

Dealing with Laboratory Computer Exercises in The Times of The Pandemic

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Section 1

Introduction

- Experiences from the Computer Science classes at the Faculty of Sciences, University of Novi Sad
- These classes almost always have a laboratory component

- In “normal” classes (pre pandemic):
 - An assignment (or several) is given
 - Some explanations are added
 - Students work on the programs
 - Assistants try and help them
- Variations exist, of course

- Most classes have a dedicated Moodle course
 - Lecture notes, slides, books, etc
 - Assignments, solutions
 - Extra work materials, etc
 - Sometimes a place to submit assignments or homework

Section 2

Pandemic

- Pandemic meant no physical interactions
- Practically no one knew how to handle the classes now
- The first few weeks were almost with no exercises

- People started experimenting with various video platforms
- An acceptable replacement for regular classes
 - students can listen
 - feedback can be in chat or voiced
- Regular classes have less interaction (in most courses)

- At the start everyone used whatever they found to work
 - Or found out the hard way if it doesn't :(

- CS Departments actually the most prepared for these circumstances
 - But honestly – no one was really ready
- Having Moodle was a big help for communication

- Many students also had issues
 - Weak computers - problems with video
 - Shared computers at home
 - Lack of space at home
 - Lack of knowledge in setting up

Video conferencing technologies

- Zoom, Google Meet, MS Teams, Discord, etc
 - Commonly problems with number of participants
 - Some larger courses used pre recorded video shared on Moodle
- jit.si as one open alternative
 - Faculty eventually set up an in house server; somewhat integrated with Moodle
- University had a project with Cisco Webex

- Eventually Webex took a majority of our courses
- A significant part still used Teams or Discord
 - Sometimes as just support for extra communication

Tests

- Very problematic in the beginning
- Some went with homework type tests
- Some went with asking students to have their cameras on while working on assignment
- For some big courses we even reverted to on-paper programming

Section 3

Approaches to Labs

- Several types and combinations, many courses experimented and “mutated” during the years
- Some main approaches will be presented, but they were often combined

Demonstration mode

- Teacher shares their screen and solves the problem
- Students have limited interactions
- Exercises are basically done independently “at home”
- (+) Straightforward to implement
- (-) Not really laboratory exercises - more like the theoretical type
- With some effort can still be very effective
 - (+) Students can be encouraged to interact more
 - (-) Students can't be forced to interact, they can just sit and (hopefully) listen

Breaks for individual work

- Teacher shares their screen and show the problem(s) and gives some hints
- The class “disbands” to start working
 - Teacher is potentially available during this time for more hints
- After some time the class reassembles
- Solutions are presented and discussed
 - Students are encouraged to share their screens with the solutions

Solving Next Time

- Variation on to the “breaks” approach
- Give the assignments towards the end of the class
- Solve the assignments together with the students next time
- Can be combined with points for homework

Section 4

Slow Return to "Normal"

- Timing going back to in-person lectures was problematic
- In our case, Computer Science was returning last
 - Lack of space, allowing others to use it more efficient
 - CS teachers and students are the most adept at staying online
 - Laboratory exercises need a lot of time slots live

- Transition was gradual
- Some courses returned full in-person (usually smaller ones)
- Others would do at least some of the tests in-person with online labs

Section 5

Student performance

- The general feel was that students were on average passing the exams at similar rates
- Example from a big obligatory course

Year	“Active”	Passed labs	Passed	Comment
2019	80%	54%	51%	Normal
2020	74%	61%	58%	On paper
2021	81%	54%	52%	Mixed tests
2022	78%	48%	41%	In person tests
2023	82%	61%	50%	Back to “normal”

- Same rates of passing does not mean “it wasn't different for students”
- Likely:
 - Some students preferred working “on their own time”
 - Some students probably had to work a lot harder to achieve results

Section 6

Conclusions

Return to “normal”

- Live interactions are irreplaceable
- Walking between students, giving little pushes when noticing common problems
- Shy students are more likely to ask when a teacher approaches on a walk
- Teacher can notice struggling students more easily
- Students can help each other sometimes

Some things can be different

- Some demonstration videos can still be used
 - Help students who have missed some classes
 - General help for harder problems
 - Covering coursework that was not presented live for unforeseen events
- Many teachers now offer online consultations on-demand

Thank you for your attention!

Questions?