SAFETY

simulation for medical practice

SIMULATION APPROACH FOR EDUCATION AND TRAINING IN EMERGENCY

R2.3 Needs analysis report

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DOCUMENT VERSION 01

AUTHORS

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Data collection and analysis

The survey was promoted by the University of Foggia in collaboration with the universities and companies involved in the SAFETY project. The population of interest was asked to fill in an online questionnaire. The link to connect to for completing the questionnaires, appropriately translated into 7 languages, has been published on the web page and on the project's social channels.
The data were analyzed with the NLOGIT 6 statistical software.
In order to reduce the biases related to the different training courses, all participants were asked to respond to the questionnaires referring to the training course carried out during their university career, not taking into account the training received in any post-graduate period.

The data analysis procedures envisaged 3 main phases, respectively assigned to preprocessing, to the calculation of descriptive statistics and to inferential statistical procedures.
In the first post-encoding phase, the numerical matrices of the responses were exported and recoded, when necessary, in order to obtain the metric characteristics necessary for quantitative analyzes.
We then proceeded to a first general description of the statistical characteristics measured, and subsequently to any standardization, renormalization or discretization, depending on the scale of measurement decided for the variable, or the possible factorial role assumed by the character in the investigated models.
After the first preprocessing phase, descriptive statistics were produced for the variables considered, both quantitative and discrete, and the general psychometric characteristics were evaluated.
A student t-test for independent values was used for the comparison between the student group and the academic group.
Data are expressed as Mean ± Standard Deviation.
The size of the sample made it possible to investigate the results based on different levels of significance with different p values (<0.1, <0.05, <0.01).
In the third phase, inferential, parametric and non-parametric analyzes were conducted, as well as those of dimensional reduction (i.e. factor analysis) suitable for evaluating the experimental hypotheses and defining the useful variables to be able to implement the Choice Experiment
In the Choice Experiment, the products in question are described as sets of different attributes that vary on different levels. That is, different sets or choice sets are presented to the interviewees, consisting of several alternatives defined on different levels of the relevant attributes of the asset in question. For each set of choices, the interviewee must select the most preferred option or choose none of those proposed.
The evaluation of the dimensionality of the tool involved the use of a factor analysis, with the Varimax oblique rotation method (i.e. for related factors), and with the method of extracting the factorization of the main axis. The best factorial solution was therefore adopted as a criterion for the production of factorial scores, aimed at highlighting the existence of latent traits or factors that cannot be directly measured and possibly present within the groups of questions posed in the first section of the questionnaire.
Data are expressed as Mean ± Standard Deviation.
The size of the sample made it possible to investigate the results based on different levels of significance with different p values (<0.1, <0.05, <0.01).
The coefficient deriving from the analysis conducted on the choice experiment is expressed with a positive (+) or negative (-) sign depending on the request for the specific attribute.

Results

4.1 Socio-demographic characteristics of the sample

A total of n. 1464 students and 288 academics.
The group of students is made up of 37% of Romanian nationality, 22% of Spanish nationality, 21% of Italian nationality, 17% of German nationality, 2% of Norwegian nationality, 1% of English nationality, 0% Portuguese nationality.

Tab. 1

	ITA	GER	NOR	POR	ROM	SPA	ENG
n.	312	255	24	6	534	324	9
%	21	37	2	0	37	22	1

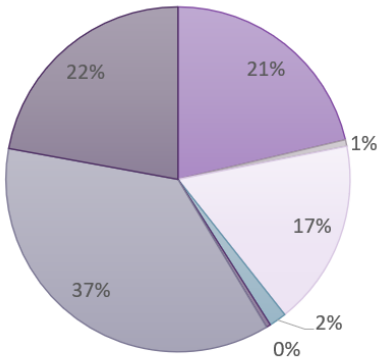

Fig. 1

The group of academics is made up of 38% of Spanish nationality, 32% of Italian nationality, 18% of Romanian nationality, 6% of German nationality, 5% of Norwegian nationality, 1% of English nationality, 0% Portuguese nationality.

Tab. 2

	ITA	GER	NOR	POR	ROM	SPA	ENG
n.	92	17	14	1	52	110	2
%	32	6	5	0	18	38	1

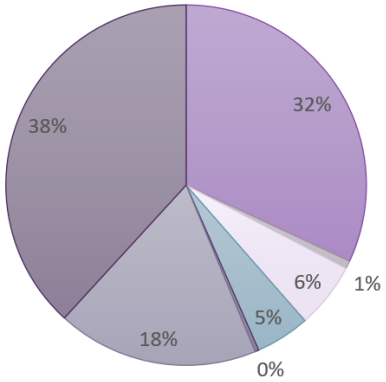

Fig. 2

In the breakdown by gender, the group of students is made up of 70% of women and 30% of men; the group of academics is made up of 53% female and 47% male individuals.

Tab. 3

STUD	M	F
n.	435	1029
%	30	70
ACCA	M	F
n.	135	153
%	47	53

The breakdown by age produced 69% of responses from the 18-25 age group, 22% from the 26-32 age group, 8% from the 33-50 age group, 1% from the age group> 50 years in the student group; 9% from the age group 25-30, 59% from the age group 31-50, 32% from the age group> 50 in the academic group.

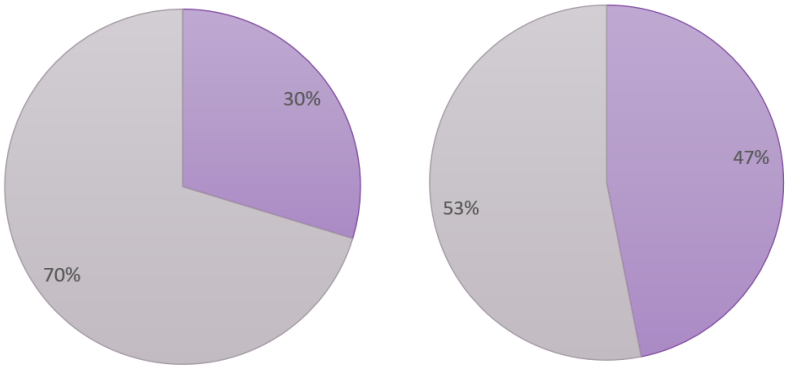

Fig. 3

The breakdown by age produced 69% of responses from the 18-25 age group, 22% from the 26-32 age group, 8% from the 33-50 age group, 1% from the age group> 50 years in the student group; 9%

from the age group 25-30, 59% from the age group 31-50, 32% from the age group> 50 in the academic group.

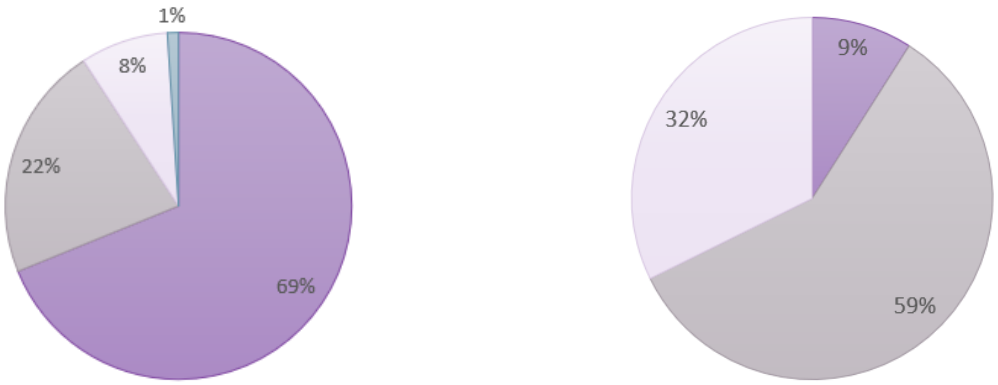

Fig. 4

Tab. 4

ACCA	25-30	31-50	>50
n.	26	169	93
%	9	59	32

STUD	18-25	26-32	33-50	>50
n.	1008	321	120	15
%	69	22	8	1

From the analysis of the students' data it appears that 67% are enrolled in the Faculty of Medicine and Surgery, 17% in the Faculty of Nursing Sciences, 16% have already obtained a university degree (doctors in specialist training, paramedics, midwives) .

Tab. 5

STUD	Med	Inf	Altro
n.	980	255	299
%	67	17	16

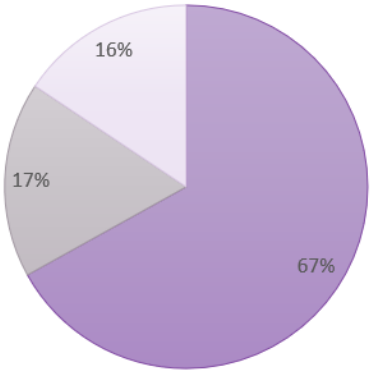

Fig. 5

From the analysis of the data of the academics it emerges that 28% perform a tutor role in training, 25% are specialists in subjects related to critical and emergency medicine, 14% have a researcher role, 33% have the title of University professor.

ACCA	Tutor	Spec	Ric	Prof
n.	80	73	40	95
%	28	25	14	33

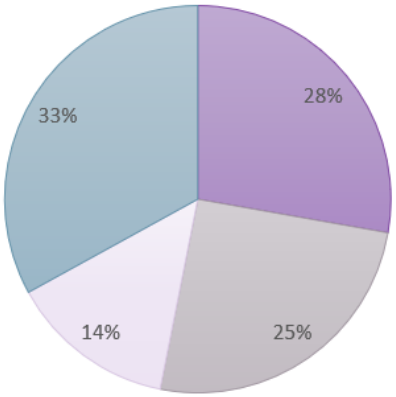

Fig. 6

4.2 Answers to the questionnaire

4.2.1 Results of the first part of the questionnaire

This paragraph presents the answers of the participants, expressed in average scores with relative standard deviation, to the 35 questions aimed at investigating the state of the art of teaching, the presence of simulation courses within universities, the perceived degree of preparation by students and academics in medical emergency matters.

These questions were asked to evaluate the following sub-categories:

Survey on university training offer (10 questions)

Team work (5 questions)

Usefulness in teamwork (5 questions)

Health Emergency Management (6 questions)

Learning of Technical Skills (8 questions)

Simulation Learning (1 question)

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Questions	Average - Students	Average - Academics	P value
D1a	3.11 (±1.16)	2.97 (±1.16)	*0.06**

D1b	3.61 (±1.16)	4.08 (±1.06)	*1.29*
D1c	3.25 (±1.20)	2.98 (±1.14)	*0.00***
D1d	3.01 (±1.54)	2.20 (±1.56)	*1.55*
D1e	4.18 (±1.03)	4.37 (±0.92)	*0.00***
D1f	3.06 (±1.38)	2.81 (±1.51)	*0.00***
D1g	4.70 (±0.62)	4.72 (±0.67)	*0.63*
D1h	3.00 (±1.53)	2.12 (±1.68)	*0.63*
D1i	3.11 (±1.53)	2.30 (±1.60)	*3.11*
D1j	4.60 (±0.75)	4.73 (±0.71)	*0.00***
D2a	4.65 (±0.64)	4.78 (±0.51)	*0.00***
D2b	4.74 (±0.53)	4.81 (±0.43)	*0.01***
D2c	4.87 (±0.40)	4.92 (±0.28)	*0.01***
D2d	4.52 (±0.70)	4.54 (±0.74)	*0.67*
D2e	4.45 (±0.79)	4.72 (±0.53)	*7.59*
D3a	3.22 (±1.19)	2.39 (±1.05)	*0.00***
D3b	3.37 (±1.20)	2.58 (±1.13)	*0.00***
D3c	3.47 (±1.19)	2.80 (±1.10)	*8.87*
D3d	3.14 (±1.27)	2.52 (±1.15)	*6.66*
D3e	3.06 (±1.30)	2.49 (±1.14)	*3.66*
D4a	3.21 (±1.21)	2.87 (±1.05)	*9.92*
D4b	2.80 (±1.35)	2.18 (±1.00)	*4.44*
D4c	2.93 (±1.29)	2.62 (±1.06)	*0.00***
D4d	2.79 (±1.34)	2.30 (±1.03)	*2.70*
D4e	3.11 (±1.27)	2.60 (±1.10)	*2.50*
D4f	2.55 (±1.54)	1.89 (±1.01)	*8.88*

D4g	2.61 (±1.47)	1.96 (±0.98)	*6.66*
D5a	2.98 (±1.45)	2.18 (±1.15)	*0.00****
D5b	2.89 (±1.52)	2.28 (±1.23)	*1.58*
D5c	2.54 (±1.63)	1.60 (±0.90)	*0.00****
D5d	3.48 (±1.34)	2.58 (±1.20)	*0.00****
D5e	2.75 (±1.56)	1.95 (1.22)	*8.88*
D5f	3.27 (±1.35)	2.48 (±1.23)	*8.88*
D5g	3.32 (±1.34)	2.57 (±1.17)	*0.00****
D5h	3.07 (±1.27)	2.22 (±1.07)	*0.00****
D6	4.66 (±0.68)	4.59 (±0.78)	*0.15*

Note: ***, **, * ==> Significance level at 1%, 5%, 10%. *Tab.9*

The answers to questions D1c, D1f, D3a, D3b, D4c, D5a, D5c, D5d, D5g, D5h were statistically significant for a value of p <0.01 with a higher average in the student group.
The answers to questions D1e, D1j, D2a were statistically significant for a value of p <0.01 with a higher average in the academic group.
The D2b and D2c responses were statistically significant for a p value <0.05 with a higher mean in the academic group.
The D1a response was statistically significant for a p value <0.1 with a higher mean in the student group.

- Choice Experiment - Second part of the questionnaire

Through factorial analysis it was possible to group the 35 questions that make up the first part of the questionnaire. The new variables are then defined for the students as follows:
Q1F - Training received during the university course
Q1U - Educational offer provided by the University
Q1O - Opinion towards the training received
Q2 - Team work
Q3 - Usefulness in team work
Q4 - Management of Health Emergencies

Q5 - Learning of Technical Skills
Q6 - Learning in Simulation

The results of these new variables allowed to exclude Q1O and Q2 as not statistically significant.
The new variables are defined as follows for academics:
Q1N - I don't know
Q1U - Educational offer provided by the University
Q1O - Opinion towards student education
Q2 - Team work
Q3 - Usefulness in team work
Q4 - Management of Health Emergencies
Q5 - Learning of Technical Skills
Q6 - Learning in Simulation
The results of these new variables allowed us to exclude all variables, except Q1O and Q6, which were statistically significant.
The new variables obtained and the data from the demographic analysis were then compared with the 6 cards of the Choice Experiment, which contained the following Attributes (ATT):

ATT 1	Technical skill 1 - Interpretazione degli esami di laboratorio e di imaging	No - Si
ATT 2	Technical skill 2 - Gestione delle emergenze (Arresto cardiaco, Politrauma, Pazienti con Shock, Pazienti Ostetriche etc)	No – Si
ATT 3	Technical skill 3 - Applicazione e gestione dei monitoraggi, inserimento e gestione degli accessi vascolari e dei cateteri	No – Si
ATT 4	Non-technical skill 1 – Comunicazione e Gestione dell'emergenza (Crisis Resource Management)	No – Si
ATT 5	Non-technical skill 2 - Team leading and team working	No – Si
ATT 6	Corsi Ibridi (In presenza (ftf)+ corsi e-learning (el))	100% ftf, 80% ftf + 20% el, 60% ftf + 40% el
ATT 7	Feedback	No - Si
ATT 8	Durata (ore)	20 30 40 50
ATT 9	Prezzo (€)	100 200 300 400 500

The comparison between the new variables and the demographic data obtained from the student questionnaire and the choice cards produced the following results:

As regards the training received during the university course, it was found that as it increases there is a statistically significant preference for ATT 6 and ATT 8 (p <0.05), and for ATT 7 (p <0.1) and a statistically significant rejection for ATT 1 and ATT 5 (p <0.05) and for ATT 2 (p <0.01).

Q1F - Training received during the university course

	COEFFICIENTE	DS	P value
ATT 1	-0.08	0.04	0.03**
ATT 2	-0.43	0.06	0.00***
ATT 3	-0.03	0.04	0.50
ATT 4	-0.00	0.43	0.50
ATT 5	-0.06	0.30	0.04**
ATT 6	0.07	0.03	0.03**
ATT 7	0.07	0.03	0.06*
ATT 8	0.00	0.00	0.04**

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.11*

As regards the educational offer provided by the University, it was found that as it increases there is a statistically significant preference for ATT 2 and ATT 4 (p <0.01), and for ATT 5 (p <0.05) and a statistically significant refusal for ATT 6 and for ATT 8 (p <0.1).

Q1U – Offerta formativa fornita dall'Università

	COEFFICIENTE	DS	P value
ATT 1	0.11	0.04	0.75
ATT 2	0.27	0.06	0.00***
ATT 3	0.33	0.04	0.43
ATT 4	0.10	0.42	0.00***
ATT 5	0.74	0.03	0.02**
ATT 6	-0.06	0.03	0.07*
ATT 7	-0.00	0.04	089
ATT 8	-0.00	0.00	0.08*

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.12*

With regard to utility in team work, it was found that increasing it corresponds to a statistically significant preference for ATT 6 (p <0.05) and a statistically significant rejection for ATT 2 and ATT 5 (p <0.01).

Q3 - Usefulness in team work

	COEFFICIENTE	DS	P value
ATT 1	-0.05	0.04	0.21
ATT 2	-0.42	0.07	0.00***
ATT 3	-0.03	0.04	0.56
ATT 4	0.03	0.05	0.56
ATT 5	-0.11	0.03	0.00***
ATT 6	0.08	0.03	0.02**
ATT 7	0.01	0.04	0.72
ATT 8	0.00	0.00	0.11

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.13*

As regards the management of health emergencies, it was found that as it increases, there is a statistically significant preference for ATT 6 and ATT 8 (p <0.01), a statistically significant rejection for ATT 1 (p <0.05) and ATT 2 (p <0.01).

Q4 – Gestione delle Emergenze Sanitarie

	COEFFICIENTE	DS	P value
ATT 1	-0.09	0.04	0.01**
ATT 2	-0.55	0.07	0.00***
ATT 3	-0.02	0.04	0.61
ATT 4	-0.04	0.05	0.47
ATT 5	-0.05	0.03	0.11
ATT 6	0.10	0.03	0.00***
ATT 7	0.00	0.04	0.89
ATT 8	0.00	0.00	0.00***

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.14*

As regards the learning of Technical Skills, it was found that increasing it corresponds to a statistically significant preference for ATT 6 (p <0.1) and for ATT 8 (p <0.05), a statistically significant rejection for ATT 1 (p < 0.05) and for ATT 2 (p <0.01).

Q5 – Apprendimento delle Technical Skills

	COEFFICIENTE	DS	P value
ATT 1	-0.09	0.04	0.01**
ATT 2	-0.43	0.07	0.00***
ATT 3	-0.06	0.05	0.17
ATT 4	0.04	0.05	0.41
ATT 5	-0.04	0.03	0.19
ATT 6	0.06	0.03	0.09*
ATT 7	0.00	0.04	0.92
ATT 8	0.00	0.00	0.02**

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.15*

With regard to learning in simulation, it was found that increasing it corresponds to a statistically significant preference for ATT 2 (p <0.01), a statistically significant rejection for ATT 6 (p <0.05).

Q6 – Apprendimento in Simulazione

	COEFFICIENTE	DS	P value
ATT 1	-0.07	0.06	0.90
ATT 2	0.49	0.10	0.00***
ATT 3	-0.07	0.06	0.29
ATT 4	0.07	0.07	0.34
ATT 5	0.06	0.05	0.20
ATT 6	-0.10	0.05	0.04**
ATT 7	-0.03	0.05	0.55
ATT 8	-0.00	0.00	0.14

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.16*

As regards the geographical distribution, it was found that the countries of Northern Europe (Germany and Norway) compared to the countries of Southern Europe (Italy,

Spain, Romania), have a statistically significant preference for ATT 2, ATT 5 and ATT 7 (p <0.01), a statistically significant rejection for ATT 3 and ATT 8 (p <0.05).

Differences with respect to the geographical distribution (North vs South)

	COEFFICIENTE	DS	P value
ATT 1	0.05	0.11	0.63
ATT 2	0.86	0.20	0.00***
ATT 3	-0.26	0.12	0.04**
ATT 4	-0.4	0.14	0.80
ATT 5	0.25	0.09	0.00***
ATT 6	-0.09	0.09	0.28
ATT 7	0.29	0.11	0.00***
ATT 8	-0.01	0.00	0.04**

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.17*

Regarding the differences with respect to increasing age, there is a statistically significant preference for ATT 7 (p <0.01), a statistically significant rejection for ATT 2 (p <0.01), for ATT 6 (p <0.05) and for ATT 1 (p <0.1).

Differences with respect to increasing age

	COEFFICIENTE	DS	P value
ATT 1	-0.08	0.05	0.09*
ATT 2	-0.26	0.08	0.00***
ATT 3	-0.01	0.05	0.76
ATT 4	-0.02	0.06	0.64
ATT 5	-0.00	0.04	0.98
ATT 6	-0.17	0.07	0.01**
ATT 7	0.13	0.05	0.00***
ATT 8	0.00	0.00	0.18

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.18*

As for the differences with respect to the increase in the course year, there is a statistically significant preference for ATT 1 and ATT 2 (p <0.01).

Differences from the year of the course

	COEFFICIENTE	DS	P value
ATT 1	0.07	0.02	0.00***
ATT 2	0.21	0.04	0.00***
ATT 3	0.01	0.02	0.51
ATT 4	0.01	0.03	0.65
ATT 5	0.03	0.02	0.13
ATT 6	-0.02	0.02	0.29
ATT 7	-0.00	0.02	0.72
ATT 8	-0.00	0.00	0.12

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.19*

Regarding the responses of Nursing students compared to those of Medicine students, there is a statistically significant preference for ATT 2 and ATT 8 (p <0.01), a statistically significant rejection for ATT 1 (p <0.01) and for ATT 5 (p <0.05).

Nursing students vs medical students

	COEFFICIENTE	DS	P value
ATT 1	-0.10	0.02	0.00***
ATT 2	0.91	0.18	0.00***
ATT 3	0.31	0.10	0.77
ATT 4	0.18	0.12	0.15
ATT 5	-0.20	0.08	0.01**
ATT 6	0.10	0.08	0.20
ATT 7	-0.02	0.09	0.81
ATT 8	0.01	0.00	0.00***

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.20*

As regards the responses of the Others (paramedics, trainees) compared to those of medical students, there is a statistically significant preference for ATT 2 (p <0.01) and for ATT 5 (p <0.05), a statistically significant rejection for ATT 6 (p <0.01).

Others vs medical students

	COEFFICIENTE	DS	P value
ATT 1	-0.05	0.11	0.65
ATT 2	0.75	0.20	0.00***
ATT 3	-0.01	0.12	0.93
ATT 4	-0.02	0.14	0.86
ATT 5	0.18	0.09	0.04**
ATT 6	-0.26	0.08	0.00***
ATT 7	0.06	0.10	0.57
ATT 8	-0.00	0.00	0.30

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.21*

The comparison between the new variables and the demographic data obtained from the academic questionnaire and the choice cards produced the following results:

As regards the opinion towards student education, it was found that as it increases, there is a statistically significant preference for ATT 5 (p <0.01), for ATT 3 and ATT 7 (p <0.05), a statistically significant rejection for ATT 6 (p <0.05).

Q1O - Opinion towards student education

	COEFFICIENTE	DS	P value
ATT 1	-0.02	0.08	0.76
ATT 2	0.18	0.14	0.21
ATT 3	0.22	0.10	0.02**
ATT 4	-0.06	0.10	0.53
ATT 5	0.33	0.09	0.00***
ATT 6	-0.56	0.27	0.04**
ATT 7	0.20	0.09	0.02**

ATT 8	0.01	0.02	0.63

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.22*

As regards learning in simulation, it was found that increasing it corresponds to a statistically significant preference for ATT 2 and for ATT 5 (p <0.01), for ATT 7 (p <0.1), a statistically significant rejection for ATT 6 (p <0.05).

Q6 - Learning in Simulation

	COEFFICIENTE	DS	P value
ATT 1	-0.18	0.12	0.14
ATT 2	1.30	0.35	0.00***
ATT 3	0.20	0.13	0.13
ATT 4	0.05	0.14	0.71
ATT 5	0.49	0.12	0.00***
ATT 6	-0.22	0.10	0.02**
ATT 7	0.19	0.11	0.08*
ATT 8	-0.00	0.00	0.68

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.23*

Regarding the differences with respect to gender, it was found that males compared to females have a statistically significant preference for ATT 6 (p <0.05), a statistically significant rejection for ATT 2 and ATT 5 (p <0.01) and for ATT 3 (p <0.05).

Differences from gender

	COEFFICIENTE	DS	P value
ATT 1	0.09	0.17	0.56
ATT 2	-0.89	0.29	0.00***
ATT 3	-0.53	0.20	0.01**
ATT 4	0.05	0.20	0.77
ATT 5	-0.45	0.16	0.00***
ATT 6	0.32	0.14	0.02**
ATT 7	0.12	0.17	0.49
ATT 8	-0.00	0.00	0.41

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.24*

As for the differences with respect to increasing age, there is a statistically significant preference for ATT 2 and ATT 7 (p <0.01), a statistically significant rejection for ATT 4 (p <0.01).

Differences with respect to increasing age

	COEFFICIENTE	DS	P value
ATT 1	0.00	0.06	0.92
ATT 2	0.70	0.23	0.00***
ATT 3	-0.03	0.08	0.72
ATT 4	-0.55	0.13	0.00***
ATT 5	0.06	0.06	0.37
ATT 6	0.03	0.05	0.55
ATT 7	0.61	0.17	0.00***
-0.00	0.00	0.69	0.41

Note: ***, **, * ==> Livello di significatività a 1%, 5%, 10%. *Tab.25*

CHAPTER 5 - DISCUSSION

The main objective of the questionnaires was to evaluate the state of the art of the teachings in the field of critical and emergency medicine, the didactic deficiencies (both theoretical and practical), and the desire to deepen the various topics concerning the medical emergency. using the new didactic methodology proposed, that is the didactic courses in simulation.

The main data that emerges from this research is the importance that is attributed to the teaching method in simulation by both groups. Both students and academics assigned an average score higher than 4.5 on the Likert scale to learning procedural techniques (Technical Skills) and communication and teamwork techniques (Non-Technical Skills), if developed in simulation.

Interesting results emerge from the analysis conducted on the state of teaching in the field of critical and emergency medicine. The questions aimed at investigating the university educational offer show how students believe they have acquired good training skills for the approach and management of patients, compared to what academics believe. This mainly derives, in addition to the theoretical training

obtained, from the possibility of participating in practical medical simulation sessions. An interesting fact is also the use of software and platforms for e-learning; taken up mostly in recent years due to the SARS-COV2 pandemic, it is accepted by both groups with greater preference from academics.
With regard to Technical Skills and their learning, students have shown a greater consideration of their abilities than the opinion of academics towards them. However, the figure is not high as a degree of satisfaction, averaging level 3, or slightly lower in many cases, of the Likert scale. This probably demonstrates that there is a lack in university courses with respect to the acquisition of procedural techniques deriving, most likely, from the lack of laboratories and / or environments suitable for the acquisition of these skills.
The opinion expressed regarding communication and team work in emergency situations (Non-Technical Skills) is interesting. Both groups showed a high degree of appreciation for the subject matter; academics have shown more awareness of the importance of acquiring the ability to work in teams and communicate effectively in emergency situations than students; students, on the other hand, perceive that they have a good preparation in teamwork and communication compared to what academics thought of them.
What emerged from the results of the first part of the questionnaire, about the importance of integrating the simulation within university courses in the health area, was further supported by the results obtained from the Choice Experiment, present in the second part of the questionnaire.
The new variables obtained through factorial analysis were related to the attributes contained in the choice cards, giving rise to interesting results.

With reference to the answers provided by the students:
As the training received increases, there is a greater demand for courses conducted in e-learning mode, a greater demand for feedback and longer courses; on the other hand, there is less demand for courses containing Technical Skills and notions of team work.
As the university educational offer increases, there is a greater demand for courses based on emergency management, from a procedural and team management point

of view; there is less demand for courses conducted in e-learning mode and of a shorter duration.
As preparation in team work increases, there is a greater demand for courses conducted in e-learning mode; on the other hand, there is less demand for courses based on emergency management, from a procedural and team management point of view.
As the ability to manage Health Emergencies increases, there is a greater demand for courses conducted in e-learning mode and over several hours; the lower the demand for courses based on the learning of Technical Skills.
As the acquisition of Technical Skills increases, there is a lower demand for courses based on the acquisition of the Technical Skills themselves; On the other hand, there is a greater demand for courses based on team working of a longer duration.
A distinction was noted with respect to geographic distribution. Students from Northern European countries (Germany and Norway) require courses more based on learning procedural management and emergency team management, in which there is active feedback, compared to Southern European countries (Italy, Spain, Romania).
As students age, the demand for courses based on Technical Skills and conducted in e-learning mode decreases, on the contrary, the demand for feedback during courses increases.

Finally, the difference with respect to the different courses of study attended was assessed. Students enrolled in nursing studies require courses that are less based on learning how to manage emergencies from a procedural and team management point of view than students enrolled in degree courses in Medicine and Surgery; on the other hand, paramedics and doctors in specialist training require courses based more on these attributes than the students of Medicine and Surgery themselves.

These results confirm that higher quality training guarantees the knowledge necessary to make students more confident in approaching patients.
Students later in training require fewer and fewer courses based on learning procedural techniques, as they have already been acquired along their path. On the

other hand, by acquiring greater maturity, their request for courses geared to managing team work during emergencies increases and their willingness to discuss, manifested by a greater request for feedback, increases.

With reference to the answers provided by academics:
A gender distinction was noted. Male academics require more courses conducted in e-learning mode and less based on learning procedural and emergency management for their students than their female colleagues.
As the years of experience increase, they believe that courses more focused on learning procedural management of emergencies are useful, as they are also willing to provide and receive feedback; on the other hand, they consider learning team communication less useful during emergencies.

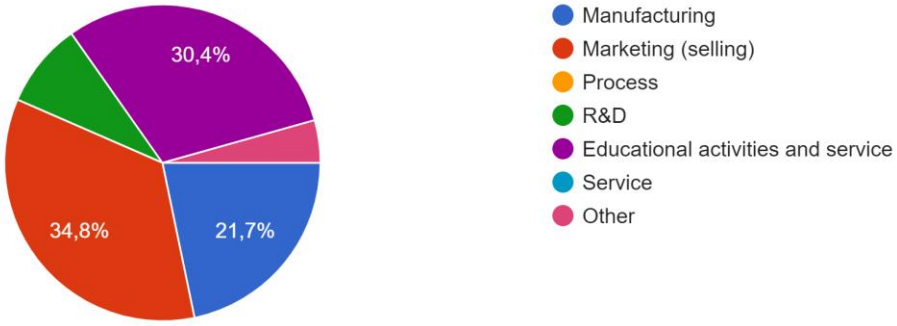
These results seem to highlight that academics, linked to the traditional teaching method, albeit supported by new technologies, tend to prefer the use of simulation for teaching Technical Skills to the detriment of Non-Technical Skills and communication skills, fundamental to management of a health emergency.

CHAPTER 6 - CONCLUSIONS

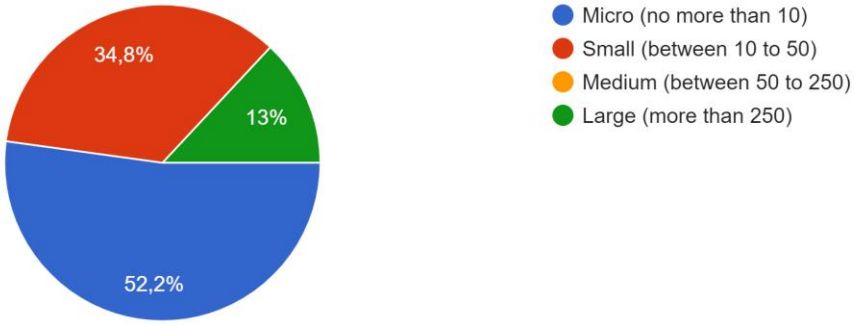
For more than 20 years now, Simulation has become an integral part of the healthcare sector to meet the growing demand of doctors and healthcare professionals to acquire Technical and Non-Technical Skills in a safe and repeatable way, so that practical experiences do not occur for the first time in work contexts.
The aim of the SAFETY project is precisely to standardize education in the health sector, improving the quality and efficiency of education and training.
The analysis conducted through the questionnaires contained in WP2, and the comparison of the same with the results obtained from DESK RESEARCH conducted in WP1, will be of great use to be able to formulate educational courses using simulation technology.
The hope, at the end of the project, is to be able to create educational courses to be included in the university programs of subjects relating to the health sector.

Companies survey results

Sector:
23 risposte

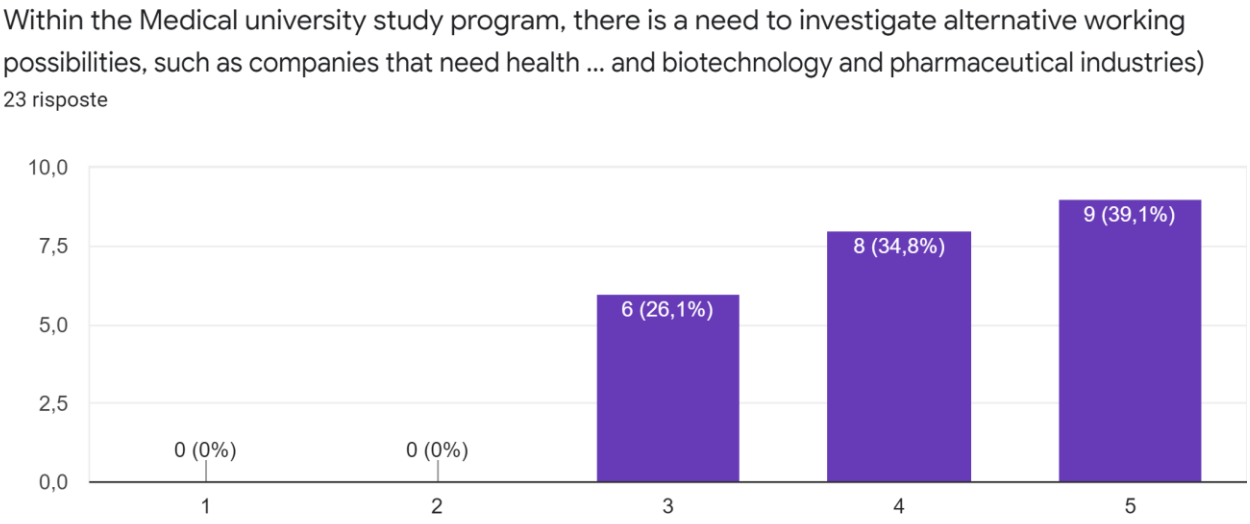


Size of the company (staff members number):
23 risposte

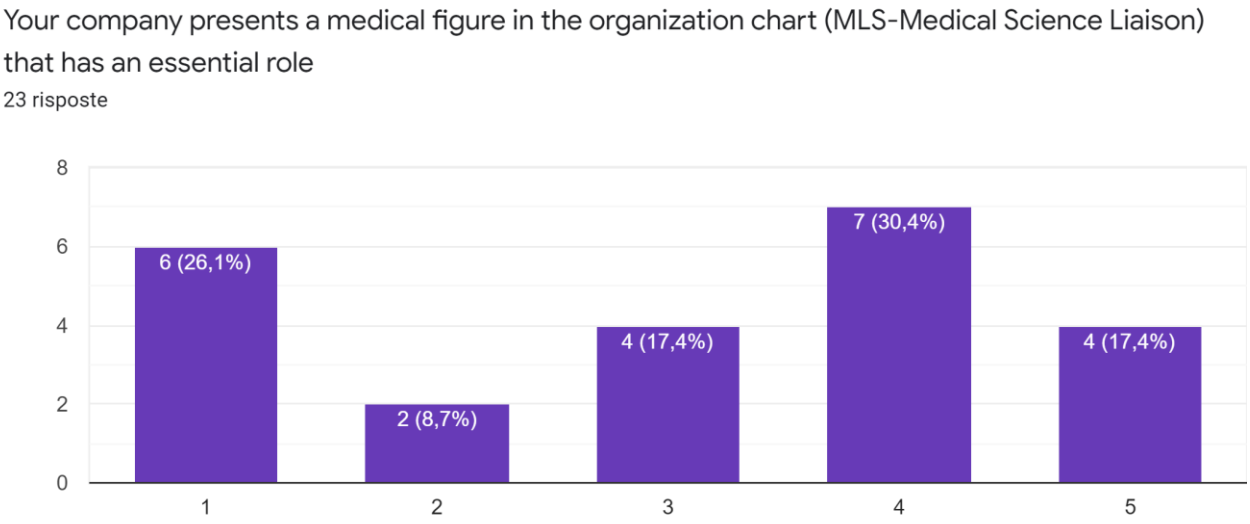


You will now find 4 different groups of elements affecting companies' needs. Please, indicate your opinion using the scores 1 (strongly disagree) - 5 (strongly agree).
GROUP 1 - Presence of medical staff within companies

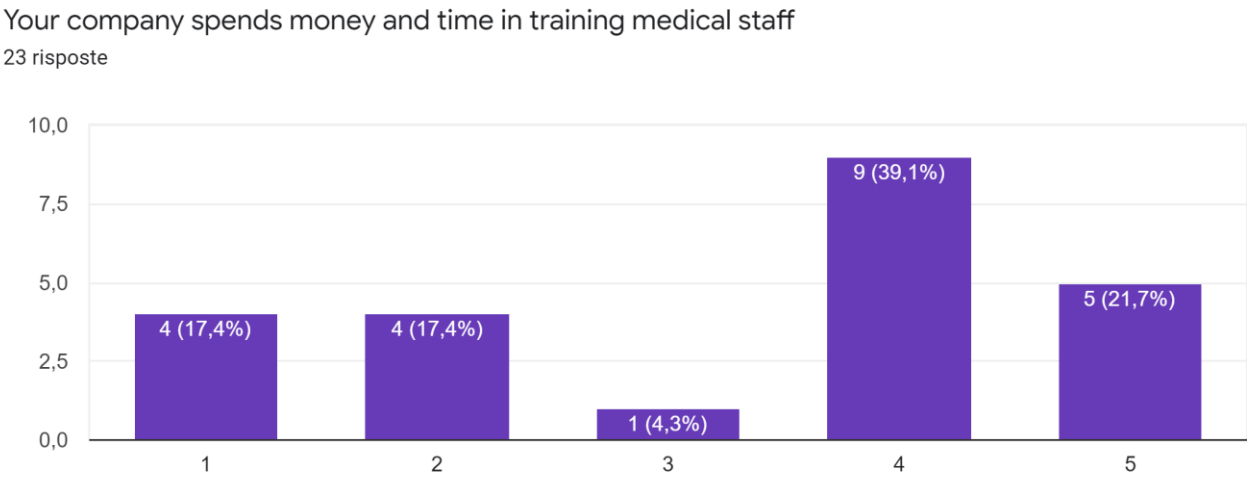
Within the Medical university study program, there is a need to investigate alternative working possibilities, such as companies that need health professionals in their staff (wellness industry, bioscience and biotechnology and pharmaceutical industries)



Your company presents a medical figure in the organization chart (MLS-Medical Science Liaison) that has an essential role



Your company spends money and time in training medical staff

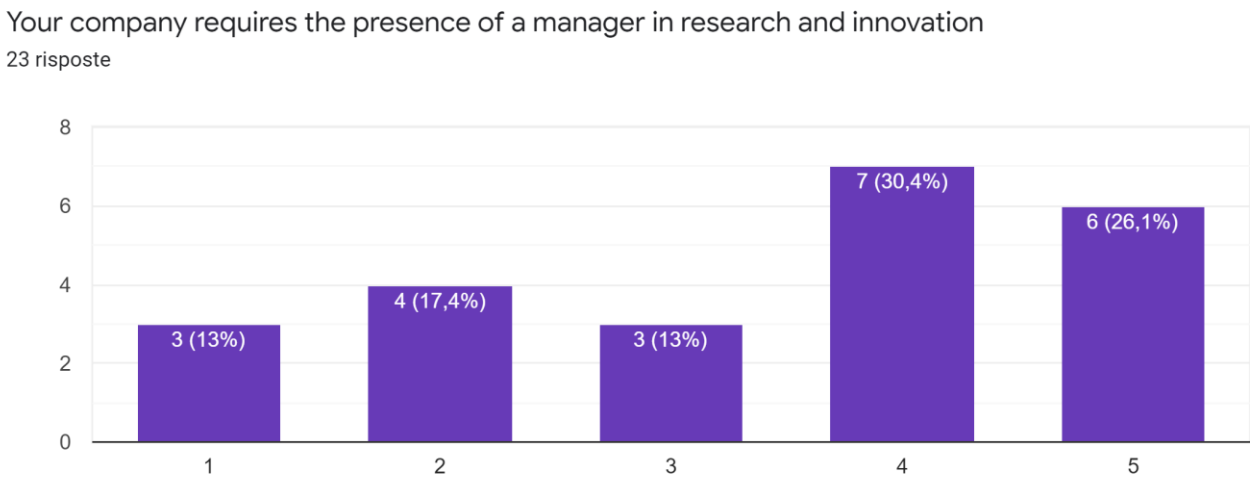


The legislative and economic framework that every company must deal with in the field of medical training must be part of the university programs

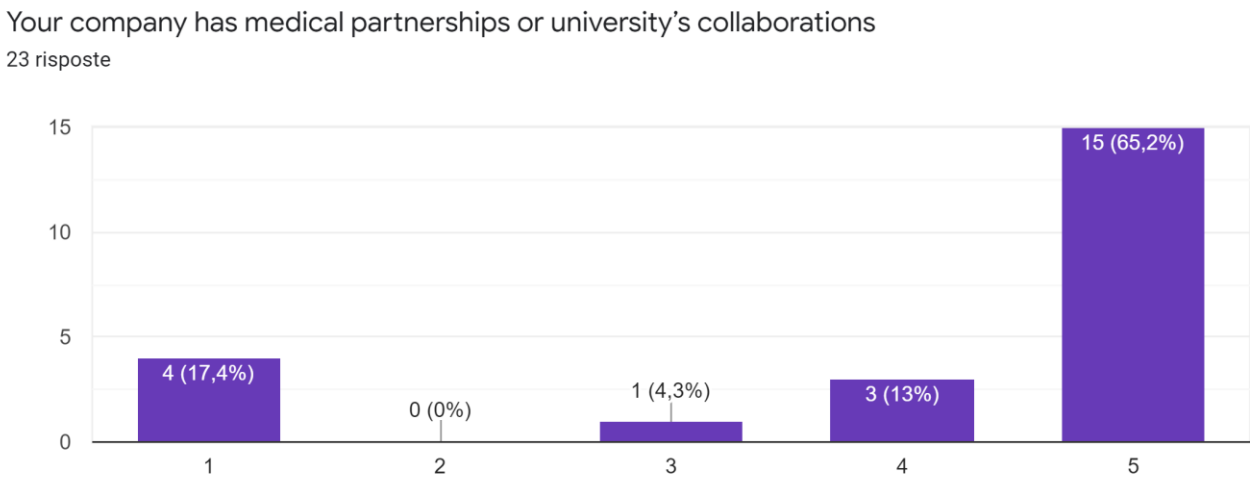
It's difficult to find medical personnel ready to leave the clinical-hospital activity and move to business activities

GROUP 2 - Importance of research and communication within the company

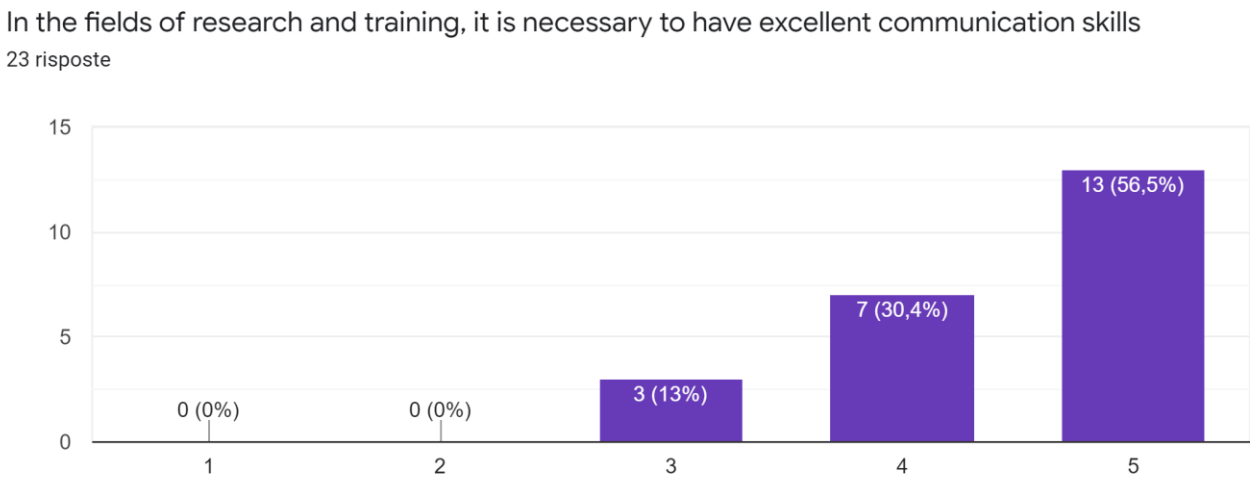
Your company requires the presence of a manager in research and innovation



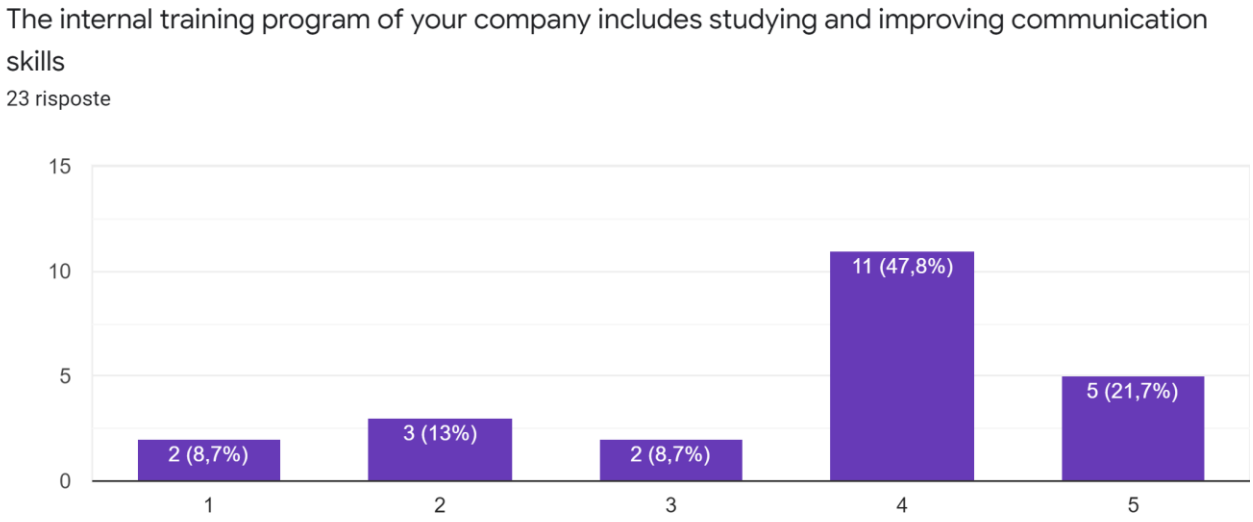
Your company has medical partnerships or university's collaborations



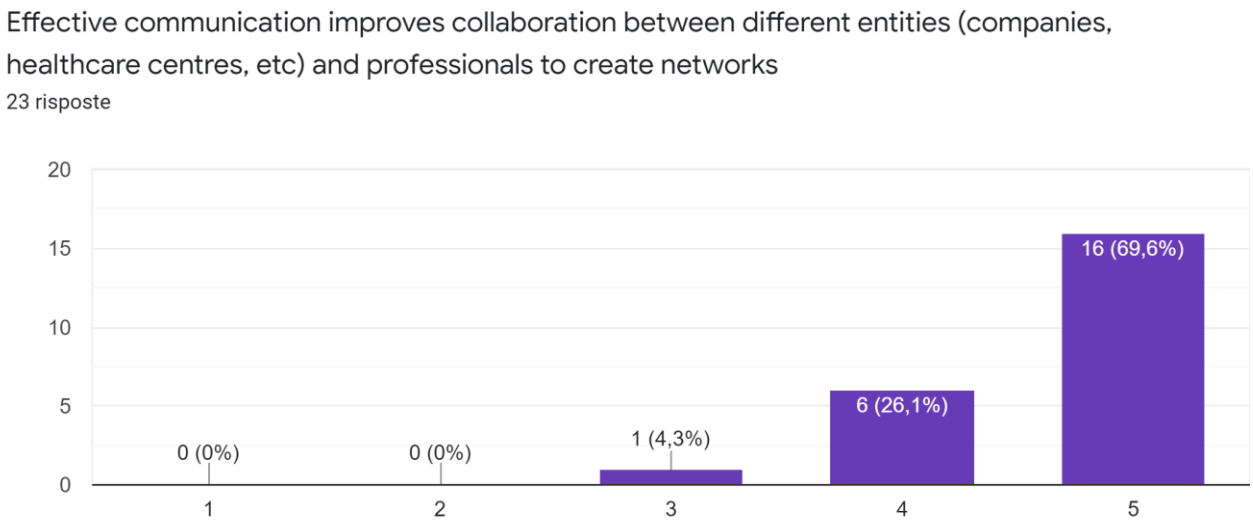
In the fields of research and training, it is necessary to have excellent communication skills



The internal training program of your company includes studying and improving communication skills

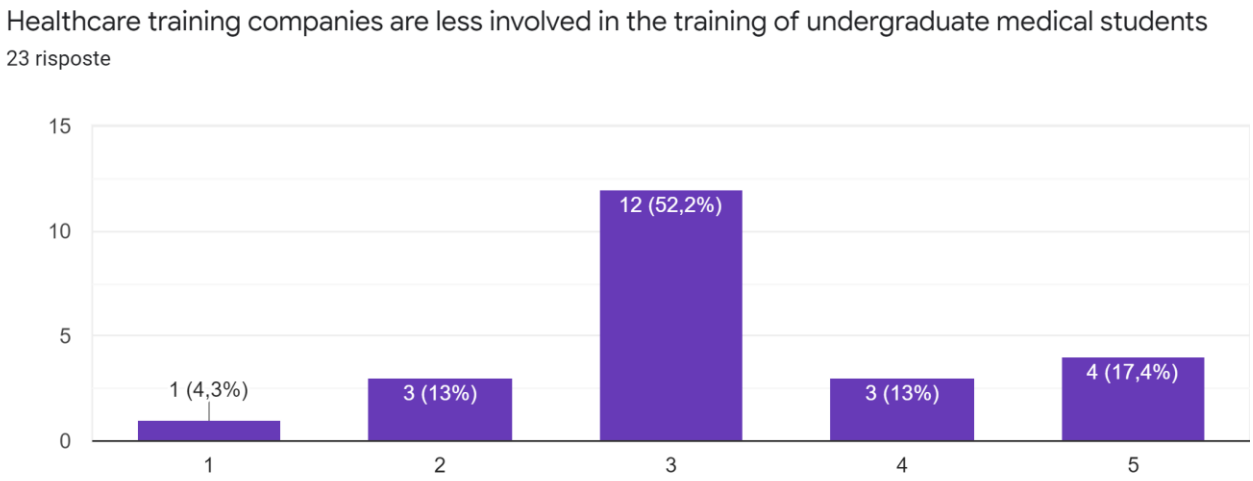


Effective communication improves collaboration between different entities (companies, healthcare centres, etc) and professionals to create networks



GROUP 3 - Presence of companies in university's program

Healthcare training companies are less involved in the training of undergraduate medical students



There is a need of companies' involvement in the training program of medical students, especially those in the final years

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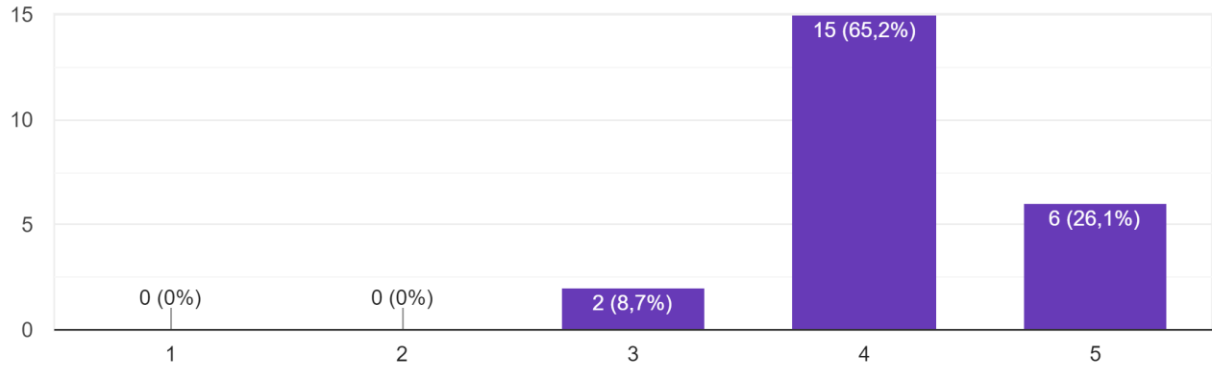
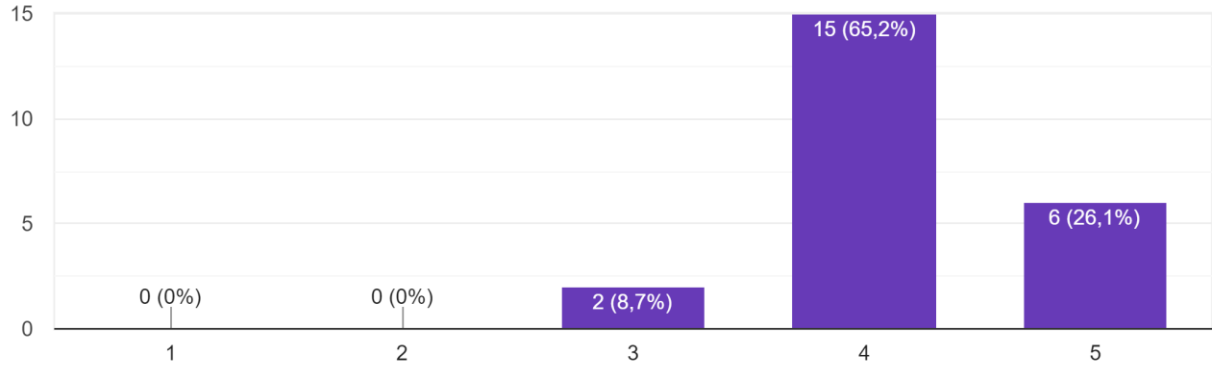
23 risposte

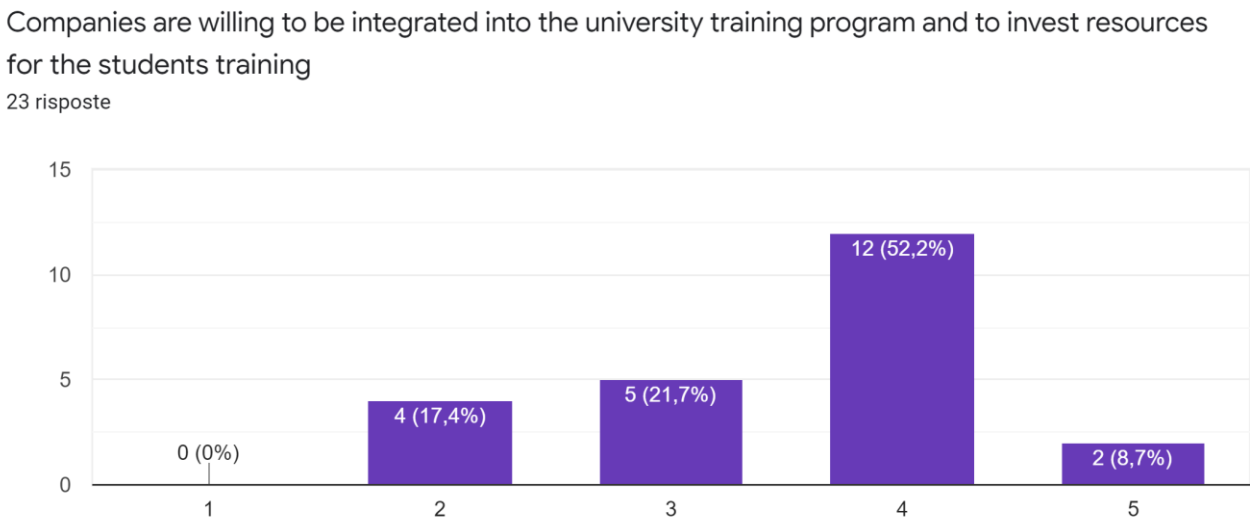


There is a need of companies' involvement in the training program of medical students, especially those in the final years

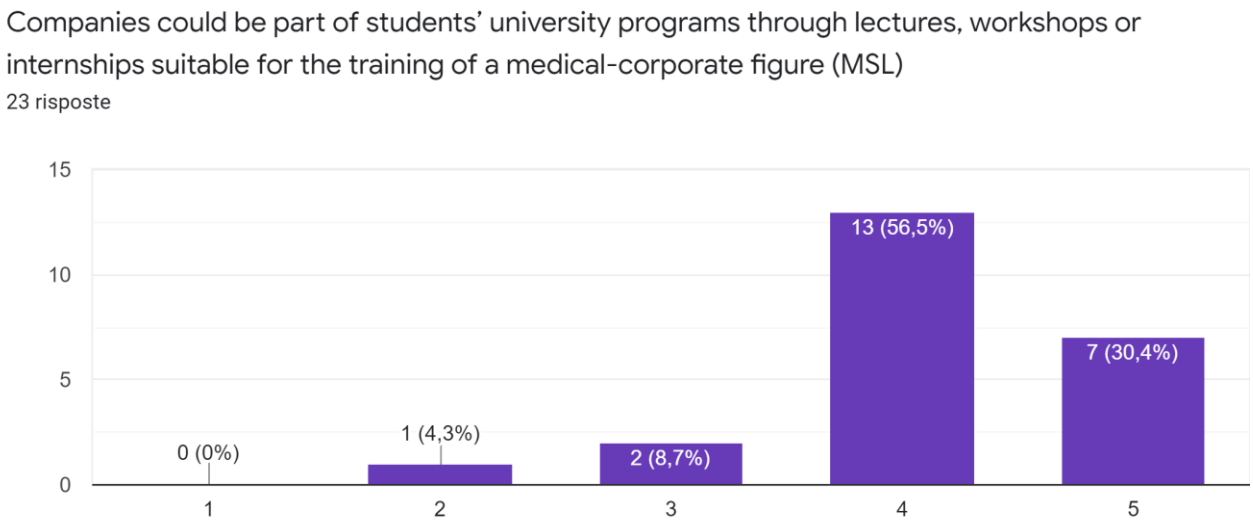
23 risposte



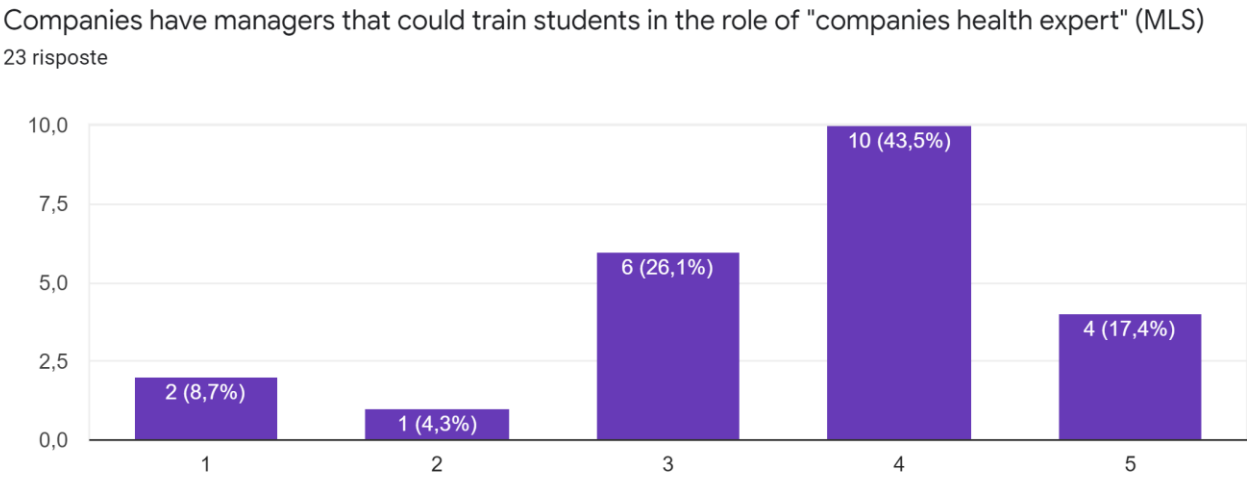
Companies are willing to be integrated into the university training program and to invest resources for the students training



Companies could be part of students' university programs through lectures, workshops or internships suitable for the training of a medical-corporate figure (MSL)

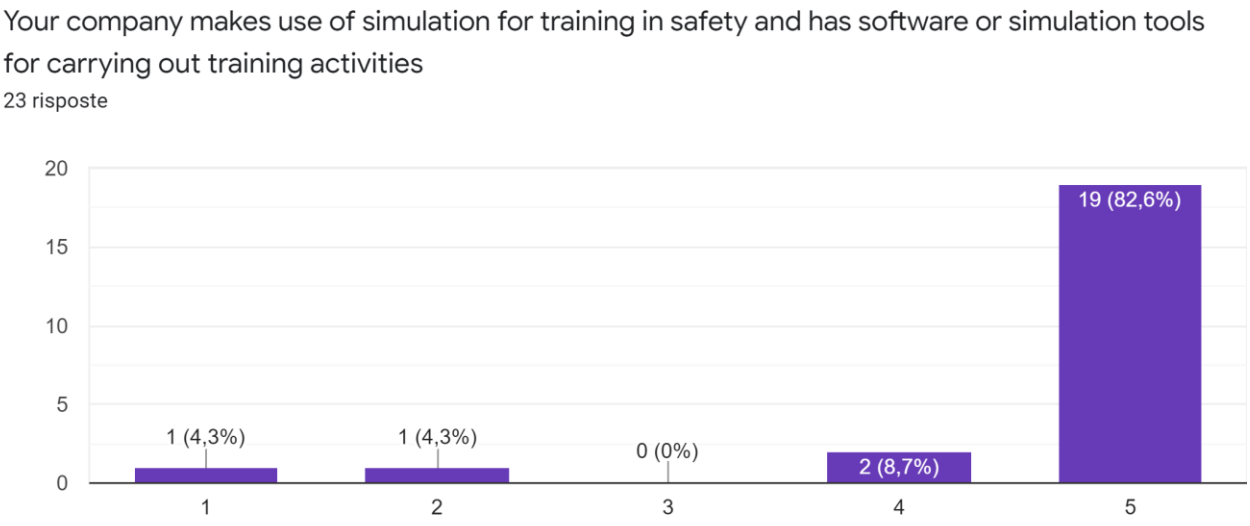


Companies have managers that could train students in the role of "companies health expert" (MLS)

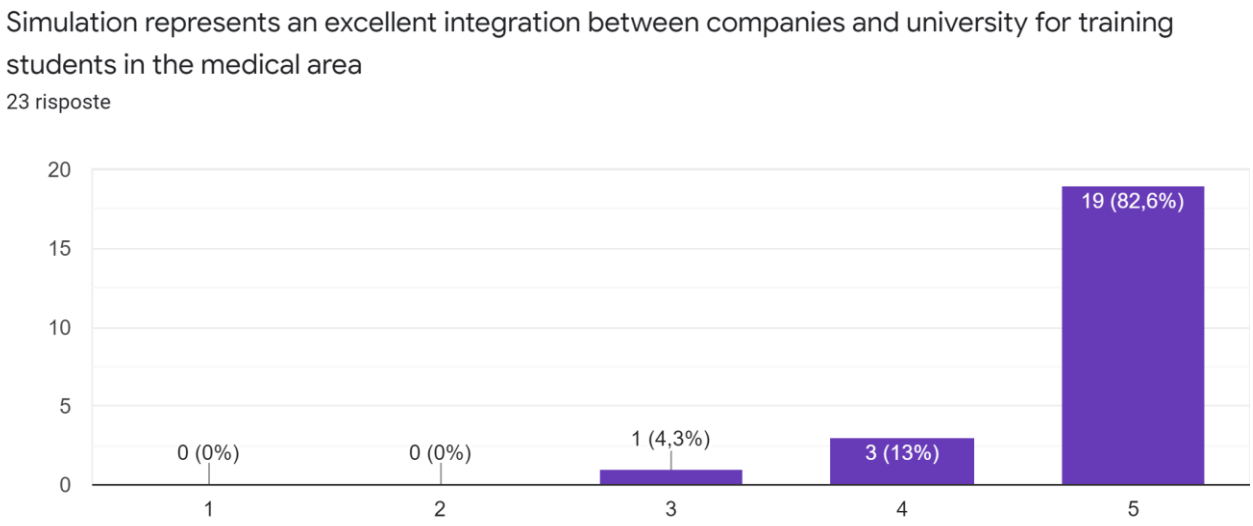


GROUP 4 - Medical training in simulation

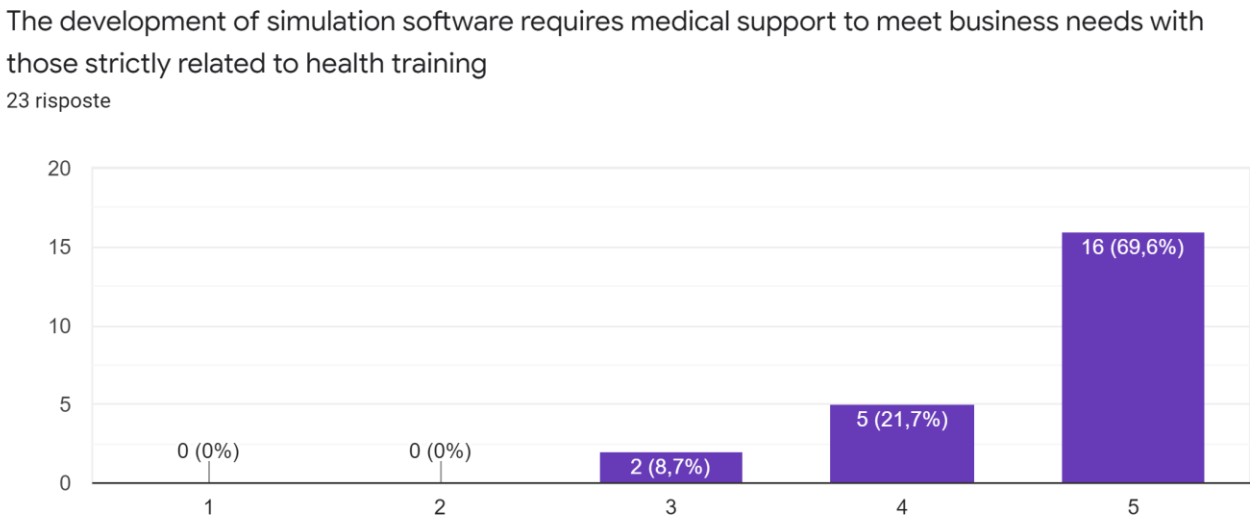
Your company makes use of simulation for training in safety and has software or simulation tools for carrying out training activities



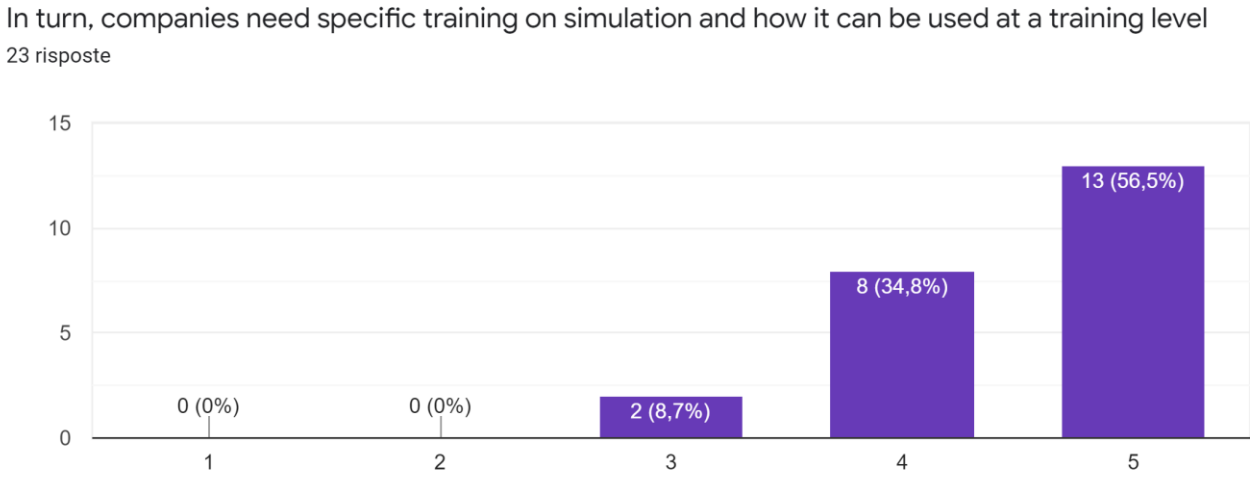
Simulation represents an excellent integration between companies and university for training students in the medical area



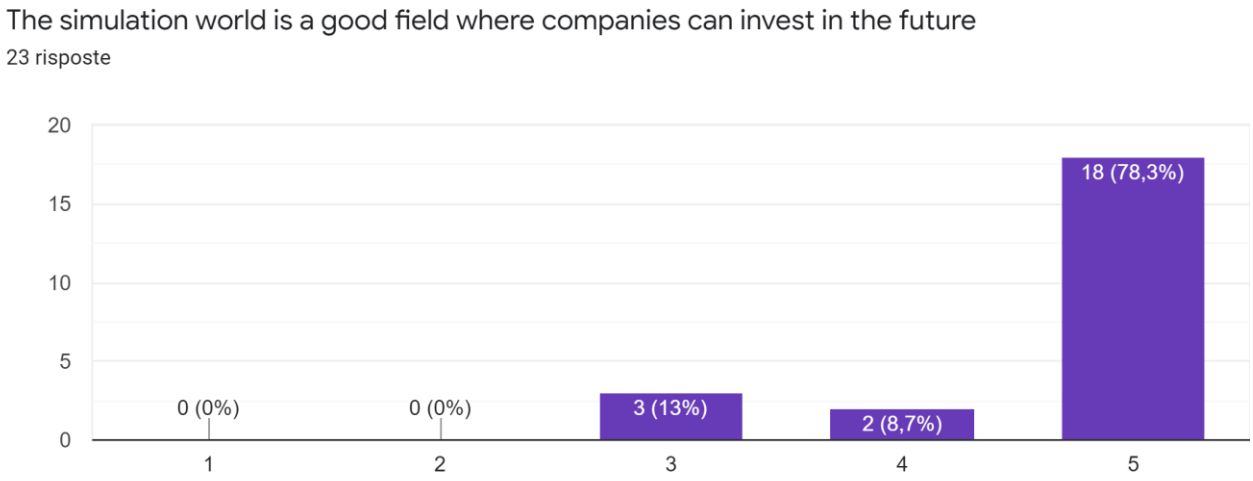
The development of simulation software requires medical support to meet business needs with those strictly related to health training



In turn, companies need specific training on simulation and how it can be used at a training level



The simulation world is a good field where companies can invest in the future

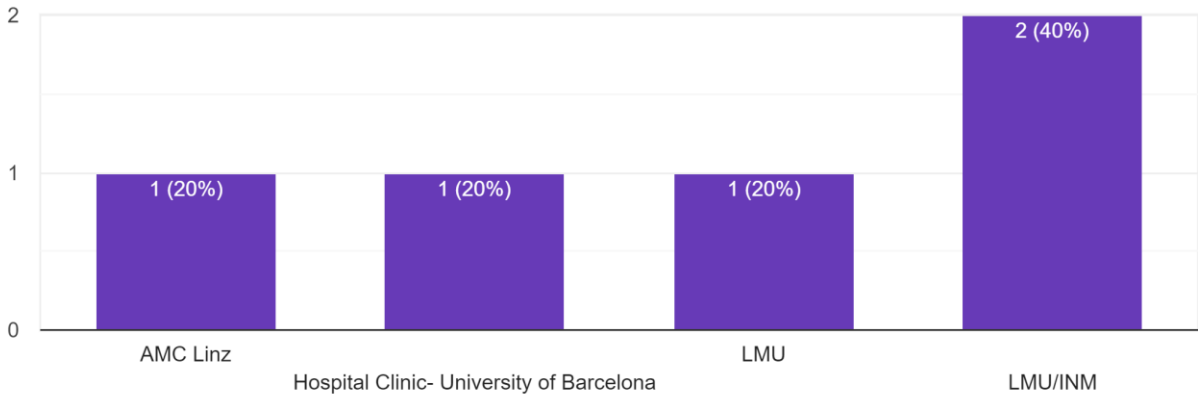


Interview modality:

8 risposte

SAFETY Project Partner you represent or you are in touch with / Interviewer:

5 risposte



HealthWay - Formação, Investigação e Inovação

Nordic Simulators Oy

CATHI GmbH

SimStation

Laerdal España

TriCAT GmbH

Simedu Sp. z o. o.

Universidas Vic. Centrat de Catalunya. Simulation centre

Interview

What are the roles that a medical figure can play within your company? (e.g. researcher, development of new tools and equipment, trainer, Medical Science Liaison)

Instructor, course coordinator, program coordinator, researcher

Development of new tools & technology

Ideally a medical figure with a certain technical understanding, included in the development process, able to translate between requirements from healthcare personnel and technical realisation/implementation. Also knowledge of training necessities.

No classical healthcare know-how in company needed due to nature of product, but feedback from users in healthcare of paramount importance. "Translation" from user needs into technical specs is provided by company.

Simulation Instructor

Networking into own professional community, internal consultant on professional matters (within the company), and liaison to professional community as someone knowing the community from the inside.

Trainer

Researcher

What are the necessary skills that these doctors should obtain during their studies in order to be able to offer the right contribution to your company?

- Technology and Infromatics useful to improve teaching efiiciency.
- Technical and non-technical skills in training with virtual patients and high-fidelity simulators, for the development of good health safety practices
- Pedagogical notifications & innovations
- Understanding of technology.
- Provide basic education on simulation, simulation technology and debriefing to be able to provide meaningful feedback in order to enhance product quality
- Simulation previous experience. Communication and debriefing skills
- If the role contains some budget responsibility, in any case a basic understanding of economics and the way a company is working. Definitely a certain affinity to hard- and software, competence in teaching methodology using new technology and a virtual learning environment.
- Communication and some technical skills which can give them ability to teach course participants effectiely using our equipment.

What is the contribution that companies, through advanced or basic medical simulation, can provide for students training? (existing or future ideas and projects) Give also

examples of your collaboration or partnership with scientific societies or local universities

- For us, the future involves the inclusion of medical simulation on a mixed basis. this we always include in our courses the simulated part and the hands on. We have worked with our partners such as Universidade Atlantica and Universidade da Beira Interior and we have two postgraduate courses with more than 35 editions in 5 years of work, always sold out.
- Finding solutions that improve learning targets and results in simulation training. Helsinki University Hospital simulation centers in various clinics (3), more than 60 centers globally.
- Perform scientific studies with prototypes, thus contributing to students' training but also enhancing product.
- Cooperation with educational entities is important, in order to provide all students with current technology, but also for companies to learn from a big number of simulations and be able to test new features, thus generating a positive feedback loop.
- Apply simulation on competencies development. Facilitate Peer to Peer training
- The training does most certainly enhance patient safety and guideline adherence, more generally speaking the quality of care. Also, by being trained in a realistic environment motivation rises. Stress in critical situations can be decreased by experiencing those situations before, in the training environment. Also, through close cooperation (see also next point) with Universities and hospitals a better interlocking between education, clinical work and industry can be obtained.
- We did several workshops for undergraduate and postgraduate medical students using high fidelity medical interventional simulators (laparoscopic, endoscopic, ultrasound) together with medical universities, when the university teacher (doctor) has been showing practical clinical skills using our simulator and has been proctoring students or young doctors when they've been using simulator.
- Infromation about simulation innovations, infromation about how other simulation centres very oftne companiees representatives become crucuial to contact with other teachers of simulation.....

What can be the University’s contribution, through their study courses, in developing or using simulation tools for students’ training? (educational workshops, biomedical science courses, internships in companies)

The university can and must be the standard that we want to introduce in the best way of learning, in error without consequences. In this way, even after they graduated in university terms, even when they

began their professional activity, they would always continue to favor the way of learning with simulated practice.

Their experience on challenging issues with clinical work, like communication etc.

Universities should invest time in cooperation with companies, instead of expecting companies to pay in order for their products to be used in training. Being open to offering or recognising internships in companies from the healthcare simulation field. Although in patient care new technology is being used, in training of students often very old methods are employed.

First of all, use it! Enhance or replace theory through practical session by using simulation. Offer theoretical background to simulation and debriefing, also as basis for better professional activity and teamwork.

Educational workshops, Clinical scenarios development

Universities (and our company has cooperations with several German Universities and University Hospitals) should understand that it is necessary to bring in knowledge and also personnel to jointly develop products - for the end-users, together with the end-users. It does, however, cost some money - personnel, time. Educational institutions should contribute with knowledge and also by accompanying scientific projects.

Educational worshops, clinical skills courses with simulators, team training drills

I think the contribution es very important as the universities have inside populations of all educative levels and all health porfessions.