Disaster Medicine and Public Health Preparedness

www.cambridge.org/dmp

Training of Medical Students for Mass Casualty Incidents Using Table-Top Gamification

Rafael Castro Delgado[1,2], Lucía Fernández García[1], José Antonio Cernuda Martínez[1], Tatiana Cuartas Álvarez[1,2] and Pedro Arcos González[1]

[1]Emergency and Disaster Research Unit, Oviedo University, Spain and [2]SAMU-Asturias, Spain

Original Research

Cite this article: Castro Delgado R, Fernández García L, Cernuda Martínez JA, Cuartas Álvarez T, Arcos González P. Training of medical students for mass casualty incidents using table-top gamification. *Disaster Med Public Health Prep*. **17**(e255), 1–7. doi: https://doi.org/10.1017/dmp.2022.206.

Keywords:
disaster simulation; medical education; gamification; table top

Corresponding author:
Rafael Castro Delgado,
E-mail: castrorafael@uniovi.es

Abstract

Introduction: "Table-top" exercises can improve knowledge and skills related to mass casualty incidents (MCIs) with little logistical efforts. We aim to evaluate the learning process of 5th year medical school students related to MCI response using table-top simulation and measure their methodology perception.

Methods: A theoretical part plus an MCI simulation board exercise was organized. Knowledge pretest and 1 mo after posttest was scored, and an assessment questionnaire with 27 questions with a Likert-type scale with 3 dimensions: methodology, knowledge acquisition, and skills acquisition was administered. Students did not receive any written or training material between pretest and posttest.

Results: A total of 108 (80%) completed the evaluation questionnaire, pretest, and posttest. For the pretest, average grade was 4.25 (SD = 1.71) and 42% passed, and for the posttest, average grade was 8.33 (SD = 1.28) and 97 % pass ($P < 0.0001$). All variables measuring methodology perception scored more than 8, except for the duration of the exercise (7.3). Most knowledge acquisition scored above 9. Self-perception skill acquisition scores were slightly lower, although all above 7.

Conclusions: "Table-top" methodology is useful for acquiring knowledge and skills related to MCI response. Retention of knowledge is very high. Students consider that this methodology can be very useful for medical studies. Active or nonactive role is a factor that only influences final results in specific items.

Integrating practical skills in the field of mass casualty incidents (MCIs) requires a complex process until an adequate performance of skills could be applied in real situations.[1] After the necessary theoretical knowledge, students must know how to integrate it transversally to focus on problem solving. In the field of MCI, you must also be able to acquire a series of practical skills to be applied in a hostile and unstable environment, so training in simulated scenarios would represent one of the last phases of the learning process.[2] Simulation is defined as "an artificial representation of a process in the real world, which must be faithful enough to achieve a clear and specific objective, which allows evaluating the training or a certain action".[3] Simulation exercises also have a series of methodological characteristics that differentiate them from the rest of the exercises because they are exercises in which information is handled through role play,[4] so it is based on decision-making both individually and collectively, facilitating cross-learning and team decision-making.

All simulation exercises are made up of 3 phases[5]: a first information phase (or briefing), in which the main and specific objectives that we want to achieve have to be marked, the working groups are organized, the roles to be performed by each member of the group are assigned, and the necessary information about the situation that is going to develop must be provided; a second phase, in which students face a situation around which the entire simulation revolves; and a third phase of debriefing or evaluation, which consists of an analysis of the exercise carried out. In this phase, the students have the opportunity to comment on what happened and can consider what could or should have happened; it serves to check if the problem has been solved or not throughout the simulation. In the first and second phase (briefing and action), teachers have a similar role to that of a conductor, while in the third stage (debriefing), the teacher becomes pure facilitator of the process, and students become the protagonist of their own learning.

A specific type of simulation exercise is the "table-top" exercises, defined by the WHO as "an exercise for filtering relevant information and making key decisions, where participants are tasked to review and discuss the risk communication and related actions they would take at specified stages of the emergency. This allows for testing of emergency risk communication plans in an informal, low-stress environment".[6] It normally takes place in a classroom and the participants will have a defined role during it. This exercise is carried out by presenting the participants with various situations and alternative solutions. Board exercises have been widely used in emergency professional training plans,[7,8] even for specific situations[9–11] and

© The Author(s), 2022. Published by Cambridge University Press on behalf of Society for Disaster Medicine and Public Health, Inc. This is an Open Access article, distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike licence (http://creativecommons.org/licenses/by-nc-sa/4.0/), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the same Creative Commons licence is used to distribute the re-used or adapted article and the original article is properly cited. The written permission of Cambridge University Press must be obtained prior to any commercial use.

SDMPH
SOCIETY FOR DISASTER MEDICINE & PUBLIC HEALTH

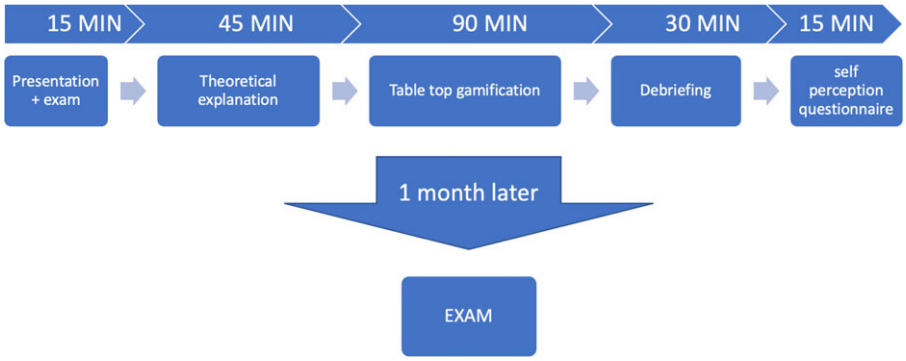

Figure 1. Organization of the sessions.

specific centers,[12] with good learning outcomes,[13] but there is little experience of use in medical schools. There are studies that analyze this type of exercise in terms of the acquisition of knowledge in nursing students applied to triage, all concluding improvement of knowledge on the subject[14] and better decision-making in those processes that require the participation of different teams with different roles.[15] In addition, the performance of the main role allows the rest of the students to understand the importance of leadership in the health response to MCI.[16] There are also experiences on the use of immersive virtual reality (RVI) in the study of MCI management and categorization of victims involved in incidents,[17] as well as the use of games in medical teaching.[18]

The aim of this work was to evaluate the learning process of 5th course students of Oviedo University Medical School related to MCI response through the use of the table-top simulation by measuring their perception about the methodology and the acquisition of knowledge and skills, and also measure their knowledge improvement.

Methods

The 135 students enrolled in the subject "Preventive Medicine and Public Health" in the 5th year of the Degree in Medicine at the University of Oviedo during the 2018/19 academic year were included in the study. They were organized in 3 groups (45 students each group), all of them receiving the same training and evaluation process. Between March and April, 2 separate sessions per group were organized separated 1 mo. The organization of the first session was (Figure 1): (1) Presentation and exam (15 min): teaching team is presented, purpose and structure of the seminar is explained, and the theoretical knowledge pretest about MCI is carried out; (2) Theoretical explanation (45 min): lecture related to emergency medical services (EMS) organization and to general content related to MCI management and patient triage. The same professor, with extensive teaching and EMS clinical experience, was in charge of the lecture for the 3 groups; (3) Table-top exercise (90 min): after explaining the rules, it was developed on 2 boards (filed board and resources map board); and (4) debriefing, in which professor acted as a facilitator for the students to analyze the decisions taken. Randomly selected students had an active role during the exercise, while the rest acted as spectators, being able to intervene and even help their colleagues with an active role. All the actions carried out on the board were projected on a screen for all students. The roles performed were: emergency coordinator center physician (2), medical commander first advanced life support unit (ALS) physician (1), first advanced life support unit (ALS) nurse (1), rescue command (2), police command (2), emergency medical technician (4), second ALS physician (1), and second ALS nurse (1). Once the roles were distributed, teachers present to the students the case to be developed, consisting of a bus accident, with 25 passengers, which crashed with a gas station, producing an explosion and fire. Figurines corresponding to the accident itself were placed on 1 of the boards, and a map of the region was placed on a second board, with figurines representing the different resources available. Students with an active role were making the decisions they considered appropriate based on the theoretical knowledge previously explained, and taking into account possible problems that may arise during the development of the exercise (Figure 2). Through a Web-cam connected to the projector, the students who had a passive role could observe the development of the exercise and intervene and provide creative and innovative solutions to the new problems that arose during the development of the exercise. Once the case was finalized, a debriefing (30 min) was performed about the development and what was the resolution of the case.

After the exercise, students were invited to complete the self-perception questionnaire (Appendix 1), using a 10-point Likert-type scale (minimum 1 point and maximum 10 points) from which 27 variables grouped in 3 dimensions were analyzed at the end of the exercise: perception on the methodology, perception on the acquisition of knowledge, and perception on the acquisition of skills. Median and interquartile range (IQR) were calculated. Cronbach's alpha coefficient was calculated to assess the internal validity of the questionnaire in each of the dimensions. A Mann-Whitney U test was used to compare active and nonactive roles results.

The students completed a pretest knowledge consisting of 10 multiple-choice questions, and after 1 month, the same test was repeated. Students with more than 50% correct answers passed the exam. Students were not provided any type of material, apart from the theoretical introduction and the board exercise to evaluate only what was learned and acquired during the exercise. It was not compulsory for the students to answer the self-perception questionnaire, and, if so, they were excluded from the study. They were informed that this would have no effect on their final grade.

Results

Of the 135 students enrolled in the subject "Preventive Medicine and Public Health" in the 5th year of the Degree in Medicine at the University of Oviedo, 108 students (67 female, 37 male and

https://doi.org/10.1017/dmp.2022.206 Published online by Cambridge University Press

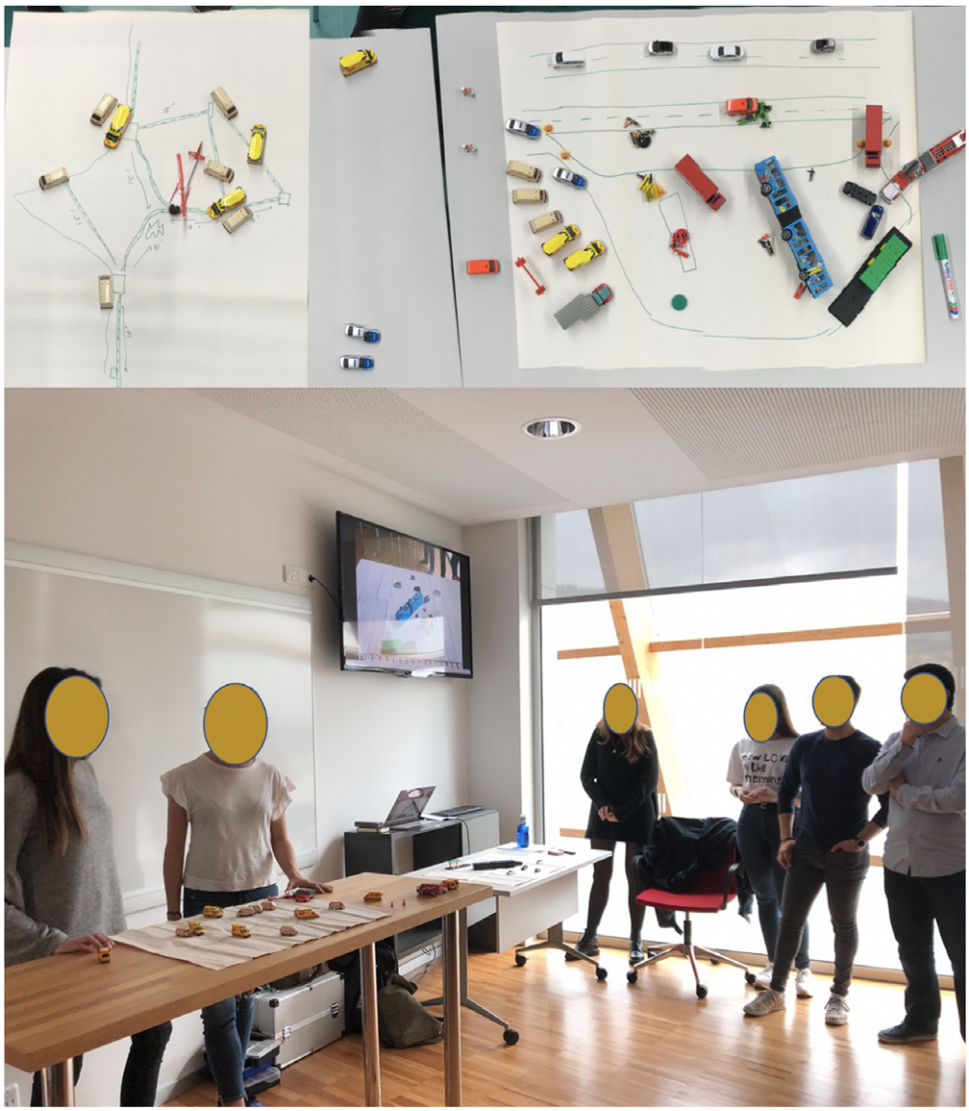

Figure 2. Table top scenario and students playing roles.

4 undetermined) who answered the pretest, posttest, and self-perception questionnaire were in included in the study (80% response rate). Cronbach values to asses internal validity were 0.86 for methodology perception, 0.91 for knowledge acquisition perception and 0.87 for skills acquisition perception. A total of 27 students (25%) had an active role. Average age was 22.98 (SD = 2.55). Students had previously had 0.88 h (SD = 0.87) of table-top experience before this exercise, and had had 0.95 h (SD = 3.02) of study regarding disasters and MCIs during medical school. Median for methodology perception was 9 (IQR = 2), acquisition of knowledge perception median = 9 (IQR = 2) and skill acquisition perception median = 8 (IQR = 2). Table 1 shows the results for each variable. Students who developed an active role perceived a better acquisition of knowledge related to MCI roles ($P = 0.048$); and better perception regarding multidisciplinary team coordination skills ($P = 0.014$), but no statistical differences were found in the rest of the perceived skills analyzed. Posttest results (mean = 8.33; SD = 1.28; 97% pass), were significantly better ($P < 0.001$) than pretest exam results (mean = 4.25; SD = 1.71; 42% passed). A total of 97% of students improved their results.

Discussion

The use of this methodology, through the recreation of scenarios that simulate an MCI, allows to involve students in complex situations in a controlled environment. It also allows the re-creation of a stressful environment that brings students closer to the stress experienced in a real situation of these characteristics, and covers a teaching need in medical schools.[19] Although it has been previously published that active student participation facilitates the acquisition of skills and knowledge,[20] we have found differences in only 2 items. This finding is relevant because we can see that this methodology is useful for all participating students, and not only for active role students.

One of the points to highlight in this type of exercise is its innovation, as we have not found previous studies that develop this type of exercise in medical university students; we have found teaching experiences on disasters in medical schools,[21,22] but not with the use of the table-top methodology. Another point to highlight is that students improve their knowledge related to MCI without complex technological resources nor a great logistical deployment; a board

https://doi.org/10.1017/dmp.2022.206 Published online by Cambridge University Press

Table 1. Median, IQR, and differences by group of the variables studied

VRIble	Total		Espectator rol		Active rol		U Mann-Whitney	*P*-Value
	Median	IQR	Median	IQR	Median	IQR		
Methodology perception	9	2	9	2	9	2	−0.529	0.597
Interest on the subject	9	2	9	2	9	2	−1.037	0.300
Facilitation of knowledge acquisition	9	2	9	2	10	2	−1.519	0.129
Facilitation of skills acquisition	9	2	9	2	9	2	−0.607	0.544
Increased motivation to attend class	8	3	8	3	9	2	−0.259	0.796
Facilitation of teamwork skills acquisition	9	2	9	2	9	1	−1.600	0.110
Adecuate previous exercise explanations	9	2	8	2	8	3	−0.183	0.855
Adecuate theory explanation duration	8	2,25	8	3	8	2	−0.025	0.980
Adequate exercise duration	8	2,25	8	2	9	2	−1.073	0.283
Immersion facilitation in real cases	9	1	9	1	10	1	−0.898	0.369
Interesting for medical studies	9	1	9	1	10	1,5	−0.159	0.874
Knowledge acquisition perception	9	1	9	1	9,5	1	−0.720	0.472
Understanding of different roles in MCI	9	2	9	2	9	1	−1.902	0.048*
Understanding importance of communication among different response services	10	1	10	1	10	0	−1.376	0.169
Understanding organizational difficulties in IMV	10	1	10	1	10	1	−0.289	0.773
Understanding MCI triage importance	10	1	10	1	10	1	−0.322	0.747
Understanding security issues importance	10	1	10	1	10	1	−0.024	0.981
Understanding command importance	10	1	10	1	10	1	−0.279	0.780
Understanding communications importance	10	1	10	1	10	1	−0.721	0.471
Understanding importance of medical functions	9	2	9	2	9	2	−0.491	0.623
Understanding importance of nursing functions	9	2	9	2	9	2	−0.264	0.792
Understanding the importance of emergency technical functions	9	2	9	2	9	2	−0.553	0.580
Understanding importance of rescue team functions	9	2	9	2	9	2	−0.594	0.552
Understanding importance of law enforcement functions	9	2	9	2	9	2	−0.372	0.710
Skills acquisition perception	8	2	8	2	8	2	−1.490	0.136
Improvement of multidisciplinary team coordination skills	8	2	8	2	8	2	−2.465	0.014*
Acquisition of leadership skills	7	2	7	2	8	2	−1.565	0.118
Acquisition of scene safety assesment	8	2	8	2	8	2	−0.556	0.578
Acquisition of scene sectorization skills	8	2	8	2	8	2	−0.768	0.442
Acquisition of triage skills	8	3	7	3	8	3	−1.184	0.237

*significance <0.05.

and a token are enough to re-create the situation or incident that we want to develop. The general interest expressed by this teaching methodology is similar to that expressed by medical students in carrying out disaster response exercises.[23]

Regarding the *students' perception of this methodology,* high scores obtained indicate a positive perception. No differences were found between the active role and the spectator, which facilitates the development of the exercises with a significant number of students. These results are very positive for our work, because it shows a very positive general perception of the student. In the case of immersion, it shows that this type of simulation exercise brings the student to manage MCI closer to those experienced in a real situation, reinforcing their motivation for learning.[24]

The *perception of the students related to the acquisition of knowledge* through this method also obtains very high scores, something that is congruent with the significant increase in the grades obtained in the posttest. Other studies have also shown that simulation training of medical students improves knowledge acquisition.[25]

On the other hand, it is worth mentioning the low number of previous hours devoted to studying MCI during medical training, which shows the need to deepen this field of knowledge during medical studies.[26] The limited number of times during medical studies that they had attended classes based on *table-top* gamification methodology may be also something to improve.

Regarding the *student's perception of the acquisition of skills,* results were slighter lower compared with the previous sections. Even so, we consider the positive results, because it is achieved that the students internalize difficulties regarding managing MCI, and within the resources available, they get as close as possible to the reality of what an MCI is. The fact that playing an active role suggests a better perception related to the improvement of multidisciplinary team coordination skills makes us think that decision-making training, similar to our active role scenarios, can be useful in other fields of medicine that involve teamwork tasks, and that the development of other specific skills in MCIs is not related to the role the student play.

In the open response section, most of the comments were positive about the exercise. Most consider exercise a very useful tool to put themselves in a situation and improve acquiring knowledge and skills. Above all, active participation and immersion in decision-making stood out. Other students highlighted not having been able to participate as an active role, and that, if they had, they would have acquired more knowledge. Among the weakest points

https://doi.org/10.1017/dmp.2022.206 Published online by Cambridge University Press

of the exercise, the excessively long duration and the fact that it is not possible for all students to develop an active role stood out. However, we have not found many perception differences related to active or nonactive role.

Among the limitations that we found, firstly highlighting the excessive number of students per group, which meant that not all students could participate actively in the exercise through an active role. This has had a significant influence on the time in which they rated the degree of satisfaction after the exercise, because a percentage of students demanded that they had not been able to participate and, if they had been, they consider that they would have acquired more knowledge and skills. Smaller groups of students would have allowed 2 different cases to be raised, as well as the active participation of a greater number, or even the entire student body. By developing the exercises with smaller groups, it is also guaranteed that the space is ideal, and that all students can follow the course of the exercise and perceive that they are integrated into it.

As a conclusion, table-top exercises increase students' motivation, their theoretical knowledge, and their skills perception to respond to MCI, with a high degree of retention of knowledge. Students consider it an attractive activity from the teaching point of view, and a good complement to the theoretical classes, which will also improve promotion of the EMS field of knowledge among medical students. It is a cheap technique that can be used in many different educational settings. It is necessary to adapt the number of students per group and their involvement in the different roles. An active or nonactive role is a factor that influences final results only in specific items.

Data availability. The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Author contributions. R.C.D. designed the study, participated in the teaching procedure, analyzed data, wrote manuscript and approved final version; L.F.G. participated in the teaching procedure, analyzed data, wrote manuscript and approved final version; J.A.C.M. analyzed data, wrote manuscript and approved final version; T.C.A. participated in the teaching procedure, wrote manuscript and approved final version; P.A.G. designed the study, analyzed data, wrote manuscript and approved final version. All authors have read and approved the manuscript

Funding. No funding. Approved as Teaching Innovation Project in Oviedo University (Code PINN-18-A-098).

Conflict of interest. The authors declare that they have no competing interests.

Ethical standards. Not applicable. Local ethics committee ruled that no formal ethics approval was required in this particular case. Students were informed that they agreed to participate by filling the questionnaire.

References

1. **Lennquist S.** Education and training in disaster medicine. *Scan J Trauma Emerg Med.* 2005;94:300-310.
2. **Montán KL Hreckovski B, Dobson B, *et al.*** Development and evaluation of a new simulation model for interactive training of the medical response to major incidents and disasters. *Eur J Trauma Emerg Surg.* 2024;40(4):429-443. doi: 10.1007/s00068-013-0350-y
3. **Gomar-Sancho C, Palés-Argullós J.** ¿Por qué la simulación en la docencia de las ciencias de salud sigue estando infrautilizada?. *Educ Med.* 2011;14(2):101-103
4. **Akl EA, Kairouz VF, Sackett KM, *et al.*** Educational games for health professionals. *Cochrane Database Syst Rev.* 2013;2013(3):3:CD006411. doi: 10.1002/14651858.CD006411.pub4.
5. **UNDRR.** *Guidelines for developing emergency simulations and drills.* Washington, DC: Pan American Health Organization; 2011
6. **WHO.** https://www.who.int/emergencies/risk-communications/simulation-exercises
7. **Chi CH, Chao WH, Chuang CC, *et al.*** Emergency medical technicians' disaster training by tabletop exercise. *Am J Emerg Med.* 2001;19(5):433-436. doi: 10.1053/ajem.2001.24467
8. **Morton Hamer MJ, Reed PL, Greulich JD, *et al.*** Economic community of West African States disaster preparedness tabletop exercise: building regional capacity to enhance health security. *Disaster Med Public Health Prep.* 2019;13(3):400-404. doi:10.1017/dmp.2018.44
9. **Achatz G, Friemert B, Trentzsch H, *et al.*** Terror and disaster surgical care: training experienced trauma surgeons in decision making for a MASCAL situation with a tabletop simulation game. *Eur J Trauma Emerg Surg.* 2020;46(4):717-724. doi: 10.1007/s00068-020-01441-x
10. **Sandström BE, Eriksson H, Norlander L, *et al.*** Training of public health personnel in handling CBRN emergencies: a table-top exercise card concept. *Environ Int.* 2014;72:164-169
11. **Chung S, Gardner AH, Schonfeld DJ, *et al.*** Addressing children's needs in disasters: a regional pediatric tabletop exercise. *Disaster Med Public Health Prep.* 2018;12(5):582-586. doi: 10.1017/dmp.2017.137.
12. **Sherman M, Leland F, Ross B, *et al.*** Simopoly: improving simulation center operations through a tabletop simulation exercise. *Simul Healthc.* 2014;9(5):304-311. doi: 10.1097/SIH.0000000000000051
13. **Whitney RE, Burke RV, Lehman-Huskamp K, *et al.*** On shaky ground: learner response and confidence after tabletop earthquake simulation. *Pediatr Emerg Care.* 2016;32(8):520-524. doi: 10.1097/PEC.0000000000000681.
14. **Evans CA, Baumberger-Henry M, Schwartz R, *et al.*** Nursing students' transfer of learning during a disaster tabletop exercise. *Nurse Educ.* 44(5):278-283. doi: 10.1097/NNE.0000000000000602
15. **Evans CA, Schwartz R**. Using tabletop exercises as an innovative and practical teaching strategy in response to external disaster scenarios. *Nurs Educ Perspect.* 2019;40(1):62-64. doi: 10.1097/01.NEP.0000000000000308
16. **Hershkovich O, Gilad D, Zimlichman E, *et al.*** Effective medical leadership in times of emergency: a perspective. *Disaster Mil Med.* 2016;2:4 doi10.1186/s40696-016-0013-8
17. **Ferrandini Price M, Escribano Tortosa D, Nieto Fernandez-Pacheco A, *et al.*** Comparative study of a simulated incident with multiple victims and immersive virtual reality. *Nurse Educ Today.* 2018;71:48-53. doi: 10.1016/j.nedt.2018.09.006.
18. **Bochennek K, Wittekindt B, Zimmermann S-Y, *et al.*** More than mere games: a review of card and board games for medical education. *Med Teach.* 2007;29(9):941-948. doi: 10.1080/01421590701749813
19. **Barrimah I, Adam I, Al-Mohaimeed A**. Disaster medicine education for medical students: is it a real need? *Med Teach.* 2016;38(Suppl 1):S60-S65. doi: 10.3109/0142159X.2016.1142515.
20. **Huang C-D, Tseng H-M, Jenq C-C, *et al.*** Active learning of medical students in Taiwan: a realist evaluation. *BMC Med Educ.* 2020;20(1):487. doi: 10.1186/s12909-020-02392-y.
21. **Kommor MB, Hodge B, Ciottone G.** Development and implementation of a disaster medicine certificate series (DMCS) for medical students. *Prehosp Disaster Med.* 2019;34(2):197-202. doi: 10.1017/S1049023X19000165
22. **Wiesner L, Kappler S, Shuster A, *et al.*** Disaster training in 24 hours: evaluation of a novel medical student curriculum in disaster medicine. *J Emerg Med.* 2018;54(3):348-353. doi: 10.1016/j.jemermed.2017.12.008
23. **Jasper EH, Wanner GK, Berg D, *et al.*** Implementing a disaster preparedness curriculum for medical students. *South Med J.* 2017;110(8):523-527. doi: 10.14423/SMJ.0000000000000681
24. **Mahler D, Großschedl J, Harms U.** Does motivation matter? - the relationship between teachers' self-efficacy and enthusiasm and students' performance. *PLoS One.* 2018;13(11):e0207252. doi: 10.1371/journal.pone.0207252
25. **Offiah G, Ekpotu LP, Murphy S, *et al.*** Evaluation of medical student retention of clinical skills following simulation training. *BMC Med Educ.* 2019;19(1):263. doi: 10.1186/s12909-019-1663-2
26. **Pollard KA, Bachmann DJ, Greer M, *et al.*** Development of a disaster preparedness curriculum for medical students: a pilot study of incorporating

local events into training opportunities. *Am J Disaster Med.* 2015;10(1): 51-59. doi: 10.5055/ajdm.2015.0188

APPENDIX 1.: STUDENT PERCEPTION QUESTIONNAIRE

EVALUATION OF THE UTILITY OF A "TABLE-TOP" EXERCISE FOR THE ACQUISITION OF KNOWLEDGE ON THE PREHOSPITAL RESPONSE TO INCIDENTS OF MULTIPLE VICTIMS (MCI)

AGE:

SEX:

ROLE DURING THE EXERCISE: Active Vs Spectator

IN CASE OF ACTIVE ROLE, SPECIFY:

Rate from 1 to 10 your degree of agreement or disagreement with the following statements, with 1 not agreeing at all and 10 totally agreeing

PERCEPTION ON THE METHODOLOGY

The use of table-top "gamification" exercises increases my interest in the subject of study.

1	2	3	4	5	6	7	8	9	10

Table-top "gamification" exercises facilitate the acquisition of knowledge

1	2	3	4	5	6	7	8	9	10

Table-top "gamification" exercises facilitate the acquisition of skills

1	2	3	4	5	6	7	8	9	10

Using table-top "gamification" techniques increases my motivation to attend class

1	2	3	4	5	6	7	8	9	10

The use of table-top "gamification" techniques facilitates the acquisition of teamwork skills.

1	2	3	4	5	6	7	8	9	10

The previous explanations about the development of the exercise were adequate

1	2	3	4	5	6	7	8	9	10

The duration of the theoretical introduction has been adequate

1	2	3	4	5	6	7	8	9	10

The duration of the exercise has been adequate

1	2	3	4	5	6	7	8	9	10

The use of table-top gamification techniques in medical studies facilitates the immersion of the student in real cases

1	2	3	4	5	6	7	8	9	10

In general, I have found the use of table-top gamification interesting for its application in medical studies

1	2	3	4	5	6	7	8	9	10

Indicate the number of times during your medical studies that you have attended classes based on table-top gamification methodology

KNOWLEDGE ACQUISITION

During medical studies, the hours spent so far studying multiple casualty incidents have been:

I have understood the different roles involved in the prehospital response to MCI

1	2	3	4	5	6	7	8	9	10

I have understood the importance of communication between different response services

1	2	3	4	5	6	7	8	9	10

I have understood the organizational difficulties inherent in an MCI

1	2	3	4	5	6	7	8	9	10

I have understood the importance of triage in an MCI

1	2	3	4	5	6	7	8	9	10

I have understood the importance of equipment safety before an MCI

1	2	3	4	5	6	7	8	9	10

https://doi.org/10.1017/dmp.2022.206 Published online by Cambridge University Press

I have understood the importance of the chain of command to organize the response to an MCI

1	2	3	4	5	6	7	8	9	10

I have understood the importance of communications in responding to an MCI

1	2	3	4	5	6	7	8	9	10

I have understood the functions of the doctor before an MCI

1	2	3	4	5	6	7	8	9	10

I have understood the functions of the nursing staff when faced with an MCI

1	2	3	4	5	6	7	8	9	10

I have understood the functions of the health emergency technicians before an MCI

1	2	3	4	5	6	7	8	9	10

I have understood the functions of rescue teams before an MCI

1	2	3	4	5	6	7	8	9	10

I have understood the functions of law enforcement before an MCI

1	2	3	4	5	6	7	8	9	10

SKILLS ACQUISITION

The use of table-top gamification in MCI has allowed me to improve my skills to coordinate multidisciplinary teams

1	2	3	4	5	6	7	8	9	10

The use of table-top gamification in MCI has allowed me to acquire leadership skills

1	2	3	4	5	6	7	8	9	10

The use of table-top gamification in MCI has allowed me to acquire skills in scene safety assessment

1	2	3	4	5	6	7	8	9	10

The use of table-top gamification in MCI has allowed me to acquire skills in sectorization of the scene

1	2	3	4	5	6	7	8	9	10

The use of table-top gamification in MCI has allowed me to acquire skills in triage

1	2	3	4	5	6	7	8	9	10

https://doi.org/10.1017/dmp.2022.206 Published online by Cambridge University Press