UNIPED

UNIVERSITETSFORLAGET

RESEARCH PUBLICATION

ÅRGANG 42, NR. 1-2019, S. 9–26
ISSN ONLINE: 1893-8981
https://doi.org/DOI: 10.18261/issn.1893-8981-2019-01-02

Student-centred learning environments in higher education

From conceptualization to design

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ABSTRACT

This contribution proposes student-centred learning environments (SCLEs) as an instrumental notion for teachers and institutions in higher education. SCLEs are viewed as spaces for learning that enable students to address unique learning interests and needs, to meet institutional requirements as well as engage with knowledge, resources, tools, or people in order to learn. To clarify the notion, the article problematizes the idea of student centrality and discusses key assumptions following perspectives to learning that emphasize students' responsibility, when also being provided with the necessary guidance and support in the process. The article identifies a set of principles to be considered when designing such learning environments in higher education. Two examples of course designs in software engineering and legal education are examined and discussed in an attempt to illustrate how these principles are employed in the two empirical contexts. By accounting for the fact that SCLEs can cater, foster and support student learning, the article makes a case that such environments need to be carefully crafted. Ultimately, this contribution provides a toolbox for teachers and higher education programmes in higher education, which could be employed to enhance the quality of teaching and learning.

Keywords

student learning, learning environments, higher education, pedagogical design

SAMMENDRAG

I denne artikkelen diskuteres hvordan betegnelsen student-sentrerte tilnærminger kan utvides til å inkludere perspektiver og prinsipper som også fanger opp utviklingen av mer helhetlige studentsentrerte *læringsomgivelser* (SCLEs). Ved å lansere et slikt kontekstuelt fokus ønsker artikkelen både å poengtere viktigheten av å tenkte mer helhetlig rundt kvalitetsarbeid, og hvordan dette kan komme til nytte i praktisk implementering og utvikling av undervisnings- og læringskvalitet. Betegnelsen *læringsomgivelser*

fremhever her betydningen av de kontekstuelle rammene som må til for å skape gode læringsmuligheter for studentene, der vi tar hensyn både ~~en rekke enkeltfaktorer som~~ studenters forutsetninger, interesser og behov, ~~hvordan man ivaretar~~ institusjonelle og faglige krav ~~og~~ ikke mist hvordan disse faktorene må samspille for å ~~kunne opp~~nå målet om gode helhetlige læringsmiljøer. Artikkelen diskuterer også prinsipper som kan gi retning til ~~utviklingsprosesser~~ hvordan slike læringsomgivelser kan designes og hvilke ~~prinsipielle~~ føringer dette kan medføre for lærer og undervisningsledere i praksis. For å illustrere disse prinsippene, trekker artikkelen inn to eksempler fra jus og dataingeniørfag, der ~~vi~~ både utfordringer og ~~interessante~~ løsninger drøftes i lys av de prinsippene artikkelen lanserer ~~i forbindelse med på design av helhetlige læringsomgivelser~~.

Nøkkelord
~~studentlæring~~, læringsomgivelser, høyere utdanning, pedagogisk design

INTRODUCTION

Educational renewal is often seen as a way to keep pace with the dynamics of knowledge domains, society and the labour markets. In the contemporary context, increased access to an expanding body of knowledge and practices constantly presents the educational field with new challenges. From a situation where lectures and teacher-led activities served as significant access points to information and knowledge, the learning challenge of today is about critically engaging with widely available knowledge, transformative practices serving both profession-related but also life-long learning goals, and developing capacities to self-evaluate, self-regulate and manage own learning (Francis, 2010; Boud et al., 2018). These developments have led to an increased need for generating new types of learning environments, teaching practices and way of organizing education. Whereas in the past teaching and learning activities in higher education were quite clearly informed by discipline-specific knowledge and practices or centrally structured curricula, nowadays there is a great deal of emphasis on the centrality of the student's needs and responsibilities. In this vein, student-centred learning has been proposed as a pedagogical approach and response to these challenges. It is assumed that student-centred activities enhance tailored processes of learning that allow students to make sense of increasingly specialized knowledge and practices, and that also makes possible the development of generic skills and competences. At the same time, participation and engagement can be beneficial for learning but place a great deal of responsibility on the students, who are expected to self-manage their learning process and achieve institutionally set learning outcomes.

However, while upheld broadly, student-centred learning is a 'container' notion that has not been clearly operationalized and has led to disparate and local interpretations and implementation in educational practice. The ambiguity of arguments surrounding the idea of student-centred learning represents the point of departure in this contribution. We argue, in line with other scholars (Goodyear & Dimitriadis, 2013; Jonassen et al., 2012; Sawyer, 2014), that learning in itself cannot be strictly determined, or 'dictated', by teaching, planned activities and assignments. Rather, teaching and pedagogical design can provide the environment and the tools that make learning possible, by supporting, guiding, feeding content and giving direction to the activities that are acknowledged to be conducive to learning. From this viewpoint, we claim that it is not learning that is student-centred (since learning

is a process enacted by the learner anyway), it is rather the environment that provides opportunities for learning. Therefore, the emphasis should rather be on designing *environments* that place the student at the centre, where students can make use of and acting upon what is provided (activities, assignments, resources, tools, guidance, etc.) to trigger, enhance and support their learning. In this positioning article we elaborate on the notion of *student-centred learning environments (SCLEs)* (Land, Hannafin & Oliver, 2012), which focus on creating spaces that provide the students with the opportunity to act upon the learning needs, intentions and interests, all supported and guided in a structural manner.[1]

The discussion on student centrality and how that can be concretized connects directly to on-going discussions, especially in the Norwegian context, about quality in higher education. While quality in higher education is often considered from a broad perspective (see Damşa et al., 2015; Elken & Stensaker, 2018), it has been made clear that a considerable role in how quality is achieved relates to the processes of teaching and learning, and how these processes are planned and enacted to provide a meaningful learning experience (Ashwin, 2014; Baeten et al. 2010; Biggs & Tang 2011; Lindblom-Ylänne et al., 2006). More recent studies suggest that pedagogical design, i.e., how learning activities, teaching approaches and resources and assessment forms are arranged (Kirkwood & Price, 2014; Nerland & Proitz, 2018) matter significantly for student learning. This only reinforces the importance of generating learning environments that provide students with opportunities to be active, engage, explore, generate knowledge and take responsibility on basis of sound pedagogical support and expert knowledge, rather than focusing on outcomes and the enactment of teacher-driven or prescribed learning scenarios.

To be able to design and implement in practice such SCLEs, a better understanding is needed of what is meant by 'student centeredness' and what are the principles underlying such environments. In addition, from a quality assurance perspective, knowing more about how SCLEs can be employed and capitalized upon in ways that are conducive to learning is crucial. In this paper we therefore pursue the following question: *What are aspects of student-centred learning environments that are important for teaching and learning in higher education*? We attempt to answer this question by problematizing the notion of student-centred learning to better understand the principles that underpin the design of SCLEs. Indirectly, by doing so, we claim an arena for research findings and educators' voices in the discussion about student centrality in an effort to propose research-based knowledge and concrete pedagogical design efforts as constitutive of quality of teaching and learning in higher education.

We draw on empirical findings and material gathered in an extensive national research project on Quality in Norwegian Higher Education (funded by the Research Council of Norway). We extract two empirical examples of cases from this project in order to problematize the conceptual grounding of SCLEs and discuss implications for the educational practice. Empirical illustrations here serve the purpose of triggering a thought-provoking discussion on what is important when addressing student centrality and quality, with insights that can inform a broad range of actors in the teaching and learning practice

1. This view of learning environments builds upon a learning design perspective, rather than a broad perspective that also considers structural and institutional aspects (e.g., campus conditions, student services, infrastructure).

(teachers, institutes and programme leaders), as well as other stakeholders in the higher education sector.

STUDENT-CENTRED LEARNING AS POINT OF DEPARTURE

The term 'student–centred learning' (SCL) has been widely used in the teaching and learning literature and is linked to a range of related perspectives such as flexible learning, experiential learning or self-regulated learning (see Järvenoja et al., 2011), to mention a few. The slightly overused notion of student-centred learning can therefore be confusing since it signifies different things to different people. Historically, the concept has been credited as early as 1905 to Hayward and to Dewey's work, but is also associated with work by Piaget and Malcolm Knowles (O'Neill & McMahon, 2005). In a more contemporary perspective, where there has been a shift away from a focus on teaching to student learning, there surfaced a critique against teacher-focused/transmission of information, such as monological, large group lecturing. Glimpses of this student-centred movement appeared during the 1960s and early 1970s (Northedge, 2003, p. 169) partially by contesting the strong factual orientation in professional and medical education (Pettersen, 2006). This movement also drew attention towards motivational factors in letting students explore knowledge on the basis of their own interests as active and participative learners. Two decades after, Anna Sfard's classic paper 'On Two Metaphors for Learning' (1998) set off a debate around what she termed as 'active learning', by referring to knowledge as something to engage with, which she also related to a 'constant flux of doing' (p.5). In recent years, an increased interest from educational policymakers has led to an inflation in the usage of the term student-centred learning, but these policy-based references are generally not clearly defined in terms of how students handle their learning. Another important perspective often associated with SCL is the conception of self-regulation, with a focus on how students develop strategies for tackling their own learning (Järvenoja et al., 2011). Finally, more recent conceptions also involve marketing ideas, emphasising a student-experience focus and attempting to maximise positive student experiences (Boud et al., 2018). The above are examples illustrating the variety of perspectives relating to the notion of student-centred learning, which can barely be conceived of as a conceptually coherent movement.

Taking a practice perspective, SCL seems to be depicted in relation to two broad orientations in teaching: the teacher centred/content-oriented conception and the student centred/learning oriented conceptions. The essence of this dichotomy is synthesized in the principle that SCL conveys knowledge as constructed by students and that the lecturer is a facilitator of learning rather than a presenter of information. What this means in practice is interpreted in highly divergent ways, with equally unclear implications, e.g., the reliance on active rather than passive learning, emphasis on deep learning and understanding versus surface learning, increased responsibility and accountability on the part of the student compared to a reliance on the expert as a rightful 'knowledge owner', and increased sense of autonomy in the learner compared to a reliance on faculty offering valid notions (O'Neill & McMahon, 2005).

Finally, in policy documents and quality assurance statements, student-centred learning is often viewed as a solution to a range of problems. In the Norwegian national context, this

emphasis is politically visible through official governmental and ministry statements underlining the positive effects of student-centred *learning and teaching (KD, 2014).* These political signals also surface explicitly in a white paper on "Culture for Quality in Higher Education" (KD, 2018) referring to student *active learning* as well as student *active teaching* as important measures in achieving educational quality in the sector. This white paper also underlines the Norwegian governmental commitment to standards and guidelines for quality assurance in European higher education, in which student-centred learning is defined as a paradigm shift towards quality, in line with the implementation of the European qualification framework promoting the focus on learning outcomes (EU, 2016). This development towards fixed learning outcomes and program standardisation are again problematic with regard to the student-centred notions stressing students' possibility to pursue learning based on their own conditions, which is held in high regard in constructivist, self-regulative and even marketing perspectives. While the above medley of conceptions (active, centred, learning or teaching) reveals itself as somewhat confusing, educational practices still are expected to accommodate these (politically or institutionally) assigned approaches through national quality assurance measures.

Based on the above portrayal of the disorderly SCL landscape, the remainder of this paper will convey student-centred learning environments (SCLE) as a conceptual alternative making student-centred notion more graspable with respect to the handling of educational practice.

SCLEs – ASSUMPTIONS, DESIGN PRINCIPLES AND FRAMING CONDITIONS

We conceive of 'learning environments' as spaces assumed to have components of an intellectual nature (e.g., knowledge contents, tasks, types of assignments, assessment forms), human-relational (e.g., participants, interaction, communication) virtual (e.g., digital tools, online platforms), physical (e.g., infrastructure, material resources). According to Land, Hannafin and Oliver, student-centred learning environments 'provide interactive complimentary activities that enable individuals to address unique learning interests and needs, study multiple levels of complexity, and deepen understanding (p. 3, 2012).

At a fundamental level, learning environments always encompass particular epistemological aspects, i.e., beliefs and perspectives of knowledge, and how learning can be organized and achieved in relation to it. The conception of SCLEs connects to an expansion of socio-constructivist and sociocultural perspectives to learning, towards a deeper, underlying, ecological and transformative view. When viewing learning from this extended perspective, we do not exclude aspects of (individual) human knowledge and thinking, but conceive of them as natural events and outcomes of participation in actual practices (Dewey, 1938). This implies that the individual student, in this case, learns by actively relating to the environment and other individuals. How those relations are formed is a part of how a person comes to know, learn and develop (Vygotsky, 1987). In this sense, knowledge, material surroundings and practice, are not ontologically separate from human development, but considered as inherently intertwined. Learning, therefore, comprises conditions of activity, in which both individuals and environments change, and where environments provide a 'playground' for human behaviour in altering both entities (Damşa & Jornet, 2016).

From key assumptions to the design of SCLEs (2)

Given the above notions on SCLEs, we therefore suggest a set of key assumptions underlying the relation between the perceived nature of learning, the structure of the environment, and the role of the learner. Generally, epistemologies emphasizing knowledge acquisition are here linked with pedagogical designs wherein knowledge transmission scenarios prevail and learning environments aim at information transfer. Conversely, learning epistemologies highlighting knowledge construction and participation are associated with pedagogical designs where learning activities and resources more organically address the students' needs by supporting interaction through speech or activity, production of knowledge/objects, or various forms of participation. For example, one environment would rely upon individual use of technology to test and refine personal theories, while another would support collaborative activities to facilitate shared meaning of scientific practices. Both can be considered student-centred and supportive of learner-constructed meaning and knowledge, but with core ideas and values stemming from different epistemologies.

Of several assumptions, some are considered of central importance (see Jonassen & Land, 2012): a) the centrality of the learner in creating meaning and understanding; b) access to multiple perspectives and (contextual) resources that facilitate learning; c) scaffolded participation; and d) coherence in the design of the learning environments. These are assumptions generally rooted in relational, situated and transformational perspectives to learning. In practice, these assumptions would involve activities such as solving problems, sharing knowledge, engaging actively with resources available in the environment, with people and tools, and ideally in ways that align authentically with practices of a knowledge domain. The main educational purpose within this realm is to develop extended awareness (Jeong & Hmelo-Silver, 2015; Quintana et al., 2006).

When given the opportunities to make choices and pursue individual interests, learners are assigned a central role, together with a greater responsibility for what happens in this process. Providing the students with this opportunity, *to actively construct meaning, knowledge, experiences,* can ~~be done~~ by establishing external learning goals, i.e., learning outcomes. ~~But the question is by~~ what means the learner ~~then~~ can determine how to proceed based on individual needs, interest, prior knowledge and motivation ~~(Land et al., 2012)~~. Examples could be exploring the steps of the programming process in software engineering projects, or the meaning of learning theories in a case-based collaborative task in teacher education (see Damşa & Nerland, 2016). Students have the opportunity to pursue goals, plan strategy, understand their lack of knowledge and attempt to alleviate it. They can, based on these premises, also formulate and test hypotheses and models, integrate new and existing knowledge, and thereby review and revise their approach (cf. Clark et al., 2009). But, as underlined by Quintana and colleagues (2006), 'learners can be overwhelmed by the complexity of options available to see what steps are relevant and productive and make effective decisions.' (p. 359). Therefore, this process of managing the inquiry (i.e., deciding on actions, addressing open-ended tasks, determining how resources could be used, reflecting on what is being learned, etc.) should be supported by guiding structures in the learning environment. The individual is thereby assigned the responsibility that concerns uniquely generating understanding, but is at the same time provided explicit support by the learning environment.

Some core assumptions concern the way SCLEs should support this kind of *'contextualized'* learning. Rather than treating knowledge as isolated content to be processed, elaborated and retrieved, SCLEs are intended to promote authentic practices that situate knowledge-in-use (Sawyer, 2006). The context can involve human-relational resources, such as mutually defined practices, beliefs, and understanding (Barab & Duffy, 2000), or knowledge standards, norms and resources generated in specific communities, which cannot be accessed in the isolation of a lecture hall (O'Neill & McMahon, 2005). It also provides authentic problems of the type that may be encountered in real-world, out-of-school context. Capitalizing on problem contexts designed to link everyday experiences and build upon what students know anchors learning in more authentic contexts and makes it more likely for students to understand how, for example, concepts are applied and why they are useful; in other words, to make knowledge 'actionable' (Markauskaite & Goodyear, 2017).

The design of learning environments is informed also by premises about how various resources and digital technology can *scaffold* teaching and learning. Depending on the theoretical perspective taken as the point of departure here, technology can be seen *as a tool* that helps to mediate the performance of a learning activity, or it can be seen as *structuring resource* for the students' learning and participation processes (de Lange, Møystad & Torgersen, 2018). This applies especially for activities that take place differently when digital tools are involved compared to when they are not (Säljö, 2010). These premises can be translated in various ways into learning environments and types of support for working with knowledge, social interaction, evaluation and reflection. This support is concretized into *affordances,* i.e., what digital technology and its functionalities enable or make possible for particular activities. For example: support in a) accessing and working with study materials; b) communicating and collaborating; c) knowledge production; d) assessment and progress; e) managing activities and materials; f) engaging with multimedia activities, and g) community building (see Goodyear & Retalis, 2010). Digital learning environments usually enable such affordances in various configurations, which can be taken advantage of in pedagogical designs. Examples of affordances for collaborative learning are sharing resources, co-writing, using chat to facilitate discussions, planning teamwork, and building shared repositories (Jeong & Hmelo-Silver, 2015). The value of a digital learning environment is often conceived on how it facilitates such combined tasks, in addition to user friendliness (e.g., navigation within the system or attractive design). In addition, future digital systems may need to adhere to ideas of ecosystems with integrated support solutions built into the SCLEs, providing flexible and varied means of engagement, or ecologies of tools (Luckin, 2008).

The *coherence* in a SCLE reflects how its various components are brought together and connect with institutional arrangements. A common notion is that pedagogical approaches and activities should be "constructively aligned" with intended learning outcomes, tasks, assignments and assessment forms (Biggs & Tang, 2011). Here, a distinction is made between designs that predominantly ~~take~~ the cumulative structure of the discipline and its scientific concepts as ~~its~~ organizing structure, and designs that emphasize the relation to work practices and the relevance of activities for the students' prospective professional contexts (Muller, 2009). A curriculum with conceptual coherence is typically characterized as having a strong hierarchy of abstraction. In contrast, contextual coherence is character-

ized as involving segments that are connected to a context and with sufficient practical ~~purpose~~ (Muller, 2009, p.216). In a contextual perspective it is also likely to anticipate that conceptual notions influence SCLEs, the structuring of learning activities and the choice of assessment and examinations.

Design principles for SCLEs

Making the notion of student centrality a reality in practice usually happens through pedagogical design, i.e., the process of translating abstract assumptions about learning into workable solutions in the classroom. The notion of design refers here to a process of preparing situations and 'things' for others to learn (Goodyear & Dimitriadis, 2013). Such designs *for* learning should not be understood as pre-made configurations of course (or program) elements, but rather as dynamic arrangements, open for adjustment to the emerging needs of an increasingly diverse student population (Goodyear, 2015). The teacher/designer can specify learning goals and propose activities, while the learners can construct their own interpretation of requirements of a designed task and work accordingly. Goodyear and Dimitriadis (2013) identify the 'locus of control', which in student-centred environments is most often placed in a balance between the teacher and student. The aim of setting up learning environments that are student-centred is then best served if teachers provide situations that can scaffold productive and meaningful student engagement. In other words, these designs (process and outcomes) involve a combination of educational activities that provide for a variety of possible behaviours, experiences and learning approaches. In turn, these combinations of curricular elements are to be interpreted and pursued (/used) by the learners. In this sense, learning environments are 'contingent and locally inhabited' (Jones & Dirckinck-Holmfeld, 2009), while teachers and students interact flexibly with the available resources provided in these contexts.

Based on the premises underlying the design of SCLEs, we put forward a number of *guiding principles* for design of learning environments that entail student centrality. These principles are not intended as a prescriptive model for course or program design; rather, as indications of what research deems as relevant and important to take into consideration when engaging with such pedagogical design work. In line with the current argument, SCLEs are assumed to:

a. provide students with possibilities to access and work with (i.e., structure, organize, process, manipulate) course-relevant knowledge;
b. offer students opportunities and support for producing knowledge, individually or in collaboration with others;
c. provide opportunities for interaction (i.e., communication with teachers and peers and for organizing collaboration);
d. offer context and support for formative assessment, feedback, and reflection, prior to summative assessment moments;

e. offer students support for self-regulation (e.g., through use of analytics, feedback) and for managing learning activities, and the opportunity to act upon the responsibilities they want to take for their own learning process;
f. offer the possibility of configuring set(s) of resources, activities, tools both teachers and students may want to engage with or employ
g. offer opportunities for differentiated learning trajectories students might want to follow according to their interests, needs, performance, and other important factors;

We will employ these principles to briefly discuss the way higher education courses have planned to facilitate student learning and participation, and to distil aspects of relevance for further research on educational practice.

SCLEs IN HIGHER EDUCATION PRACTICE

In this section we present two vignettes that illustrate ways of translating SCLE ideas in higher education practice, in line with the notions of student centrality discussed above. The illustrations are drawn upon empirical work conducted in two empirical cases as part of a large research project on quality in Norwegian higher education. Both vignettes are based on case studies of single-semester undergraduate courses in two different institutions. The cases were selected due to their comparable size and similar intentions to stimulate student-driven learning activities and support the development of skills for independent inquiry and learning. At the same time, the courses differed with regard to: a) disciplinary context (professional vs. non-professional), b) pedagogical approach (project-based vs. lecture-based), and c) types of supporting teaching and learning activities.

The vignettes have been created on the basis of large sets of data collected in each case, including observations of lectures, seminars, labs, group work, student and teacher interviews, and course documents. The data are mainly analysed through qualitative content analysis (see Damşa, 2018; Fossland & De Lange, 2018). The vignettes highlight course features that materialize the teachers' vision of learning activities where students engage actively with the domain knowledge and practices.

SCLEs in software engineering education

The first case is a 10 ECTS second semester Bachelor course introducing students to a Computer Engineering program with advanced project-based programming and using Java as the programming language. The course, with 170 students, was designed and coordinated by a main teacher, assisted by another teacher and 4 teaching assistants (TAs). The TAs, selected among the program's older cohorts, were responsible for leading group tutorials, providing feedback during lab sessions and assisting in the assessment of assignments. Empirically, the work of fifteen students organized in five groups was documented in detail

VIGNETTE 1. PROJECT-BASED LEARNING ENVIRONMENTS

In the software engineering course, the main pedagogical approach was collaborative project-based learning activities. One of the key professional practices in the software engineering domain is 'software development', which is characterized by distributed knowledge that is incorporated in tools, such as programming languages, testing tools, or open access resources. For the collaborative projects, which represented the final exam (called 'semester assignment'), the groups were required to develop a digital board game (called 'Game of Life' or GoL) using the principles, programming languages and strategies learned during the course (i.e., Java, CSS), and to individually document their programming work. This was a form of activity that involved to a great degree the students' initiative to organize work, collaboration, gather knowledge, and learn new strategies for programing and project management. To proceed with the group project, each individual student was required to have fulfilled the mandatory individual assignments, to be performed in parallel to the group assignment – this offered the students the opportunity to also engage in individual learning, in parallel to the collaborative work. The project work was supported by a variety of learning activities re-designed by the teachers after observing previous courses and discussing with students, including weekly lectures, programming laboratory sessions (programming labs), and TA-led coaching sessions. The groups would meet twice a week during the lab time, but they were free to meet or work outside these hours too, giving the opportunity to organize work at their preferred pace. The TAs were present during the lab hours, answered questions by groups or individuals, and provided feedback. Questions regarding the development process and product could be addressed at any point through email to the teachers or TAs. The software product was first assessed in formative style two weeks before the final deadline, with feedback being provided by the teaching staff. This tailored feedback strategy provided space for all students to access expertise and guidance on a needs-basis, which represents a way of addressing the diversity in learning needs, ambitions, and programming competence in the student population.

SCLEs in Legal education

The second case is a course in criminal law (20 ECTS), in the 7th semester of a five-year Legal Education program. The approximately 200 students attending the course were introduced to judicial and procedural principles based on assignments solving realistic criminal cases. The intention with this practical approach is to integrate theory/content, ethical aspects and practical skills in the students' learning. The ambition is to enable students to develop a more elaborate understanding of principle issues, as well as how to approach criminal law in practice. The course provides traditional lecturing, but also practical exercises on writing legal documents and statements and training in practical settings in roles of defence, police/prosecutor and judiciary. The four regular teachers and a range of guest-lecturers and visitors from the professional field form the teaching staff.

VIGNETTE 2. LECTURE-BASED LEARNING ENVIRONMENTS

The aim with this pedagogical design was to engage students though a variety of practical assignments that required student engagement and that were to complement the large lecture format. Through these assignments, the students needed to identify and solve criminal cases by actively applying judicial principles (moot-court sessions). In this way the students were to learn about specific steps in court proceedings, responsibilities of various parties in a courtroom as well as ethical standards involved in the legal process. In these assignments, the students had to perform with cases both individually and in collaboration with other students. In this way the students were exposed to a broad range of experiences on how to convey legal reasoning in different judicial contexts and relational situations.

While the course teaching was based on a range of teaching approaches, such as online and face-to-face lectures, assignment seminars, moot-court sessions, writing seminars etc., the overall goal of the course was to provide a learning environment in which students learn about the discipline in an integrated manner. The specific practical assignments required students to self-organize, collaborate, gather and process information, put it to use and present it – a range of activities that required the students to be active and take responsibility. This also involved an effort to create a productive interplay between the various teaching formats as well as to coordinate teachers involved in parallel teaching sessions and in the formal assessment of students' performances. This coordination complexity emerged as an on-going adaption process throughout the course.

While a premise for implementing the described variety of teaching and course activities (as described in the examples above) was to engage students in disciplinary learning through procedural and practical work, the implementation of the student-centred activities proved intricate and somewhat double-edged.

In the software engineering course, the students experienced, on one hand, that the planned activities were both highly engaging (*design principle a)* ~~*above*~~), supporting interaction with peers and others with more knowledge (*principle b*), and useful in helping them to understand the relation between theoretical principles and practical (or applied) aspects of the discipline. The course design also allowed for formative feedback and assessment (*principle d*), much appreciated by the students as they could collect not only preliminary assessment but also suggestions for further work on their project. On the other hand, they also reported that these activities generated a considerably increased burden, as they were more openly and collectively exposed during their learning efforts. This two-sidedness reveals that the opportunity offered to produce knowledge with support from teachers and peers (*principles a and b*) appear somewhat unbalanced in the offering of differentiated learning trajectories. This also illustrates the pressure students can experience in well-intended supportive measures, if these environments are experienced as a deadlock for students that engage and perform differently. These apprehensions related to learning need to be taken seriously, since it easily can lead students to become unproductive. While a goal of creating a completely safe learning environment is not a ~~fully~~ realistic expectation, the question here is rather how we can create a setting where students feel safe to take various risks and

engage in scaffolded work where they can build on their own experiences, and develop knowledge and skills in their own pace.

A slightly different challenge surfaced in the law education example, was that a long range of different learning resources and online teaching material was made available to the students, in addition to a rather extensive variety of workshop-oriented seminars and moot-court sessions. While the sum of all these elements in isolation represented an impressive assortment of choices for the law students, making these choices brought about a whole new set of challenges for them. This concerned on the one hand how these resources were coordinated, which refers to *principle f)* to offer the possibility for configuring sets of resources, activities and tools students may want to employ. While the availability of these resources was unquestionably the case for the law students, making the right choices and making sure that these choices were in coordination with each other was not sufficiently attended to by the course teachers. In this case, those in need of most support when handling their own learning process seemed to face the most challenging problems in tackling such complex environments. This brings us to *principle e),* on student support for self-regulation and managing activities, which appears even more challenging when offering complex learning environments compared to traditional and content-based curricula.

The complexity in designing and implementing student-centred learning environments also relate to the need to coordinate course activities, being clear on the intentions of these activities and how they are interrelated, in other words, creating coherence and communicating clearly about expectations, activities, and available resources. One of the experiences gained from the course in criminal law was a certain amount of confusion, misunderstandings and misinterpretation of the implemented teaching and seminar sessions. In the software engineering course, the teachers and the students experienced that many (new) opportunities for feedback were designed for in the course, but were not organized in a way that was most productive from the students' perspective. While it cannot be expected that the implementation of new course elements proceeds without friction, what surfaced as a characteristic feature was that this confusion to a large extent resided in the implicitness of intentions behind the new pedagogical design, and that explaining these purposes proved to be more difficult and comprehensive than expected.

SCLEs – OPPORTUNITIES AND CHALLENGES

This article revealed how student-centred learning environments are aimed at providing designs *for* learning, wherein students face relevant situations and thus develop their own relevant strategies and knowledge repertoires. However, catering for students with diverse backgrounds, learning needs and ambitions, or fluency in student-centred work strategies leads inevitably to the need to devise advanced and differentiated course designs. While SCLEs are envisioned to cater for this variety while still having to account for the institutionally set learning outcomes, their design brings about new challenges by extending complexity and diversity. A different and, perhaps, more complex accountability emerges in relation to SCLEs compared to teacher-led course designs. When considering the opportunities and challenges related to student learning in SCLEs and their design, some aspects

ought to be considered, such as: finding the appropriate degree of responsibility to assign to the students; the balance between student-centred and other types of teaching-learning activities; the coherence between the course or programme elements; the relationship with the disciplinary knowledge or profession-specific competences. The current argument and contribution offers a toolbox for teachers, curriculum developers/designers and programme leaders in their process of weighing these opportunities and addressing challenges related to providing context and support for learning.

The central aspect of the argument in this article relates to how *SCLEs are designed to cater for a student centrality that is conducive to ~~meaningful engagement and~~ participation ~~in~~ learning ~~activities~~*. From this viewpoint, discussions of SCLEs and quality of teaching and learning should take into account the value of how these environments encourage and make possible processes of engagement and participation, together with providing the framework for developing and realizing formal competencies and outcomes. As suggested in this argument, the design work must provide concrete opportunities through specific teaching approaches, learning activities, tasks, assignments, but also forms of feedback and assessment that provide supportive learning situations for students. In this context, what the students are doing with knowledge and the intended course content, and what it becomes possible to learn by engaging in the envisioned activities, is equally important to understand and examine, rather than focusing solely on students' satisfaction parameters, institutional arrangements or merely teacher-driven course designs. Furthermore, the emphasis should rather be placed on making tacit features of established knowledge fields more explicit (Land et.al. 2012), and more accessible to students to engage with. In practice, this assumes a design in which the learner could engage with knowledge in a contextualized manner and by focusing on authentic problems (Barab & Duffy, 2012). A typical task when designing a SCLE is, therefore, to introduce realistic situations to be handled on basis of a specific knowledge field, which was also the case in both empirical examples above. This approach to designing for learning is also often combined with collaborative learning, explorative activities, open-ended problem-solving, construction of knowledge products and critical reasoning. Such forms of activity have the potential to prompt students to be more active and engage in explicating and externalizing their knowledge and learning experiences in relation to the presented practical problems.

The notion of SCLEs is not considered as a one-size-fits-all recipe, but it rather entails a set of principles emphasizing how to be observant of creating various opportunities for student learning. It is vital not to simply focus on these overarching design principles, but also being aware of *what this involves in various disciplinary domains,* with their unique conceptual structure and methodologies. This attentiveness to distinctive disciplinary features is, as we consider it, a presupposition for succeeding with the development of sustainable SCLE and how they relate to distinctive professional and/or societal contexts. A basic assumption in SCLEs approaches is that this explication and externalisation orients the students' experiences and explications towards the formalized conceptual basis and methodology of the given knowledge domain of the educational setting in question (Jonassen & Land, 2012). Moreover, when students are allowed to approach their learning through contextualised problems, it is assumed that they also situate their learning experiences in a way that resemble relevant knowledge practices (Paavola et al., 2012). When taking into consid-

eration some of these challenges in the presented examples, both the notion of explicitness and the student's capacity to handle complexity appear as paradoxical. This surfaces in the purpose and internal relations of the learning designs, but also the students' capacity to handle the complexities swirled up by the compound mosaic of disciplinary knowledge, established practices and practical problems. A thought-provoking side effect of these complexities are the dexterities required to avoid overload, anxiety and frustration in those segments of the student population that need support most. An awareness of how to develop a flexibility in pace and focus, in addition to providing overview and advice on offered resources in the SCLEs, seems prudent in this respect.

As highlighted in the current argument, there are various perspectives and circumstances to be taken into account when considering how SCLEs and their design can contribute the quality of teaching and learning. Research has highlighted especially that teachers' approaches to teaching are related to the way students engage in learning activities (Baeten et al. 2010), but also *the need for connection and coherence* between all components of the curriculum, such as learning activities, anticipated outcomes and assessment forms (Biggs & Tang 2011; Ashwin, 2014). Such findings bring about the question of how all these aspects can inform the design, teaching and learning in student-centred learning environments. Hence, we argue that there is a need to explore this relationship in order to gain systematic insight in institutions' and teachers' (/course designers') efforts to improve the teaching and learning practices and the students' participation, role, view and experiences thereof. Understanding intentions, work and the possible discrepancies between envisioned, enacted and experienced SCLEs is here important for understanding how student-centred approaches can be translated into situations that actually enhance learning as previously described. The intended learning outcomes, activities and assessment forms and criteria should be clear to the students in order to have sufficient potential to enhance their engagement and motivation (see also Biggs & Tang, 2011). Furthermore, in the context of SCLEs, it is important to design in a way that teaching and students' activities are interrelated. It is about addressing the challenge that shifts from lectures and teacher-led activities being the only access points to information and validated knowledge, towards the students being facilitated to learn to access, engage with, and make sense of (complex) knowledge and practices. Teaching in this context becomes thus a process of guidance, and entails skilfulness in providing (often differentiated) scaffolding for students to help them engage, monitor and follow their own learning path.

Finally, drawing on the above summarized notions related to the design of SCLEs, and based on the experiences of developing such environments, it is clear that these kinds of educational surroundings do not emerge ready-made, and that their continued existence is not a given after their implementation. This kind of environment is in constant flux, where adjusting and attuning elements appear as a kind of stable instability. This is not to be considered as continuous complex reorganisations, but rather as a continuous awareness and attentiveness in adjusting and justifying how students are given opportunities to manoeuvre their learning, and experiencing support in doing so. Given these complexities, constant attention to SCLEs is suggested with careful considerations on incorporating disciplinary features and student-learning opportunities. It appears as a given that this way of handling education is both one that presupposes the development of design competencies of

teachers in higher education, and that addresses the SCLEs design *and* maintenance and evaluation. It is also recommended that the complexities in designing, implementing and maintaining these environments are tackled collectively, i.e. that teachers design education collaboratively but also develop these design strategies together. This is important in handling the unavoidable challenges raised by the need for coherence that emerges in large educational programmes. While the notions presented in this paper mainly illustrate how these design processes can be guided in principle, each program or course design needs to be experimented with in order to explore how these principles apply and play out in local practices.

CONCLUSION

This article elaborated on the notion of student-centred learning environments, how these can be designed to cater student learning and how they can become a means for teachers and study programmes to contribute towards the quality of teaching and learning. It outlines a number of key assumptions underlying the thinking behind the SCLEs, which put forward notions of learning through exploration and inquiry, use of resources from within and outside the institutional context, and interaction and work with authentic problems. SCLEs are conceptualized as spaces that can make available the intellectual, relational, physical, virtual, and procedural resources and learning activities that address students' varied learning needs, ambitions, and levels of competence. Two vignettes drawing upon cases from two courses in software engineering and legal education helped illustrate how SCLEs can be interpreted and operationalized in different ways, aligned also with the culture and standards of the domain. Based on examining seminal studies and this empirical exploration, the article proposes a set of principles that can serve the design of SCLEs in higher education, emphasizing, among others: the provision of access to and possibilities for students to engage with knowledge in different ways; opportunities to capitalize on all types of resources available; guidance through formative assessment and feedback for learning; support for self-regulation (e.g., through analytics, feedback) and for managing learning activities.

The article flags an important argument: that educators, administrators and policymakers alike, should acknowledge that enhancing quality, and especially quality of teaching and learning, requires a solid understanding of what and how students nowadays (need to) learn. In addition, it highlights that teachers and study programmes should and can provide and sustain learning environments that enable and support activities and processes that prepare students for becoming knowledgeable and competent graduates, and engaged citizens. For the educational practice, it underscores the necessity to engage in the design of SCLEs mindful of the coherence between the course elements, the disciplinary knowledge and context, and the institutionally determined learning outcomes. Finally, the article provides a toolbox for teachers and programmes that enables efforts at pedagogical design aiming at generating SCLEs in order to make learning through engagement and participation a reality.

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