

task, the metacognitive process, or to the self or personal level. Another important premise of effective feedback according to Hattie and Timpeley [17] is that it should have a clear goal or purpose, with a meaning and it should be given in a clear manner in order to help the student make connections between the prior knowledge and the task ahead. In order to gain effective feedback at the task, process, and self-regulatory levels interrelation among these elements is more powerful when it is inserted in the design of online education.

The literature also collects experiences in which feedback is given by teachers, peers of himself. These examples from the literature include educational strategies that facilitate the monitoring, effort, time and environmental management and self-efficacy [16]. This together with other educational principles for the design of online learning environments (e.g. having students to work on tasks in authentic scenarios, providing feedback, etc.) aim to maximize the engagement of the student with the activity, enable the communication and maximize opportunities for feedback and reflection [18].

4. Instructional Design: Adjusting the Master Course *Design for Behavioral Change* to Facilitate Online Learning

Design for Behavioral Change is a master elective course within the master curriculum of the Industrial Design (ID) department [17]. The course aims at having students to gain knowledge and skills pertaining to the design of technologies that can help people change behaviour and attitude without coercion, manipulation or deceit. The orientation of the course is geared towards informing about and having students to apply the design of interactive technologies with theories deriving from the fields of health and social psychology, communication and behavioural economics. The educational forms of the course have been of traditional character consisting of lectures to familiarize students with theories, self-study assignments to apply the insights of the theories gained and the application of these theories to design through hands on workshops and a design case. However, with the internationalization of the curriculum and the objective to facilitate students attending an exchange program in a university overseas while having access to the ID master program, a new dimension for learning was employed in this master course.

4.1. From Traditional to Online and Blended-Learning

The master elective course *Design for Behavioral Change* at the Industrial Design department was adjusted to include an online set-up to allow students to attend the course from universities overseas. The

course consisted of an 8-week program including lectures, workshops, self-study, individual and challenge-based group assignments. Although the structure remained similar to the course offered on-campus, some blended-learning and e-learning elements were introduced. The traditional face-to-face version of the lectures and assignments were still provided for the students attending the course in the Netherlands. However, and in order to enable students to attend online lectures and be assessed at distance, the model TPACK model [18] was followed. The TPACK models provides a suitable framework for teachers to integrate technology in their teaching and learning, and have them think of the content in terms of knowledge and skills while applying the didactics appropriate for their education [19].

Having in mind the content to learn, the teaching staff initiated the changes in the course by transferring the classroom learning environment and the students' assignments from a physical environment to a digital one.

To facilitate online education, the course included life streaming lectures. Streaming lectures were provided so that students, mainly in Asian countries enrolled in an exchange program, could attend the lectures at Dutch time.

In addition, the live streaming platform incorporated channels to interact with students located abroad. The platform included possibilities to ask questions as well. The aim was to create interaction and stimulate active participation in the classroom during these lectures. Lectures were live streamed and students both in-class and in universities in other countries attended the lessons at the same time. Time difference between the Netherlands, China and Japan is seven and eight hours respectively. Assignments and course content was posted weekly basis in the Learning Management System (Canvas) of the university.

Besides the lectures, the courses also included projects and exercises in small teams. These team activities were carried out by groups of two students outside the classroom. For students living abroad they needed to incorporate an online platform to facilitate the communication and discuss group project activities. Often Skype or similar web-based technologies and channels were used. For both students abroad and nationals, the assignments were the same and no major changes in the form or objectives of the activities took place.

The assessment of the course *Design for Behavioral Change* consisted of a combination of both individual as well as groups assignments. The group assessment included the application of the behaviour change theories to the design and evaluation of systems in teams; the use of the frameworks of mechanisms and principles for exploiting influence in design, etc. What it become a particular challenge was the individual assessment. It consisted of a mid-term multiple choice exam to test the understanding of the core behaviour

change and persuasion theories. For the organization of the mid-term exam an online platform was employed allowing for assessing students regardless time and location. The digital assessment was employed for both students on-campus and students living abroad.

The interim assessment consisting of a multiple-choice online test on the Cirrus platform which was uploaded in the ProctorU system [20]. Cirrus is a testing software and with Proctorio as online proctoring software. Online proctoring allows students to take part in a test, in this case in Cirrus, and this can be done both on or off campus. Students conduct the online assessment in their own computer or laptop in a secure manner within an allotted time slot. In this kind of online assessment methods, the Proctorio's online proctoring software was used as platform in which the Cirrus testing software browser was opened providing Proctorio, therefore, a secure environment to conduct examinations. The ProctorU system was only employed with students living abroad.

The online test was planned to take place at the same time as the test was administered in the Netherlands.

5. Research Questions and Method

The overall purpose of this study was to experiment with e-learning platforms in order to consider scalability of online education and offer more e-courses for exchange students. This to learn from the results and evaluate whether these platforms would be options to internationalize the curriculum as part of the departmental policy. In light to understand the impact of online and distance education in the master elective course *Design for Behavioral Change* we formulated the following research questions for this experiment: (1) Is life streaming a suitable lecture format for students registered in an exchange or internship program abroad? (2) Is ProctorU an adequate online system to assess students abroad? (3) Are students enrolled in an exchange program abroad satisfied with this online version of the course?

The methodology used to conduct this investigation was based on a triangle approach combining qualitative research methods. The Table 1 below indicates the methodology for this research.

Table 1. Research methods

Method	Research approach	N=
Qualitative	Students' survey – Likert scale 1 to 5	4
	Individual meetings	4
	Teacher's interviews	1

The total number of students registered in this course was N=43. However, only N=4 students were enrolled in an exchange program and attended this course online from universities abroad. To study the

benefits of this pilot experiment we followed N=4 students' patterns which were collected through individual interviews. In addition, we also collected in students' survey students' satisfaction regarding the feasibility of this online course. For the survey we used Likert scale questionnaires with a 1 to 5 scale being 1 totally disagree and 5 totally agree. Teacher's satisfaction was also collected in an interview.

6. Results

We considered three main questions for this study. Regarding the suitability of the live streaming as a format for the provision of lectures for students abroad, we observe students' high satisfaction about it (4.0) (see Figure 1, Students' course evaluation). In general, we appreciate in a moderate manner (3.0) that students did not encountered major problems to attend the course at distance. With respect to whether students could understand the theory and participate in the course projects, students are moderately (3.0); while students' are highly satisfied with the course as it helped students implement interest in career development (4.0). Similar high satisfaction (4.3) was found in that despite that students were living abroad, it did not prevent them to work on project activities with students participating in the course on-campus in the Netherlands.

With regards to the second research question of this study about the suitability of the digital assessment system to assess knowledge at distance, we observe a considerable level of dissatisfaction (2.0) concerning the system.

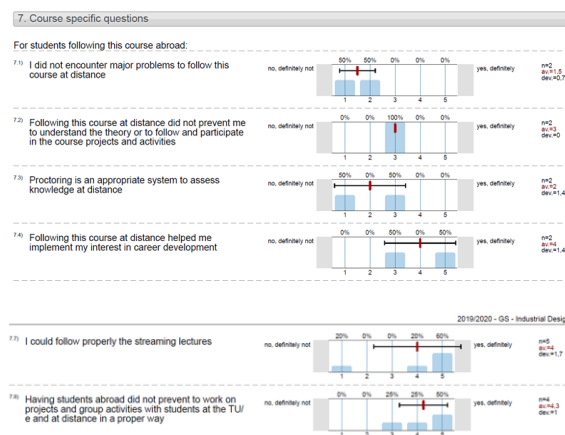


Figure 1. Students' course evaluation

Individual interviews were conducted with the students participating in this course overseas in order to capture their impressions about the suitability of this online course offered to facilitate exchange programs.

We summarize the feedback from students with a review of the statements and impressions on online education. Students described the drawbacks as

'Difficult to synchronize 'streaming lectures' with differences in time (the Netherlands and Asian countries); 'Difficult to synchronize 'group work that caused lack of motivation'. With regards to the online assessment, students mentioned that 'it was difficult to adjust to exam time'; 'Intrusive program'; 'First time needs practice'. Despite the description of the difficulties in this pilot course students considered that 'There was no impact on quality of education: feedback, assignments'. Students' perceptions on technology in education were positive and did not influence students' attitudes towards e-learning.

Regarding the teacher's perception, the teacher mentioned to be positive on the experience with this online course due to a number of reasons. First of all, the introduction of technology in education, i.e., live streaming, was easy to use. However, additional technical and organizational support for the teachers remain a crucial point for success. Secondly, and regarding the digital assessment, i.e., remote proctored exam, the teaching staff described this system as very intrusive as privacy is, to some extent, transgressed.

The results of this study indicate that there are factors such as time difference between the Netherlands and Asian countries, e.g., China and Japan, that influence the motivation of the students to attend the online lectures. Similarly, group assignments were difficult to carry out from different locations. Likewise, the online assessment system seems to be a downside form of assessment.

7. Conclusions and Implications for Improvement and Future Research

In the theoretical considerations in this study we considered a number of educational principles to integrate when designing online courses. First of all, feedback is a powerful tool to guide students. Feedback can also be of more value depending on when it is employed to adjust behavior, task of the self. In this experiment, feedback on content and assignments was given while self-direction was expected from the students, as Industrial Design is a study program which strongly lies in educational principles such as learning students to become self-directed learners in the choices, they make to select courses, in competency development and in the development of an identity and vision as designers. Furthermore, this experiment was conducted in a master course and students are supposed to have learned and developed self-directedness throughout the bachelor program. Therefore, the fact that this experience has not been fully positive in terms of motivation for students, it can be understood perhaps due to a number of reasons. Time difference between Asian countries and the Netherlands made the attendance to the lectures a difficult undertaking to follow in real time. When students on-campus had morning or afternoon lectures, students abroad had evening sessions. Also, the group project assignments

needed to be carried out in teams oftentimes from students in different countries. This made it difficult sometimes to engage them in active participation in the teamwork. Moreover, the digital assessment software program was difficult to implement due to the that not only time difference was not convenient but also because the privacy concerns about the system. Furthermore, this digital system employed in this course was the first time applied to assess students online in the whole university. Therefore, the use of this tool had a logical reaction and a natural sense of resistance towards the unknown.

The analysis of this experiment cannot only be done from the perspective of guidance in self-directedness or from the technology perspective. The design of education in the context of online and distance education needs to be addressed as well. Despite the efforts paid by the teaching staff to re-design the course to meet online demands of distance students, it is still a need to work on the adjustments of the assignments in order to make them more tailor-made to the students.

An iteration in the integration of the TPACK model can be considered in the re-design of education. This model offers an excellent framework for the design of online education and the introduction of technology in education. Tailor-made assignments to meet individual needs aligned with the content, the technology and the didactics behind need to be addressed.

Considerations point out that introducing innovations in education is not a question of just changing assignments. The didactical and technical support is crucial to boost a sustainable transformation towards the flexibilization and internationalization of the curriculum. Reflexion, experimentation and iterations in the design of education should be part of all educational reforms both at program as well as at course level.

It is worth mentioning that the process of internationalizing education is not a one-day action. Transforming current educational paradigms asks also for a change in the 'mindset' of the teaching staff to make use of technology of education with appropriate insights and understanding in didactical approaches and methods. Special emphasis should lie in stimulating self-directed learners and supporting meaningful choices in courses and decisions that help guide own learning path.

Finally, there are interesting lessons learned to draw from this study. This experience provide numerous venues and implications for further research. The study of the impact of re-design of the course *Design for Behavioral Change* and the adjustments of the assignments to meet the needs of the distance students in an online environment can bring about interesting insights for the educational practitioners. In addition, the effectiveness of the online education and the impact on motivation and self-directed learning attitudes of the students will be considered in future research. The latter is specially of great importance as there is a need

to contribute with new insights to the body of knowledge in this field so that the teaching community and the universities as a whole can benefit from the results of this study to transform education towards the internationalization and flexibilization of the curriculum.

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