Transition from Classroom Teaching to E-learning in a Blink of an Eye

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Abstract. The main purpose of this paper is to give an overview and the lessons learnt about the abrupt transition from traditional classroom teaching to distance learning based on the experience of Tallinn University of Technology (TalTech). The rapid outburst of the COVID-19 virus led to a situation that the government had to shut down all the schools and universities and all the teaching activities had to be carried out without physical contact. The universities had one weekend to conduct the transition. The influence of the rapid change in teaching practice was analysed using the feedback of the study program directors, students and academic staff. The main enablers and disablers with the main constraints are presented. Analysis showed that the transition is impeded both by the lack of technological solutions (i.e. remote usage of laboratories) and by human resources (i.e. skills and willingness to conduct the transition by the academic staff). The unique and hopefully non-recurrent situation enables to analyse both the institutional, technological and personal readiness to adapt with the rapid changes in teaching practice. The outcomes of the experience will be used to improve the readiness and competences at all levels at TalTech.

Keywords: Classroom teaching · E-learning · Transition

1 Introduction

Over the years a number of e-learning environments and approaches were used in Tallinn University of Technology (TalTech) which led to the situation where students had to adopt with and have multiple user accounts to use the environments. The level of the e-learning support was volatile and the definition of the support was used very creatively. The presents of e-learning support was optional and not regulated at the university level.

Therefore it was centrally decided that from spring 2018 all compulsory courses in TalTech had to have an e-learning support. For that, the university set up its own e-learning environment based on Moodle and defined minimum requirements for the e-courses. Although the initiative was successful, until this spring a minority of the courses were taught only in e-learning environment (which was actually not set as a goal). In most of the cases, the e-learning support was just assisting the classroom teaching.
The rapid outburst of the COVID-19 virus in Estonia in March 2020 [1] led to a rapid transition from classroom teaching to e-learning. This meant that all the teaching activities had to be carried out without physical contact. The universities had one weekend to conduct the transition.

It is evident that neither the institution nor the students and academic staff were ready for such a giant leap in changing the teaching practice in just a few days. Nevertheless the university reacted very quickly and launched precise and clear instructions for the academic staff how to carry on with the teaching activities. Two factors – availability of the support and clear guidance form the Educational Technology Centre and presents of the e-learning support for all compulsory courses – were enabling the transition for the academic staff. For example before the transition in the School of Engineering 94% of all compulsory courses had the required e-learning support. At the university level, the percentage was 88.7 being lowest at the School of Information Technology (69%). The three major disablers for the transition were short time frame, motivation, preparation and willingness of the academic staff and limited or no remote access to the infrastructure (i.e. lab facilities). The enablers and disablers of the transition are listed in Table 1.

| Enablers                                                        | Disablers                                                   |
|----------------------------------------------------------------|-------------------------------------------------------------|
| Most of mandatory courses had e-support                        | Short time frame for the transition                         |
|                                                               | Preparation of the students and staff                       |
| Available guidance from Educational Technology Centre          | Limited or no remote access to the laboratory infrastructure |
| Some lecture rooms were equipped with technology needed for    | Large number of courses that include practices and lab      |
| online lectures                                                | measurements                                               |
| Most of the staff and students were familiar with the tools     | Large number of different tools that were used for online   |
| for online meetings/lectures                                  | meetings/lectures                                          |

This paper analyses the possible constraints of such abrupt change in teaching practice to the overall teaching quality and outcome. Potential impact of the transition with the lessons learnt is discussed.

2 Initial Phases of the Transition

The influence of the rapid change in teaching practice was analyzed using the feedback of the study program directors, students and lecturers. The timeline of the crisis is presented in Fig. 1 to show the information flow throughout the event.
The School of Engineering started to collect the feedback from the study program directors from the first day to support the transition. An online form was set up to collect the information. Online meetings were held to gain more specific details about the shortcomings in the study process. Different measures were analyzed on how to support the transition process and the impact of the rapid transition was studied throughout the especial event. Students feedback was collected indirectly (through the feedback of the study program directors and dean’s office personnel) and directly through interviews.

The collected data was and will be used for two purposes:

1) Overall management of the transition during the especial event. Feedback from all parties was be used to support the decision making process and to propose different measures to mitigate the transition. This includes for example sharing the guidance materials and contacts of the Educational Technology Centre, contacting the academic staff whose contribution to the transition was weak, activating students to take part in the distance learning, analyzing the situation and potential threats.

2) Summarizing the feedback for future crisis and analyzing the success of the transition at the institution, study program and individual course level. This will enable to identify the short comes and potential to further develop the e-learning environments and to diversify the teaching practices based on the needs of single courses and the frame of reference.

The generalized responses from the study program directors and students are brought forth in Table 2. Around 80% of the study program directors gave their feedback to the transition process during the first two weeks.
Based on the feedback the critical courses were identified and the responsible lecturers were contacted at the university, school/institute and study program level. In most cases, it was possible to carry on with online lectures. Only a few courses postponed the activities for March and April.

The more-or-less smooth transition from classroom teaching to e-learning was greatly supported by the rapid reaction at the university level. University had three days (including a weekend) to prepare guidelines for the staff and students about the teaching process during the emergency situation. Over the weekend clear guidelines were prepared. This included instructions for students, staff, about events and work-related gatherings, rules at the university’s premises and services and general recommendation. At the same day a guideline was sent to all lecturers with recommendations how to carry on with the teaching and on what platforms. A Facebook page for events, news, instructions and recommendations was set up for rapid information sharing. Sample classroom was prepared in MS Teams with guidelines how to use it for teaching purposes. Webinars and online courses about online teaching were announces for the coming weeks.

In the end of April it was evident that the peak of the COVID-19 crisis was exceeded. Therefore new guidelines for staff and students were announced on 22nd of April. Based on the current knowledge it was assumed that in the near future, some sort of face-to-face teaching would resume by the decision of the Government of the Estonia also in higher education institutions. Therefore it was proposed that studies at TalTech would be organized as follows:

| Feedback from study program directors | Feedback from students |
|--------------------------------------|------------------------|
| Most of the courses continued in online format using different online platforms | Some courses were delayed, no information how the learning process will be carried on |
| Problems with guest lecturers as they do not have user accounts for some of the online platforms | Students got a lot of individual assignments, the teaching part was forgotten |
| Problems with special software, not enough licenses to be shared with students | Information gained from the lecturers was vague |
| Problems with students laptops/PC-s, hardware is not capable to run simulation programs | Problems with lab work and practices |
| Labs postponed to May-June | Students preferred that lectures carried on in online according to the study plan before the crisis |
| Problems with setting up virtual laboratories because of cyber security issues | No contact with some of the lecturers |
Majority of the courses would be completed according to the academic calendar.

Majority of the exams and assessments would be completed according to the academic calendar.

In exceptional cases and in compliance with the rules of the emergency situation, face-to-face teaching could be carried out also during the examination period.

It should be ensured, however, that students are able to complete their courses also by distance learning methods (since some students have left for their home countries abroad, some are in quarantine etc.).

At the request of the study program director and by dean’s order, the deadline for completing a course can be shifted, if necessary, to the end of August. The study load of students at the end of academic year will be calculated after that.

The deadline for the defense of graduation theses is according to the academic calendar. In exceptional cases, the deadline for the defense of graduation theses may be extended until the end of August in accordance with the procedure established by the dean of the school.

In exceptional cases, it is possible to defend a graduation thesis conditionally, i.e. a student is allowed to defend his/her graduation thesis even if he/she has not completed all the courses included in his/her study program.

The deadline for confirming the study place was extended until 30th of August, in order to give the bachelor’s and professional higher education graduates the opportunity to continue their studies at the master’s level at TalTech starting from the autumn.

The festive graduation ceremonies were cancelled.

3 Actions During and After the Transition

In the beginning of May it became evident that the emergency situation will end in the coming weeks. The deadline of the emergency situation declared by the government matched with the end date of the spring semester. Therefore last two months of teaching was carried out in distance learning. At the same time data about the courses that needed extension were identified at the university level. Similarly the number of students that needed extension for their defense of graduation thesis were compiled.

At the School of Engineering 403 courses were taught in the spring semester. Out of the 403 only 25 courses were extended and the completion date was set to August. This is 6% of the courses which is very low taking into account the number of courses that include laboratory and/or field practices. In addition 15 of the 25 courses were from one study program. In that case the postponement of the courses was agreed at the institutional level. Therefore the actual need for the postponement was even less.

Similar trend was seen with the defense of the graduation thesis. In total 556 students submitted an application to defend the thesis. Out of the 556 only 33
requested for postponement of the defense to August. This makes again \( \sim 6\% \) of all the applicants. Nearly half of the requests (16) were from the study program of architecture.

Two questionnaires were prepared at the university level to analyze the transition to distance learning in the perspective of students and academic staff. At the university level it was decided that students opinion will be gathered during the periodic feedback (twice a year after the semester). At the schools level the approach was somewhat different. In some schools, where the number of students was lower, it was decided to send out specific questionnaires about the transition process already in May when the emergency situation was not yet over. The School of Engineering decided to add some questions related with the transition process to the periodic feedback questionnaire. All the statements are assessed from 1 to 5, where 1 stands for “Completely disagree” and 5 stands for “Completely agree”. All questions have possibility to add comments. The additional questions were as follows:

1. Information about the changes in the organization of the studies was available and timely
2. Distance learning was (generally) well organized and supported learning
3. The selected e-learning environments supported me in conducting my studies and my active participation as a learner in the learning process. Add to the comments your preferred e-learning environments
4. Staff in the dean’s office was supportive and good-natured when solving the upraised problems
5. Lecturers reacted quickly and adequately when problems upraised

Questionnaire for the academic staff was sent out to all lecturers just before the emergency situation was over. The questionnaire was opened for one week and lecturers were asked to answer the questionnaire based on the courses they taught. This meant that there were multiple answers for one course (if there were more than one lecturer) and from one lecturer. All-in-all 171 unique answers were gathered about 172 courses. The following aspects were asked from the academic staff:

1. Your name
2. Code of the course
3. Please choose all methods you used during distance learning
   a. Online lecture according to the timetable
   b. Online practice/seminar according to the timetable
   c. Online group work
   d. Online consultation
   e. Recorded lecture (uploaded to Youtube, Moodle etc.)
   f. Practice session solution sheets (without additional verbal explanations)
   g. Lecture presentation for individual studying
   h. Individual reading instead of a lecture (e.g. a chapter from a book)
   i. Other
4. Please choose all tools and/or learning environments you used during distance learning
   a. MS Teams
   b. Zoom
   c. BigBlueButton
   d. Google Classroom
   e. Google Hangouts Meet
   f. Discord
   g. Moodle
   h. Facebook
   i. Skype
   j. Other

5. Based on your experience, please rate how has distance learning affected the following student related aspects:
   a. Participation in lectures/studies
   b. Acquisition of learning outcomes (number of students achieving positive results)

6. Information about the changes in the organization of studies was available and timely

7. The selected e-learning environments supported me in conducting my studies and my students active participation as a learner in the learning process

8. What have been the positive aspects of conducting studies during this distance learning period? Please explain.

9. What have been the negative aspects of conducting studies during this distance learning period? Please explain.

   Questions 6 and 7 were added to the questionnaire only for the academic staff in the School of Engineering. The idea was to have some of the questions in both of the questionnaires (students and academic staff) to compare the results on information sharing and e-learning environments.

   The results for some of the questions are presented in the next section.

4 Results and Discussion

Taking into account the feedback gathered during and after the emergency situation it can be concluded that the rapid transition from classroom teaching to distance e-learning was successful. Tallinn University of Technology was quite well prepared both on the e-learning support and technological readiness but the main uncertainty was on the readiness and motivation of the staff and students to adopt with the transition. Luckily the staff was motivated and reacted on time. This can be seen from Fig. 2 where the change of percentages of the mandatory courses equipped with proper e-support are shown.
Blue line shows the number of total courses that had e-support at the School of Engineering and red line shows the percentage of the new courses that had e-support and were taught for the first time during the spring semester. At the beginning of the semester (beginning of February), less than half of the new courses had proper e-support. This number increased quite rapidly during the first months and reached around 85% at the beginning of the COVID-19 crises. At the end of the semester only 6 courses (~1%) did not have an e-support with all the necessary elements according to the university’s standard. Lecturers of most of the courses were specialists outside of the university and did not have enough time and/or knowledge to set up the required e-support. In that case members of the academic staff (either program directors or fellow lecturers) were asked to assist them during the process. Extra work of the academic staff members was reimbursed.

First feedback about the transition process at the university level was gathered from the lecturers. Figure 3 shows the lecturer’s satisfaction about the information exchange and relevance during the crisis and their opinion on the available e-learning environments. It can be concluded that the information exchange at the university was very good. Majority of the lecturers (~91%) rated this with 4 or 5. The average satisfaction was as high as 4.47. The availability of proper e-learning environments was rated high as well (~86% rated with 4 or 5) but the average satisfaction was a little bit lower at 4.23. This is understandable as the rating is more subjective. Real fact based conclusions can be drawn after the examinations.

**Fig. 2.** Changes in the percentage of mandatory courses that had e-support during the emergency situation.
Figure 4 gives a very good overview how the students reacted to the transition. It is good to see that in majority of the classes the students’ participation did not change or even improved (75%). Still it has to be reckoned that in 25% of the cases the students’ participation decreased. This is not only affected by the crisis. Previous studies on class attendance have shown that the number of attendees decrease during the semester [e.g. 2, 3]. A study carried out in an elite Economics school in Portugal [2] showed that the class attendance decreased from the start of the semester from 84–95% to 49–66%. The percentage of average attendance was more-or-less linearly decreasing throughout the semester. Similar trends were reported in a study performed in Technical University of Denmark taking into account information received from nearly 1 000 undergraduate students [3]. It was shown that the attendance differed based on the students performance but decreased in all performer groups. Therefore it can be concluded that the transition process was successful as majority of the lecturers (75%) did not notice a remarkable decrease in attendance and in some cases the attendance even improved.

**Fig. 3.** Lecturer’s feedback on information exchange and e-learning environments

- The selected e-learning environments supported studying and teaching, average 4.23
- Information about changes in the organisation of studies was available and timely, average 4.47
Figure 5 presents a subjective assessment of the lecturers on the students’ performance and how they obtained the learning outcomes. Nearly 3/4 assumed that the rapid transition from classroom teaching to e-learning did not affect the performance. 14% reported that it had a negative impact and 13% reported a positive impact. This data will be used to compare the actual students’ performance after the examination to see the real effects of the transition.

**Fig. 4.** Students participation in lectures according to the feedback of lecturers

**Fig. 5.** Acquisition of learning outcomes according to the feedback of lecturers
5 Conclusions

The process of a rapid transition from classroom teaching to e-learning based on the experience of Tallinn University of Technology was analyzed. It was shown that the successful transition was enabled by the fact that most of the mandatory courses had e-support before the crisis. In addition clear guidelines were present and rapidly prepared by the Educational Technology Center to support the lecturers. It was evident that not all the laboratory measurements and practices could be transferred to online environment in just a few days (or even months). Another constraint was the readiness of lecturers and students to switch to a new teaching method in a blink of an eye.

University started to gather data (both centralized and decentralized) from the first day of the transition. This enabled to detect the courses where the transition to e-learning was postponed and the lecturers who struggled with the set-up of e-learning environments. This resulted in a low number of courses (~6%) where the teaching activities were postponed to June-August. Similarly only ~6% of the students postponed their defense of the thesis indicating that the collaboration with the supervisors carried on successfully in online environments.

Feedback gathered from the lecturers indicated that the rapid transition did not have a significant effect on the class attendance. Moreover in most of the cases the class attendance remained the same or even increased compared with the situation before the crisis. The students’ performance can be assessed after the examination period. The lecturers’ subjective opinion indicates that the performance is expected to be fairly good.

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