

Experiences and Challenges of International Students in Technology-Rich Learning Environments

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ABSTRACT

This article presents a study of international students and their use of technology in a Scandinavian institution of Higher Education. A special emphasis is placed on patterns of use of a virtual learning environment (VLE) that is available to all the study programmes at the institution. Actor-Network Theory (ANT) is used as a theoretical approach to focus on the socio-material nature of the various networks that students, teachers, course designers, and artefacts make up within the realm of the institution. Qualitative data were collected through interviews with forty informants, all of them students or staff members at the studied institution. The main findings of the study are that the following factors are essential in the educational experience of international students: the students' level of digital literacy, their degree of understanding of academic and administrative language, and the types of technology that are used in communication. The article also suggests that technology as a socio-material assemblage may encapsulate cultural codes that can be alienating for international students and that there is a need to "open the black boxes" of technology to cater for the needs of international students.

Keywords

Higher education, International students, Educational technology, Actor-Network Theory, Socio-materiality

Introduction

Trends in international Higher Education point toward an increase in technology-enhanced education (online education). In this context, the use of virtual learning environments (VLEs) has a particularly strong standing, as this type of learning technology is widely implemented throughout Higher Education. VLEs are online systems that typically allow for making course material available in a structured way and provide a platform for synchronous and asynchronous discussions. Literature on VLE use in Higher Education reports that the use of VLEs contributes to the shaping of teaching and learning activities (Blin & Munro, 2008; McGill & Hobbs, 2008), even if the technology is used primarily for making teaching material available online, for the administration of courses, or for automating time-consuming processes such as testing. However, different institutions and different disciplines and professions use the technology differently (Johannesen & Habib, 2010a). In some cases, the technology is used as a tool to support critical thinking, scaffold collaboration and facilitate processes whereby students produce their own study material and create their own learning tasks (Johannesen & Habib, 2010b). Over the last few years, social media have made their entrance on the educational scene, often raising hopes that they would deliver novel learning experiences to students (Shaltry, Henriksen, Wu, & Dickson, 2013), but questions have been raised about their capacity to facilitate debate (Friesen & Lowe, 2011).

Scandinavian institutions are attractive on the international Higher Education market, presumably due to relatively low tuition. This situation brings about challenges for Scandinavian universities and colleges, which have to cater for a growing diversity among students, in terms of language, culture, and academic background. In this article, we examine how international students use and relate to learning technologies in a predominantly monocultural context, using the theoretical and methodological lens of Actor-Network Theory (ANT).

Literature review

International students cannot be characterized as a homogenous group, but the relevant literature generally deals with one of two categories of international students: (1) students from what can be referred to as the Global South (which is also commonly labeled as the Third World or developing countries), and (2) students enrolled in institutions from the Global North on an exchange or internationalization programme.

- Students from the Global South have probably experienced the so-called digital divide, a divide in terms of economy, access, knowledge and power (Ferro, 2010; Haddad, 2002; Hilbert, 2011; Wolff & MacKinnon, 2002; Carm & Øgrim, 2013). Many countries in the Global South are lagging far behind the North when it comes to technological infrastructure and penetration of personal technology (InternetWorldStats, 2012), even if the Global South as a whole experiences the highest rise in technology index (World Bank, 2009). As a result, the students from the Global South are likely to lack familiarity with technology that their Scandinavian counterparts may take for granted. In Scandinavia, those students normally enrol into the regular teaching, which is typically provided in a Scandinavian language (or, exceptionally, in English, if required by the study programme).
- Students enrolled in institutions in the Global North come to Scandinavia typically for a limited period of time (one or two semesters) mostly with funding from internationalization programmes such as Erasmus. They are typically in their middle or final year of studies, and have therefore acquired some knowledge of Higher Education from their first few years of study. There may be differences in terms of level of available technology between their home institutions and the Scandinavian institutions they come to, but those are generally less significant than those that their counterparts from the Global South are likely to experience.

The growing internalisation of Higher Education has raised some concern about the integration of international students and their adaptation to an unfamiliar academic culture and environment (e.g., Guo & Chase, 2011). In the growing research literature on the subject, a number of key issues related to cross-cultural differences in Higher Education may be identified. Some of the scholarly literature focuses on variances regarding teaching and learning style (e.g., Heffernan, Morrison, Basu, & Weeney, 2010) while other research studies have a stronger focus on learning philosophies (e.g., Chen & Bennett, 2012). It is also interesting to note that technology acceptance has been identified as a cultural issue that plays a major role in today's learning experience (Yoo & Huang, 2011).

Scandinavian teaching and learning culture can be characterized as focusing on critical thinking and reasoning, and as being to a large extent grounded in socio-cultural learning theories (Favorin & Kuutti, 1996; Illeris, 2009a, 2009b). In Scandinavia, the tradition is that students and faculty members relate to each other on a very "flat" basis, with little difference in status (Arnesen & Lundahl, 2006; Kansanenab, 1999). The students are expected to be self-regulating in their learning activities, and collaboration and peer learning are favoured as learning methods.

The Scandinavian model of education fits in a broader Western academic culture, which is generally considered to be more interactive and student-centred than Asian and African academic cultures, which have been described as more power-distant and teacher-centred (Hofstede, 2001). More generally, a number of research works on international student experience focus on describing and analysing the relationship between learning style preferences and cultural backgrounds (e.g., Charlesworth, 2008). Attributes such as perfectionism (Nilsson, Butler, Shouse, & Joshi, 2008) or reverence for teachers' authority (Chiu, 2009) have been reported as characteristic to Asian students, also when studying in Western institutions. Nevertheless, describing the influence of culture on learning styles is not a straightforward task, and concerns have been raised about the validity and reliability of studies that propose models of culture-specific learning styles (Eaves, 2011). An important question that has been raised is whether the learning styles of international students are predetermined by their cultural background or whether their learning practices evolve as they move from one learning environment to another (Wong, 2004).

In this landscape, learning technologies (such as VLEs) emerge as key elements to understand how international students relate to technology. Our investigation has therefore focused on identifying patterns of use of learning technologies among international students.

Theoretical framework

The starting point of our quest for theories and methodologies was an acknowledgement of the need to find approaches that can handle the complex nature of the problem at hand, involving a large number of elements (students, academics, managers, home institutions, host institutions, native language, technology, academic language, etc.) without being reductionist. In this quest, we quickly realised that socio-material approaches (Fenwick, Edwards, & Sawchuk, 2011; Sørensen, 2009), including ANT, had much potential to support our research. Previous experience

with using ANT (Johannesen, 2013; Johannesen, Erstad, & Habib, 2012) and the literature on socio-material approaches in education (Fenwick, 2011; Fenwick & Edwards, 2011; Saito, 2010) suggest that those approaches are well suited to inform scholarly inquiry in areas where the relationships between the various elements of investigation are fast-changing and do not easily lend themselves to a clear categorization. A socio-material approach such as ANT was therefore a natural choice in an attempt to make sense of the “messiness” of the dynamics that characterised the research topic.

ANT emerged in the late 1970’s within the field of sociology of technology and sociology of innovations. The notion of “theory” might not fully encapsulate what ANT represents, as it can also be seen as an approach or perspective with both philosophical and methodological inferences. Its main tenets repose on a fundamental questioning of what at the time seemed to be a unanimously accepted view of the world as neatly divided into discrete spheres such as “the social”, “the natural” and “the technological.” ANT offered an alternative understanding of the world as made up of various networks or assemblages of interrelated entities. The originality of ANT resides in the “hybrid” character of those networks, i.e., their capacity to include both humans and non-humans (i.e., animals, technological artefacts, viruses, etc.). In order to provide a coherent framework for the purpose of social enquiry, ANT introduces the notion of “actant,” i.e., significant elements within a network that may be either human or non-human.

ANT uses a wide and often changing apparel of concepts, some of which are recurrent throughout the literature, while others are favoured more particularly by one scholar or a group of scholars. The concepts that we choose to use in this article are largely common to those that pervade the traditionally marginal, but recently growing literature within the field of educational science (Fenwick & Edwards, 2010; Fox, 2009; Nesper, 1994). From an ANT perspective, educative activities can be conceptualized as complex webs involving actants, i.e., both humans and non-human elements (including physical buildings, curricula, learning technologies, etc.) that are constantly evolving and, as they do so, are “negotiating” with new elements (Latour, 1999), and, if successful, “recruiting” or “enrolling” them into the network (Callon, 1986). Networks whose constitutive elements are tightly knit toward the same goal may become so stable and robust that they no longer are questioned and can, in ANT terms, be characterized as “blackboxed” (Lanzara, 1999). Within the realm of an ANT framework, actants, in particular technological artefacts, may be “inscribed” (Akrich, 1992; Akrich & Latour, 1992) with a certain pattern of action, as the team of designers that decide on their functionalities and appearance make such choices on the basis of a particular image they have of future users and future uses. However, with any artefact whose designer is not the end-user, there is a chance that actual use will turn out to be different from the intended use, which reflects what ANT refers to as “translation” (Hanseth, 1996), i.e., a process whereby users adapt, shape or convert an actant to fit their own needs.

Methodology

In this study, we apply an interpretive methodological approach, framing both the students’ study practice and their teachers’ teaching practice. The study has been designed as an explorative case study (Yin, 1989) of international educational programmes at a Higher Education institution. The election of the participants for this study was based on purposive selection criteria (Miles & Huberman, 1994; Patton, 1990). The main criteria used for selection were as follows: (a) being a student enrolled at the studied institution for one semester or more; and (b) having a native language other than Norwegian, Swedish or Danish (as those three languages are highly similar).

The data for this article were collected through interviews with international students at the studied institution, and with academic staff in charge of courses offered to international students. The total number of informants was 40, some of whom were interviewed in groups, while others were interviewed individually. We conducted a total of 10 group interviews of students (group size between three and seven), three individual interviews of students, and one group interview of teachers.

The interviews were semi-structured and lasted around one hour. A number of core questions were asked to all informants, while the follow-up questions differed according to the answers given to the core questions. A selection of typical core questions is provided below, categorized in thematically-related areas:

- Use of learning technologies:
 - What are your main learning activities?
 - How do you use IT/learning platforms/social media generally?
 - How do they relate to your learning activities?

- Ease of use and preferences:
How do you consider the role of IT when it comes to the availability of curriculum texts?
Do you have any suggestions for any alternative learning programmes?
Where do you most want to be when carrying out learning activities?
What role does IT availability play in your choice of place when carrying out your learning activities?
What do you think would be the ideal use of IT in your education?
- Skills and training:
How did you acquire your IT skills?
Who was involved in your training?
How would you evaluate your IT skills in relation to that of the other students?
How would you evaluate your IT skills according to what is required for your studies?
- Writing vs. oral communication:
How would you evaluate the role of IT when it comes to your writing activities?
What do think of digital communication compared to face-to-face communication?
- Cultural differences:
Can you mention situations where you have experienced cultural differences in your education? Can you elaborate on such differences?
Do you consider such differences problematic/advantageous? In what way?

The original plan was to rely on self-recruitment to get hold of minority informants, but despite numerous ads and presentations of the study during lectures, no one volunteered to be interviewed, presumably for fear of being stigmatized. Interviews with minority student informants were therefore carried out during classes where the teacher had defined the interview as being a compulsory part of the study programme. Recruiting international students that were enrolled in an exchange programme or an international master programme was relatively more straightforward, possibly because the process of self-recruitment as international students did not conjure up the same kinds of feelings of stigmatization that minority students may have experienced.

The informants represent two distinct student groups. The first group we identified was a group of students from West or South Asia, such as Iran and Pakistan. They have typically lived in Norway for several years prior to enrolling into their study programme, and are bilingual (using both their mother tongue and the Norwegian language on a daily basis). We will further refer to these students as *Asian International students* (AI students), which is a sub-set of the group described above of “students from the Global South.” Those students attend either a work-place based Early Childhood programme or a bi-lingual teacher education programme at the Faculty of Education. In both programmes, the learning philosophy leans heavily on a socio-cultural approach to education, where interaction with peers plays a major role in learning (Engeström, 2001; Vygotsky, 1978). There is also a particular focus on encouraging the students to put their own reflections down in written form, and to give feedback to each other, based on those writings. The students enrolled in those programmes can be characterized as mature students, who generally already have a first degree from their home country.

The second group of student respondents in the study consists of students from either European or North-American background. We refer to this group as *European or North-American International students* (ENAI students), a group that is a sub-set of the above described group of “students from the Global North.” The respondents from the ENAI group all attend the “European Project Semester” (EPS) student exchange programme. These students are typically young adults from a European country, such as Germany, Spain and the Netherlands, although a few may also come from North American institutions. They are used to study in their own mother tongue, and expect the exchange programme to be a cultural and linguistic experience. Typically, a European Project Semester results in a written report, but writing texts is rarely used to support processes of learning.

Core findings: Socio-material assemblages of international students learning environments

In this section, we will present some core findings and use the conceptual framework of ANT to gain a deeper understanding of the international students' learning environments, with a particular focus on the socio-material assemblages of these technology-rich environments.

Digital literacy

The data material indicates that all the interviewed international students use technology in their study programmes. All are satisfied with using the VLE available at the institution. The students report that all their teachers use the VLE, but with significant variations in volume and type of use. In some programmes, the VLE is used for communication between teachers and students and as a platform to hand in assignments. In others, the use of the VLE is more minimalistic, for example as a repository for links to webpages outside the VLE, often because the teachers feel pressured from their academic management to use the VLE, while they would prefer to just use the web.

Many international students are used to using VLEs from their earlier studies in their home institutions, but those typically use a number of different VLEs, while only one VLE is available at the studied institution. It appears from the interviews that only having to relate to one VLE is a considerable advantage in their studies. However, having to navigate through the system to find the relevant information is not always straightforward, and is therefore a source of dissatisfaction.

The two groups of students interviewed in this study appear to have very different perspectives on VLEs. The AI students consider the VLE as a technological artefact that they need to learn to master, just as any other technological solution. They therefore report a need for specific training in VLE use, and in the use of technological artefacts in general. Most of them report having little technological proficiency from earlier studies, presumably because, as mature students, they only have study experience from a time when technology was mostly absent from Higher Education.

One AI student reports that when asking the administrative staff for help to register required information, she was repeatedly told to “log onto the *Student web*.” When she explained that she had trouble finding the right form within the generic *Student web*, the only answer she got was to “log onto the *Student web*”. The above example illustrates how administrative staff may in some cases overestimate the actual level of digital literacy of some international students, which in turn may create frustrations amongst those students.

In contrast, the ENAI students appear to have a higher level of technical proficiency, presumably because, as younger students, they are more digitally literate, and have been exposed to a range of VLEs and every day technologies over the years. Although none of them have been acquainted to the studied institution's VLE from earlier studies, they report having had no problems learning to use it, as the VLEs they are used to from their home institutions have similar functions and design. Since the academic language for the EPS programme is English, and few ENAI students use English on a daily basis at their home institutions, they report having to resort to technological help to understand lectures and express themselves correctly in writing. For example, several interviewees report using translation tools such as *Google Translate* or *Lingui*.

None of the ENAI students considers VLEs to be core technology, but rather a practical “place” to carry out and organise learning activities, such as creating study groups, handing in assignments, or finding the names of other group members. Their teachers also report having a pragmatic approach to VLE use, often as a gateway to their own webpage.

Types of technology used in communication

Several of the interviewed students—both ENAI and AI students—mention that their learning activities take place within a number of different arenas. Meetings with co-students on school premises are the preferred learning arena, while meetings on social media such as Facebook and Skype are useful supplements to physical meetings. However, they report never using social media in their communication with teachers and rather use e-mail for that purpose.

They consider social media to be arenas for private communication, in particular because they are the repository of information that can be judged inappropriate in an academic context.

Interviewer: “That is interesting, that Facebook is considered private.”

Informant 1: “Lots of privacy”

Informant 2: “You have all your pictures and I don’t know, yes”

[Extract of interview with student informants]

Academic language

As far as academic language is concerned, there seems to be a difference between ENAI students and AI students. The ENAI students do not report experiencing any particular difficulty when using a foreign language in an academic setting, neither for written nor for oral communication. In contrast, AI students report feeling insecure about using Norwegian, a non-native language to them, in an academic setting. This is particularly evident when they are supposed to use a VLE, i.e., a tool for publishing written work, in a language that they do not feel they master fully. The interviews reveal that having to publish their own Norwegian texts in the VLE is a source of worry and procrastination for those students. Such a situation is especially problematic in study programmes in early childhood education, as the Norwegian tradition for such studies is to use written reflections and feedback from peers as a central learning method.

“I am still very careful with using it [the VLE] because others can see it [my text], perhaps there are some grammatical errors, aren’t there? This is why I’m very careful.” [Extract of interview with student informants]

Despite their scepticism and reluctance to publishing texts online, the interviewed AI students report that they are willing to improve in that area, and that the only road to improvement is to dare to publish online, regardless of their underlying anxiety.

One interesting finding is that other technologies can be used to support the “publishing, sharing and reflecting” learning approach that is ubiquitous in the Early Childhood Education programme, and those may be more appropriate to international students as they do not require so much text. For example, some interviewees report having used digital storytelling tools within their studies, where pictures play a central role, to document their own learning experiences, and having felt more comfortable using that type of learning and documentation method.

“... Then I think [hard] about what I am going to say, it is also [a kind of] reflection. [...] Because it is easier to describe [experiences] using pictures and short sentences. [Extract of interview with student informants]

Administrative language

In the VLE used in the studied institution, the Norwegian language pervades the system in two ways. First, the very labelling of the system is designed for Norwegian language. The students report that even when choosing English as a preferred language, several labels are still presented in Norwegian. Second, most of the general information from teachers and administrative staff to students is given in Norwegian, either via the news feature of the VLE or through emails to large groups of students. ENAI student informants describe that they regularly receive large numbers of emails written in the Norwegian language. They report that they first tried to translate those emails into their mother tongue in order to understand their content. However, because it was a time-consuming activity and because most of the information they received was not relevant to them, they ended up ignoring all news and emails, expecting that important information will be given to them orally by the teacher. This, however, was not always the case, and ENAI informants recount having missed important information, such as a visit from scholars from another university, because of the overload of incomprehensible information on the VLE.

Analysis and discussion

In this section, we revisit the data presented in the section above, using some of the core concepts from ANT as a structuring tool.

Inscription and translation

The notion of culture (and cultures) is central when trying to understand the learning experience of international students. In that context, an ANT perspective can be useful, as it offers conceptual tools that allow for a rich investigation of the various aspects of culture. For example, an important element in the broader picture of Norwegian education is the general focus on curriculum, which undergoes a series of transformations involving a number of stakeholders. Study programmes in Norway are not designed by individual academics, but are generally the result of a set national curriculum and an institutional adaptation of this curriculum. The concepts of inscription and translation can be useful to study the relationship between programmes (including curriculum, and expected learning outcome), artefacts (especially language and VLEs), and learning cultures (including work styles, student tasks, behaviour and attitudes from and among teachers and students). Former studies (e.g., Johannesen & Habib, 2010a; Nespor, 1994) have shed light onto the existence of inscriptions, i.e., situations where programmes and technologies are being designed and developed. However, those programmes and technologies are implemented within culturally laden contexts, and those contexts may prompt a number of appropriations or “translations” that are much dependent on the culture they enter. It is, however, important to note that the studies referred to here have been limited to a traditional national context, and have not taken into account the possibility of international participation to the courses.

Several elements from the data point toward the existence of inscriptions with long-lasting effects. For example, the studied institution’s VLE system appears to be unambiguously inscribed with the general institutional strategy to implement computer-supported learning at all levels and in all study programmes. However, although all study programmes have had to adopt the VLE as a platform to support teaching and learning, it is apparent that the VLE has been translated very differently from one faculty to another and from one study programme to another. In particular, in those faculties that had been using the web to support learning long before the implementation of the VLE, there seems to be a significant reluctance toward discarding old, but well-functioning solutions to adopt new, but unfamiliar and, in the eyes of some, dubious ones. The data provide a telling example of a translation of the VLE, when it is used by teachers mostly as a gateway to their own websites, where all the content used to support their teaching actually resides, in a form that is more accessible to international students.

Another institutional inscription is apparent in the way the VLE is used to support the sharing of texts created by the students. For the teachers, who have embraced a socio-cultural perspective on learning, there is a point to encouraging the students to write as much as possible and make their texts available to their peers so as to get their feedback. For the AI students, this inscription has potentially adverse effects, as having to write and publish text is experienced as strenuous and distressing. They do, however, suggest other types of uses of the VLE that would entail a translation of the very idea of the students reflecting on their own learning experience and using the VLE as a medium to share it – which seems to be central to the teaching philosophy at the studied institution. While the teachers seem to rely solely on activities involving writing texts, the students propose using other types of activities, for example digital storytelling, which makes use of pictures in combination with text, often mostly spoken text.

Those findings are in line with the literature that underlines the importance of the international students’ cultural background in their learning practices (e.g., Charlesworth, 2008). They also corroborate the idea that the AI students may carry a cultural baggage with a strong emphasis on perfectionism and high standards of achievement (Nilsson et al., 2008), which may in turn make them uneasy when having to expose their unfinished texts to the scrutiny of their peers.

Enrolment and alignment

The ANT notion of enrolment is central when analysing the interwoven-ness of technology and the social groups that use it or have a stake in it. Because VLEs are comprehensive software supporting both teaching, learning and

administrative activities, they have a strong potential as enrolling actants. Another ANT concept, that of alignment, may be useful to understand the dynamics of inter-relations with and around a VLE. One important actant in this dynamic network seems to be the socio-cultural learning philosophy that argues that learning happens between learners (Engeström, 2001; Vygotsky, 1978). Alignment then happens as technologies are used to champion and to reinforce the underlying learning philosophy, and results that corroborate the hypothesis that such a philosophy is justified are also used as bolstering elements to the network.

As mentioned in the above section, the data show that the ENAI students apply a range of different technologies, included but not restricted to VLEs. In cases where the VLE can offer functionalities that exceed and surpass other technologies, both students and teachers adopt those, such as the VLEs functionality for managing groups. In this case, the teachers, maybe unintentionally, use a certain feature of the VLE technology to enrol student into collaborative practice. In a similar way, teachers often embrace the automated hand-in facilities that make the follow-up of assignments easier and more efficient for themselves and correspondingly achieve some kind of alignment with the student groups – who, according to the data, appreciate having those follow-up routines to keep on track. It is apparent that this process of alignment plays a substantial role in making learning processes effective for both students and teachers, thereby paving the way for a strong focus on learning throughout the educational programme.

Opening black boxes

Institutions of Higher Education have typically developed their routines and systems over time, and chances are that many of them have become blackboxed, thereby becoming accepted and taken for granted by both the students and the teaching and administrative staff. The data indicate that blackboxing also happens within student groups, with little or no involvement from the institution. For example, the idea that social media such as Facebook and communication tools such as Skype are private communication technologies that may be used for communication between students, but that do not lend themselves to communication between students and teachers, is not altogether an obvious concept in the eyes of an analyst.

An example of institutional blackboxing is that of information given via the VLE. The large numbers of emails, news and guidance given by administrative and academic staff are often aimed at all the student groups and are given in Norwegian, without any consideration about the diversity in language capabilities among the receivers of that information. Consequently, the ENAI students abstain from trying to translate all this information and in practice shut down an information channel that has become irrelevant to them.

AI students also seem to be confronted by the existence of a number of black boxes, in particular the notion of writing as a central method for learning. However, because of the AI students' reluctance to letting others read their texts, the lecturers may be compelled to question their beliefs that a focus on writing will necessarily bring about optimal levels of learning for all students. In that sense, the AI students may indirectly help their teachers to "open the black box" of "writing to learn." This very questioning process can be useful in raising awareness about difficulties experienced by international students.

Socio-material assemblages as cultural scaffolds

The data from this study illustrate that AI students struggle to produce and publish texts in the Norwegian language as required within their study programme. However, they also report that digital technologies help them reflect on their own learning and put words on those reflections. When informants recount their positive experience with a digital story-telling tool, and how they experience this kind of technology as supportive for producing digital texts, they exemplify how technology and teaching practice can go hand in hand to support learning.

The ENAI students seem to be more technologically mature, and employ a range of technologies with a distinct and clear idea about what technology to use for what purpose. While media such as Facebook and Skype are used in both study-related and social-related affairs, the communication with and feedback from teachers is still expected to happen via email or VLEs. Such data suggest that those media do not lend themselves to be aligned directly with the general learning network, and that they might need to be translated, revisited and perhaps renamed before gaining a

legitimate place into the network. Such data concurs with the existing literature that underlines the difficulties inherent to using social media as a platform for learning (Friesen & Lowe, 2011). Our research also suggests that those difficulties may be heightened in a learning environment including several national cultures, as students belonging to minority cultures may feel insecure about what is appropriate to say and do on a social network, which may in turn become a hurdle in their learning activities, if those are meant to happen on social networks.

Conclusion and implications

This study points to the existence of a number of technology-related hurdles for both AI students enrolled in regular programmes, and international students enrolled in exchange or international programmes. In particular, the use of learning technologies such as VLEs may bring about a focus on reading and writing that may put non-native speakers at a disadvantage. However, such technologies also have the potential to equip AI and ENAI students with tools that are empowering to them, for example by facilitating non-text-based forms of documentation.

This study has highlighted the need to differentiate between different types of international students in a culturally diverse Higher Education context. As illustrated in the study, different learning and teaching philosophies may co-exist within the same institution and there may be variations as to how international students relate to those philosophies and appropriate the teaching and learning methods that they meet. One of the implications of the study is that there may be a need for an increased awareness amongst educators not only regarding the principles of their own educational approach but also regarding how their approach may differ from what international students are used to and are equipped to handle.

The findings from this study suggest that educators may better succeed at involving students from cultures that emphasise perfectionism if they allow for activities that do not expose the international students' weaker points, such as the production of written texts. In that respect, technology-assisted learning, which provides a wider range of activities than traditional educational forms, can be a useful ally to teaching staff working with international students. For example, learning technologies that enable students to use images, sounds and films to express their ideas may play a role in empowering international students by facilitating their participation in dialogic learning practices that may formerly have been restricted to the exchange of written text.

Using ANT has provided us with an alternative view of learning structures such as a study programme where the focus is not on either bringing in or shutting out particular types of learning cultures, but on the negotiations that happen between several types of networks, i.e., the socio-material or cultural networks of the international students and the network that they form together with their study programme and the technology in use at their institution. An ANT-based outlook helps considering the situation not from a normative point of view, but from a more descriptive and analytical viewpoint. The process of mapping out all the networks of aligned interests, without a dogmatic stance, will give them all a place on the broader picture and will help taking seriously issues and difficulties experienced by members of different networks.

One of the main limitations of the research is that it is based on a relatively limited number of cases from a single institution. In addition, the two groups that we have identified for the study (ENAI students and AI students) follow two different types of programmes at different faculties. The EPS programme where the ENAI interviewees are enrolled does not put much emphasis on the production of written text as a method for learning. Although the end-product is generally a written report, much of the learning process seems to happen through face-to-face discussions either within the student groups or between the student groups and their project supervisor. In contrast, the interviewed AI students are all enrolled at the Faculty of Education where activities related to producing texts and providing responses to those texts are at the core of the traditional teaching philosophy.

Further research may include broadening the range of informants to include other faculties, other institutions, and other types of informants such as administrators, technical staff and software developers. Other possible avenues for research could be trying out new teaching processes within for example the realm of pilot projects, and following them closely using action research methods. Examples of such improvements may be using more picture-based narratives as a means to convey students experiences within the realm of their studies, and introducing more technological training and support for non-Western international students. For Western international students, improvements may include reducing the amount of messages in Norwegian language on the VLE.

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