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EDUCATION CONFERENCE



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

TEACHING AND LEARNING CHEMISTRY DURING THE QUARANTINE – THE CASE OF THE LABORATORY WORKING

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CONTENT

- INTRODUCTION (the study programs, subject Chemistry, the situation during winter semester 2020)
- The performing of the laboratory work
- Survey and the results
- CONCLUSIONS

THE STUDY PROGRAMS IN THE FACULTY OF NATURAL SCIENCES AND MATHEMATICS

- Biology
- Ecology with Nature Conservation
- Physics
- The subject teacher (Educational Biology, Educational Physics, Educational Chemistry, Educational Mathematics, Educational Computing, Educational Techniques)
- Mathematics

THE SUBJECT CHEMISTRY

- Obligatory subject
- Lectures (45 hours) and 9 laboratory exercises (30 hours) in winter semester of the 1st or 3rd (Physics) semester of the studies
- The lectures and laboratory exercises include: the basic conception of general, inorganic and organic chemistry, influence of the structure of compounds on their properties and reactivity, chemistry of the most important elements and compounds in the environment, chemical laboratory and industry

THE SITUATION

- Usually: the realization of the laboratory exercises in the laboratory, students work alone or in tandems
- The changes in winter semester in 2020 because of the lockdown
- Till the end of october we finished 4 laboratory exercises
- Still have to carry out 5
- Students' and assistent's decision for the online laboratory exercises in december 2020 and january 2021



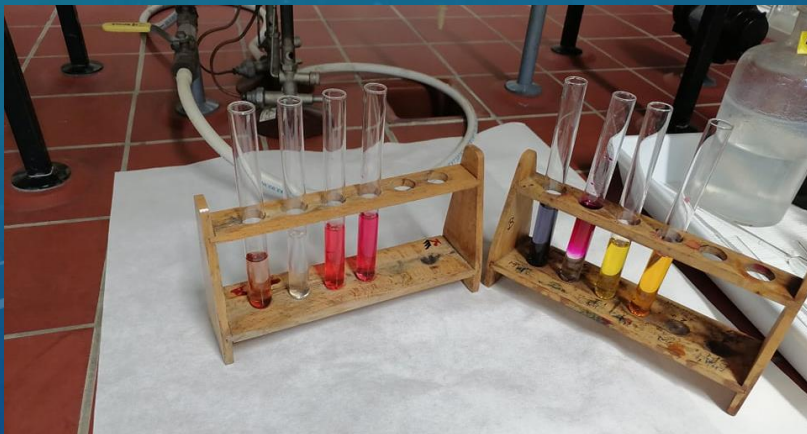
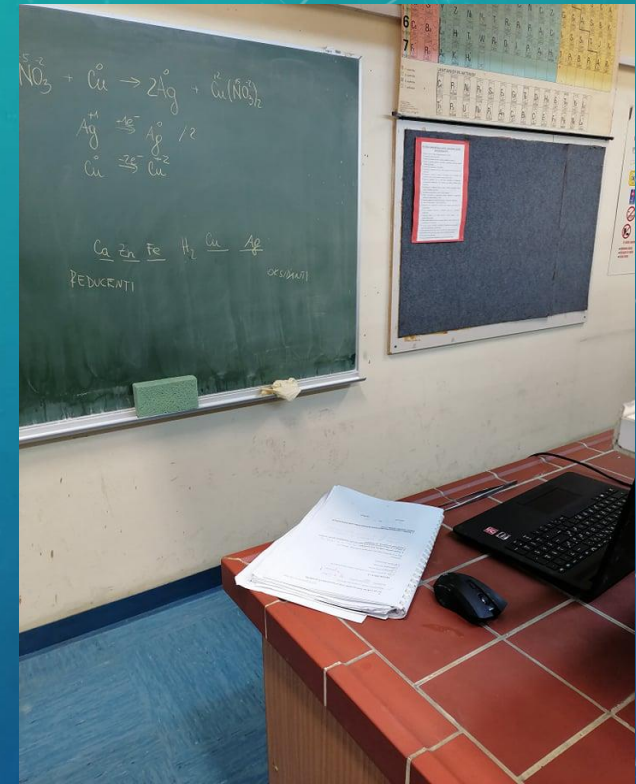
THE REALIZATION OF THE ONLINE LABORATORY EXERCISES

- The students had scripts of the laboratory exercises (in which the theory of each exercise and all the procedures are described; students can also make notes in them)
- 5 laboratory exercises: acids and bases; chemical equilibrium; redox reactions; simple distillation; the synthesis of acetylsalicylic acid
- all of the 5 laboratory exercises were performed online from the chemistry laboratory of the Faculty, in front of the eyes of the students
- Students could observe every single experiment in live

- Before starting with the experiments we repeated all the theories they heard in the secondary school and we went through new knowledges
- The conversation between assistant and students was going on all the time: during each experiment we talked about what we were going to do, which chemicals would we use, how we would work on the experiment, what should we expect, we looked at the reactions, changing colours of the solutions, talked about what was going on etc.
- Most of the students did cooperate in conversation, they were asking questions, fulfilling the answers to the scripts
- At the end of each tutorial we repeated the results
- The laboratory exercise *the synthesis of the acetylsalicylic* was partly realized through ppt presentation

THE PROBLEMS

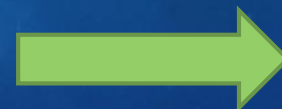
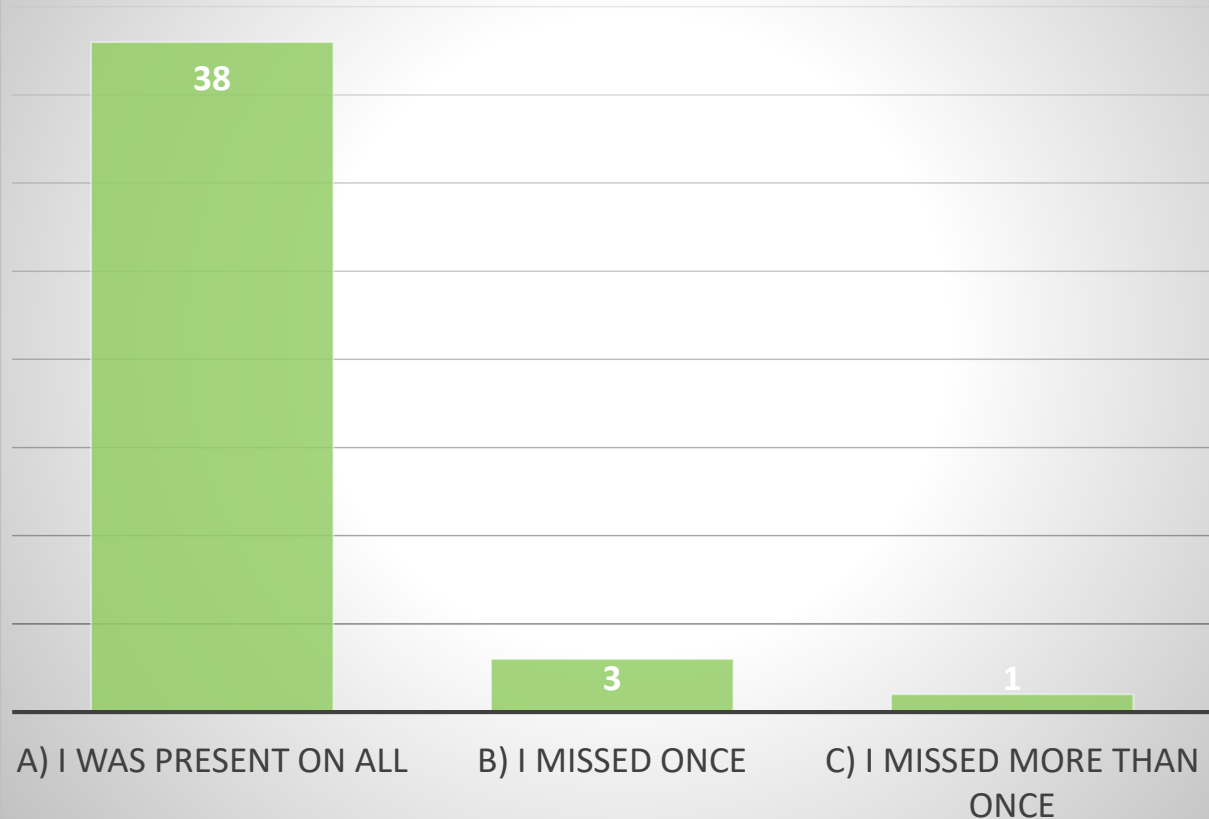
- The chemistry laboratory is in the basement of the Faculty, where we expected to have some problems with the wifi connection
- We were aware that such performing of the chemistry lab exercises is not the best, so we were trying to show all the experiments as good as possible (for example, with white background etc.), we were repeating the reactions if needed, we were repeating the results



THE SURVEY

N= 42

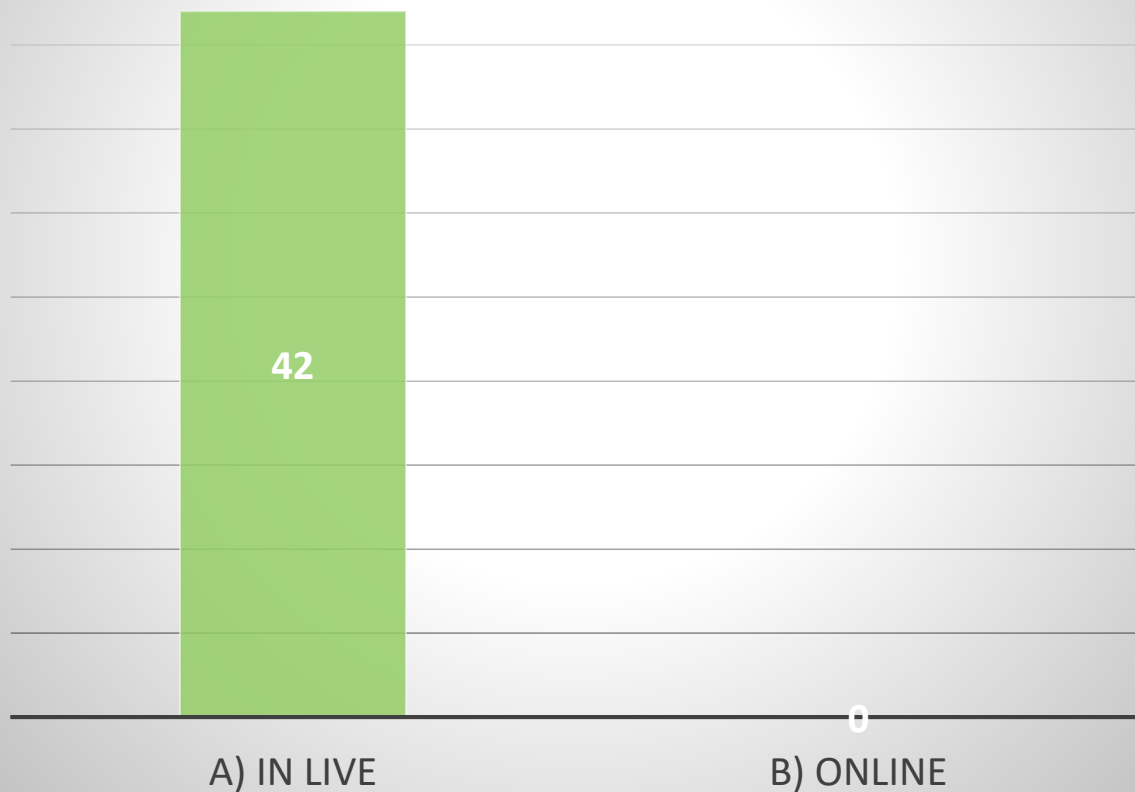
How many times did you attend the lab exercises by the subject Chemistry?



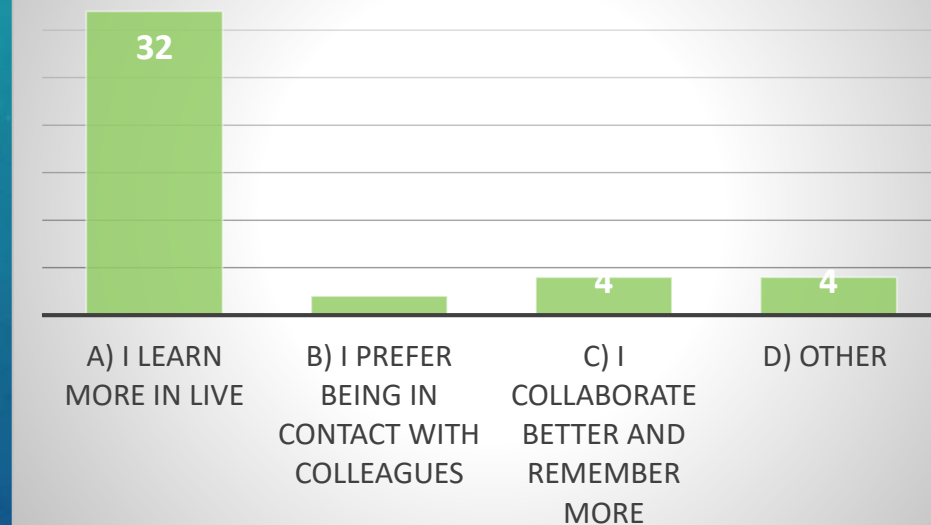
If you answered b) or c), when were you missing?



If you could choose between in live and online exercise realization, which one would you choose?

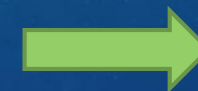
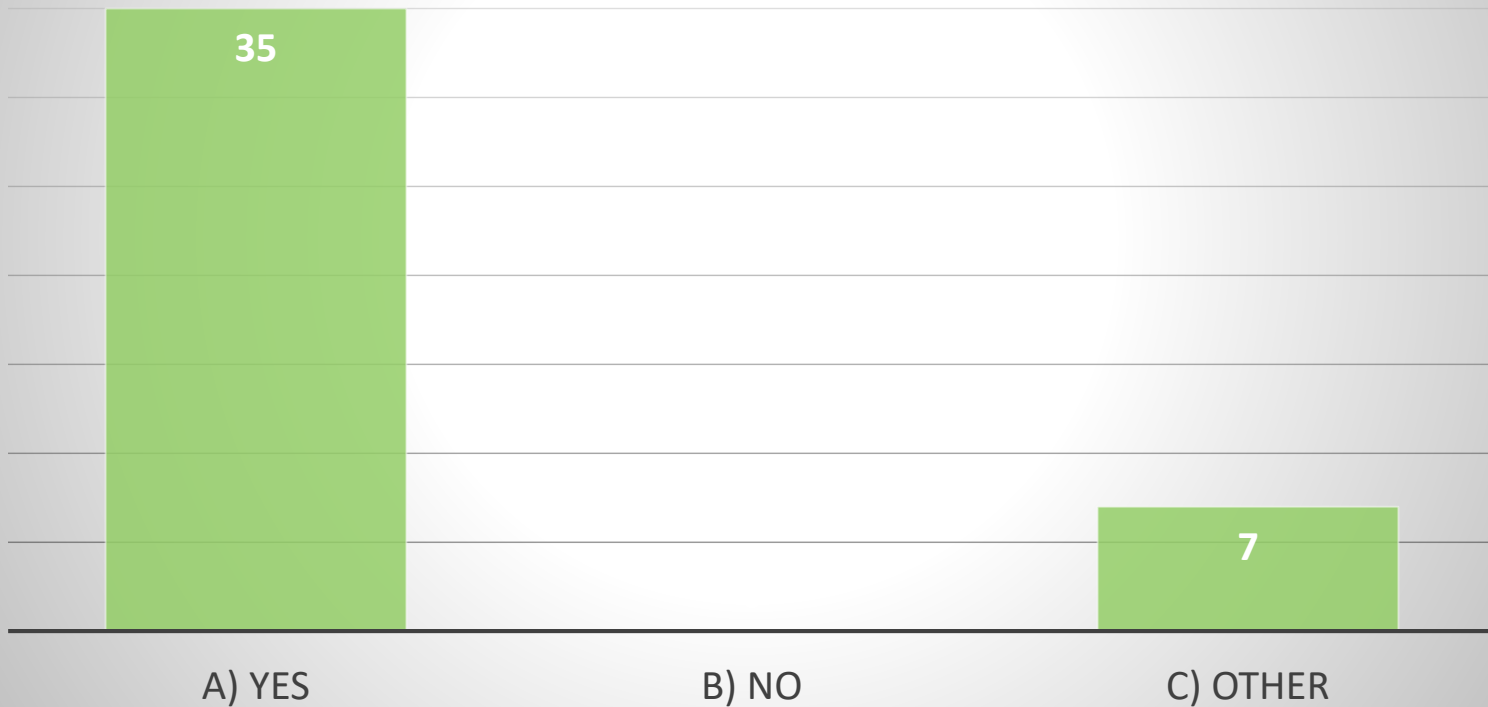


If you answered a):



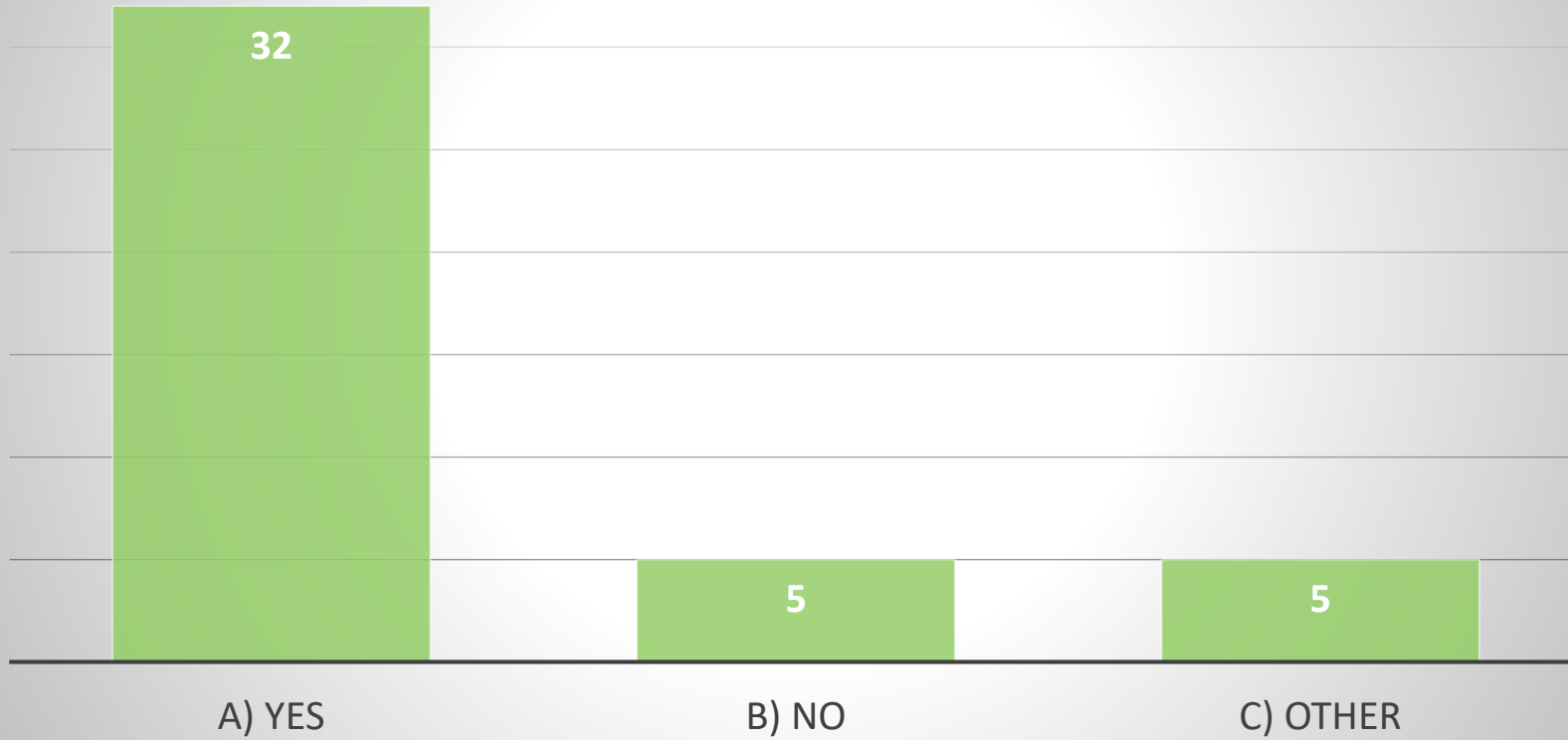
- D)
- I could hardly imagine what is going on
 - in live exercises are more effective
 - we can't get practical skills online

The assistant realized the lab exercise in front of you. Do you think the exercises were properly performed?



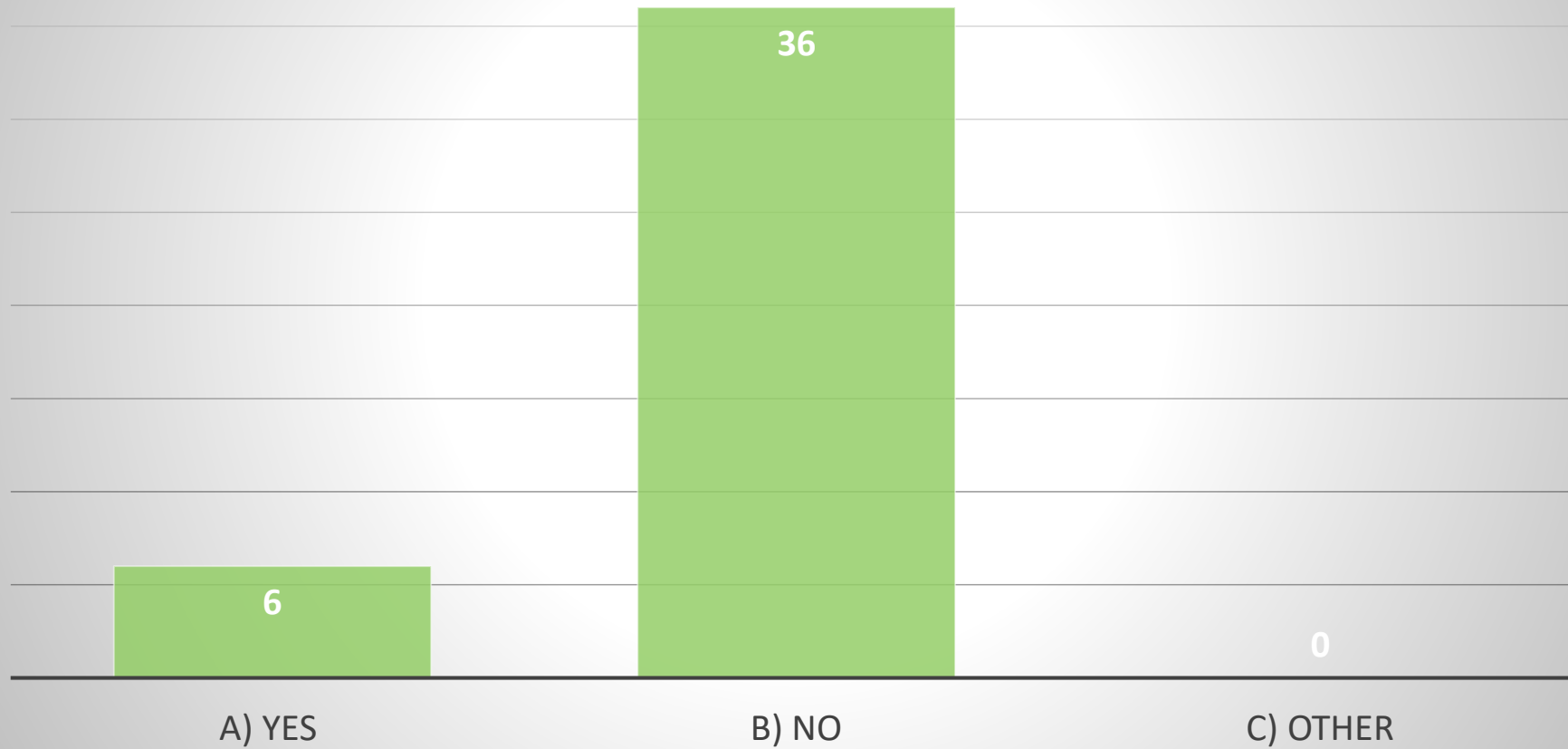
C)
- the lab exercises were realized properly however there was a problem in video
- the results should be presented as pictures

Do you think you learned enough?

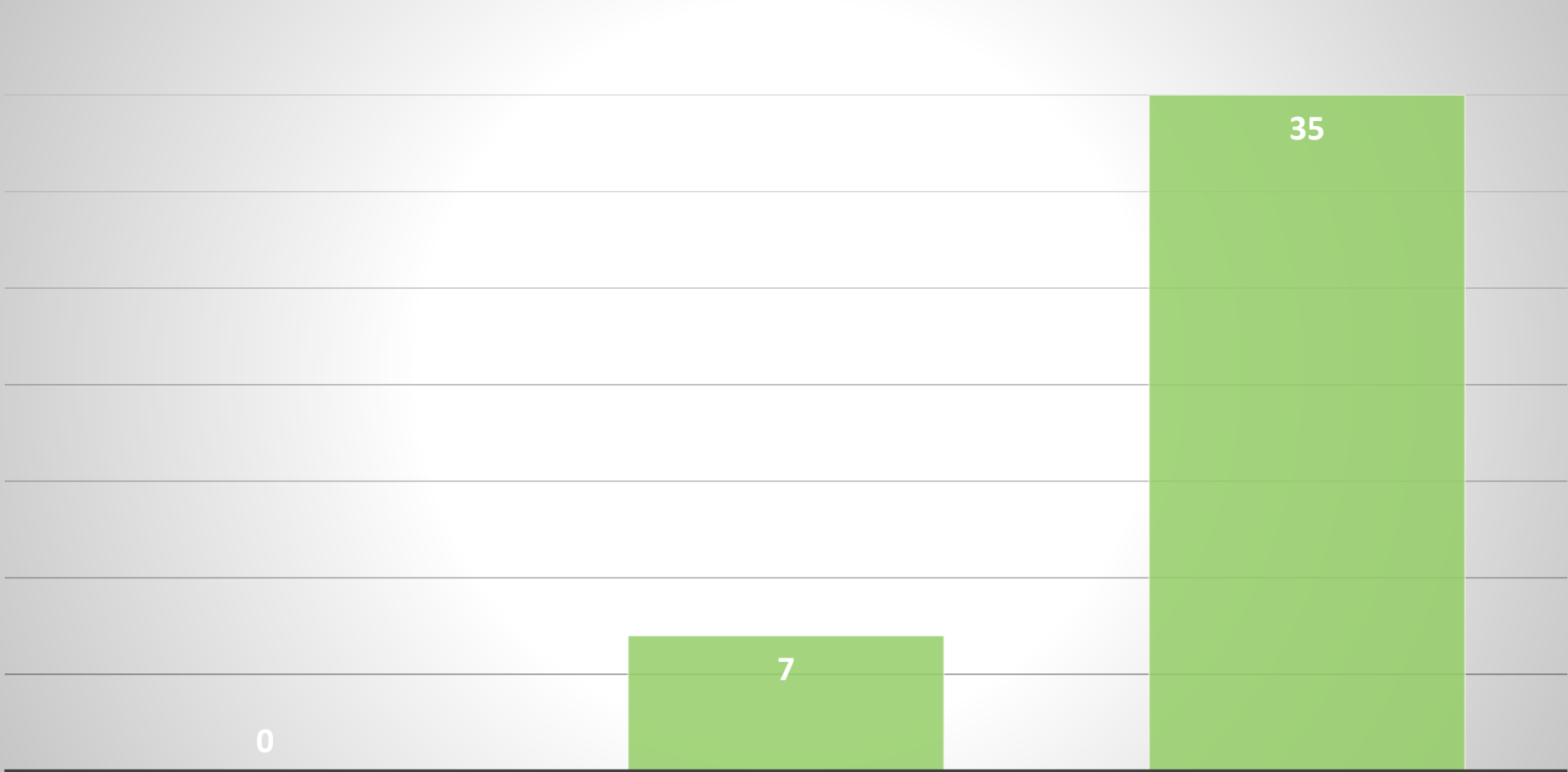


- C)
- by online working we needed motivation which was falling during the time
 - the part of individual work was missing
 - the measuring and practical work were missing, but we learned something by observing

Would you prefer video presented exercises?



I was following online exercises using:

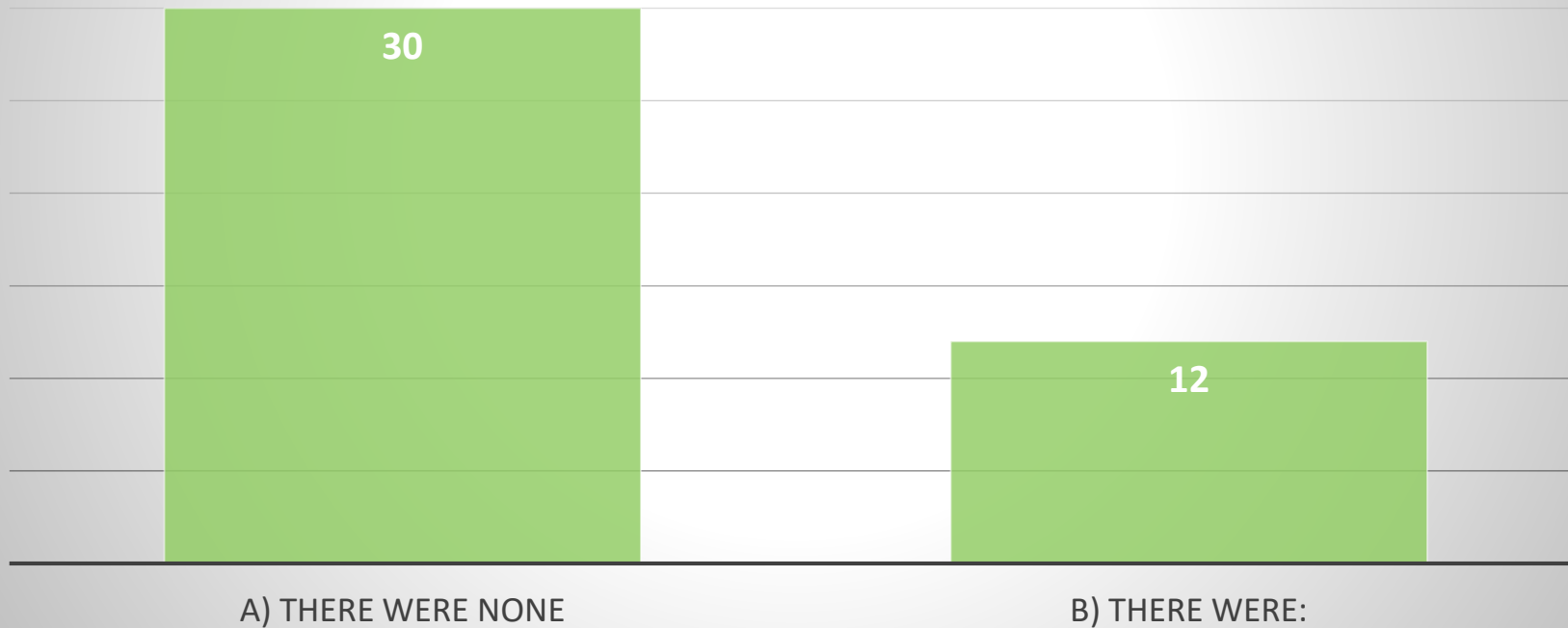


A) TABLET

B) SMARTPHONE

C) COMPUTER

Which do you think was the major disadvantage of the online exercises?



B)

- we didn't work alone; there were some breaks of the video
- the pictures of the results should be send to us
- we couldn't get the practical skills online
- we saw the experiments and the results but working alone would be better

CONCLUSIONS

- The laboratory exercises should be realized in live
- If there is no chance to work in the lab → waiting till the end of the lockdown → later realization
- If we have to do the exercise online again → making a video of each exercise → making the presentation including the videos → presenting the exercises as we did + sending the pictures of the results to students

The background is a blue gradient with faint technical diagrams and circular patterns. On the right side, there are several circular diagrams with concentric lines and arrows, resembling a gauge or a control panel. The text "THANK YOU!" is centered in a bold, white, sans-serif font.

THANK YOU!