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Student challenges in entrepreneurship education: planning for uncertainty

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INTRODUCTION

A student challenge departs from a problem that an external actor (a ‘client’)—such as a local business—currently faces, which in cooperation with faculty member(s) is formulated and presented to students who work in groups to solve this problem. *Student challenges* are therefore defined as faculty-facilitated short-term processes in which groups of students address problems presented by client(s) where innovation is needed and propose solution(s) to the presented problem as part of a curricular course or extracurricular activity. The students’ task during a student challenge is to interact with the client and other external actors to provide a response to the problem that would provide value for the client. As such, student challenges are interesting as a novel alternative to ‘traditional’ case teaching since they add real-world interaction (Daly, 2013) and value creation for others (Jones et al., 2020; Lackéus, 2018) to case teaching methods. Even though student challenges have similarities to other related approaches such as live cases (McWilliams & Nahavandi, 2006), hackathons (Briscoe & Mulligan, 2014), and consultancy projects (Lycko & Galanakis, 2019), student challenges are distinguished from these in terms of their purpose, how the addressed problem is formulated, and the suggested time frame.

Because of their short time frame, student challenges may be integrated into entrepreneurship education courses and programmes or exist as a standalone initiative to develop students’ entrepreneurial skills and mindsets. For entrepreneurship education, a student challenge can represent a particular ‘space’ for entrepreneurship (Pittaway et al., 2019) where students are exposed to and possibly immersed in the context of the client organization (Bonfanti et al., 2019). Simultaneously, the process is facilitated by faculty, and the focus is the student’s learning outcome in being exposed to an early-stage innovation process. Hence, student challenges relate to recent developments in how learning processes are facilitated in entrepreneurship education (Hägg & Gabrielsson, 2019). Accordingly, this chapter is relevant for faculty who

would like to explore student challenges as a fruitful pedagogical intervention in entrepreneurship education and for external actors who would like to involve themselves in student challenges at the university.

Although it offers attractive opportunities in terms of student learning and work–life relevance to education (Mielikäinen, 2022), involving students' work in real-life problems from external actors in curricular courses in higher education has become a very delicate task for educators. This is because faculty must balance three main stakeholders in the process (Daly, 2013): students, faculty, and clients. Whereas the client strives for a close relationship between the student challenge and the client's actual (and perhaps urgent) everyday tasks, university faculty strive to uphold theoretical relevance and sufficient compliance with pre-set learning goals in their course or programme. Students will have additional viewpoints and motivations, and the degree to which the student challenge resonates with the students' preferences will likely influence students' creativity and ownership—both critical factors for the process and outcomes of the student challenge. Therefore, this chapter focuses specifically on the tensions between stakeholders and provides recommendations on how to prepare for and handle them to ensure that students are trained to embrace uncertainty during the student challenge.

Seven recent student challenges at Nord University (Nord) and the Norwegian University of Science and Technology (NTNU) were studied through an analysis of interviews with involved faculty members and clients, as well as written feedback statements received from students who participated in the student challenges. The next section presents in more depth what a student challenge is and how it relates to nearby concepts such as live cases, hackathons, and consultancy projects. We then introduce the practical conditions for the student challenges studied. Thereafter, the findings from the empirical investigation are used to present a set of recommendations for faculty and clients who would like to explore and be involved in student challenges. The chapter ends with a discussion of the practical implications of student challenges for entrepreneurship education development and teaching practice.

STUDENT CHALLENGES AND THEIR PEDAGOGICAL UNDERPINNINGS

First, we describe the student challenge and its pedagogical underpinnings, as it is a concept new to the existing literature on entrepreneurship education. Even though the student challenge is a short-term process (normally between 2 days and 2 weeks), student challenges require planning and a great deal of preparatory work before the student challenge starts. In this pre-phase, the faculty works with external clients to develop and present general problem(s) to students. The student challenge starts with the client presenting the general problem, after which the students are split into (preferably multidisciplinary) groups of around four. It is also an advantage to have facilitators dedicated to helping the students in the first phase since an open problem description and students' unfamiliarity with the pedagogical method create confusion. Existing tools may be used to facilitate this first stage, such as wayfaring (Steinert & Leifer, 2012) or design thinking principles (Kleinsmann et al., 2017; Sarooghi et al., 2019). The student groups work intensively towards the deadline, after which they will present their

solution to a jury. The jury will then either grade the work (curricular) or present a winning solution (extracurricular).

Student challenges share several similarities with live cases since they involve a current situation (McWilliams & Nahavandi, 2006), which requires close dialogues with clients (Stewart & Dougherty, 1993), and decisions for the problem are yet to be made by the students (LeClair & Stöttinger, 1999; Lincoln, 2006). Furthermore, the live case also focuses on facilitating the process to ensure students' learning. However, student challenges depart from the traditional live case approach because of time constraints and competition elements, where they share several similarities with hackathons instead.

Briscoe and Mulligan (2014, p. 1) define a *hackathon* as an event in which computer programmers and others involved in software development collaborate intensively over a short time frame on software projects. Most research in the field also investigates software projects and digital innovation (e.g. Lara & Lockwood, 2016; Munro, 2015). However, the concept has also been used with a non-technology focus, such as in marketing (Calco & Veeck, 2015), management consulting (Maaravi, 2020), and medical education (Aungst, 2015; Olson et al., 2017; Wang et al., 2018). Three core elements differentiate student challenges from hackathons. First, student challenges are specifically regarded as an approach to learning through early-stage innovation processes with a clear emphasis on the learning aspect for the student and with university faculty actively involved in the process. Second, student challenges do not necessarily relate to digital or even technological innovations. Finally, the time aspect is slightly different, as hackathons often range between 24 and 72 hours (Hmelo-Silver, 2004), and student challenges can be longer to ensure the desired learning outcome. Consultancy projects are a third approach that shares similarities with student challenges as they are an established action learning method that has become an integral part of education in many business schools and universities (Lycko & Galanakis, 2019). These have also been called *commission projects* (Laughton & Ottewill, 1998) and they focus on the live projects coordinated between clients, faculty, and students. They can be implemented as part of a course (Bak, 2011) or as an alternative to the more established dissertation (Ardley & Taylor, 2010), either with for-profit or non-profit clients (Desai & DeArmond, 2021). Research on consultancy projects has been shown to build bridges between higher education and industry, as well as enhancing employability (Koendjibiharie, 2020). Even though student challenges share similarities with consultancy projects, the student challenge is shorter term and is more evolved around the early stages of an innovation process. In addition, the process takes place more on students' premises than the external clients'.

However, there are studies that do match the description of student challenges given here that have been called *live cases* (e.g. Culpin & Scott, 2012) or *hackathons* (e.g. Angarita & Nolte, 2020), and even specific challenges such as the 'business model challenge' (Bolzani & Luppi, 2020) in the literature. Hence, the distinction between these pedagogical approaches is not always clear. Nevertheless, Table 10.1 summarizes the main distinctions between the four approaches, as stated above.

Table 10.1 Student challenges compared to live cases, hackathons, and consultancy projects

Approach	Problem statement	Normal time frame	Core feature
Student challenge	Vaguely defined; developed in cooperation between faculty and client	3 days to 2 weeks	Students learn through being leaders of an early-stage innovation process. Developing a solution is a learning vehicle.
Live case	Clearly defined by client and faculty in cooperation	1 semester or less	Students learn actively based on real-life problems from external clients.
Hackathon	Clearly defined and mainly on technical innovation; client develops problem statement	24 hours to 3 days	Students compete to create the best solution for a client.
Consultancy project	Vaguely defined; client together with students	1 semester or less	Students work with clients to develop solutions. Students work primarily for the clients.

Being an approach primarily to promote learning, student challenges combine strengths from live cases, hackathons, and consultancy projects to facilitate several types of student learning. First, student challenges allow students to actively engage with innovation and problem-based learning (Hmelo-Silver, 2004; Wood, 2003), so they include several aspects of *experiential* learning (Kolb & Kolb, 2005). The tasks the students are given are—as mentioned in the introduction—vaguely defined and require skills for students’ *self-directed* learning (Garrison, 1997; Morris & König, 2020). The process of student challenges further facilitates learning through *inquiry* (Kienzler & Fontanesi, 2017), as the externally provided challenge is up to students’ interpretation, creativity, and judgement. Since students work in groups, there are also aspects of *collaborative* learning (Wang et al., 2018) and team learning (Decuyper et al., 2010). In practice, student challenges position students as leaders in early-stage innovation processes (Salerno et al., 2015). Thus, some foundations for using student challenges as a case teaching approach in entrepreneurship education can be found in how early-stage innovation practices are facilitated.

The first stages of an innovation process have been termed the *fuzzy front end* (Khurana & Rosenthal, 1997; Vestad et al., 2019), where there is considerable ambiguity about what the problem *is* and even *how* the potential solution space looks. Various approaches may guide the early-stage innovation process, such as design thinking principles (Kleinsmann et al., 2017) and wayfaring (Steinert & Leifer, 2012). In the wayfaring approach, Steinert and Leifer (2012) emphasize that it is essential to avoid ‘going home prematurely’ (p. 252). By that, they mean that the innovators—in our case, students participating in a student challenge—should avoid pursuing the first solution that comes to mind and rather iterate and continuously explore the problem/challenge and solution options for some time. The nature of the early-stage innovation process implies that organizers, such as university faculty, must acknowledge and accept the iterative, ambiguous, and uncertain path of the process. Consequently, organizers must take on several roles during the student challenge (Wraae et al., 2020).

EMPIRICAL BACKGROUND

Nord and NTNU are partners in Engage, a 10-year government-funded centre for excellence in education through entrepreneurship that was established in 2017. Engage's vision as a centre is 'to increase the number of students in Norway and around the world with entrepreneurial skills and the mindset to become change agents for the better' (Engage, 2021, p. 4). Based on pre-existing practices of each of its five partner organizations at Nord and NTNU, Engage has developed and organized several student challenges as it has been shown to be a proper pedagogical intervention to train students to embrace uncertainty and interact with the world outside the university. An empirical investigation of seven student challenges organized at Nord and NTNU was conducted to explore how a student challenge should be facilitated to balance tensions between stakeholders. The seven student challenges were divided into four types, arranged by Engage in 2018, 2019, and 2020, and lasted from 2 days to 2 weeks. In total, 269 students took part in one of the student challenges, and 27 case descriptions were presented to the students by a diverse group of external clients. For the present chapter, the authors collected written materials and extensive student feedback ($N = 93$) from the seven student challenges before the authors conducted in-depth interviews with the key faculty organizers of each challenge.

Table 10.2 briefly introduces the student challenges, and the four types of student challenges are described in more detail below.

Table 10.2 Descriptive overview of the student challenges studied

Name	Duration	Type	Students	Problem presented
A Lofoten Sustainable Tourism Challenge	Friday–Sunday	Extracurricular	25	3 (2018)
B Blast-Off Week	Monday–Friday	Curricular	63 51 67	4 (2018) 4 (2019) 3 (2020)
C Seafood Industry Transportation Challenge	Monday–Sunday	Extracurricular	32	1 (2018)
D Health-Tech Challenge	2 weeks	Extracurricular	18 13	6 (2018) 6 (2019)

Type A, the 'Lofoten Sustainable Tourism Challenge', was an extracurricular challenge organized by Nord that took place in Lofoten in October 2018. The event was sponsored by the local county, a local bank, and a local power company. Twenty-five students were selected based on their written applications; they came from seven Nordic universities. The background for the challenge related to conflicts between local communities and tourists due to overtourism in Lofoten. Three problems regarding more sustainable tourism were presented by local organizations. Students could prioritize which problems they wanted to work with, while organizers divided students into groups. After two intensive days of work, the group presented their solu-

tions to the jury on the last day. The winning team received a prize as well as the opportunity to qualify for a spot in an accelerated programme.

Type B is a curricular annual student challenge organized as part of the course ‘Innovation and Change Processes’ at Nord. The challenge, called ‘Blast-Off Week’, lasts from Monday until Friday. Students are given lectures about innovation processes and teamwork before the student challenge. Problems regarding health, industrial development, and a circular economy from three to four external clients were presented on the first day. Students thereafter prioritized the problems they wanted to work with and were subsequently divided into groups of four to five. The assigned mentors for the groups would either be students who had taken the course previously (Arntzen-Nordqvist & Ramskjell, 2021) or faculty. The students were graded by an external jury, and the grade counted for 40% of their final grade on the course.

Type C, the ‘Seafood Industry Transportation Challenge’, was an extracurricular challenge co-organized between NTNU and the University of Washington (UW). The contestants were 20 students from NTNU and 12 from UW. The main problem that the students explored was how fish could be transported more efficiently from Norway to fish markets in Asia. Students and organizers travelled to two remote locations to observe the challenges of transporting fish. The student challenge lasted 7 days, and each group had to decide on a focus within the more general problem. Proposed solutions were pitched to a jury, and the winning team won travel to UW.

Type D, the ‘Health-Tech Challenge’, is an annual extracurricular challenge organized as a cooperative venture between the student organization DRIV NTNU and the research infrastructure group Future Operating Rooms (FOR) at NTNU. FOR went to different surgical clinics at the university hospital at NTNU to collect six real-life problems from practitioners. Students from engineering studies, medicine, and other programmes were divided into groups by the organizers. Each group chose a problem to work on, and several groups chose the same problem. After initial guidance and encouragement, the student groups had 2 weeks to propose a solution that they would present to a jury to potentially win €2,000 for continuing the work on their proposed solution.

INSIGHTS FROM THE INTERVIEWS

In this section, insights from the interviews with core faculty and organizers, as well as evaluations by students and clients, are presented. This section pinpoints topics that may be particularly important to consider when organizing student challenges rather than elaborating the overall process of student challenges as such. However, the overall structure of a student challenge, as well as the four specific types of student challenges studied here, can be found in the previous sections of this chapter. Each response is, for the sake of clarity, tagged with a specific identifier, such as ‘A-S1’, where ‘A’ refers to challenge type A, ‘S’ refers to student (and thus ‘C’ for clients and ‘F’ for faculty), and ‘1’ is a unique number to distinguish each individual.

A central topic throughout the interviews was the degree to which the problems presented to students should be openly or narrowly defined. In very interdisciplinary teams, such as in student challenge type D, there were different opinions about how easy it was to understand

problems presented by clients. Two students at the same student challenge evaluated the problems presented in the following way:

Quite unspecific. It was not really problems to be solved, but some dreams that the different [research] groups had. It was difficult to understand and less inspiring. (D-S1)

The descriptions were good, but many difficult words for us that are not students of medicine. (D-S2)

Faculty should therefore consider how they can guide the process of creating problem descriptions. It can be challenging to provide problems so broad the groups use their interdisciplinarity and different skill sets to devise creative and innovative solutions. While the opportunity for new and unexpected solutions increases with more openness in the problem descriptions, the flip side is the amount of time students have to understand what the problem actually *is*, as well as solutions that may end unrealistically. Hence, the benefit of a narrower problem description is that proposed solutions are easier for clients to implement. Simultaneously, students may feel that they are consultants set to conduct a specific task rather than self-motivated innovators. A student who participated in student challenge type A suggested that the problem descriptions should be more open: ‘The challenge would be a lot better if the problem were more open, as this would lead to more creative thinking and results. I felt like we were more consultants for other businesses than trying to be innovative’ (A-S2).

One way to depart from the problem description and solution value dilemma is to shift the focus from the starting point (problems) and outcomes (solutions) to the *learning* process instead:

Some students who participated in [the student challenge] did not entirely understand their learning outcomes until their final year [at the university]. (B-F1)

What I learned the most from was the questions the students approached me with during the second day of the challenge. (A-C1)

The empirical study also revealed two intertwined and uncertain processes during a student challenge. The first was the very explicit process in which students innovated to propose solutions to the client’s problem. However, the outcomes may not have been in line with the client’s expectations: ‘The results are not always what [the clients] think they will get’ (C-F1).

The other process was the group work process, where an interdisciplinary group of individuals were to work effectively together. Frameworks for innovation processes, such as wayfaring, were found useful here to guide the problem exploration phase. Experience from the student challenges exemplified how the group work may lead the innovation process to one of two extremes: a participating student may feel they have the best ideas or solution and cannot receive feedback and work collaboratively with the group, or one or several students in the group do not actively participate. A quote from a student challenge exemplified this: ‘I did not expect to meet persons not willing to work on a challenge like this, but there was one in my group. The person did not resist working, just kept really quiet and didn’t pay attention to what we were discussing and had no comments when asked’ (A-S10).

Handling potential upcoming issues in the process became a focus for faculty in several of the student challenges studied, and sufficient resources to handle such issues were stated as important: 'Another way to embrace the uncertainty is to dedicate some resources for training in it, to facilitate the process and handle the unexpected things that will happen during this first phase. I would suggest having a trained facilitator for each group to help challenge and guide the groups' (A-F2).

Thus, the insights from the interviews suggested that preparing what can and should be done before the challenge is an important measure to maximize the resource slack of the faculty during the student challenge. Assessment criteria and accommodations, for instance, can also be thoroughly prepared. Another approach that was found useful to prepare students for group work and to provide guidelines for active participation was establishing a group work contract in advance. Nevertheless, it is important for faculty to remember that the students are to lead the early-stage innovation process. Faculty should ensure that they are not involved too heavily and that they do not control students' process. Being a leader may be new and even frightening for some students. The following quote illustrates how students' expectations may be affected by the type of educational approaches with which they have become familiar during their studies: '[The student challenge] was the only thing I was worried about before I started the master programme but ended up being one of the best learning experiences I have ever had' (B-S40).

Hence, an appropriately designed student challenge may have a transformative effect, not only in terms of student learning but also on students' views of the educational approaches in which they are participating.

DISCUSSION

In this chapter, we have explained the pedagogical underpinning of student challenges and explored seven student challenges empirically based on insights from students, faculty, and clients. The combined experience from the seven student challenges studied in the present chapter leads to three main recommendations for faculty who want to use student challenges as a pedagogical approach in entrepreneurship education.

First, we suggest that all three types of involved actors—that is, students, faculty, and clients—shift their focus to their learning process rather than specific solutions developed, since the learning of involved actors is the primary value created. Thus, value creation, in terms of proposed solutions from the innovation process, is a means of reaching the overarching learning goal. While perhaps obvious for some, the findings in this chapter suggest that a focus on the learning process as a primary outcome should not be underemphasized.

The second recommendation relates to planning and organizing student challenges. The findings in this chapter advance how student challenges encounter dominant educational norms and routines. While a way to facilitate student learning is to have students embrace uncertainty, faculty must also handle uncertainty to a large degree. Successfully conducting student challenges therefore involves the delicate task of separating what can and should be *prepared* in advance and what must and should result from the *emerging* and uncertain process

that students, faculty, and clients experience during a student challenge. There is likely no either/or option, and faculty should consider how the appropriate balance between preparatory planning and an emerging process should be handled. Ensuring there are extra resources or designated assistants to facilitate, especially the first phase of the student challenge, is one practical implication that should be considered when organizing a student challenge.

The third recommendation highlights the effects and importance of expectation management among actors involved in a student challenge. Clients must accept and leverage the fact that a student challenge is primarily a learning vehicle where students learn through innovation and value creation. Hence, students will probably contribute more through the way they question the client's current assumptions, ideas, and practices than through the development or implementation of narrower and predefined concepts or tasks. Clients should thus ensure that they are open to and leverage the emergent process of a student challenge. This can also be done in the assessment criteria for both curricular and extracurricular activities. In curricular activities, the criteria for grading should include process-based criteria, such as how students handled issues in the team and how they worked with the clients. For extracurricular activities, the criteria on which the jury bases its decision should also include process criteria. This assumes that the jury should follow the process, not only examining the presentation but also ensuring process criteria are emphasized.

IMPLICATIONS FOR CASE TEACHING PRACTICE AND REFRAMING THE CASE METHOD FOR ENTREPRENEURSHIP EDUCATION

Students will often find that a student challenge fundamentally differs from what they are used to in higher education. For students who have mainly experienced traditional teacher-led, lecture-based, and narrow-focused (entrepreneurship) education, a student challenge will be a new, strange, and perhaps scary experience. Faculty could take measures to make students safer in the new situation, but the core implication for higher education institutions is that they should expose students to student challenges from the first year of their college or university degree programmes. Student challenges may be a fruitful first entry into entrepreneurship education.

The present chapter contributes to reframing the case method by defining student challenges as a fruitful pedagogical approach to teach students to embrace uncertainty, which is an important feature of entrepreneurship education. For faculty and clients, *planning for uncertainty* is a core process in preparing and conducting student challenges. The recommendations provided also suggest how the student challenge can be aligned with the stated learning outcome and the student assessment.

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