

# Skills vs Knowledge in Emergency Medicine

*Prof. D. Vaitkaitis*

# Disclosure



LITHUANIAN UNIVERSITY  
OF HEALTH SCIENCES

# Republic of Lithuania



Geographic size - 65 300 km<sup>2</sup>

Population size - 2.9 M

Life expectancy (2014) – 74,7

Male – 69,2

Female – 80,1

Infant mortality – 3,9/1000

Gross domestic product (GDP) in ppp - \$41.3 billion (2015)

\$ 24,400 per capita

Percentage of GDP spent on Health care - 6.6

(4.8 – public, 1.8 – private)







# Emergency medicine in Lithuania

- LitSEM - 2003
- EM is a recognized specialty since April 2013
- 5-year Residency program approved in May 2013
- 6 residents in Kaunas and 4 in Vilnius started training in August 2013
- 11 and 8 residents from 2014
- 10 and 8 from 2015
- 10 and 8 from 2016
- Lithuanian Government included Emergency Medicine in the list of specialties by decree from January 1<sup>st</sup>, 2014

# Skills vs knowledge

Is there any other way to teach skills, procedures and non technical skills in Emergency medicine?

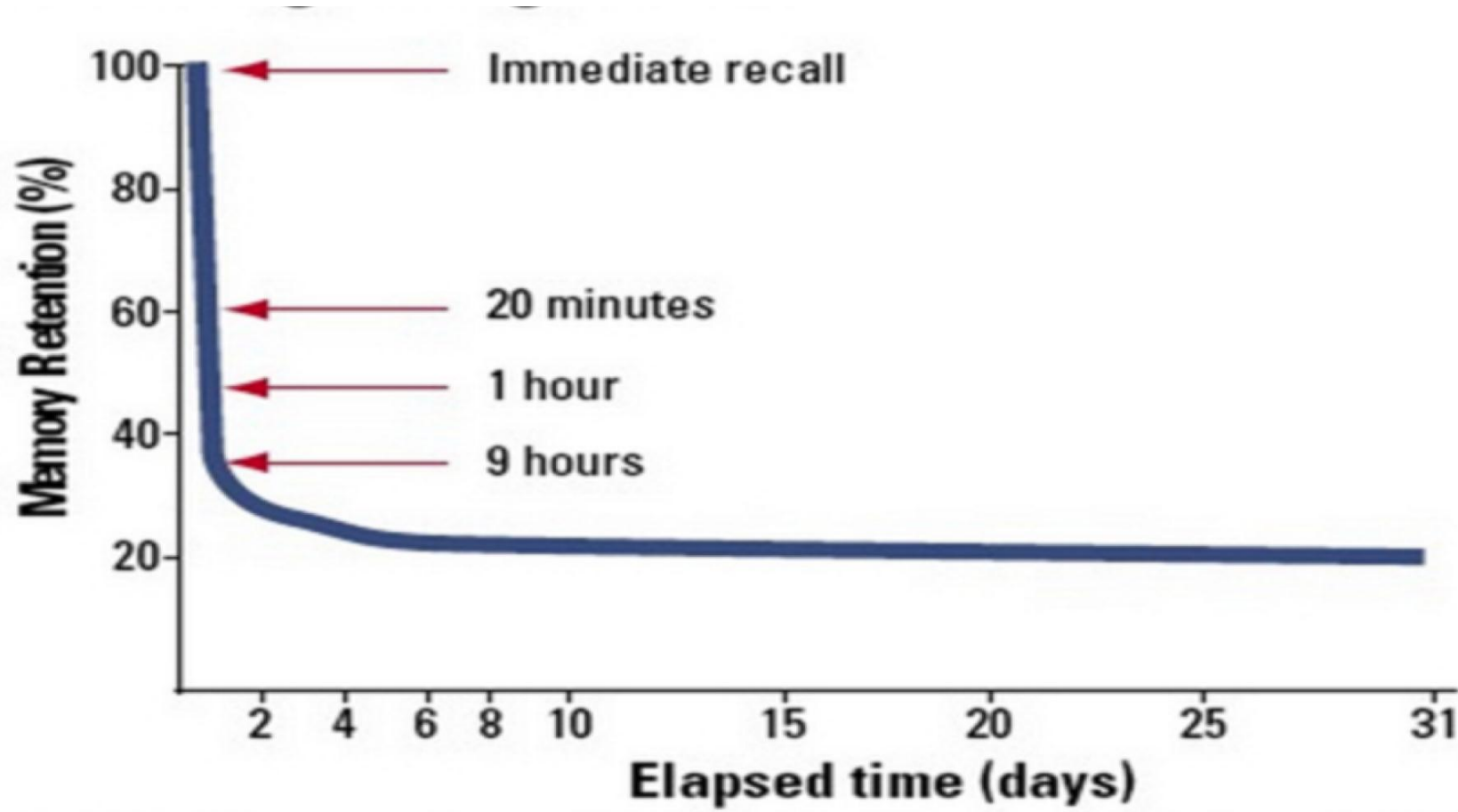
- Why
- How



# ITO – International Training Organization

- American Heart Association
- American College of Surgeons
- European Resuscitation Council
- American Academy of Family Physicians
- International Academy of Emergency Dispatch
- National Association of Emergency Medical Technicians
- Advanced Life Support Group
- ...

# The Forgetting Curve, Hermann Ebbinghaus, 1885



Jaap M. J. Murre, Joeri Dros, **Replication and Analysis of Ebbinghaus' Forgetting Curve**, PLoS One. 2015.



- All post course tests are useless.
- Short term v.s. long term memory.
- ATLS, PHTLS, BTLS – we flush away 70 percent of info the next day.

# x, y and



– NO LONGER  
than

## 3min

# Z- generation



## 7 seconds





# PANEM ET CIRCENSES

In a century or so before the powerful Roman Empire collapsed, most Roman citizens were more interested in "bread and circuses."



EDUTAINMENT!



# Common problems



# THE EXECUTIVE VIEW \*

\*CEO Survey—Fortune 500 and Large Private Company, ROI Institute

	Measure	Current Measure	Should Measure	Measure Importance
1. Inputs	Last year, 78,000 employees received formal learning.	94%	85%	6
2. Efficiency	Formal learning costs \$2.15 per hour of learning consumed.	78%	82%	7
3. Reaction	Employees rated our training very high, averaging 4.2 out of 5.	53%	22%	8
4. Learning	92% of participants increased knowledge and skills.	32%	28%	5
5. Application	At least 78% of employees are using the skills on the job. Our programs are driving our top 5 business measures in the organization. Five ROI studies were conducted on major programs yielding an average of 68% ROI. Our learning and development program won an award from the American Society of Training and Development	11%	61%	4
6. Impact		8%	96%	1
7. ROI		4%	74%	2
8. Awards		40%	44%	3

TRAINING CENTRES

STAKEHOLDERS

# ROI story



## Infant mortality in Lithuania

1992 - 16,5/1000



2014 - 3,9/1000



# Lithuania - Southern Kazakhstan project: implementation of PPH protocol

- 4249 km
- 566 students
- 4 HLAB classes
- 4 months
- Low budget



# Mastery learning

## 24/7 Next Generation Simulation with Remote Instructor



**Monitoring &  
Evaluation by remote  
instructor**

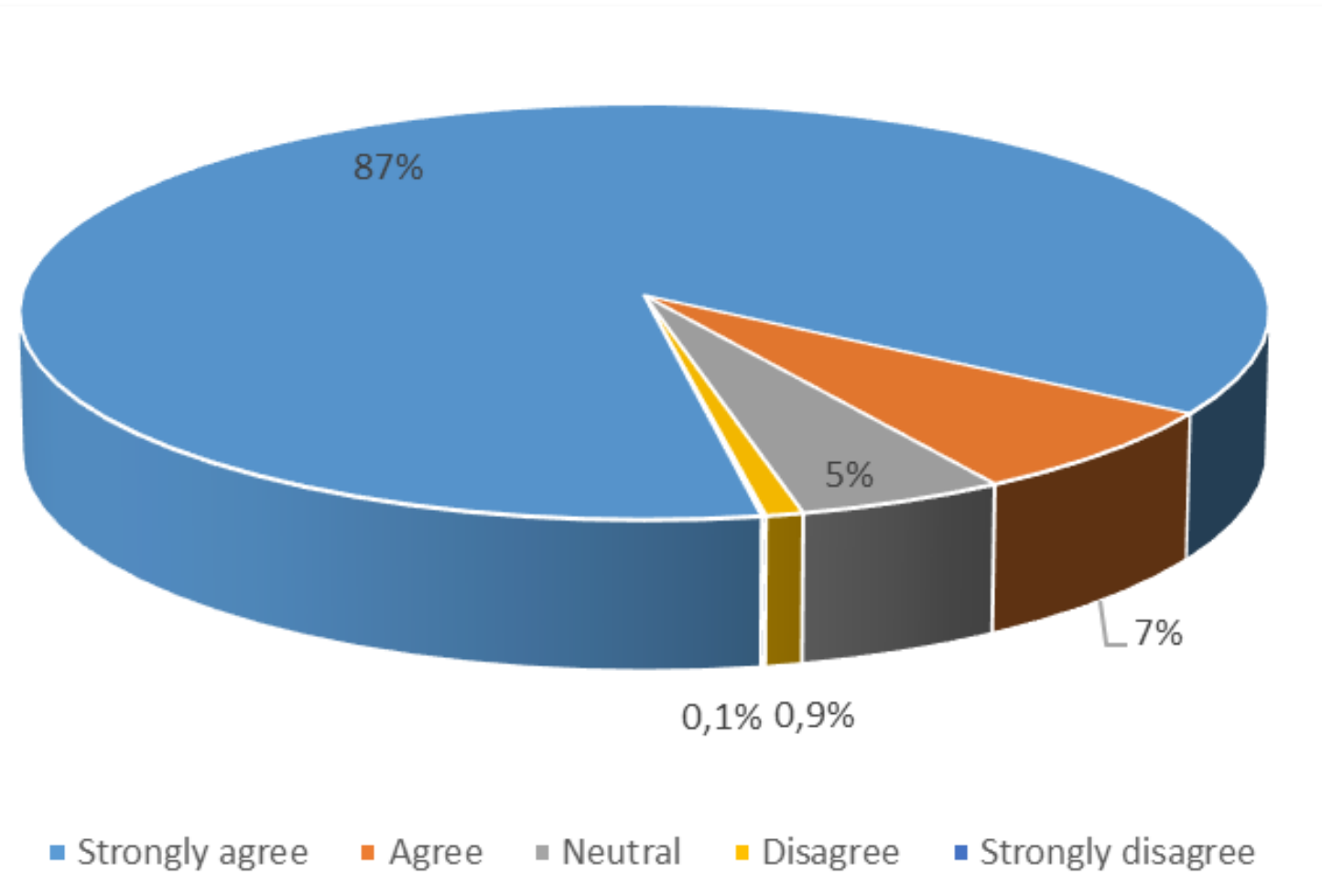
# Participants self-assessment capability to manage

## PPH after training according to Likert scale

***“I liked the team approach, it makes the task much easier. We will definitely use it in practice”***

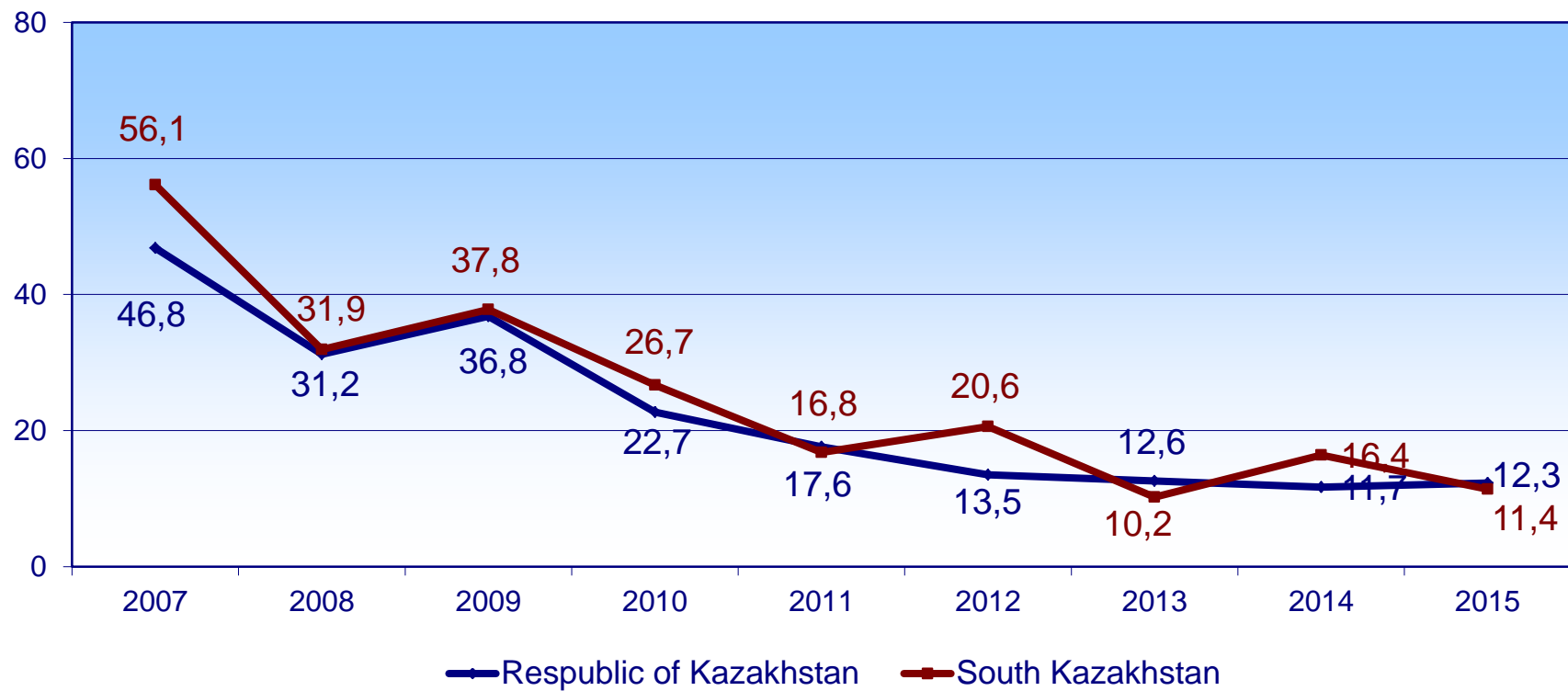
***“Thank you so much for very interesting and informative topics and scenarios. Thank you so much for the training ! We had really great time during all sessions! And we learned a lot!”***

***“Thank you! Everything was interesting and instructive. Now the skills are trained to the automatism”***



# Maternal mortality (1/100 000) 2007-2015

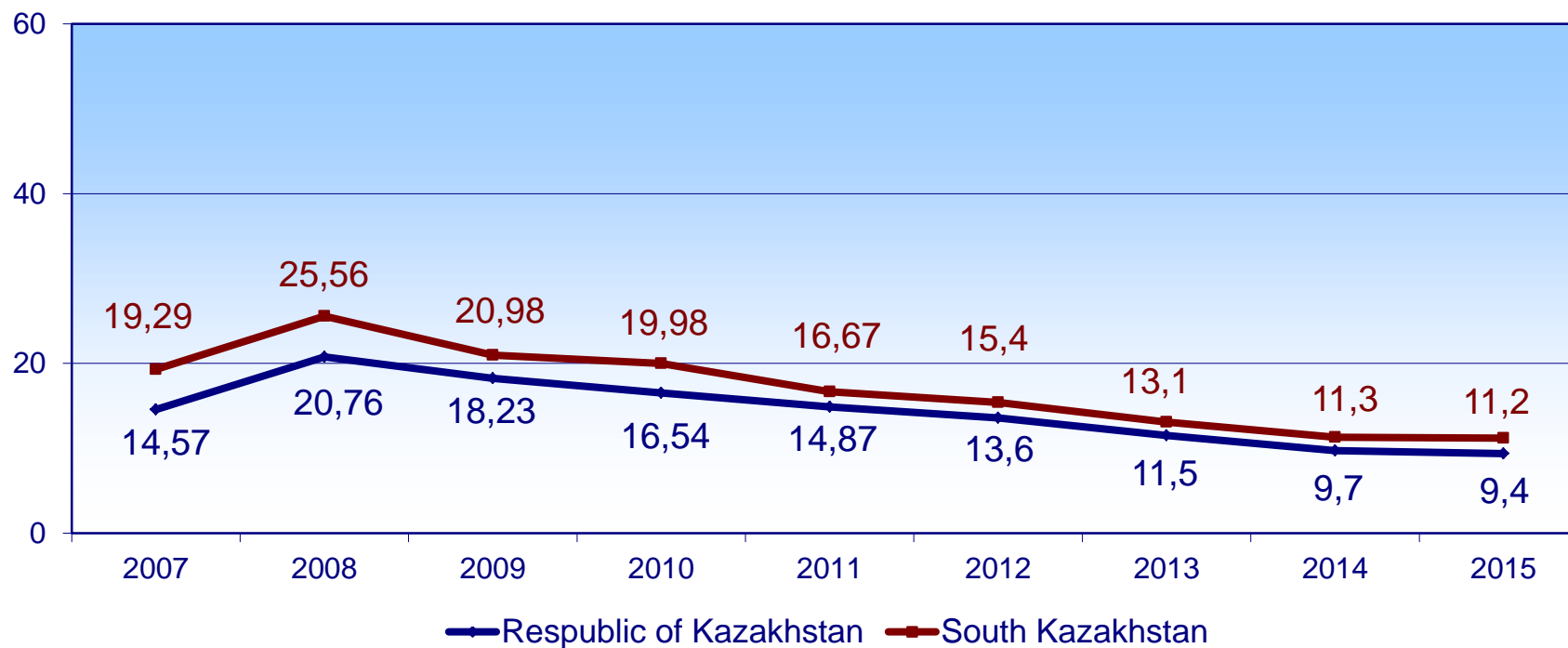
in Republic of Kazakhstan and South Kazakhstan Region





# Infant mortality (1/100 000) 2007-2015

In Republic of Kazakhstan and South Kazakhstan Region



# Where the training world is going? HOW?

- MOOCS
- Simulation

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Wesleyan University



Enhance Your Career and  
Employability Skills  
University of London



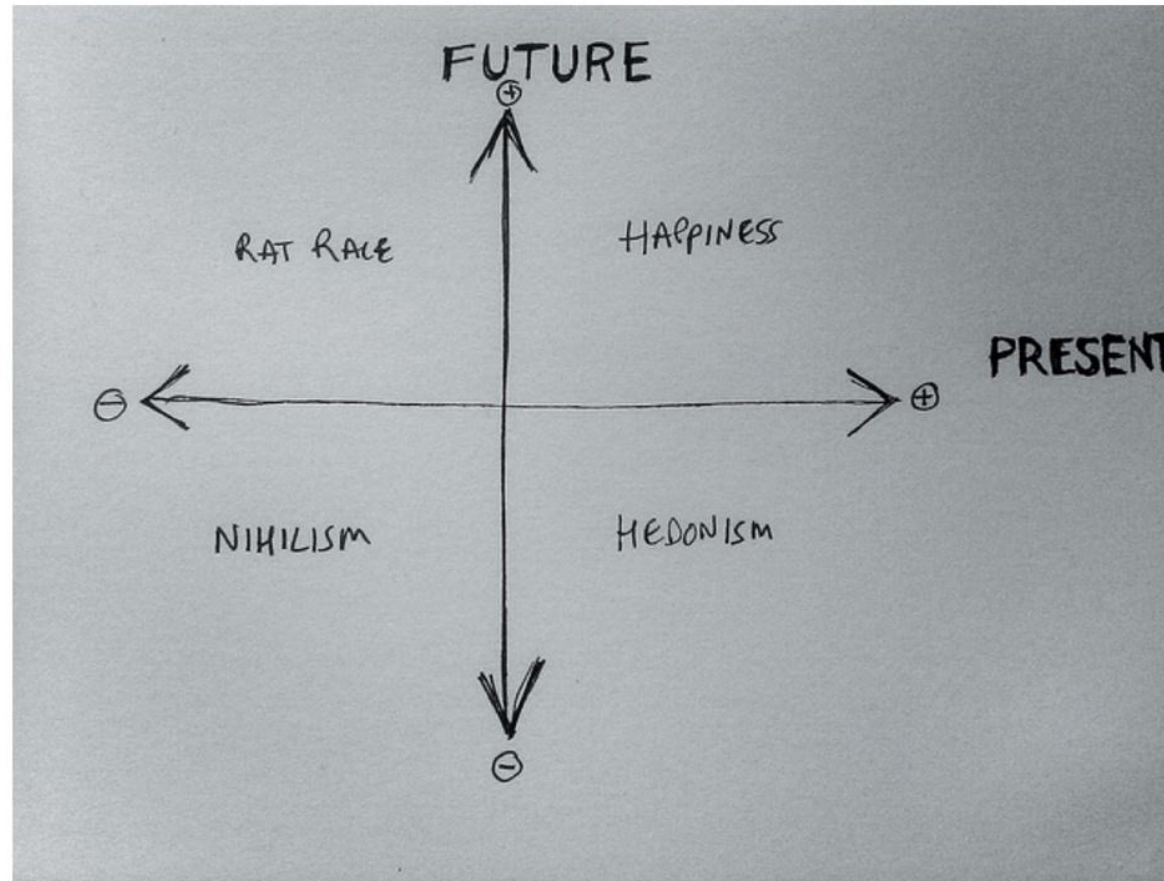
Programming for  
Everybody (Python)  
University of Michigan



Fundamentals of Music  
Theory  
The University of Edinburgh



# Harvard's Most Popular Course: Tal Ben-Shahar On How to Be Happier







ABOUT

TOPICS

OUR TEAM

FRCEM &amp; MSC

JOURNAL CLUB

SEARCH

EM ZEN

RCEM CURRICULUM

CITE ST.EMLYN'S.

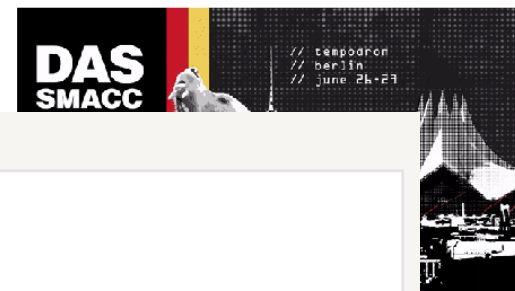
VIDEOS

CPD

LITFL RECENT POSTS

## Search Results for: oxygenation

St.Emlyn's &gt; Search results for 'oxygenation'



## ERCAST.ORG

EMERGENCY MEDICINE  
PODCASTS, REVIEWS AND  
CURBSIDE CONSULTS

ABOUT

SUICIDE RISK ASSESSEMENT

SPLINT LIKE A PRO

ANTICOAGULATION REVERSAL

VIDEO

CALF VEIN CLOTS

ERCAST » YOU SEARCHED FOR: "PREOXYGENATION"

## Search Results for: preoxygenation

preoxygenation

## RECENT POSTS

> [How to learn from a lecture](#)

## Explain it: Preoxygenation

APRIL 2018 BY DR. J. SMITH 1 COMMENT

end you lots

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- + Workshops available for Anesthesia/MOCA®, Labor & Delivery, Emergency Medicine, Surgery and others upon request.

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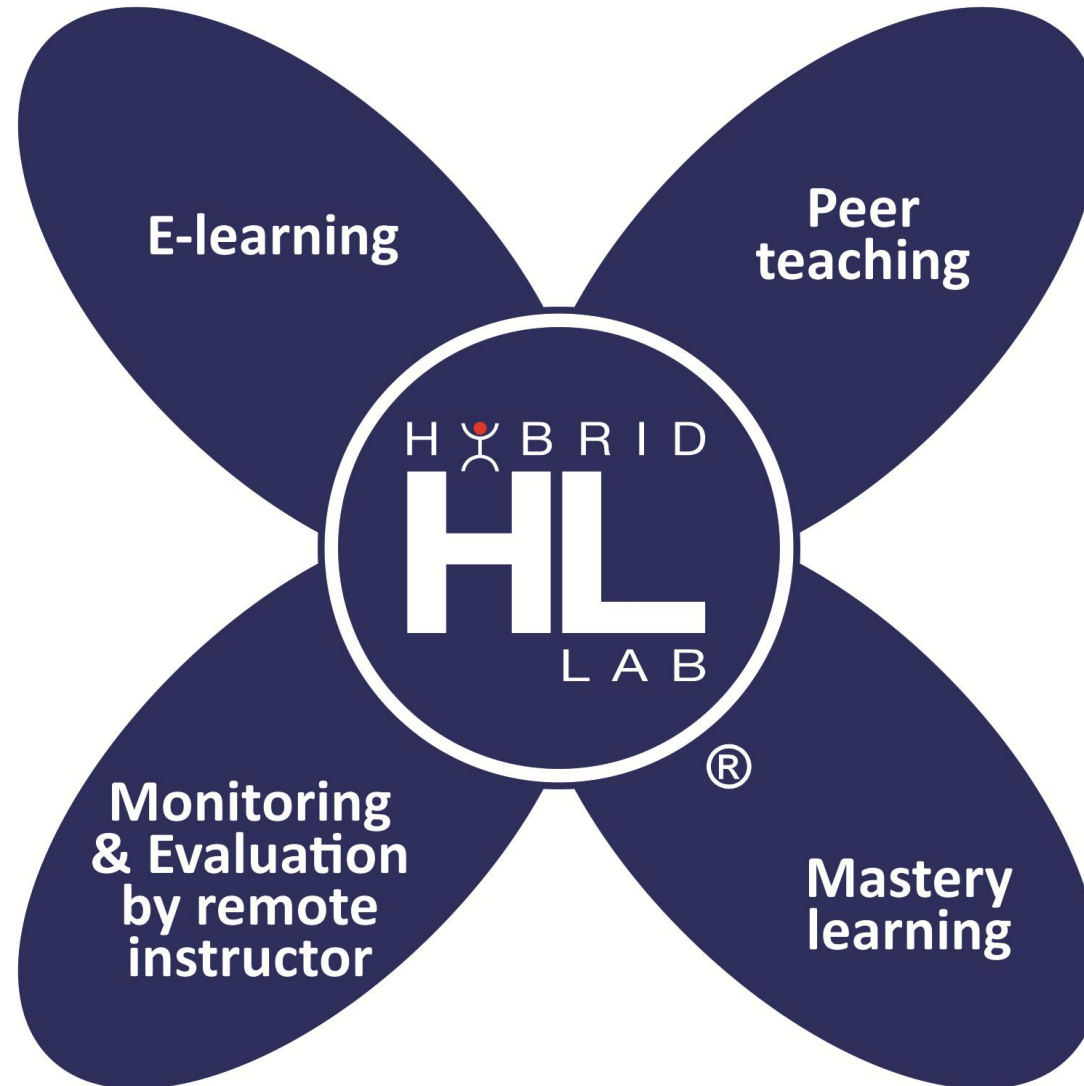



2013



# HybridLab

24/7 Next Generation Simulation with Remote Instructor







Interactive board 65"



PTZ IP video camera



HLAB giraffe



Video server



IP video camera



Laptop and barcode scanner



Electronic door lock



Tablet



Programmable entrance keys

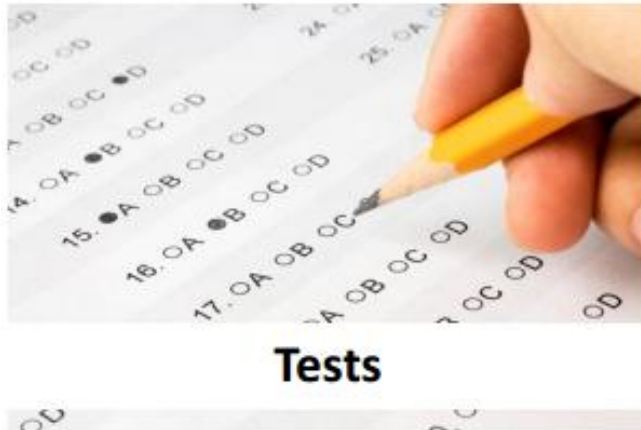
Integration and management of video and audio records, e-learning and simulation. Licence for one working place (training class)

Installation, user training and maintenance

# VLE

## 24/7 Next Generation Simulation with Remote Instructor

1



Course evaluation

### 1.3

Scenario

**BASIC LIFE SUPPORT**

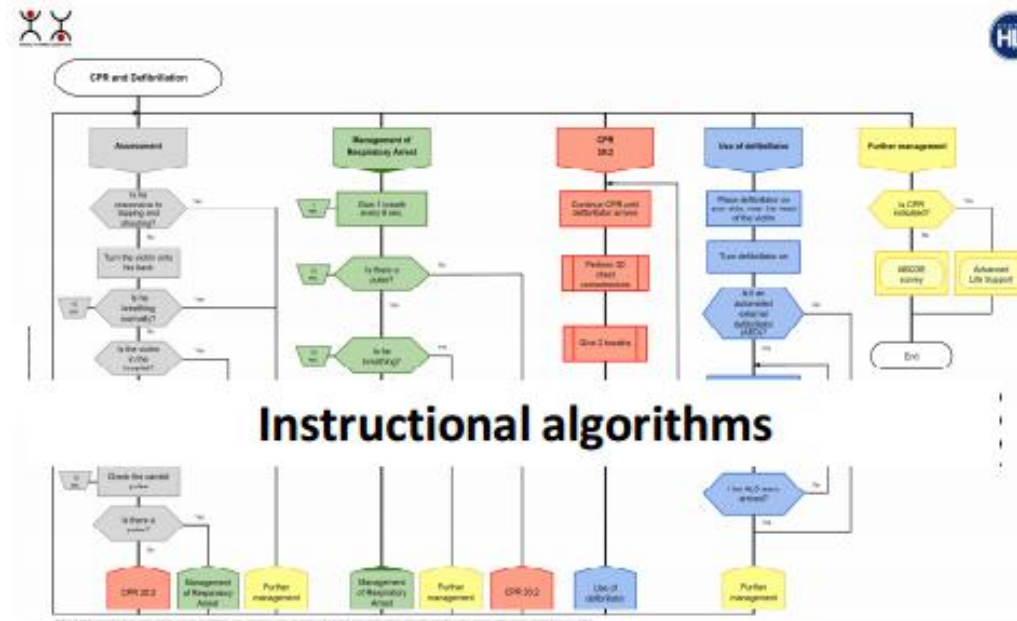
Your frightened neighbor rings your door bell. Her son has lost consciousness. She asks for your help, because she knows that you are a student at LUMS. When you come to your neighbor's flat, you find her son lying face down on the floor.

**Information before starting the scenario**

1. After 10 sec. No. 1, 2, 3, 4 are used in this simulator.
2. The patient should be examined as in real life situation.
3. Instructor was examine the patient at the simulation only after the learner has completed the examination.
4. Simulation is complete when all actions marked in bold have been performed.
5. During simulation do not look at the supervisor (B), read the content and look (M), perform the action (A).
6. Follow the simulation over the monitor (L) and (R).
7. Press Log button to record your results.
8. Use Log button device for evaluation.
9. When the simulation is complete, press start and print the report.
10. During this simulation a standard plays a role of a standard neighbor, who is lying, shouting, that the ambulance is late, and pleads who faster in order to get help faster.

Scenarios

4. Is the situation emergency? Is there a danger?	<input type="radio"/> Yes	<input type="radio"/> No
5. Is the victim in the hospital?	<input type="radio"/> Yes	<input type="radio"/> No
6. Call for an ambulance and ask for defibrillator - SOS (SOS) - SOS (SOS), SOS (SOS) - SOS (SOS)	<input type="radio"/> Yes	<input type="radio"/> No
7. Check the carotid pulse (no longer than 10 s)	<input type="radio"/> Yes	<input type="radio"/> No
8. Is there a pulse?	<input type="radio"/> Yes	<input type="radio"/> No
9. Continue CPR and defibrillator use	<input type="radio"/> Yes	<input type="radio"/> No
10. Perform 30 chest compressions	<input type="radio"/> Yes	<input type="radio"/> No
11. After 10 sec. look at the monitor (L) and (R)	<input type="radio"/> Yes	<input type="radio"/> No



Journal of Clinical Computing (2015) 7:10-17  
DOI 10.1007/s10237-015-9211-2

**ORIGINAL ARTICLE**

E. Wraynor · A. Subashini · P. Subashini  
**Students' experiences with PDAs for reading course materials**

Received: 1 March 2015 / Accepted: 26 August 2015  
© Springer Science+Business Media Dordrecht 2015

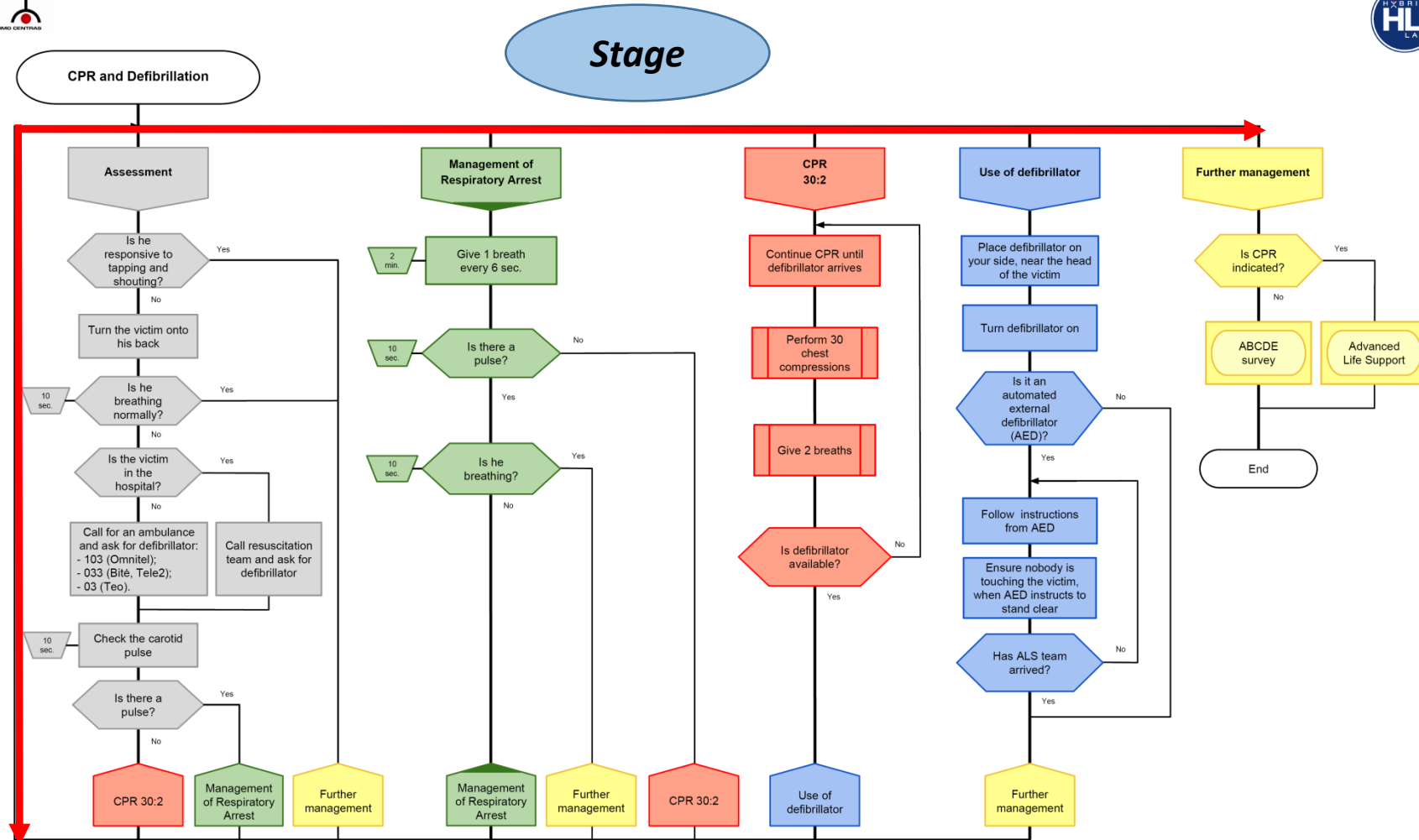
### Course material

Students' experiences with PDAs for reading course materials

Students' experiences with PDAs for reading course materials

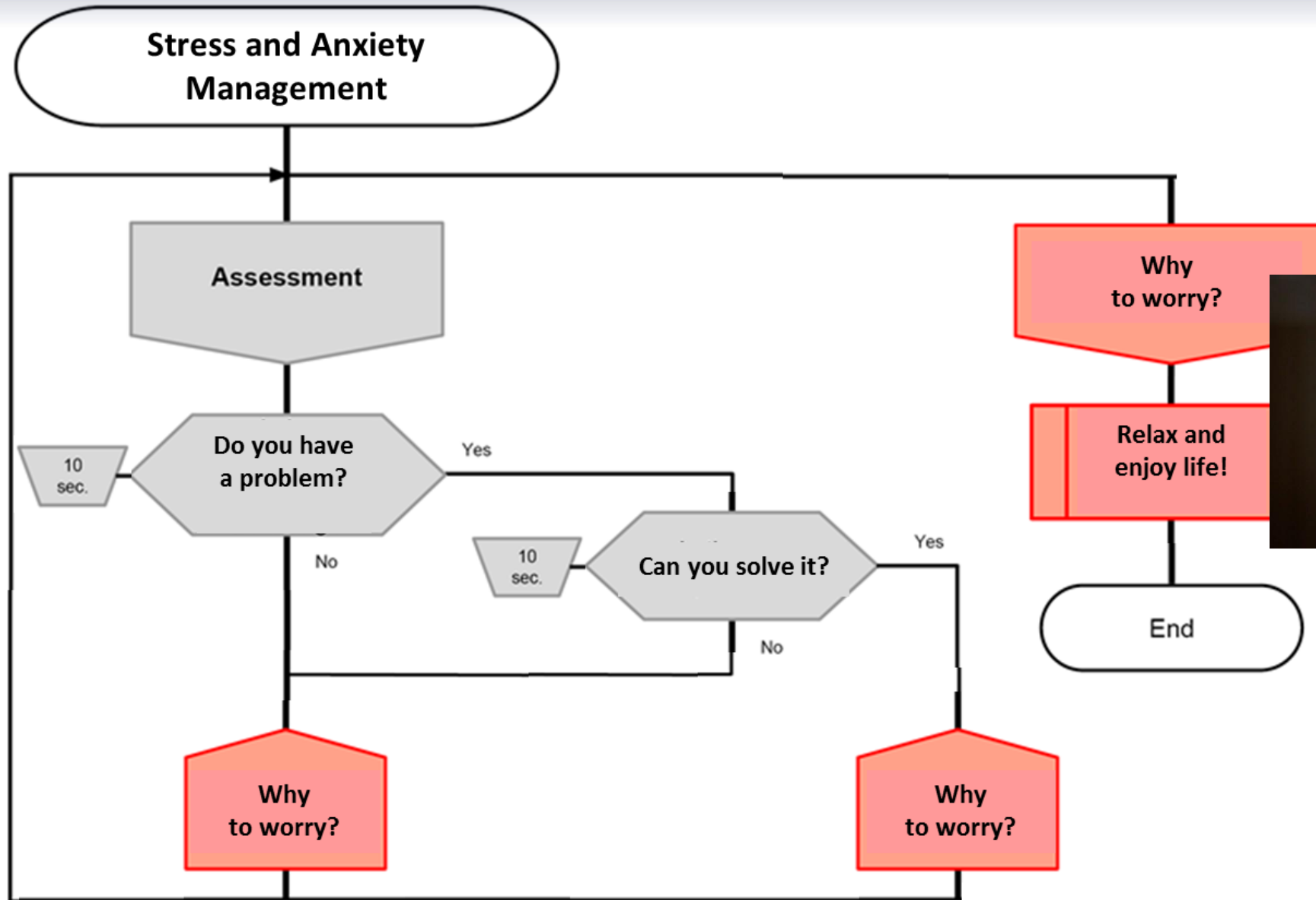
# Algorithms

2



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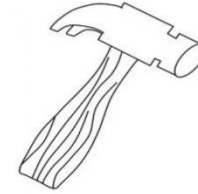
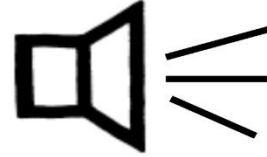
# Algorithms



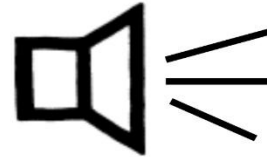
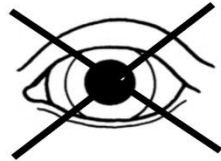


# Modified 4-step approach

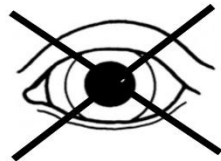
1.



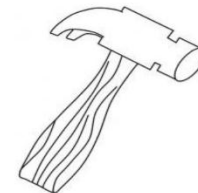
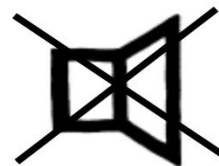
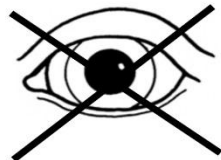
2.



3.



4.



# Simulation and peer training

## INDIVIDUAL TRAINING: TECHNICAL SKILLS



## TEAM TRAINING: TECHNICAL AND NON-TECHNICAL SKILLS



# Simulation and peer training

## Leader reads algorithms and performs tasks











# Supervisor runs the scenario and gives feedback





# Instant feedback and formative assessment

<div>1.3</div> <div>Scenario</div>	<b>Information before starting the scenario</b> <div>    </div>
	1. Algorithms No. 1, 2, 3 are used in this simulation 2. The patient should be examined as in real life situation. 3. Instructor will describe the course of the simulation only after the team leader has completed the examination. 4. Simulation is complete when all actions marked in bold have been performed. 5. During simulation <b>do not look at the algorithm</b> (  ) <b>read the actions out loud</b> (  ) <b>perform the action</b> (  ) 6. Before the simulation turn on the manikin ("Ann") 7. Press Log button to record your results 8. Use bag-mask device for ventilations 9. When the simulation is complete, press short and print the result 10. During this simulation an assistant plays a role of a shocked neighbor, who is crying, shouting, that the ambulance is late, and disturbs the leader in other ways without touching him/her (stops acting when the ambulance arrives)

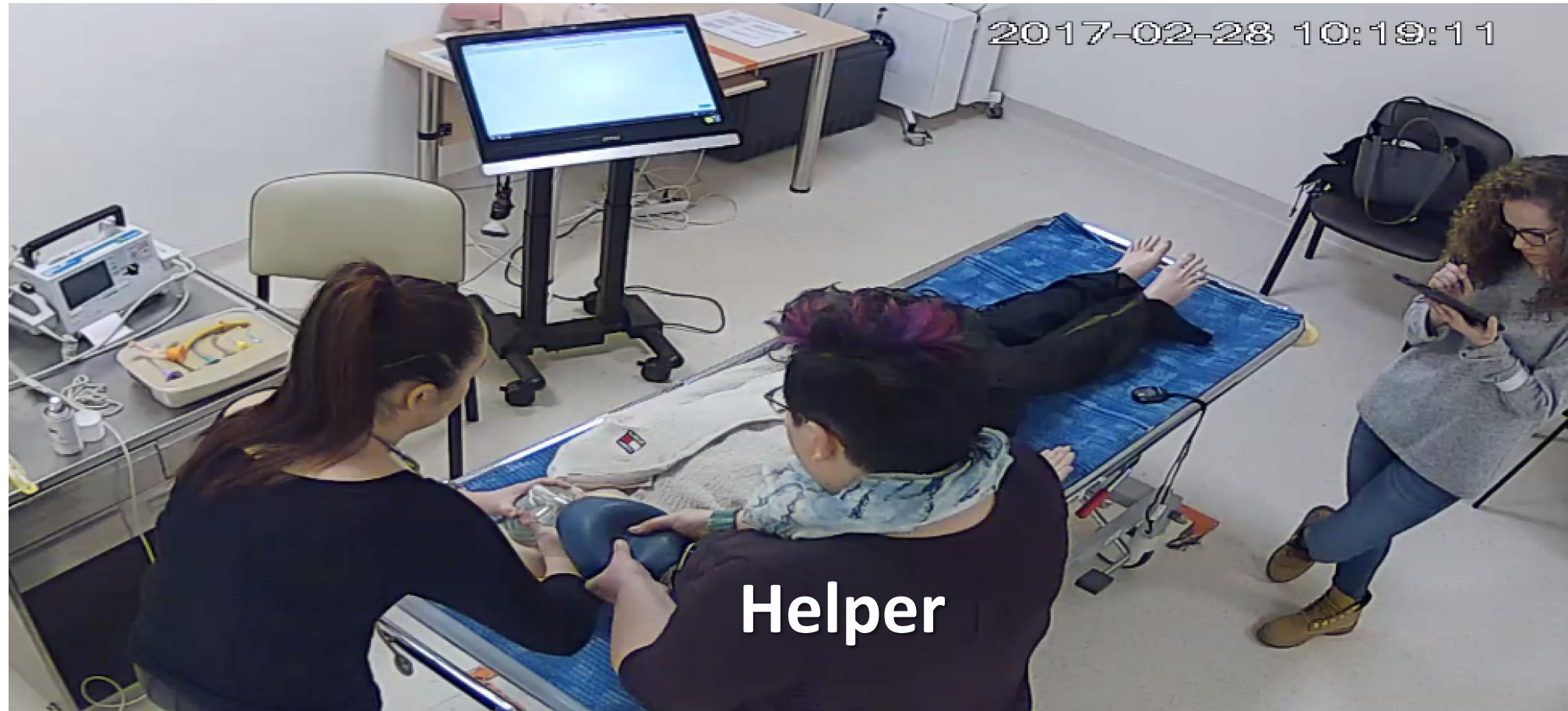
Your frightened neighbor rings your door bell. Her son has lost consciousness. She asks for your help, because she knows that you are a student at LUHS. When you come to your neighbor's flat, you find her son lying face down on the floor.

No.	Steps of the algorithm (performed by the leader and assistant)	✓	Course of the scenario (the supervisor reads out loud - only the text that is marked black)
1.	<b>ASSESSMENT</b>		
2.	Is he responsive to tapping and shouting?	<input type="radio"/>	Unresponsive to shake and shout
3.	Turn the victim onto his back	<input type="radio"/>	
4.	Is he breathing normally? (no longer than 10 s.)	<input type="radio"/>	Not breathing
5.	Is the victim in the hospital?	<input type="radio"/>	Yes
6.	Call for an ambulance and ask for defibrillator: - 103 (Omnitel); - 033 (Bité, Tele2); - 03 (Teo).	<input type="radio"/>	Must address the team member by his/her name
7.	Check the carotid pulse (no longer than 10 s.)	<input type="radio"/>	
8.	Is there a pulse?	<input type="radio"/>	No pulse
9.	<b>CPR 30:2</b>		
10.	Continue CPR until defibrillator arrives	<input type="radio"/>	
11.	Perform 30 chest compressions	<input type="radio"/>	
12.	Give 2 breaths	<input type="radio"/>	After two rescue breaths the instructor tells that stomach contents begin to flow through the patient's mouth

13.	Turns the patient's head and clears the mouth	<input type="radio"/>	
14.	Continues CPR 30:2	<input type="radio"/>	In real life situation resuscitation without rescue breathing would suffice (outside the hospital)
15.	Is defibrillator available?	<input type="radio"/>	Defibrillator is not available
16.	Continues performing CPR 30:2 without interruptions	<input type="radio"/>	Does not pass, if repeats the pulse check (must perform 5 cycles 30:2)
17.	Asks if the ambulance has arrived	<input type="radio"/>	The ambulance arrives after 5 cycles 30:2. Then defibrillator is brought and the assistant starts performing compressions (no acting!)
18.	<b>USE OF DEFIBRILLATOR</b>		
19.	Place defibrillator on your side, near the head of the victim	<input type="radio"/>	
20.	Turn defibrillator on	<input type="radio"/>	
21.	Is it an automated external defibrillator (AED)?	<input type="radio"/>	Defibrillator is automated
22.	Follow instructions from AED	<input type="radio"/>	
23.	Ensure nobody is touching the victim, when AED instructs to stand clear	<input type="radio"/>	
24.	Has ALS team arrived?	<input type="radio"/>	No
25.	After defibrillation resumes CPR with chest compressions	<input type="radio"/>	The simulation ends when 30 chest compressions have been performed after defibrillation
26.	All actions have been performed in indicated sequence	<input type="radio"/>	
27.	<b>QUALITY OF BASIC LIFE SUPPORT</b>		
28.	Compression depth > 50mm	<input type="radio"/>	Average compression depth (first line)
29.	Compression rate 100-120 times/min.	<input type="radio"/>	Average compression rate (third line)
30.	90% and more compressions are correct	<input type="radio"/>	Percent correct (sixth line)
31.	Interruptions in chest compressions shorter than 10 s.	<input type="radio"/>	
32.	During ventilations the patient's chest rises	<input type="radio"/>	The student passes, if patient's chest rises after every rescue breath

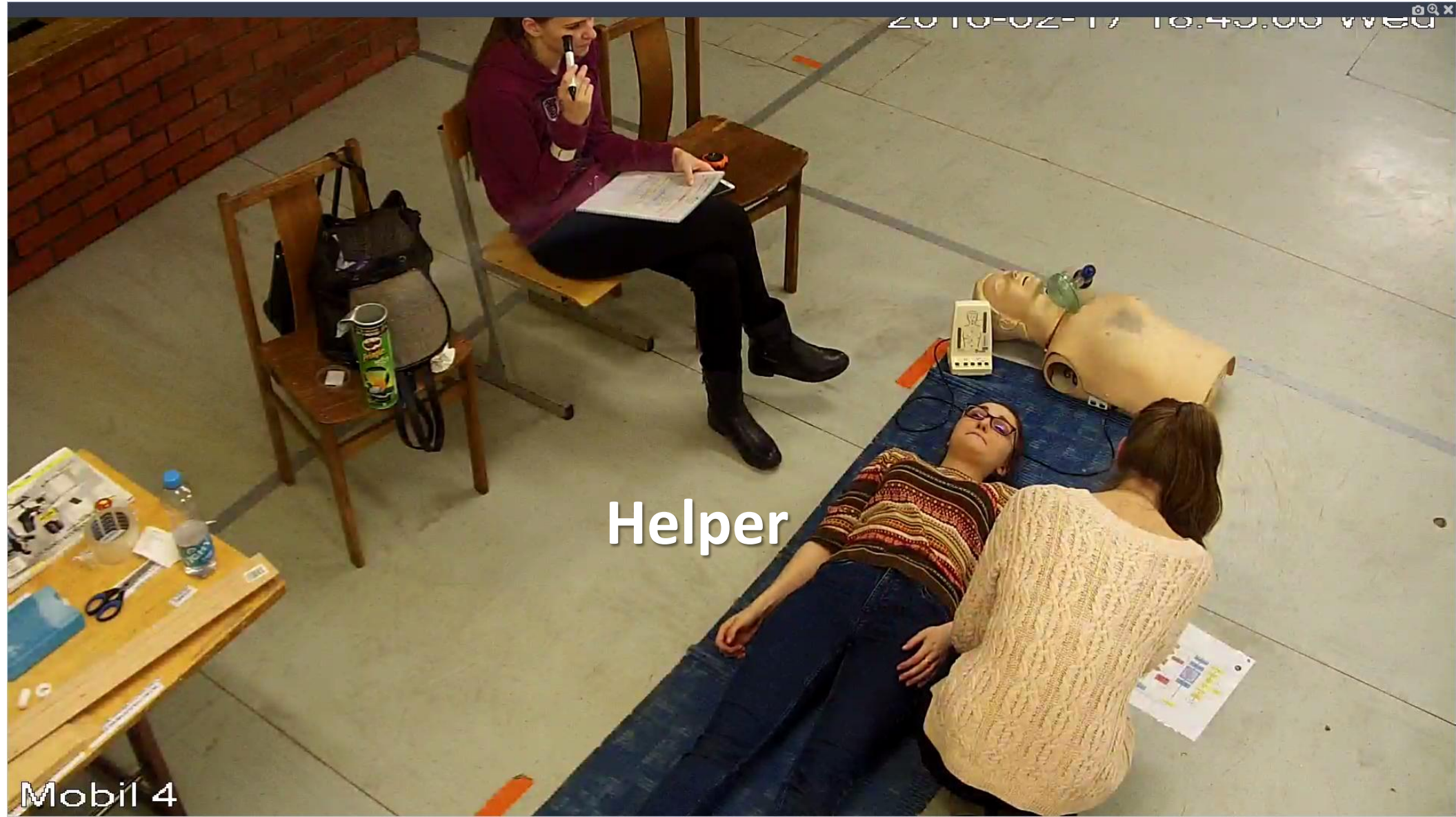
qualitative

# Helper assists during the simulation





# Helper plays a role of a patient





Then students switch roles...



# Evaluation

## 3

**Instructor monitors and evaluates student's performance:**

- From the distance
- At convenient time
- Feedback
- Formative evaluation
- Summative assessment





# Evaluation

3

www.smp.lt/moodle/mod/checkboxreport.php?id=6204&sortby=lastasc&studentid=93249

Visi punktai: 100%

**BŪKLĖS ĮVERTINIMAS**

- ☒ Ar reaguoja pajudinus ar pašaukus?
- ☒ Paguldyk ant nugaros
- ☒ Ar kvėpuoja normaliai? (ne daugiau kaip 10 sek.)
- ☒ Ar įvykis ligoninėje?
- ☒ Kviesk GMP
- ☒ Reikalauk defibriliatoriaus
- ☒ Patikrink miego arterijos pulsą
- ☒ Ar yra pulsas? (ne daugiau kaip 10 sek.)

**PRADINIS GAIVINIMAS 30:2**

- ☒ Gaivink, kol bus atneštas defibriliatorius
- ☒ Atlik 30 krūtinės paspaudimų
- ☒ Atlik 2 įpūtimus

**DEFIBRILIATORIAUS NAUDOJIMAS**

- ☒ Pasiruošimo metu atliekami krūtinės ląstos paspaudimai (iki tol, kol AID liepia atsitraukti)
- ☒ Padėk defibriliatorių prie paciento galvos toje pusėje, kurioje esi
- ☒ Įjunk defibriliatorių
- ☒ Vykdyk AID nurodymus
- ☒ Užtikrink, kad niekas neliestų paciento, kai AID liepia atsitraukti
- ☒ Po defibriliacijos atnaujina gaivinimą nuo paspaudimų

**PRADINIO GAIVINIMO KOKYBĖ**

- ☒ Paspaudimų gylis >50 mm
- ☒ Paspaudimų dažnis 100-120 k./min.
- ☒ Pauzės be paspaudimų trumpesnės nei 10 sek.
- ☒ Įpūtimų metu kyla krūtinės ląsta
- ☒ Atliko visus veiksmus teisinga seka

Komentaras / el.paštas:

Jūsų kūno padėtis paspaudimų metu: Jūs buvote šiek tiek pasisukusi į manekeno galvos pusę, todėl ir rankas laikėte truputį išrišiai krūtinės ląstos atžvilgiu. Atminkite, jog turite žiūrėti tiesiai prieš save, rankos tiesiai prieš Jus, nes kitain

Checklist

Comment to  
a student

PowerPoint

05/11/2016 13:39:36

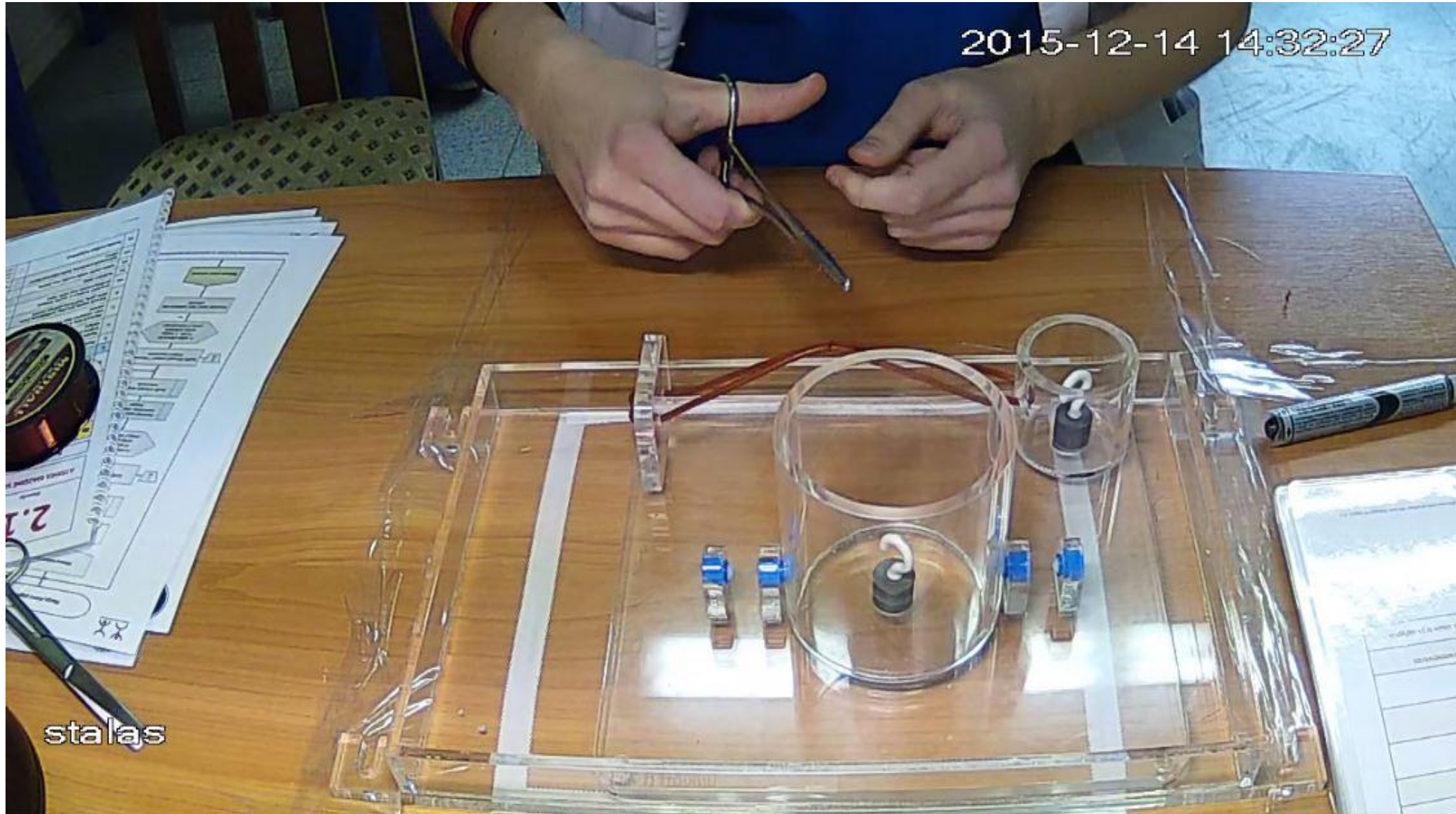
2016-05-13 13:40:00

13:35:00

13:39:37

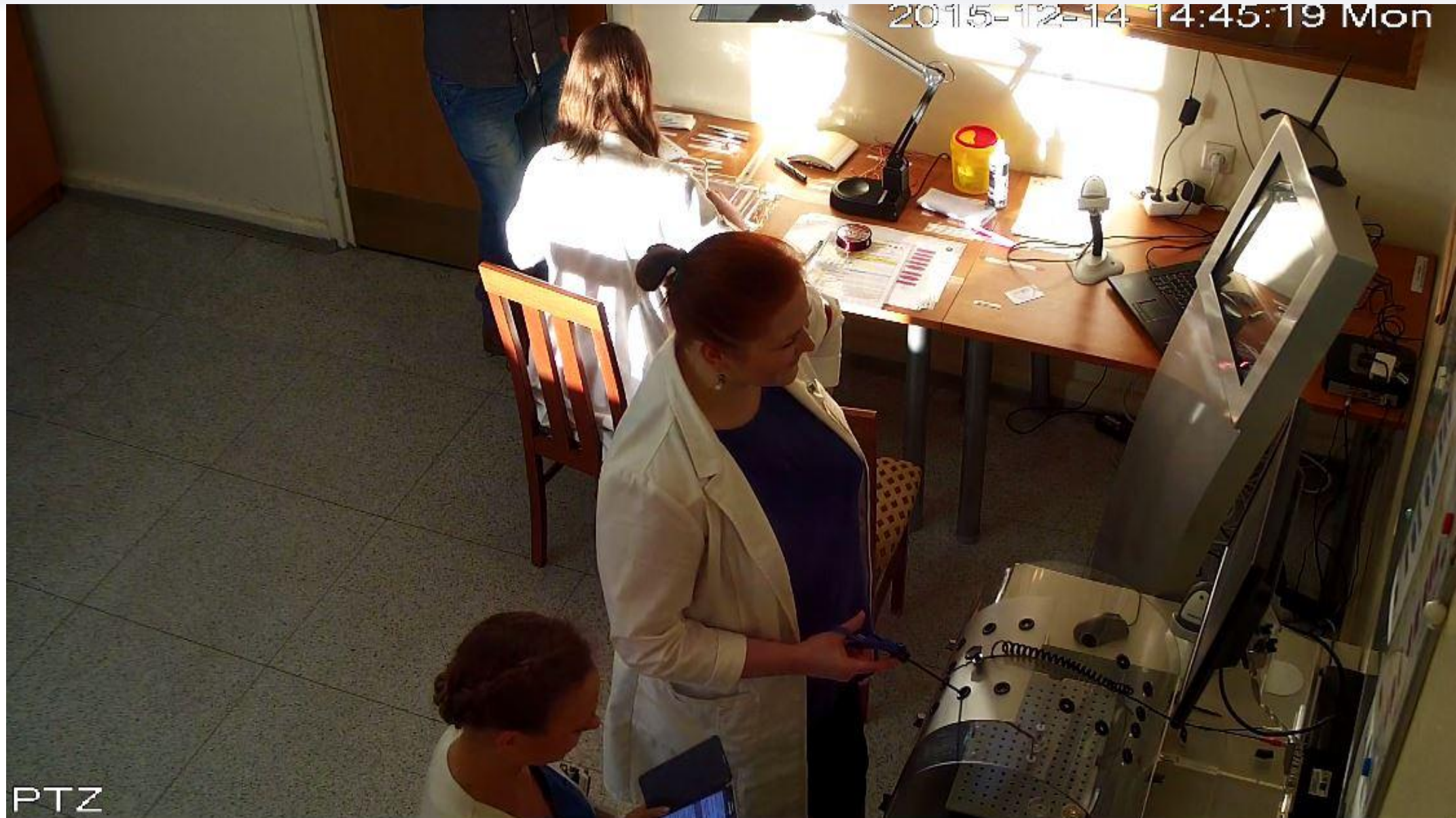


# Basic surgical skills lab: open surgery



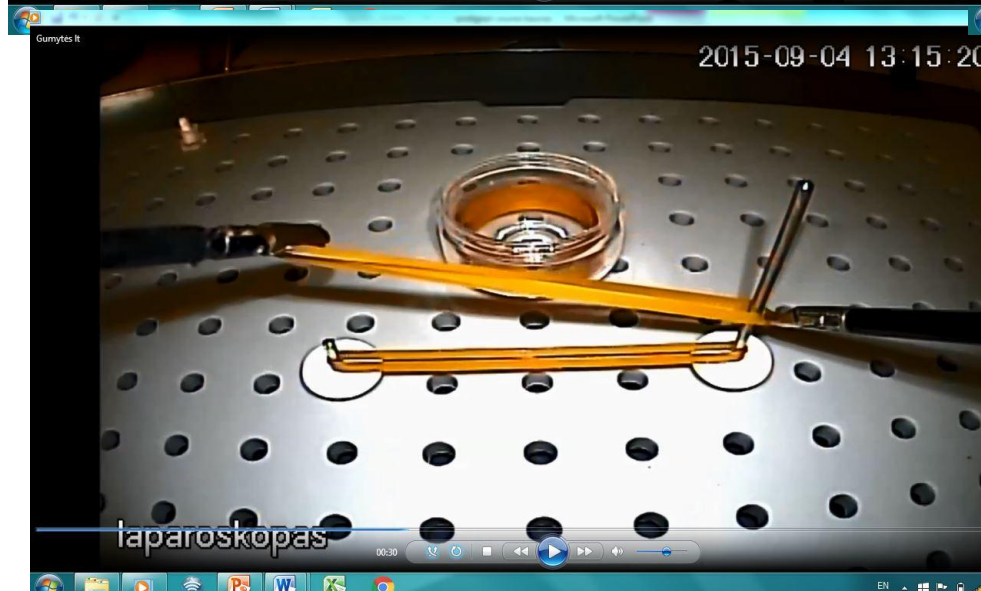
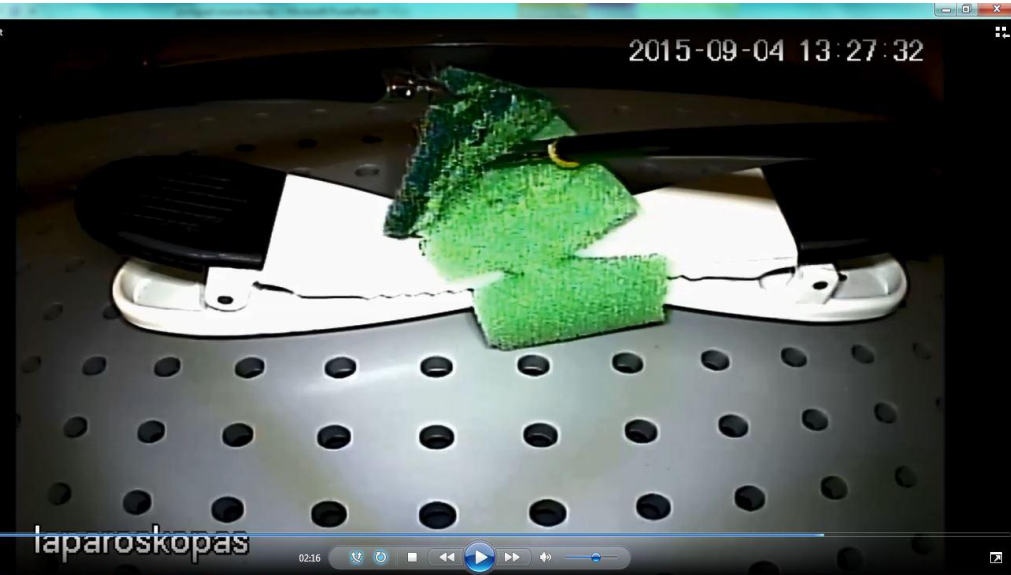
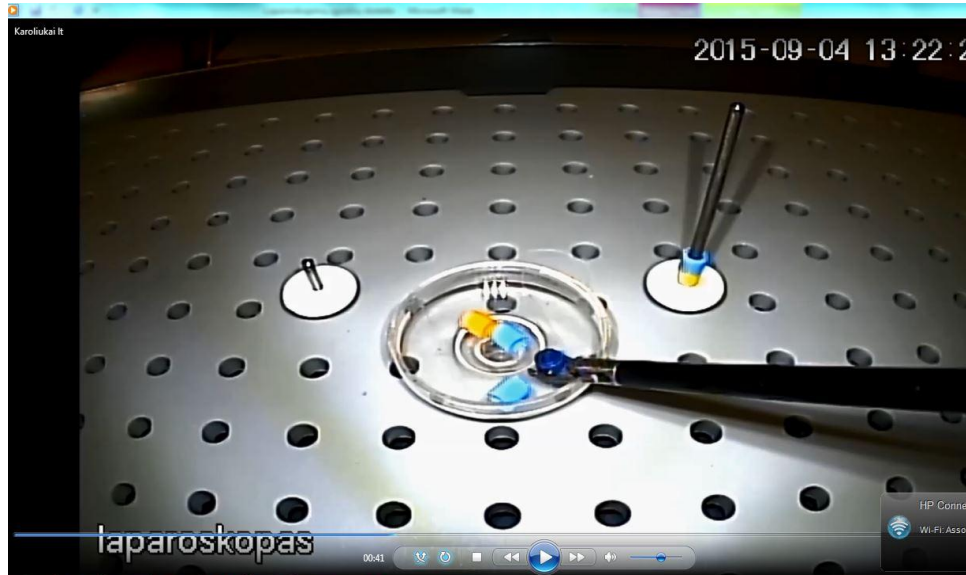


# Basic surgical skills lab: laparoscopic surgery





# Basic surgical skills lab: laparoscopic surgery





# Team training: advanced trauma life support

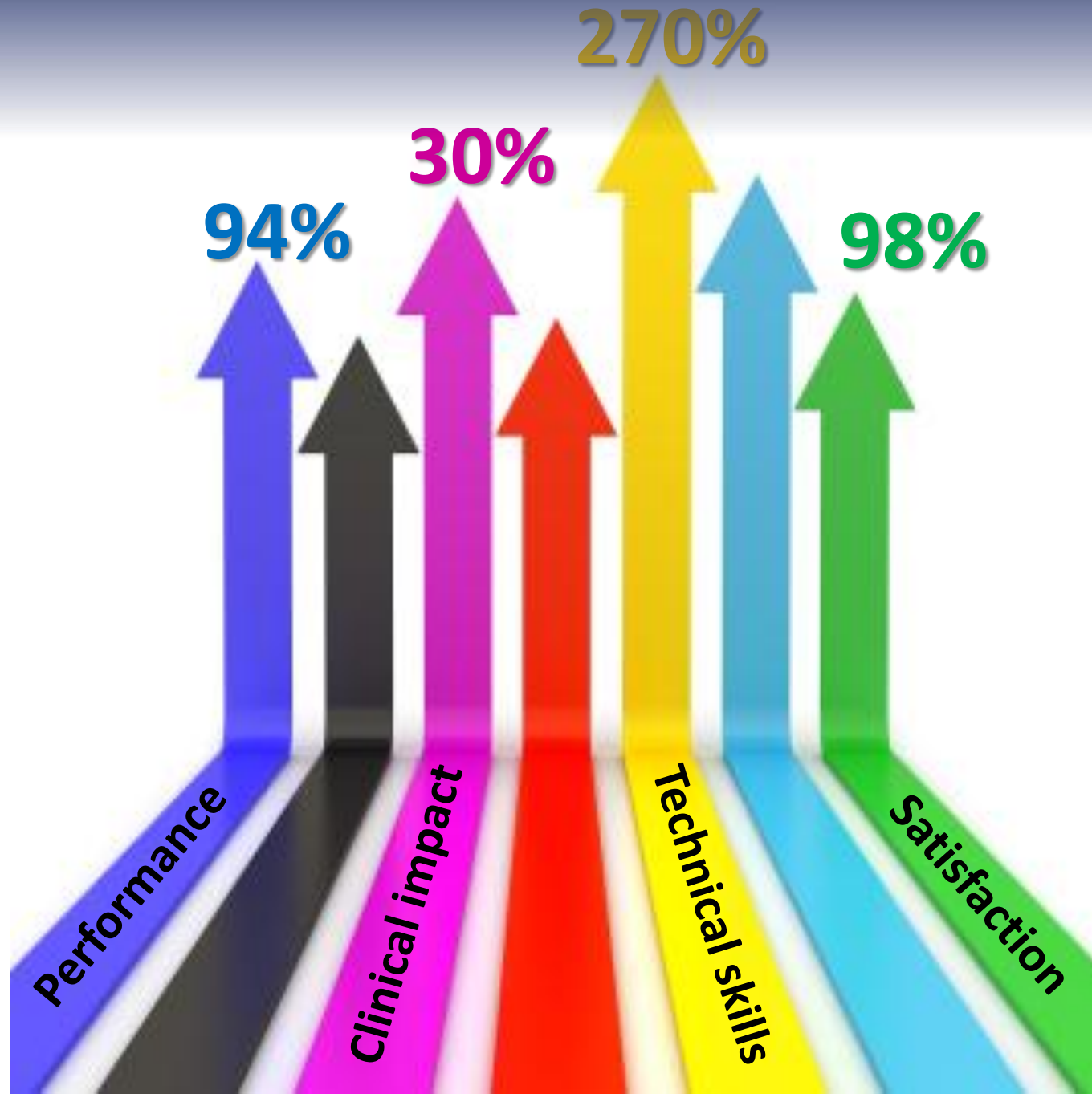




# Airways management



# Results





# In situ simulation & clinical audit





# Next Generation Simulation with Remote Instructor

- ❑ People are changing (generation -x, -y, -z).
- ❑ Learn from success, not from mistakes.
- ❑ E-learning is cheap. Simulation is expensive.
- ❑ To run a simulation without an instructor you need a precise description of all processes.
- ❑ Mixed (Hybrid) training increases hands-on time in Emergency medicine training and improves Non-technical skills.
- ❑ Everyone wants to be happy :)



[Hybridlab.com](https://Hybridlab.com)



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