Student Mobility Feedback

Torino Program

The course topics were highly innovative and were orientated to students from various disciplines with little experience in the research field but needing to understand the field more in depth.

The lecturers were extremely vivid and kept the audience captivated.
The host Prof. Danilo Demarchi was extremely pleasant. He and his team took great care of the students and spent quality time with them. They formulated interactions between the group which was beneficial both on a social and academic level. The Tempus project facilitated better acquaintance for internal collaborations and with other universities in Israel and in Europe. One student noted in particular that this type of intense interaction is far more powerful that any conference because the student has more time to interact with other researchers and exchange ideas in various topics

Grenoble Program

Bio-technology Session

Excellent training on AFM. The guide was full of knowledge and willingness to teach and give in-depth answers to all questions. Preparation of the DNA microarrays was organized were very professionally. There was an opportunity to be exposed to equipment that was unfamiliar to some students and help to better understand the preparation process and try it.

The opportunity to meet other researchers in the field was important and allows for collaboration and consulting. Beyond the educational aspect, the planning and timetable were well planned and the reception was warm and inviting.

Clean-room and Fabrication Session

This session included fabrication of MOS field-effect-transistors and characterization of their electrical properties. Over the sessions students were exposed to a huge variety of a high standard equipment. The multiple stage process was very inspiring and opened their minds to new techniques useful for their current research. In addition, the interaction with skilled professionals from other institutions who guided us along the workshop and taught us about the facilities and mechanisms that were required to the fabrication process (and also the

alternatives techniques, at specific stages) was very enlightening. Even students who had previous experience in clean room environments found that this experience was really extraordinary due the really high quality process and the endless options of fabrication and research.

EduNano survey results

In the framework of the EduNano program, two different courses were offered in a pilot project at Bar-Ilan University. One was called *Nano-science and nano-technology. "Why is "nano" different and how is it useful?"* and the other "*Kinetics of Materials".* For both courses, two different options were available. In the first option, students went to their regular classes first and were provided with a recorded version of the lecture afterwards. That way, they could review the class as often as they wanted and hence, repeat what they might not have grasped the first time **(1)**. The second option was a so-called flip-course. This means that before the students went to their regular class, they were asked to watch the recorded lecture. Sometimes, the following class would then consist of what the students had already learned in the recorded lecture or it would build upon it and require the recorded session as background knowledge **(2)**.

1st pilot course session survey results:

After completion of the courses, the students were asked to fill in a survey to evaluate the quality of recordings and the added value of on-line learning. The first survey combined both the *Kinetics* and the *Nano* course in the 1st format (first frontal lecture and afterwards possibility of reviewing it).

- Three questions asked the students to grade different features of the courses on a scale from 1 to 5.
- Furthermore, they could write comments on the combination of the recorded lessons with the standard courses.

Kinetics of Material

Six people evaluated the *Kinetics*-course. All categories were graded above average. The helpfulness of the recorded lessons reached an average grade of 3.7. The students' understanding of the lessons' subject matter without the regular lectures reached an average grade of 3.6. The quality of the recordings came off best, the respondents gave it an average grade of 4.2. One student commented on the combination of the recorded lessons with the standard courses. He liked the frontal course very much and according to him, the recorded lessons were only helpful when he did not manage to come to class.

Nano-science and nano-technology. Why is "nano" different and how is it useful?

The *Nano*-course in the first format was graded by ten students. In general, it scored slightly worse than the *Kinetics*-course, however, all categories scored above average again. The helpfulness of the recorded lessons reached an average grade of 3.3. The respondents rated their understanding of the subject matter without frontal lectures with an average grade of 3.1. Once again, the quality of the recordings reached the highest score, this time a 4.1. In their comments, the students agreed that even though they liked the recorded sessions, in general, these cannot replace frontal lectures as they do not offer the possibility of discussing with their fellow students or asking questions. It was pointed out that the recorded lessons are exactly like the frontal lectures and hence only enjoyable and helpful if the lecturer is good. One respondent criticized that the lessons were not well organized and that he did not know which assignments to hand in and when.

Conclusion

Summing everything up, even though the quality of the recordings generally achieved good grades, the students' evaluations show that their understanding would be lacking if they did not have the frontal lectures. Among others, this is due to the fact that a recorded lesson does not offer the possibility of asking questions or discussing with fellow students.

2nd pilot course

The second survey asked those students who attended the flip-course where the recorded lecture was provided before attending the frontal course to evaluate their experiences. This time,

- Five components of the course should be rated on a scale from 1 to 5.
- The students were asked to evaluate the course material content and whether the level of difficulty matched their expectations. Furthermore, they had to rate the quality of the recordings, the homework assignments and the ease of use of the Moodle user interface.
- In addition to grading the courses, six further questions allowed the students to leave short comments.

Kinetics of Material

Four students evaluated the *Kinetics* course. As an average, all areas except for one achieved at least a 4.0, the adequacy of the level of difficulty with regard to the students' expectations was even rated with an average grade of 4.2. The ease of use of the Moodle user interface reached an average grade of 3.8. According to their answers, none of the respondents encountered any difficulties (technical or other) during the course. Being asked about the advantages and disadvantages of this mode of learning relative to frontal lessons, the students described it as a good opportunity in case they missed a class. They also like the professor and saw benefits in

the online materials. All of them interacted with other students during the course and evaluated this interaction positively. It for example helped them while studying for the exam. With regard to what they liked most about the course, they named for example the applications and using older exams to study for the upcoming one. With regard to what could be improved, one student wished for more tutorials and another one for a provision of filmed exercises. The other two would have liked a shorter exam and the coverage of the topic of materials science respectively. The students had chosen the online-course because they were on the one hand interested in the topic and on the other hand appreciated the possibility of reviewing sessions they had missed free of charge.

Nano-science and nano-technology. Why is "nano" different and how is it useful?

Five students took the opportunity to evaluate the *Nano* course. Once again, all evaluations were above average, however, in comparison to the *Kinetics* course, they tended to be less positive. Once again, the adequacy of the level of difficulty with regard to the students' expectations achieved the best grade, with an average of 4.6. The quality of the recordings reached an average grade of 3.8 and the homework assignments a 3.6. Again, the ease of use of the Moodle interface scored the lowest with an average grade of 3.4. In their comments, the students criticized the navigation of the website. Regarding the advantages and disadvantages of this mode of learning relative to frontal lessons, students saw the advantages in learning at their own pace and repeating parts they did not understand well even though it also impeded concentration. The students' comments mirrored that some of them had problems with the arrangement of the course. Not all of the respondents interacted with their fellow students. The others either talked to them during the course or during homework. Being asked what they liked most about the course, two students named the teacher. The others mentioned the choice of subjects and the possibility of watching the lectures in their spare time. As suggestions for improvements, the respondents asked to enhance the quality of the recordings and the lectures. Through their answers it was not evident whether this means the same. Once again, the interface and navigation of the website were criticized. Furthermore, according to the respondents, the homework should be sent on time and some of the presentations should be organized better. Most of the respondents took the course because it was obligatory for them. Only two stated that their interest in the subject was the reason for taking the course.

Conclusion

As a conclusion, even though both courses were rated above average in the flip-course format, the *Kinetics* course came off better. The possibilities of the online lessons could be expanded to providing more recorded tutorials. The attendants of the *Nano* course were more critical, mostly with regard to technical issues, such as the Moodle interface. Even though they saw advantages, it became evident that they found organization and implementation of the course lacking.

Conclusion 1 & 2

Bringing together the first and second type of pilot courses, through the students' evaluations it does not become obvious that there was a difference in design (watching the recordings after/parallel to the frontal lecture vs. watching them before). The respondents see the recordings as a good opportunity for everyone to learn at their own pace. Apparently, for some they are only relevant if they did not manage to come to class. The quality of the recorded lectures was generally seen positively, however, the interface on the Moodle website could be enhanced. Regarding the organization of the courses there is also still room for improvement. As will become clear in the following, these points were improved

Amendments

According to the survey results it became obvious hat amendments in

1 the Moodle interface and its navigation

2 organization of the course and homework assignments needed to be made.

Adaptation of recorded lectures after pilot testing

The students' feedback was acknowledged and the Moodle website was re-organized accordingly. The different PowerPoint presentations and recorded lectures were organized under separate modules with specific titles. These facilitate the students' orientation. Furthermore, a new separate category for homework assignments was established. This way, it is easy for the students to see what they should prepare for the next session. The syllabus provided gives them information on what the course consists of and how it is assessed.

Lecturer's assessment of this type of learning.

On-line learning platforms is a new mechanism of learning and is still foreign to most lecturers today. More assistance needs to be given to lectures to build on-line teaching skills and more emphasis on staff costs needs to be geared towards consulting for on-line course teaching skills. This is very different to frontal learning and needs to be addressed. This was not addressed during this project.

This platform of recording classes that are happening live and giving a feature of free access to registered students is beneficial for revision purposes and for making up missed classes. Since these pilot tests did not allow for use of the materials without the face-to-face meetings of the lecturers it is difficult to determine whether there is more added value to the recordings than a regular face to face course.