22.12.19 – Summary of CBL project Module 5 bachelor Health Science

Background

Previous to the academic year 2022-2023, students participating in module 5 of the Health Science bachelor program embodied a start-up developing a healthcare technology to address a mental health issue. Students might choose any technology and mental health issue of their interest. Groups developed a business case of the start-up in which they have to include the concepts taught during the various courses of the module: financial management and accounting, healthcare economics and financing, and economic evaluation in health care. The final products of this project are a project report and a pitch presentations during a final "Dragon's Den" competition during which students' groups compete for a (imaginary) money price to support the development of their start-up and product. Generally, pre-master students, who are not always acquainted with project-based teaching, also participate in this module.

During the grading of this project during the academic year 2021-2022, the teachers observed that students' groups did not apply the concepts taught during the courses sufficiently and adequately. This is problematic, since these knowledge and skills are assumed known to follow the Health Sciences master program. There was also a lack of coherence between the different parts of the project reports, and the technology of some groups did not seem feasible to implement. Groups did not sufficiently think about the implementation of their technology, and probably did not spend enough effort on the project. Finally, groups spent a substantial amount of time choosing their mental health issue and technology, delaying their learning process.

Aim

To resolve some of the above-mention issues, we implemented a challenge-based learning (CBL) approach to this project to 1) make the project more 'tangible' for students and facilitate the application of the concepts taught during the courses, 2) increase students' engagement with their project, and 3) stimulate students to design feasible and implementable solutions.

What did we do?

During the 2022 edition of module 5, we included challenge-based learning through the following steps:

1. We approached all students who participated in module 5 during the 2021 edition to participate in focus groups through an announcement on Canvas. The aim of these focus groups was to evaluate what students enjoyed about the project and how it could be improved.
2. Adaptation of the project design based on the focus groups' results.
3. We attempted to appoint two student assistants to support during the development of this CBL project and to support the teaching staff during the course.
4. We recruited stakeholders from outside the University of Twente to formulate challenges concerning their daily tasks. The only restriction for the formulation of these challenges was that they had to be related to health care.
5. We evaluated the teaching innovation using a survey and our assessment of the final report.

What are the results?

1. Focus group

A limited number of students agreed to participate in the focus group. We performed two focus group interviews. Three students participated in the first focus group and two in the second one. Students like the idea of setting up a start-up and the final Dragon's Den competition because it was different than other projects they have to perform during their study. This aspect of the project therefore remained the same during the 2022 edition of the course.

What did students like and what could be improved?

Students mentioned that it was difficult to design a new technology for a mental health condition because their curriculum is more focussed on somatic diseases and on implementing health care technologies. Students sometimes had difficulty to define what their next step in the project because the project was broadly defined. Students recognised that some technologies that were designed did not seem implementable in practice. They also acknowledged that students' groups tended to design a mobile-phone application because that is the type of health care technology which is often discussed during their curriculum.

The students mentioned that providing a checklist with requirements for the technology they have to design and a lecture on intervention design and implementation may be valuable to encourage students to design of technologies that 1) can feasibly be implemented in practice and 2) are different than mobile-phone applications

Why were the courses "healthcare economics and financing" and "economic evaluation in health care" relatively less well integrated in the project reports than "financial management and accounting"?

Students replied that "financial management and accounting" seemed to be the most important course for the project. It was also the easiest to apply when setting up their start-up and the guidelines and expectations from the teacher were made clear at the beginning. Students had difficulties to translate the content of the courses "healthcare economics and financing" and "economic evaluation in health care" to their own setting. Finally, the tutorial concerning how to implement these courses in the project were scheduled too early in the module according to the students. Hence, they were not yet busy implementing these courses in their project report.

Which type of health care-related challenge would be interesting to address?

Students suggested the following type of challenges:

- Prevention-related challenge.
- Select an innovation which "failed" on the market and research why it did so.

Additionally, students mentioned that they did not reach out to health care professionals to discuss their innovation because they do not want to be a burden of the health care professionals who already have limited time. It can also be time consuming before you get in touch with the professional with the relevant background to answer your questions while the time for the project is limited. Students mentioned that it could be helpful to have a list of health care professionals that they could contact during the project.

How should the project be logistically organised? Should their be additional / other contact moments with teachers? Should we test the project's results in another way?

The students mentioned that there were enough contact moment with the teachers and that the presentations at the end of the project were nice because you want to show what you have done.

Students mentioned that organising a poster-market may be an alternative to the Dragon's Den competition.

When discussing whether the students should deliver a draft of their project, they mentioned that delivering one draft report could be useful but that delivering more than one may not have any additional value. Students further agreed that implementing peer feedback (coupled at this draft report) would be valuable.

Finally, students mentioned that formulating one challenge for all groups participating in the project may not be ideal to prevent that all solutions converge towards each other.

2. Adaptations of the project design based on the focus groups' results

We adapted the following elements of the project for the 2022 edition, based on the students feedback:

- The instructions concerning (and rubric) how to implement the "healthcare economics and financing" and "economic evaluation in health care" courses in the project were extended to provide clearer guidance to students.
- We contacted stakeholders outside the University of Twente to formulate challenges they encounter in practice.
- We scheduled a lecture on intervention design and implementation
- We implemented peer-feedback on the draft report of the students.

3. Student assistants

None of the students reacted on the position to support during development of this teaching innovation. However, three students (two master students Health Sciences and one third-year bachelor students Health Sciences) could be appointed to supervise the students' group during the project (instead of the teachers).

4. Challenges

We could recruit three stakeholders (challenge-owners) for this teaching innovation. Each stakeholder formulated a different challenge:

1. The first challenge concerned how to address fatigue and impairments in daily activities and planning activities in rheumatoid arthritis (RA) patients. Approximately 90% of RA patients experiences fatigue. Fatigue dramatically affects patients daily life and quality of life because it is unpredictable. Consequently, patients cannot predict what they will be able to do on a specific day, and have to cancel scheduled social (or medical) appointments last minute. Additionally, RA can impair daily living activities and the practice of regular physical activities because of inflammations for instance. Finally, taking medication can be challenging because they require too much dexterity or require the use of a specific self-injection device. Currently, there is either no suitable solutions to manage these issues or the available solutions are not reaching the patients, for example because it is not reimbursed by healthcare insurance companies. Are you willing to contribute to a suitable and scalable solution for these patients?
2. The second challenge concerned how to reduce work pressure for nursing staff at the emergency department (ED) of Haaglanden Medical Center. Crowding at the ED increases the pressure on quality and accessibility of acute care. High workload of nursing staff is associated with poor patient safety outcomes. Interventions to reduce workload may concern prevention of acute care, reducing absenteeism amongst nursing staff, improving capacity management

or using technology to ease (part of) the tasks nurses perform at the ED. Will you help ED nurses to reduce their workload so that they can continue to give high-quality care to ED patients?

3. The third challenge concerned mental healthcare. Often, people are referred to the psychologist but are not highly motivated to work on the issue they are dealing with. They expect that medications prescribed by psychologists may help them but medication only focuses on easing symptoms, not addressing the underlying issue they are struggling with. These clients are thus entering mental healthcare too late. Earlier mental support and advice may lead to better health outcomes for clients. Do you want to contribute at making how to make mental healthcare more accessible? Additionally, how would more accessible mental healthcare contribute to the sustainable development goals?

To introduce the students to the different challenges, we appointed one student assistant who interviewed each challenge owner. The interviews were video-taped and edited by the students. These video's were shown to students during the first project-related session for them to choose one of the challenges.

We further provided two possibilities for students to interact with the challenge-owners concerning the challenge and the solution they designed. The first moment entailed that student groups could send clarification questions about the challenge to the challenge-owners. This took place in week 3 of the 8 weeks project. The second moment was a (online) session where students could present their solution to the challenge-owner and receive feedback from the challenge-owner. This session took place in week 4 of the 8 weeks project.

4. Evaluation

Fifteen out of the 75 students who started the project (20%) filled in the final survey. The majority of respondents agreed that the challenges were appealing. The respondents further mentioned that it would have been nice to receive feedback from the teachers on their project instead of receiving peer-feedback only. However, the number of questions that teachers received during the "healthcare economics and financing" and "economic evaluation in health care" – related tutorial sessions was limited, even though that is their opportunity to ask content-related questions on how to implement these courses in the project. Students further mentioned that students' assistants should have content-related knowledge to support the groups during the project.

When assessing the reports, the teachers did not see any tremendous improvement concerning the "healthcare economics and financing" and "economic evaluation in health care" courses within the project report.

Lesson learned

1. More interaction with the challenge-owners is needed for students to be aware that they are addressing a challenge from (clinical) practice. This, however, needs to be balanced with the availability of the challenge-owners which may have limited time to participate in teaching.
2. (Bachelor) students still require extensive guidance on what is expected from them when addressing such challenge and require (frequent) content-related feedback to reassure them during the project.