a high level of reality. After the completion of the application phase of the course, the data were collected by the researchers simultaneously from the students in both groups between January-February 2020 by using data collection forms. The average time required for the participants to fill the data collection forms is 15 minutes.

f. Ethical Aspect of the Study

In order to conduct the research, permission was obtained by e-mail from Kara A. who developed the Attitude Scale Towards Learning. In addition, written permission was obtained from the Ethics Committee of the institution where the study was conducted (Ethics approval no: 2019/248) and from the Department of Nursing, Faculty of Health Sciences. All students participating in the study were informed about the purpose of the study and written consent was acquired from the students who wanted to participate for study by using the informed consent form.

g. Data Analysis

The evaluation of the study data was done using SPSS 24.0 statistical program. The data were defined using mean, standard deviation, frequency, and percentages. Descriptive statistics, independent samples t test and chi-square test were used in the statistical analysis of the data. The significance level was taken as $p < 0.05$.

III. RESULTS

a. Students characteristics: The average age of the students participating in the study is 20.98 ± 1.084 , and the overall success level in the 4-point system is 2.73 ± 0.259 . 75.4% of the students are women, 71.4% are Anatolian high school graduates, 83.3% have chosen the nursing profession voluntarily and 84.1% of the students stated that they are pleased to study in the nursing department. In addition, 50.8% of the students participating in the study have taken the simulation course and 65.1% of them have the experience of performing simulation applications. There exists no significant difference between the groups in terms of the descriptive features, except for having the experience of taking the simulation lesson and performing the simulation application (Table 1).

Table 1. Descriptive Characteristics of Students (N=126)

Descriptive Characteristics		Experimental Group		Control Group		χ^2	p
		n	%	n	%		
Age	20 \geq	14	25.0	23	39.0	2.574	0.109
	20<	42	75.0	36	61.0		
Grade point average	2.50 \geq	12	20.0	11	19.6	0.002	0.962
	2.50<	48	80.0	45	80.4		
Gender	Female	46	71.9	49	79.0	0.870	0.351
	Male	18	28.1	13	21.0		
Last Graduated School	Regular High School	10	15.6	11	17.7	1.061	0.900
	Anatolian High School	46	71.9	44	71.0		
	Science High School	1	1.6	0	0		
	Vocational High School	4	6.3	4	6.5		
	Other*	3	4.7	3	4.8		
Selection status of the nursing department	Willingly	55	85.9	50	80.6	0.635	0.425
	Unwillingly	9	14.1	12	19.4		
The status of being satisfied with the nursing department	Satisfied	55	85.9	51	82.3	0.319	0.572
	Unsatisfied	9	14.1	11	17.7		
Taking a simulation course	Taking the course	64	100	0	0	126.0	0.000
	Not taking the course	0	0	62	100		
Simulation applications experienced outside of Simulation Course in Nursing	High-reality simulation (Physical examination skill)	2	28.7	7	38.9	11.644	0.234
	Low reality simulation application (Basic first aid skill)	1	14.2	3	16.7		
	Standardized patient simulation (Vital sign measurement, drug administration skill)	1	14.2	5	27.7		
	Virtual reality simulation (Opening an intravenous catheter)	3	42.9	3	16.7		

b. Students views about simulation: When the assessments made by the students regarding the positive aspects of the simulation have been examined, it has been found that the vast majority of students who received theoretical training on simulation and those who did not receive training stated "I totally agree" for all of the statements. Furthermore, 71.9% of the students who take the simulation course and 69.4% of those who do not take the course stated that simulation supports using theoretical knowledge in practical skills (Table 2).

Table 2. Students' Evaluations Concerning the Positive Aspects of Simulation (N=126)

Question	Statements	Students Taking the Simulation Course (n=64)										Students Not Taking the Simulation Course (n=62)									
		Strongly agree		Agree		Neutral		Disagree		Strongly disagree		Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
What are the positive aspects of simulation?	Allows to experience realistic clinical situations in a safe environment.	38	59.4	26	40.6	0	0	0	0	0	0	31	50	29	46.8	2	3.2	0	0	0	0
	Minimizes the possibility of harming the patient during the care process by preparing for clinical environment.	42	65.6	18	28.1	4	6.3	0	0	0	0	34	54.8	23	37.1	5	8.1	0	0	0	0
	Reduces fear and anxiety concerning the clinical setting.	38	59.4	26	40.6	0	0	0	0	0	0	36	58.1	20	32.3	5	8.1	1	1.6	0	0
	Supports the use of theoretical knowledge in practical skills	46	71.9	17	26.6	1	1.6	0	0	0	0	43	69.4	15	24.2	3	4.8	1	1.6	0	0
	Supports competence development	38	59.4	25	39.1	1	1.6	0	0	0	0	35	56.5	21	33.9	3	4.8	3	4.8	0	0
	Enables team work by supporting group interaction in practice	34	53.1	28	43.8	2	3.1	0	0	0	0	34	54.8	21	33.9	4	6.5	3	4.8	0	0
	Improves critical thinking skills	36	56.3	26	40.6	1	1.6	1	1.6	0	0	33	53.2	22	35.5	5	8.1	2	3.2	0	0
	Allows getting feedback and learning from errors by seeing the mistakes	41	64.1	21	32.8	2	3.1	0	0	0	0	39	62.9	21	33.9	1	1.6	1	1.6	0	0
	Enables the recognizing of learning needs	36	56.3	26	40.6	2	3.1	0	0	0	0	38	61.3	20	32.3	2	3.2	1	1.6	1	1.6
	Increases learning motivation	42	65.6	21	32.8	1	1.6	0	0	0	0	36	58.1	22	35.5	2	3.2	2	3.2	0	0
	Improves communication skills	37	57.8	19	29.7	6	9.4	2	3.1	0	0	35	56.5	13	21.0	11	17.7	3	4.8	0	0
	Supports the development of autonomy by actively participating in the process	36	56.3	22	34.4	5	7.8	1	1.6	0	0	36	58.1	23	37.1	2	3.2	0	0	1	1.6
It is fun	35	54.7	21	32.8	6	9.4	2	3.1	0	0	39	62.9	18	29.0	5	8.1	0	0	0	0	

When the evaluations regarding the difficulties experienced in simulation applications were examined, it was detected that the evaluations of the students in both groups were similar. At the same time, it was identified that within the group taking the simulation course 62.5% of students and in the group not taking the course 53.2% of them, mentioned "High number of students" as difficulty at the highest rate and that was followed by the expressions "Insufficiency of model and simulators used" and "The opportunity to experience limited and few applications". Moreover, when the evaluations regarding the negative aspects of the simulation were analyzed, 39.1% of the students who took the course and 29% of those who did not take the course stated that they agreed with the statement "Requires more time to be allocated" and it was determined that the students did not agree with other negative statements other than this statement (Table 3).

Table 3. Students' Evaluations Concerning the Difficulties in Simulation Applications and the Negative Aspects of Simulation (N=126)

Question	Statements	Students Taking the Simulation Course (n=64)										Students Not Taking the Simulation Course (n=62)									
		Strongly agree		Agree		Neutral		Disagree		Strongly disagree		Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
What are the difficulties experienced in simulation applications?	Lack of time allocated to practice	17	26.6	31	48.4	13	20.3	2	3.1	1	1.6	23	37.1	21	33.9	16	25.8	2	3.2	0	0
	Lack of physical space that can be used for application	24	37.5	29	45.3	7	10.9	3	4.7	1	1.6	22	35.5	28	45.2	9	14.5	3	4.8	0	0
	The opportunity to experience limited and few applications	30	46.9	24	37.5	6	9.4	2	3.1	2	3.1	24	38.7	23	37.1	11	17.7	4	6.5	0	0
	High number of students	40	62.5	18	28.1	4	6.3	1	1.6	1	1.6	33	53.2	23	37.1	4	6.5	2	3.2	0	0
	Insufficiency of the models and/or simulators used	37	57.8	18	28.1	6	9.4	2	3.1	1	1.6	29	46.8	22	35.5	8	12.9	3	4.8	0	0
	Creating anxiety during application	19	29.7	25	39.1	13	20.3	7	10.9	0	0	7	11.3	23	37.1	24	38.7	5	8.1	3	4.8
What are the negative aspects of simulation?	Requires more time to be allocated	22	34.4	25	39.1	8	12.5	9	14.1	0	0	9	14.5	18	29.0	16	25.8	16	25.8	3	4.8
	Causes unnecessary repetition	3	4.7	12	18.8	22	34.4	19	29.7	8	12.5	3	4.8	10	16.1	12	19.4	24	38.7	13	21.0
	Increases anxiety concerning the clinical setting	8	12.5	11	17.2	13	20.3	21	32.8	11	17.2	7	11.3	7	11.3	10	16.1	22	35.5	16	25.8
	It is boring	3	4.7	3	4.7	11	17.2	29	45.3	18	28.1	3	4.8	4	6.5	6	9.7	28	45.2	21	33.9
	Has no effect on learning	2	3.1	3	4.7	2	3.1	15	23.4	42	65.6	3	4.8	5	8.1	5	8.1	20	32.3	29	46.8

When the suggestions of the students concerning the simulation were assessed, it was determined that the vast majority of the students in both groups totally agreed with all statements. The expression "More comprehensive and easily accessible simulation laboratories should be built up" was the statement recommended with the highest rate by 65.6% of the group taking the course and similarly by the 61.3% of the students not taking the course. Furthermore, it was found that the expression "Simulation applications should be used simultaneously with the courses throughout the semester" was the second-highest recommended statement by 61.3% of the students not taking the course (Table 4).

Table 4. Students' Evaluations Regarding the Suggestions for Simulation (N=126)

Question	Statements	Students Taking the Simulation Course (n=64)										Students Not Taking the Simulation Course (n=62)									
		Strongly agree		Agree		Neutral		Disagree		Strongly disagree		Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
What are your suggestions concerning simulation?	Simulation applications should be used simultaneously with courses throughout the semester	32	50.0	25	39.1	7	10.9	0	0	0	0	38	61.3	20	32.3	2	3.2	1	1.6	1	1.6
	Should be included in all areas of nursing education	28	43.8	28	43.8	7	10.9	1	1.6	0	0	31	50.0	22	35.5	7	11.3	0	0	2	3.2
	More comprehensive and easily accessible simulation laboratories should be built up	42	65.6	21	32.8	1	1.6	0	0	0	0	38	61.3	21	33.9	0	0	3	4.8	0	0
	The opportunity for repeated application with increasing difficulty should be provided	38	59.4	21	32.8	4	6.3	0	0	1	1.6	36	58.1	22	35.5	3	4.8	0	0	1	1.6
	The number of educated trainers on simulation should be higher	39	60.9	22	34.4	2	3.1	1	1.6	0	0	36	58.1	21	33.9	4	6.5	1	1.6	0	0
	Multiple learning strategies and methods should be included in simulation applications	37	57.8	24	37.5	2	3.1	0	0	1	1.6	35	56.5	24	38.7	3	4.8	0	0	0	0
	Can be used instead of some clinical applications	30	46.9	26	40.6	8	12.5	0	0	0	0	35	56.5	19	30.6	5	8.1	3	4.8	0	0

c. Students attitudes towards learning: When the scale total score and sub-dimension total score averages of the students participating in the study were examined, it was detected that the scores of the students were close to each other. It was identified that the attitudes of students in both groups towards the nature of learning and anxiety regarding learning were at an intermediate level; that their attitudes concerning learning expectations were at a low level and their attitudes with respect to openness to learning were at a high level. In addition, it was ascertained that there was no statistically significant difference between groups in the scale sub-dimension and total scores ($p < 0.05$) (Table 5).

Table 5. The Comparison of Students' Attitudes Towards Learning (N=126)

Scale Score	Students Taking the Simulation Course (n=64)			Students Not Taking the Simulation Course (n=62)			Test Statistics***	p
	Mean±SD	Min.*	Max.**	Mean±SD	Min.*	Max.**		
The Nature of Learning	15.62±4.00	8	23	15.19±3.43	8	23	t=-.648	0.518
Expectations Concerning Learning	16.28±3.90	10	27	16.69±4.45	9	28	t=0.553	0.581
Openness to Learning	29.98±4.07	18	41	29.66±4.35	17	37	t=-.430	0.668
Anxiety Regarding Learning	35.09±6.68	20	50	35.11±6.58	19	49	t=0.016	0.987
Total	96.66±13.30	64.00	128	96.66±13.07	66.00	127	t=-.137	0.891

IV. DISCUSSION

As a result of the study, it was found that the vast majority of students who took and did not take the simulation course stated that simulation supported the use of the learned theoretical knowledge within practical skills. When the literature is examined, it is revealed that simulation applications support nursing students' knowledge acquisition and the development of their practical skills (22,23). In the study, the high level of emphasis on this point by the students makes one think they focus on the cognitive and psychomotor areas, which are among the competence areas, that are aimed to be achieved by them in nursing education, and they prefer learning by experience. Similarly, it was stated that first and second-grade students have an assimilative learning style, whereas 3rd and 4th-grade students have a differentiated learning style that prefers learning by doing in the studies conducted (24-26).

When the evaluations regarding the difficulties experienced in simulation applications are analyzed, more than half of the students in both groups stated "High number of students" and "Inadequacy of the model and/or simulators used" as highly encountered difficulties. Similarly, in the study of Uslusoy (16), 93.2% of the students stated that the high number of students and the inadequacy of the models and materials in the laboratories in their institutions are among the difficulties experienced concerning the simulation laboratory; in Terzioğlu et al. (27)'s research, it has been revealed that the students thought that the education they had received is lacking before they proceed to clinical practice due to the insufficiency of models in the laboratory in relation to the number of students. Moreover, it is emphasized that simulation applications can be performed using techniques with low or high levels of reality and each technique has superior aspects to each other. (2,28). Therefore, it is considered that within the students' evaluation of the insufficiency of the models and/or simulators used, their views in this direction might be also present. When the literature is examined, it is expressed that there are deficiencies in certain areas due to the reasons such as the inability to observe patient responses in models with low-reality level (13), similarly, that such as the feeling of psychological reality does not occur in simulators with a high level of reality, or such as that the responses received from the simulator via sensors are different from those received from a real patient (28), and such as the lack of applications oriented to the cases with high-risk but very unlikely to be encountered in a clinical setting (29). It is also stated that this situation may prevent the transfer of learned skills to the clinical setting (7).

Regarding the negative aspects of simulation in the study, it has been designated that approximately one-third of the students in both groups state that the simulation requires allocating more time. As distinct from the result of the study, in the studies conducted, it is indicated that the students have

positive opinions regarding the simulation (14,15,30,31). In the study, it is considered that the opinion of the students, which is the simulation requires extra time, stems from the fact that it takes a lot of time for simulation applications to consist of briefing, application and debriefing steps and that students focus on the application phase. However, for an effective simulation application, each step is complementary to each other and is required (32). In order to obtain the expected outcomes from the simulation applications, it is necessary to explain to the students what qualifications are expected from them during the briefing phase. The failure or ineffectiveness of this phase may cause students to feel anxiety oriented towards simulation which also includes technological developments and is a new technique. In addition, the debriefing phase, which is carried out after the application phase, enables students to understand and explain their feelings and thoughts during the process and the connections between events and actions (33).

The statement "More comprehensive and easily accessible simulation laboratories should be built up" was the highest recommended expression by students in both groups. Similarly, in the study conducted by Valadares and Magro (20), students remarked that their access to the laboratory is low, the space used is insufficient and they use the laboratory for only a few applications. For educational institutions, the efficient use of simulation laboratories, of which their installation requires high cost, having difficulties in creating appropriate environmental conditions, and the requirement of regular maintenance and control of owned models and simulators, are necessary (11). In addition, considering that the students suggested the statement "The number of trainers educated in simulation should be higher" at the second-highest level, it is contemplated that faculty members experienced on the subject of the simulation, are needed for the use of simulation laboratories more effectively and efficiently. Because it is emphasized that in the installation of laboratories primarily educators should be trained and that expectations from simulation-based teaching strategy should be revealed (11). Accordingly, considering the nursing students having problems in practicing in the clinical field where the education environment to be encountered is not known beforehand and is not entirely under the control of the educator (34,35), the importance of the education that will be given to the students under the most realistic conditions becomes clearer.

In the study additionally, the effect of the course taken on simulation on students' attitudes towards learning was examined and it has been determined that the scale scores of the students were quite close to each other and there was no significant difference in terms of attitudes towards learning ($p>0.05$). Considering that learning is the product of life and permanent track behavioral change (36), it is believed that the simulation that supports learning by

doing will affect the attitude towards learning. However, the simulation course given to students in the research is an elective course and for one semester and there has not been enough time for students to develop attitudes. It is thought that the fact that there is no difference between the groups in terms of attitudes that require a longer time to change might be derived from this situation. Similarly, in the research conducted by Kiraz et al. (17), it was identified that there was no significant difference between the pre-and post- learning attitudes of the students who received education with high-reality simulation technique and that there was a significant difference between the attitudes of the students only about the nature of learning, who got training by the low-reality simulation technique. The failure to reach studies examining the effects of simulation on the learning attitudes of nursing students limited the discussion of this aspect of the study. According to Senemoğlu (37), affective characteristics (such as interest, opinion, and attitude) have a 25% impact on learning success. If the individual's attitude is turned into positive, his/her success will increase and the way to achieve this is to make the student feel a sense of accomplishment by giving him/her the opportunity to learn with various learning-teaching strategies (38). Therefore, in the light of the studies that reveal the positive effects of simulation, which is one of the active learning strategies and provides the opportunity to learn by experience, in the cognitive and psychomotor domains (9,39), studies examining the effect of the simulation on the attitude towards learning are needed.

V. CONCLUSION AND RECOMMENDATIONS

In line with the results of the study, it was determined that the students who had theoretical education and experience within the scope of simulation course and those who did not take the course had very similar opinions regarding simulation. In addition, it was determined that receiving education about simulation does not have a statistically significant effect on attitude towards learning ($p>0.05$). Accordingly, it is recommended to carry out similar studies with different sample groups to support the study results and enrich the literature about the subject in terms of relevant data.

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