



Lessons learned about online / hybrid education and the road towards calmer waters

Research report

June 2021



De
Ambitieuze
Student



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Eindhoven, June 2021

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Introduction

The vision of DAS Eindhoven is that students should be stimulated and supported to develop themselves alongside their studies. One of the means to realize this vision is the improvement of online and hybrid education, to better fit the needs of students and improve the quality of education at TU/e. In June 2020 DAS released their research report 'Student's opinions on online education after COVID-19'. This report was the product of the ubiquitous worldwide pandemic which accelerated the digitalization of education rapidly. Nevertheless, we aim to improve online education with a long-term focus. While the previous research report focused on the general aspects of online education we felt the need to provide teachers with more concrete building blocks. As a result, we hereby present our follow-up research report 'Lessons learned from online/hybrid and the road towards calmer waters'; a handbook from students for teaching staff at TU/e.

Summary

With this research, DAS Eindhoven has summarized the opinion of 84 students. Although this is only a small percentage of our community; we feel that their opinions represent a larger part of student's opinions. Combined with the extensive answering and in-depth interviews, we think this report fits perfectly in the puzzle of improving education on which the TU/e is continuously working.

Our current way of education was subject to one of the fastest educational improvements. Radical changes led to a completely digital way of working. This was not easy for staff and students. Our participants stated they were neutrally satisfied with the online skills of our teachers. Surprisingly, 0 out of 81 students indicated they were 'very satisfied' with the teacher his online skills. Hence, participants indicated insufficient technical knowledge as the root cause of technical problems among frequently made mistakes.

Leaving mistakes in the past and looking forward to education post-COVID-19, we have a new challenge ahead: how to deal with the digital inheritance of this radical shift towards online education. 45% of the participants stated they prefer live (online) lectures, whereas 35% stated they prefer (short) prerecorded instruction videos where teachers remain accesible for questions and contact moments. Obviously, there is a desire to keep a mix of lecture forms. In addition, students strongly state the preference of lectures being and keep being recorded for a wide variety of reasons.

First and foremost, students indicate they see their future education as a mix of live and recorded lectures or instruction videos with an on-campus focus for group work and interactive sessions. This supports the universities' vision but reveals the digital aspects students prefer to keep. For example, students indicate they study better for their exams when lectures are recorded. These digital aspects might require an increased investment first but will give a higher profit in this future view of education.

Concluding, we recommend to:

- Record all lectures.
- Keep improving technical difficulties.
- For high investment and high reward, use short instruction videos, or
- Use live lectures where interaction in the form of small quizzes is included.
- Use Teams as a platform for educational forms.
- Use a form of online exams where students can hand in written answers.
- In future education, use the online platform for lectures and campus for interactive moments.

Method

Goal of this research

There is one thing we would like to state beforehand: this report is not a guideline for teaching staff how to teach students. Such statements would be far above our paygrade, but most of all a lack of experience and expertise. The goal of this research report is to provide teaching staff with best practices and frequently made mistakes during online/hybrid education experienced by students. Moreover, this report tries to reveal 'hidden gems': tools or methods (some) teachers might not know yet that are positively received by our students. The method used is a combination of quantitative and qualitative research methods. Quantitative and qualitative data were gathered through a survey and additionally, qualitative data was gathered by in-depth interviews. The survey consisted of three interrelated themes all contributing to the answer to the main research question:

What possibilities does teaching staff have to improve online/hybrid education for students and themselves?

Survey

To reach a wide variety of students, DAS created a survey that was sent out to our adherents and shared via unofficial channels like departmental WhatsApp and Facebook groups. Furthermore, we discussed our set-up and results with TU/e Teaching Support. The three related themes that participants answered were the following:

- How does your current online/hybrid education look like?
- How does your ideal online/hybrid education look like?
- Which assisting tools are there for teachers to improve online/hybrid education in a sustainably and efficiently way?

There were 27 multiple-choice questions (with an open-ended answering box), 9 questions with a Likert scale, and 5 questions with an open answer. 84 students filled out the survey. The complete survey can be found in Appendix 1.

Survey analysis

The questionnaire data with the Likert scale are presented in box plots for analysis. Qualitative data was analyzed by first coding the answers and setting up different categories of answers. These categories are explained in the different chapters below. How often each category was mentioned is analyzed in graphs. Students who did not fill in an answer were filtered out.

In-depth interviews

On top of that, 3 in-depth interviews were held with participants that had interesting or common given answers. The goal of interviewing participants was to get more insight into why students have a certain viewpoint. Hereby we ensure that our conclusions and recommendations are placed in the correct context. During the in-depth interviews, participants were asked to elaborate more on their given answers.

Report structure

The report is structured as follows: first, the current education is briefly discussed and compared to our previous research mentioned earlier. Second, the ideal online/hybrid education from a students' perspective is presented. Finally, some best practices, which can ease the stress level and workload of both students and teaching staff, are discussed followed by a thorough discussion and conclusion.

Participant profiles

The survey was filled in by a total of 84 students. All participants were Dutch.

21% of the participants were Bachelor students, and 79% were Master students. The diagram below shows in which study year these students were. It is noticeable that a large part (27/80) of the participants was a first-year student.

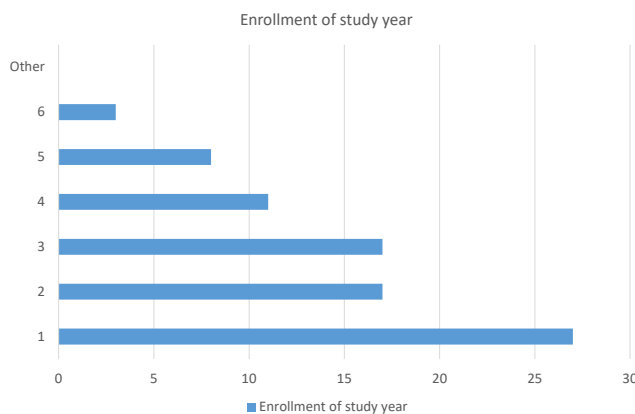


Figure 1: Study year of participants

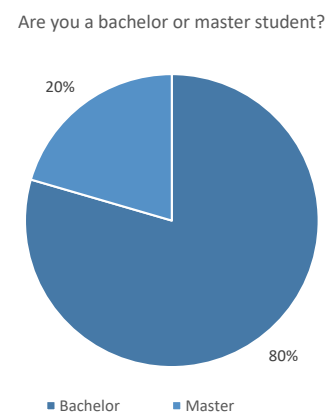


Figure 2: Study phase of participants

Results

Current experience of education

With regards to the current online and hybrid education, we asked participants how much they could relate to typical aspects of online and hybrid education. Think of, the design of the education form, recording in place or not, frequency, and interaction.

The results in Figure 3, tell us interesting facts. Many students indicate their teachers make use of (short) pre-recorded instruction videos and even more recordings of previous years. Also, people indicate that live lectures have not disappeared yet. Somewhat the same number of students indicate their lectures are sometimes always recorded as not recorded.

'Some teachers make the best of the situation and make great online videos. Other teachers just upload the recorded lectures of previous years.'

Live Q&As are, just as before COVID-19, a big part of our educational program. Almost all participants indicate their Q&A sessions or tutor groups are never or rarely recorded, which is in big contrast to the lectures. Forms other than lectures are often not recorded.

Finally, interaction during any form of education (lectures, Q&A, or tutor group) was polled to get a feeling of how the teacher compensated for the lack of physical contact last year. In specific, we were wondering how many built-in or external tools are used to enhance the interaction. Almost no one indicates teachers always use interactive tools. At the same time, almost every participant does have experience with interactive tools used by teachers. The majority of the participants indicate their teachers seldom or sometimes use digital tools to enhance the interaction between teaching staff and students.

'In an offline lecture, it's a lot easier to keep people their attention for longer periods. Online however does not provide for a situation in which people can concentrate very well. It is vital that teachers either keep their lectures straight to the point and brief or keep the students engaged through interactive tools examples and engaging questions.'

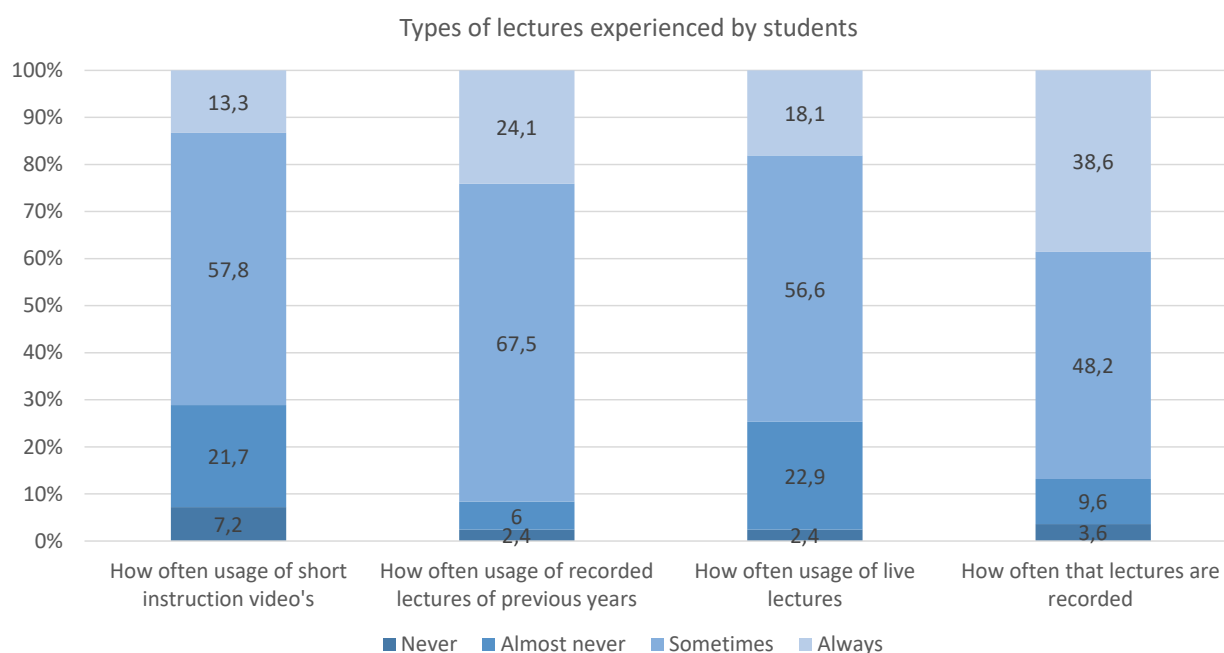


Figure 3: Lecture type per education form

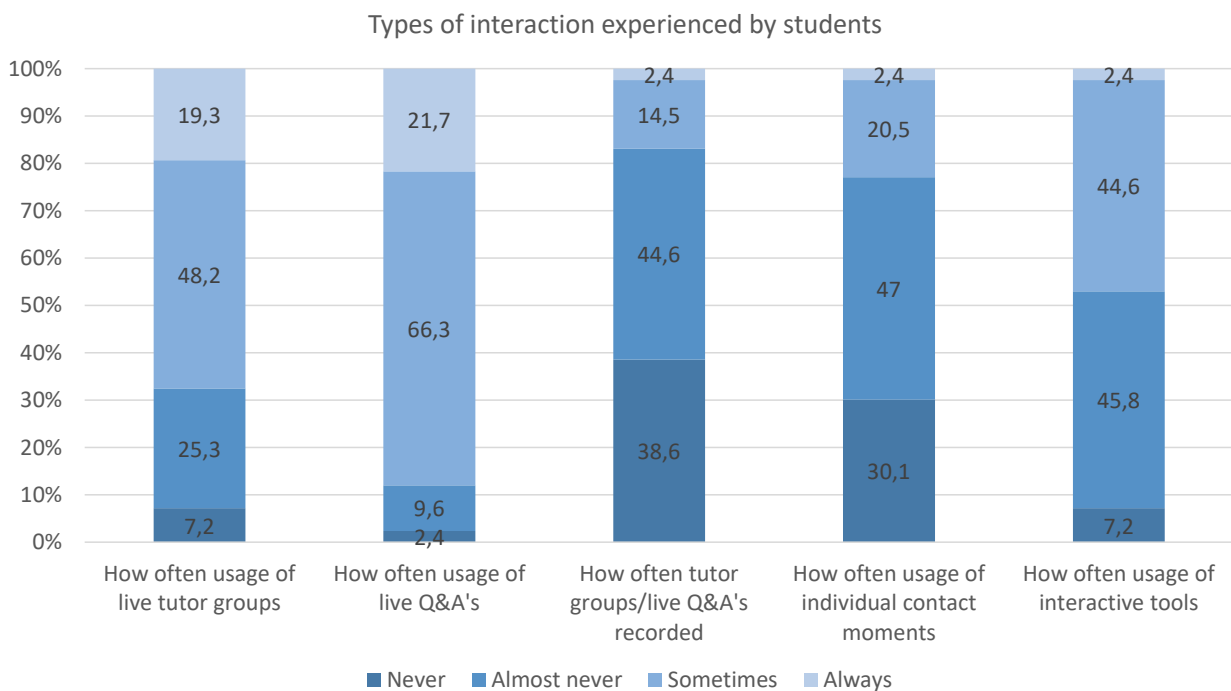


Figure 4: Interaction during education

The platform on which students enjoy online and hybrid education depends on the form of education that is given. For each form of education, we asked participants what platform they used the most. Table 1 presents the most used platform per education form. Surprisingly, each most given answer is almost unanimously given. In other words, for each most used platform, more than 75% of the participants indicated this answer. The complete answering and scores for each platform can be seen in the Appendix 2.

Table 1: Most used platform per education form

Purpose	Platform
Live lectures	MS Teams
(Short) instruction videos	Canvas
Lectures of previous years	Videocolleges.tue.nl
Recording live lectures	MS Teams
Live tutor sessions	MS Teams
Live Q&A's	MS Teams
Recording Q&A sessions	MS Teams
Individual contact moments	MS Teams
Online examination	Ans Delft

Tools that teachers use the most to enhance the interaction with their (partially) virtual classroom are presented in Figure 6. The Mentimeter is well-known among the majority of the teachers as well as the regular chat which almost every platform supports. It is noteworthy to state here that Mentimeter is an external tool without academic license for students. In contrast to Mentimeter, the poll is the least used option although supported by most of the current digital platforms.

Finally, participants indicated the level of content regarding the online skills of teachers. Overall, participants indicated that they were uiet, neutrally, or just satisfied. Nobody indicated that they were extremely satisfied and only a few participants were insufficiently satisfied.

'It depends on the teacher you have and the course. Some courses are really good online. Meanwhile, others say good luck and that's it for your feeling. The teachers that are performing well understand that we need more short breaks in de lectures and have a good setup (with working internet and good camera).'

Satisfaction with online skills of teachers

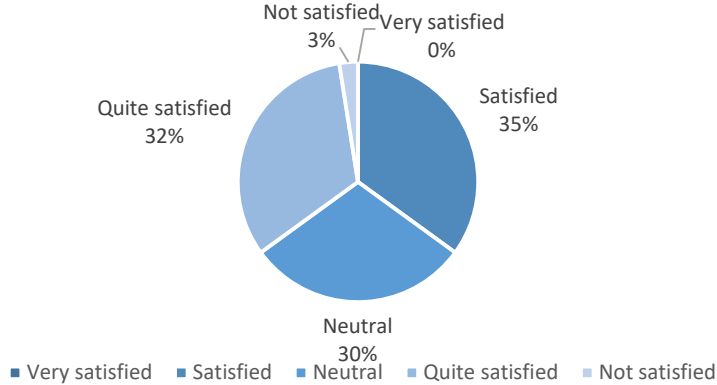


Figure 5: Technical skills of teachers

Most used platform for interactive tools

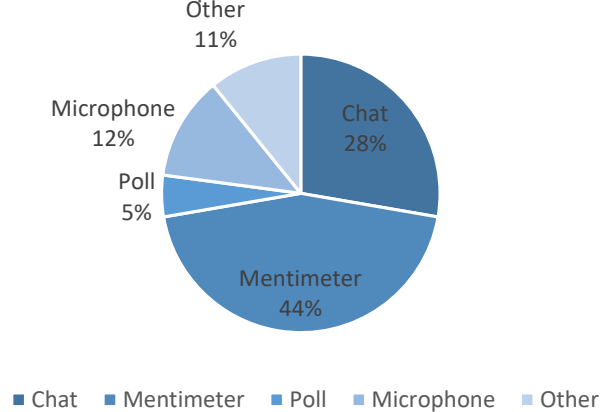


Figure 6: Interactive tools

Frequently made mistakes

The most frequent made mistakes are as follows:

- Giving a lecture acting like is offline
- Previous lectures on the video platform of the TU/e that are not in line with current slides posted on Canvas or deadlines
- Technical problems by insufficient technical knowledge
- Bad audio quality
- Information that is spread over different platforms
- Lectures that are too long for an 'online time span'
- Lack of breaks in lectures

'Giving a lecture online like it is offline is a big mistake, breaks and keeping attention should be managed differently. Polls, and more smaller breaks are examples of a solution.'

'That the information is spread all over places and then things get messed up. Or that two platforms says different deadlines.'

'Mostly the quality of their mic is just really bad in almost every platform'

View on future education (post COVID-19)

Preferred form of lectures

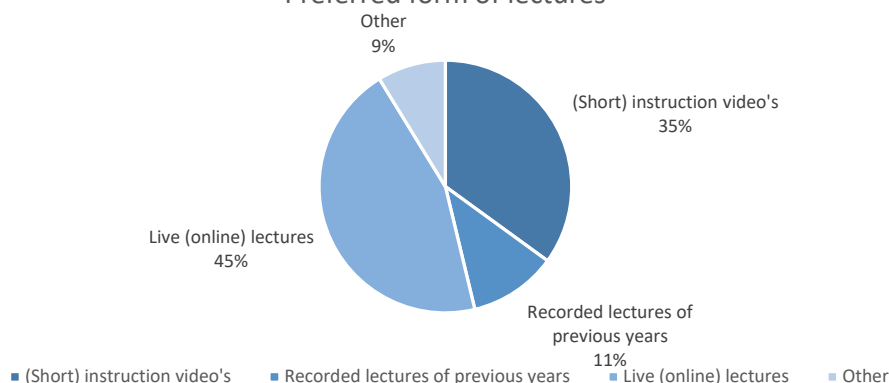
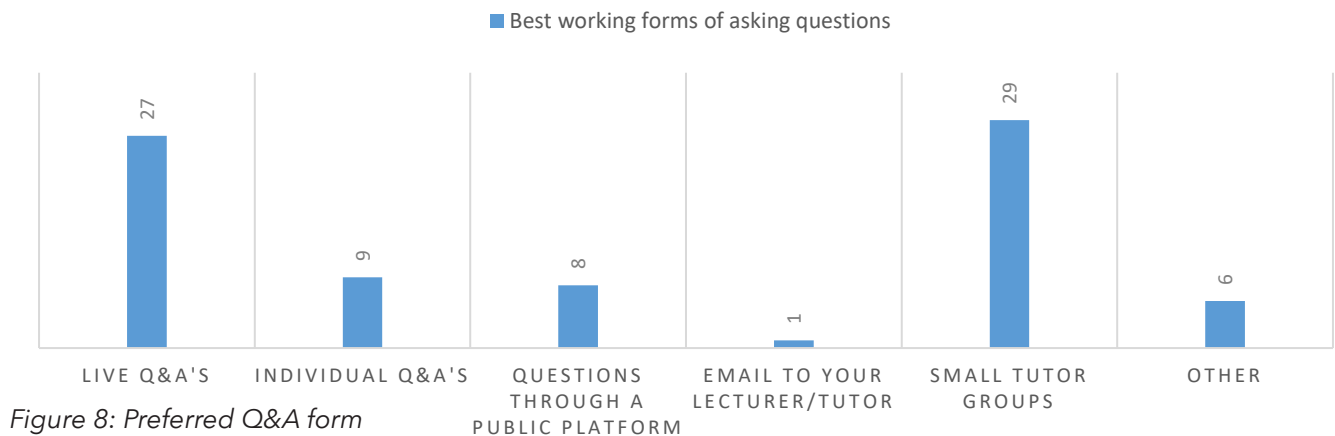


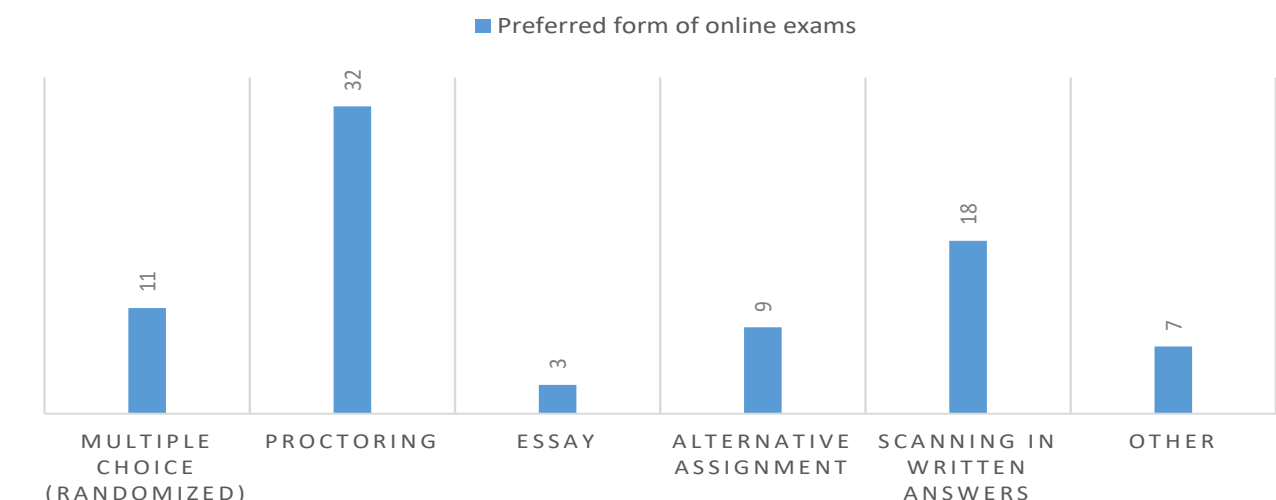
Figure 7: Preferred lecture form

Lecture form: Most of the students prefer their lectures given live, as they have the ability to ask questions during these lectures. Also, short instruction videos are an educational form that students would like, as a short attention span is needed for this. For live lectures, Teams is preferred as a platform. One of the interviewees elaborates on this. He thinks the interface is user-friendly, as you can choose to (un)mute your microphone during the call. The same works for the camera. Furthermore, the interactive functions of hands and polls work well.

BEST WORKING FORMS FOR ASKING QUESTIONS



Asking questions: From these results, it can be seen that students find it important that they can ask questions to a teacher or assistant live, where Teams is preferred as a platform. An important note is that students indicate that it is essential that there is a possibility to ask questions personally to the person who explains the subjects in the lecture. An example is given by a student where the contact info of a lecturer was not available. Another example where improvement is desired is that students have to watch lectures from previous years, but that the lecturer of that year is not available to answer questions.



Online exams: The most preferred forms of online exams are proctoring and therewith scanning in written answers. The reason for this is that for proctoring and scanning in written answers, the explanations and calculations are taken into account. We receive a lot of feed-

back from students who struggle with multiple choice exams for courses that include a calculation. For example by a first-year Chemical Engineering student:

'I am particularly skilled in calculations and explaining what I am doing, but now I failed my Applied Physics course twice because of small calculation errors.'. He refers to the basic course Applied Physics NAB0, which has changed from a written test to a multiple-choice test.'

The most preferred platforms are Ans Delft or handing in a PDF on canvas when the time for the test is over.

BEST WORKING INTERACTIVE TOOLS

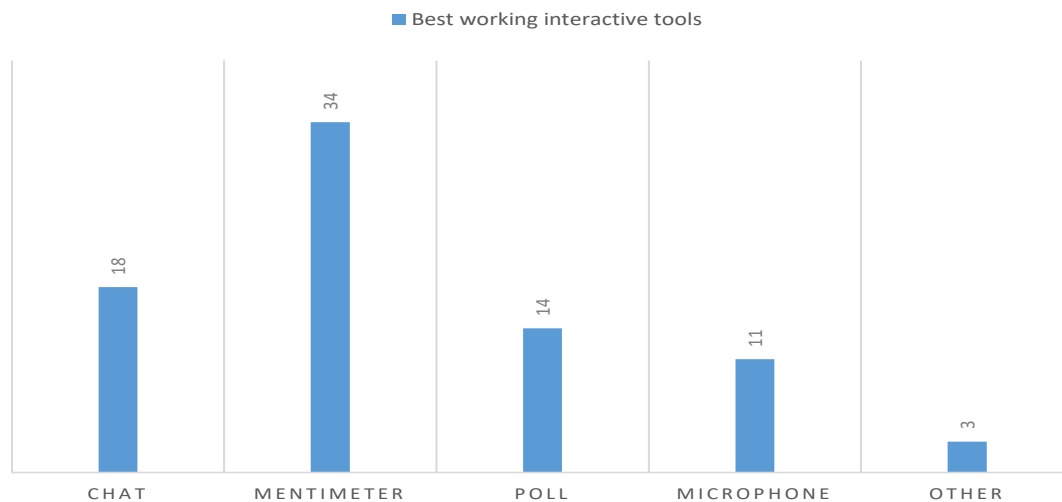


Figure 10: Preferred interactive tooling

Interactive tools: Some first-year students indicate that they do not have experience with interactive tools yet. They would encourage teachers to make use of this, to make the lectures more interesting. This could be done by small quizzes during the lectures, to test the knowledge and active participation of students during lectures. Students indicate that they would participate more actively in lectures if this would be used.

'Especially polls would work very well I think as you keep students active while testing their knowledge. Also, small breakout rooms would be a nice addition to make the lecture more interactive.'

Recommendations from students for tools to use are Miro, Slack, and a tablet where a teacher can write notes during the lecture.

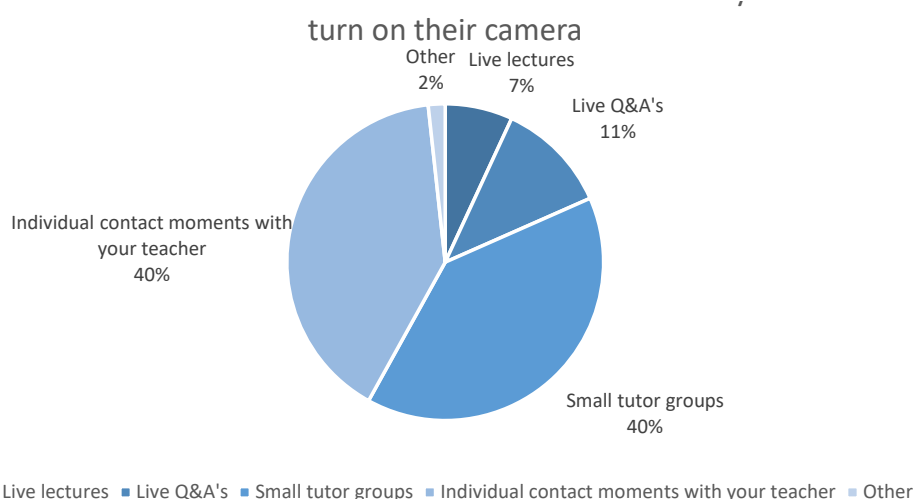


Figure 11: Preferred camera use

Camera use: It can be seen that students mainly find it important that all students turn on their camera during contact moments with a smaller group of people, where there is more interaction. However, students also state that they often do not turn on their cameras as this online education allows them to multitask during lectures. In addition to this, students value their privacy and purposely choose to switch off their cameras for this reason.

When students want to participate actively in an interactive class or satisfy the teacher, they turn on their camera.

Recording of lectures: 82% of the participants indicate that it is important for them that their lectures are recorded. The reason for this is mainly that they can then re-watch it for better understanding. An online lecture can be quite difficult to follow attentively, which is why students need to be able to re-watch all the parts of the lectures they might have missed. Furthermore, 35% of the students are performing extra-curricular activities during their lectures.

'An online setting with recorded lectures helps a lot while studying for exams'

'To have the option to watch the lecture at a later time (recorded lectures)'

The ideal form of education: Most of the students would ideally see their future education as recorded lectures or instruction videos, with the possibility to go to campus for working groups and interactive sessions. This would ensure that all students can receive education and that interaction and active participation are present.

'The ideal version would be that it becomes more interactive and include additional tools. Otherwise, the lectures from home become very boring since they are quite long. Therefore, when introduction videos are used, they should be small instead of very large to keep the student's attention.'

Discussion

This research was held, only by students. The needs of teachers and staff should also be taken into account when making changes in education. On the other side, this research report is a handbook from students for teachers. This report is not a full evaluation of the education. Furthermore, there are of course limitations to what can be implemented from the advice given in the next section. For example available staff per student, and money available to improve education.

As was mentioned in the methods section, this survey was shared with our adherents, and with the broader TU/e student community. This makes this research not fully representative of the average TU/e student. Our adherents are mostly active students, which are part of the ecosystem that is actively involved in student life. When doing future research on the topic of (online) education, it is important to also take the students into account that are not reached easily.

In this report, there are several references made to what was “normal” before the COVID-19 crisis, and there are recommendations made for how to set up parts of (online) education after the COVID-19 crisis. Although we think we are close to the end of this pandemic, it should be recognized that the consequences of this crisis cannot be foreseen, and therefore what education will look like or what will be defined as “normal” after the crisis, cannot be predicted. Therefore, the scope and context of these recommendations may very much change from what is assumed now.

It should be noted that the TU/e is already working hard on improving online education: making the technology work, training lecturers, improving the layout of online courses, laying the foundations for blended learning after the summer, and getting the students, staff, and campus ready for blended learning in the academic year 2020-2021. This is also recognized by students, who are in general satisfied with the skills of their teachers. One of the goals of this research is to provide teaching staff with a ‘gift’: a handbook with tips and tricks from students for teachers. As mentioned earlier, it was never the intention to criticize the quality of education, but to improve education of tomorrow together!

Conclusion

Our previous research 'Students' opinions on online education after COVID-19' concluded that recorded lectures are positively experienced by our students. It gives them certain flexibility that was desired. In this research, this statement is confirmed. A sizable group of students performs extra-curricular activities, something the TU/e encourages, which is why it would be preferred to re-watch the lectures. However, we see that still not all lectures are recorded. We would strongly advise recording all lectures and also consider recording tutor hours and Q&As.

Based on our research in June 2020, we recommended that the quality of the online lectures can be improved more. For example, the communication regarding online education, video quality, and how the lecturer gives more interaction to the lecture. Secondly, we noticed that physical education was, and will continue to be, desired concerning social interaction with fellow students. It is good to see that this is also in line with our university's strategy of being an on-campus university. Looking at the circumstances of the vast change to online and hybrid education and the national struggles that other universities encountered, or are still encountering, we may be proud that no significant digital problems came up. However, there is always room for improvement. Our list of frequently made mistakes gives an overview of the technical problems that could be improved for students.

To benefit from the online situation, several students recommend teachers explore the possibilities in making short instruction videos. They would prefer this over long lectures given online, as it is more difficult to stay focused on these. As we all understand the difficulty of implementation of such short instruction videos, many students are also content with live lectures, however with interaction included. This interaction would then preferably be small quizzes, such that students keep their focus and the lecturer has an overview of their understanding. The most preferred platform for this is Mentimeter.

To be able to include such interaction, with the additional possibility for students to turn on their camera, Teams is the most preferred platform for lectures, tutor hours, Q&A's and individual contact moments. If offline exams remain impossible, we recommend making use of proctoring including written answers. This ensures that students can show their ability and understanding, instead of failing courses due to multiple-choice alternatives.

Given the education of the future, the ideal situation for students would be online lectures or instruction videos, with physical contact moments on campus for interactive sessions. These sessions would entail Q&As and tutor groups. A possibility to decrease work pressure for teachers for this is to create instruction videos for online education. These might require an increased investment first but will give a higher profit in this future view of education.

Concluding, we recommend to:

- Record all lectures.
- Keep improving technical difficulties.
- For high investment and high reward, use short instruction video's, or
- Use live lectures where interaction in the form of small quizzes is included.
- Use Teams as a platform for educational forms.
- Use a form of online exams where students can hand in written answers.
- In future education, use the online platform for lectures and campus for interactive moments.

Appendix 1

Survey questions

Introduction

This survey is part of a research on online/hybrid education. We would like to improve online education for students at the TU/e. We will do this by collecting the opinions of students on their current online education and their desired future online education. Please fill in this survey of max. 10 minutes to help us improving your online education!

Current form of education

1. Are you a bachelor or a master student?
2. In which study year are you currently enrolled?

The following questions were indicated with the following scores: Never/Almost never/Sometimes/Always

3. How often do your teachers make use of (short) instruction videos?
4. How often do your teachers make use recorded lectures of previous years?
5. How often do your teachers make use of live lectures (online lectures at that moment)?
6. How often are your (live) lectures recorded?
7. How often do your teachers use live tutor groups?
8. How often do your teachers use live Q&A's?
9. How often are your Q&A's/tutor groups recorded?
10. How often do your teachers make use of individual contact moments (for example an online consultation hour)?
11. How often do your teachers make use of interactive tools during forms of education mentioned above?

12. What platform is mostly used for (short) instruction videos?

Answer: Youtube/Video uploaded on Canvas/Powerpoint/Other

13. What platform is mostly used for recorded lectures of previous years?

Answer: Video lectures platform of TU/e/BigBlueButton/Teams/Zoom/Youtube/Google Meet/Other

14. What platform is used for live lectures?

Answer: BigBlueButton/Teams/Zoom/Youtube/Google Meet/Other

What platform is mostly used for recording live lectures?

Answer: Video lectures platform of TU/e/BigBlueButton/Teams/Zoom/Youtube/Google Meet/Other

15. What platform is mostly used for live lectures?

Answer: BigBlueButton/Teams/Zoom/Youtube/Google Meet/Other

16. What platform is mostly used for live Q&A's?

Answer: BigBlueButton/Teams/Zoom/Youtube/Google Meet/Other

17. What platform is mostly used for recording tutor hours/Q&A's?

Answer: Video lectures platform of TU/e/BigBlueButton/Teams/Zoom/Youtube/Google Meet/Other

18. What platform is mostly used for individual contact moments?

Answer: BigBlueButton/Teams/Zoom/Youtube/Google Meet/Other

19. What platforms are used for interactive tools during forms of education mentioned above?

Answer: Chat/Mentimeter/Poll/Microphone/Other

20. Which form of (online) exams have you encountered mostly?

Answer: Ans Delft/Cirrus/Canvas Quiz/Essay/Alternative Assignment/Other

21. Are you satisfied with the online skills of your teacher?

Answer: Not satisfied/Quite satisfied/Neutral/Satisfied/Very satisfied

22. Could you elaborate why?

Open answer

23. What are the most common mistakes in the educational forms mentioned above? (please specify the platform used)

Open answer

Ideal form of education

24. Which form of lectures do you prefer most?

Answer: (Short) instruction video's/Recorded lectures of previous years/Live (online) lectures/Other

25. What platform do you think works best for this?

Answer: Youtube/BigBlueButton/Teams/Zoom/Google Meet/Video lectures platform of TU/e/Other

26. Which form of tutor groups/Q&A's do you think works best?

Answer: Live Q&A's/Individual Q&A's/Questions through a public platform (Slack, canvas discussion)/Email to your lecturer/tutor/Small tutor groups/Other

27. What platform do you think works best for this?

Answer: Youtube/Teams/BigBlueButton/Zoom/Google Meet/Slack/Canvas Discussion/Outlook/Other

28. Which form of online exams do you think works best?

Answer: Multiple choice (randomized)/Proctoring/Essay/Alternative assignment/Scanning in written answers/Other

29. Which platform do you think works best for this?

Answer: Ans Delft/Cirrus/Canvas Quiz/Handing in a PDF on canvas/Other

30. What interactive tools in above mentioned forms of education do you think works best?

Answer: Chat/Mentimeter/Poll/Microphone/Other

31. For which forms of education would you like to see that everyone turns on their camera?

Live lectures/Live Q&A's/Small tutor groups/Individual contact moment with lecturer/tutor/Other

32. What are the reasons you purposely switch off your camera?

Answer: Privacy/Poor internet connection/Poor working environment/Doing other things in the meantime/Other

33. What are the reasons you purposely switch on your camera?

Answer: The lecturer wants it/More interaction/Better for the motivational atmosphere/Active participation/Other

34. How important is it that your lecture/tutor group is recorded?

Answer: Extremely not important/Somewhat not important/Neutral/Somewhat important/Extremely important

35. Why is it for you (not) important that your lecture/tutor group is recorded?

Answer: Extracurricular activities/I want to re watch if for better understanding/I am always present so it is not necessary

36. Are there any additional tools or forms of education that you recommend for teachers to use?

Open answer

37. What is your ideal version of online/hybrid education?

Open answer

Closure

38. Have you participated in our previous survey on online education?

Answer: Yes/No

39. Would you like to participate in these surveys more often?

Answer: Yes/No

40. Would you be willing to give explanation on your answers by mail or a call? Then please leave your email address or phone number!

Open answer

Appendix 2

file: DAS_LessonsLearnedAboutOnlineHybridEducation_Results_June2021.xlsx