E-Learning in Poly-Topic Settings

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Abstract: In e-learning settings, technology plays several crucial roles in the teaching. In addition to enabling students to gain remote access to teaching, it can also change the way time, space and presence are perceived by students and teachers. This paper attempts to analyse and discuss the consequences of the transparency or visibility of e-learning technology inside and outside the classroom and highlight its opportunities of multiplying the learning spaces. In order to be able to differentiate between learning that occurs in the same place and learning that occurs in more places at the same time across virtual and physical spaces, the paper therefore introduces the concepts of *idiotopic* and *polytopic* learning settings. Furthermore, it argues that the development of *polytopic* learning designs could help address a potential e-learning demand for teaching presences in more places at the same time.

Keywords: e-learning, social presence, physiotherapy education, desktop videoconferencing, *idiotopic* and *polytopic* learning designs

1. Introduction

To be present in a classroom can be enacted and described in several ways; however, it is not necessarily the same thing as being physically present. Short et al. (Short, Williams, & Christie, 1976) defined social presence in the context of telecommunications as 'the degree of salience of the other person in the interaction and the consequent salience of interpersonal relationships...' (p. 65). Here salience meant the degree to which a person is perceived as a real person in the context of mediated communication (Pugsley, 2010). Furthermore, Short et al. argued that the medium itself establishes a social presence according to its ability to transmit nonverbal social cues. However, this distinction changed quickly after the advent of the Internet age; social presence became less about the objective qualities of the medium and more about perception (Borup, West, & Graham, 2012). As a result, the concept of social presence and its relation to teaching and learning has been further developed (Garrison, 2011). Several researchers have put forth definitions of social presence as the feeling of belonging to a group (Swan & Shih, 2005) and being able to interact with other students (Dziuban & Moskal, 2001). Some research is concerned with the fact that students are also more satisfied with their online courses if they feel they belong there and can interact with the teacher and with the other students (Hartman & Truman-Davis, 2001), and others suggest that the use of technology is balanced with the human touch of a real person (Borup et al., 2012). However, studies also find that students express satisfaction with web-based lectures even without an opportunity for interaction (Gosper et al., 2007); that social presence is not always related to learning outcomes (Beaudoin, 2002) and that increased social cues can be a hindrance for learning, particularly for students with low technological efficacy (Lyons, Reysen, & Pierce, 2012).

Since the social presence of the teacher/instructor is found to have a larger impact than students' social presence on, for example, perceived learning, it has been suggested that research could be extended further in the area concerning the teachers' social presence (Lowenthal & Lowenthal, 2010). In e-learning settings, the teacher's academic identity is found to be changing (Hanson, 2009). Although teachers might not be quite ready to embrace the 'disembodiment' or 're-positioning' required by e-learning (Hanson, 2009; Spencer, 2011), some suggest that they have to become accustomed to '(dis)embodiment' in order to deepen their understanding of student learning in e-learning settings (Taylor, Lopez, & Quadrelli, 1996). These aspects are at stake in the hybrid synchronous classroom and in blended learning settings and will be addressed in this paper in order to investigate the research question concerning the role of technology in relation to time, space and presence.

1.1 The physiotherapy e-learning case

When e-learning is introduced in professional bachelor programmes with a strong tradition of mixing dialogues and physical and practical exercises with the classroom lectures, the role of the teacher and the opportunities for the students to participate actively in the teaching slowly change. That is to say, students are no longer only young people sitting in the classroom with the teacher; but they can also be invisibly located at home in front of a computer screen, and represented by a steady camera in the classroom as was the case in the physiotherapy e-learning program in Denmark.

In this physiotherapy case, e-learning is understood as the part of the teaching that takes place when the students are away from campus and studying at home. E-learning is considered one component of the blended learning design that consists of on-campus and online teaching. In this paper, the definition of e-learning reflects this understanding and it is therefore close to Laurillard's definition of e-learning as the use of any digital technology or applications in the service of learning (Laurillard, 2006: 72). The definitions of e-learning and technology enhanced learning therefore overlap in this paper. The e-learning students in the physiotherapy programme could choose to participate synchronously in the teaching while it being recorded live, or they could choose to watch the video-recorded lecture asynchronously afterwards, i.e. after it had been edited by the teacher. Thus, both physically present students and students attending the class virtually were present in the classroom. This learning design and examples of others will be discussed in this paper.

The empirical basis of the paper is a PhD project's findings during 1.5 years of fieldwork in the context of professional bachelor programme in physiotherapy in Denmark when e-learning (or, more accurately, blended learning) was just being introduced for the first time in this programme. The qualitative data was constructed through participant observation in the teaching on campus and online in the hybrid synchronous classrooms; through learning design workshops with the teachers; through interviews with e-learning students in five focus groups and through semi structured interviews with their five teachers. All of the interviews revolved around the experiences related to and the thoughts underlying the learning designs in the e-learning settings.

2. Embodiment of technology

The e-learning students in the professional bachelor programme in physiotherapy are often older than the average student. Furthermore, they have a family and a job beside their studies, and often they do not live near campus. Thus, e-learning affords a way for the students to become physiotherapists despite the various obstacles and time constraints they face. Many of the e-learning students agreed with the following statement: 'Without this opportunity of e-learning where I get the lectures without showing up on campus, I would be unable to become a physiotherapist!' They therefore found that e-learning technology made the impossible possible.

Although a blind man can make use of a cane to 'see' the world, to notice doorways, staircases and chairs, he does not necessarily pay attention to the cane, nor is he interested in it as such. Rather, he uses it to come into contact with the world and gather information about his surroundings. Technology is said to be embodied (Ihde, 2010) when it mediates one's perception of the world, as is the case when a visually impaired man uses technology (glasses) as an *enhancement* of bodily perception, or when a previously impossible bodily perception or action is made possible due to technology. With respect to the embodiment relation, Don Ihde observed that 'I take the technologies *into* my experiencing in a particular way by way of perceiving *through* such technologies and through the reflexive transformation of my perceptual and body sense.' (Ihde, 2010:135). And the blind man sees the world.

The e-learning students in physiotherapy used e-learning – and in this case the desktop videoconference tool Adobe Connect in particular – to enter the classroom where the lecture was taking place and to come into contact with the teacher. They embodied the digital technology by letting the camera and microphone replace their eyes and ears; furthermore, the Adobe Connect chat functionality became their voice in the classroom. The students were physically present at home but virtually and socially present on campus. Therefore, the e-learning student could interact with the teaching by using the technology. Following Ihde (ibid.), the relation can be visualised as follows:

$$[\text{Student} - \text{technology}] - \text{teaching}$$

Thus, technology becomes part of the way the students experience the teaching, but this embodied human-technology relation requires the *transparency* of technology: 'The interface of a telepresence system is highly mediated and yet is supposed to be transparent, in the sense that it should transmit a view to the human operator and allow the operator to interact 'naturally' with what she sees' (Bolter & Grusin, 1999). Similarly, Lombard and Ditton (Lombard & Ditton, 1997) defined presence as the perceptual 'illusion of nonmediation'. This 'illusion' occurs when a person fails to perceive or acknowledge the existence of a medium in his/her communication environment and responds as he/she would if the medium were not there (Picciano, 2002). Only when the sound or the picture suddenly went missing, the e-learning students' focus shifted from the content of the teacher's lecture to the *mediation* of the lecture. Bruno Latour describes it as follows (1999: 183): 'Take, for instance, an overhead projector. It is a point in a sequence of action (in a lecture, say), a silent

and mute intermediary, taken for granted, completely determined by its function. Now suppose the projector breaks down. The crisis reminds us of the projector's existence'. Likewise, the technological breakdown also reminded the teacher in the classroom of the e-learning students' existence: 'Kenneth, we can't hear you!!!' and 'Now where's the sound again?' are the types of sayings that popped up immediately in the chat every time the sound disappeared. Due to technical problems, the e-learning students were occasionally excluded for several minutes until the technology was fixed, slipped back into transparency and let the teaching continue. These technological problems caused a lot of frustration among the e-learning students, so instead of participating in the lecture synchronously, many of them preferred to watch the recorded version of the lecture, i.e. the version of the lecture in which pauses, breakdowns and time for group work had already been edited out.

To sum up, when technology worked and was transparent, the lecture in the classroom could take place almost as if there were no e-learning students participating. When, for example, a lecture about theory concerning physiotherapy was presented, the e-learning students sitting at home could participate by listening and looking at the teacher. They also had the opportunity to ask or answer questions as if they were sitting in the same room (albeit only written questions). Nevertheless, the findings in the study showed that the e-learning students did not interact actively in the teaching. Very often the chat was silent, and although technology was a way for the students to access the classroom, it also excluded them when the chat was not visible on the screen in the classroom or the the teacher did not notice the missing sound. But when it broke down – and it did very often during the fieldwork period – the transparency of the e-learning technology ceased. The e-learning students' experience of embodiment of technology likewise ceased, and the teacher was clearly reminded of the presence of his e-learning students.

3. Technological transformation of teaching

In traditional classroom teaching, the teacher and the students are in the same physical place at the same time; what takes place is a process that is not meant to be repeated, and the activities are often evaluated immediately. Similarly, the teacher's and the students' actions and interactions are normally coordinated; not only are they able to see each other, but they also perceive themselves in the room and they are seen by others. Thus, the body is present both as perceived and perceiving. This reversibility of perception (Merleau-Ponty, 1969) is a feature of shared physical spaces, and the experience of being perceived by others is much less marked in virtual spaces, including online desktop videoconference teaching. In the hybrid synchronous classrooms, the e-learning student's body is only perceived as a name on the screen, and it is non-existent in the video-recorded version of the teaching. Although the e-learning student perceives the teacher, he/she is not perceived by others because he/she only watches the lesson later without participating in it. Thus, when the e-learning student watched the video-recorded version, his/her experience of the learning situation changed completely: the teacher was in another room and the e-learning student was unable to interact with him or with the other students in the classroom whom he/she could not see.

The question then is how the e-learning student construes a situation where he/she is not physically present; where the reversibility of perception is missing and where immediate interaction is impossible. As a student in one of the focus groups puts it, 'it is difficult. That teeny tiny picture dedicated to the teacher and the big picture of the PowerPoint… I would really like it the other way around.' Another student added: 'and you can't just ask the guy next to you if you don't get it. I would prefer to be there while it was being recorded'.

Ihde (2010) gives an example of a man sitting inside his living room while looking at a thermometer which shows that it is very cold outside. By interpreting the information he receives from technology (but without the bodily experience of the cold), he now knows that it is cold outside as if he had been outside and felt the cold. The video-recorded version of the physiotherapy teaching provides similar things: Without physically sitting in the classroom and experiencing the atmosphere and the presence of the others, and without the opportunities one has in traditional classroom settings to 'just ask the guy next to you' or the teacher, the e-learning student has to interpret the recorded version of the teaching as a part of his own teaching. Instead of asking the other students when something is difficult to understand, the student can replay certain sections of the recording or fast forward the recording if it is too easy. The findings in the study showed, that all the e-learning students watched the recorded lectures; furthermore, they felt that they learned a lot from these lectures (c.f. Borup, West, & Graham, 2012; Gosper et al., 2007; Jones, 2011).

Thus, the e-learning student has access to the classroom teaching and can interact with technology but not with the teaching that is taking place. If we follow Ihde again, it can be visualised as follows:

Student –**[**technology – teaching**]**

However, not only does technology cause the students to translate the teaching, technology also transforms it. The findings in the fieldwork showed that the students compare the video-recorded teaching to the reading of texts (as artefacts) instead of comparing it to teaching as an interactive process: 'It [to watch the video-recorded lecture] is better than reading the texts yourself', while another said that, 'The [subjects] that aren't as important as, for example, pathology, you could put it on the net and then read it yourself'.

The video-recorded lecture is a storable artefact that allows the e-learning student to interact with its technical attributes including the teacher's speaking pace or volume. Technology is therefore more visible as such than in the above-discussed synchronous videoconference teaching. As a result of the possibility of interacting with the content via technology in the video-recording, the e-learning students still find that they are able to learn in this setting.

Technology affects many parameters in different ways in the settings concerning live videoconference teaching and recorded videoconference teaching. These are summed up in Table 1 below:

	Videoconference teaching, **live**	**Recorded** videoconference teaching
Participation	By listening, asking/answering questions	Listening and watching
Transparency of technology	Yes, preferably	No
Reversibility of perception	Partly; the student is perceived as a name (in this case) or as a face	No
Interaction with	Teaching	Technology
Time	Synchronous	Asynchronous
Storable	No	Yes
Function as	Process	Artefact
Resemblance to	Classroom lecture	Textbook text

Table 1: Comparison of live and recorded video conference teaching

However, the visibility of the e-learning technology in the hybrid synchronous classroom affects the teacher differently than it does the students.

4. Disembodied presence of the teacher in the hybrid synchronous classroom

Especially when e-learning was first introduced in the physiotherapy programme, the lack of the traditional reversibility of perception seemed to be confusing to the teachers.

> *'I'm still not used to seeing myself on video' a teacher said, and later he elaborated: '[…] In the beginning, I taught differently because of the camera, but I don't anymore; I think I have got used to it standing there. In the beginning I was very aware of the technology, including the way I sat and spoke […]'.*

What seemed to be more or less transparent from the e-learning students' points of view is very visible from the teacher's perspective. The camera is placed right in front of the him, and especially when the teacher is new to e-learning, he pays a lot of attention to it (c.f. Pugsley, 2010). However, in order to ensure that it does not disturb the traditional teaching where the teacher addresses the students sitting with him in the classroom, the teacher tries to keep his focus in the room. He looks at the students that are physically in the classroom with him. He is also aware of their response to his teaching and knows that they are in the midst of perceiving him. One teacher observed as follows:

> *I don't communicate with them [the e-learning students at home] with my face, because it would take the focus away from the students sitting there [in the classroom]… But I am very aware of them so that they don't feel as if they are just sitting on the side-lines.*

Thus, the teacher makes an effort to not let his conscious awareness of the e-learning students be noticed by the students in the classroom, and by the same token, he thinks that he must be aware not to pay too much

attention to the technology standing in front of him. However, in order to make the technology as transparent as possible for the e-learning students and to the students on campus, he also has to be aware of the presence of the camera because it represents the e-learning students' eyes and ears in the classroom.

> *You really need big reserves of energy to be present both in the classroom with the students and pay attention to the chat and to answer the e-learning students without making the on-campus students think: 'Well, now I'm just wasting my time…' So I think it's really – to be present in the classroom and for the e-learning students – I think it's really difficult; I haven't been able to do it.*

The general feeling among the teachers was that the more social presence they invested in the e-learning students, the less they seemed present on campus, and vice versa.
Thus, the role of the teacher and his/her perception of the situation changed from a traditional focused physical presence in the classroom, i.e. switching between monologues and dialogues with the students in the classroom, to what might be called a *disembodied presence*. The teacher is present in two places at the same time without really being present anywhere (Gosper et al., 2010; Hanson, 2009). One of the teachers said:

> *'It's damn hard! You live in two worlds!' And one of her colleagues said that: 'It feels like sitting between two chairs! […] It's a compromise but nobody is really happy.'*

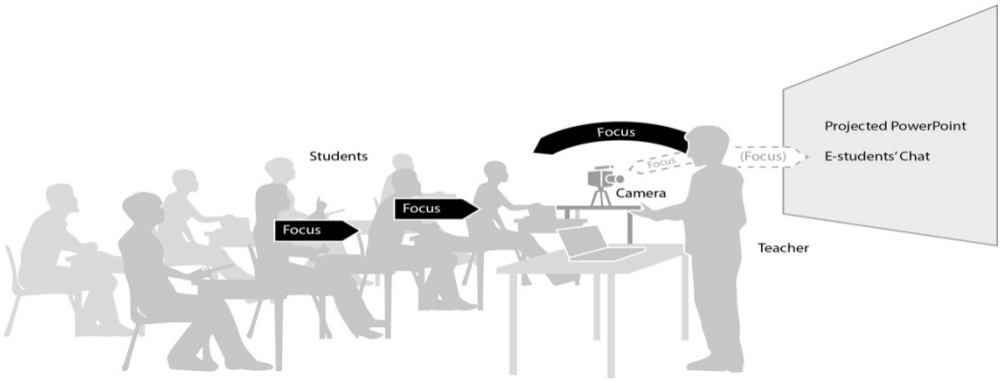

Figure 1: Classroom setting with the camera in front of the teacher and with the e-learning students' chat projected behind him. The teacher is focused mainly on the students in classroom; however, he is also focused (albeit in a hidden way) on the camera and the chat which represent the e-learning students.

When the teachers speak of presence in two worlds, they are of course aware that they are physically present only in the classroom; however, they experience a presence in the virtual space as well. In order to categorise and further analyse the teacher experience of these two worlds, we will introduce the concept of *topos* – which is Greek and means 'place' or 'location'. The teachers feel that they are present in two or more *toposes* at the same time without really being present in either one of them, and this experience of disembodied presence in the online synchronous classroom resulted in an interest among the teachers in creating technology enhanced learning designs that focused on activities taking place in only one *topos*.

5. Experience of disembodiment as a point of departure for new designs for learning

Some of the teachers separated their teaching toposes by focusing on one group and one learning place at a time. When the camera was turned off, they lectured in the traditional way in the classroom. Moreover, they could shift between lectures, dialogues and practical exercises when needed as they had always done and preferred to do. In order then to teach the e-learning students, one teacher made special podcast lectures after the on-campus teaching. In the podcasts, she spoke directly to the e-learning students and presented the content of the lesson, albeit in a shorter and more compressed way.

> *The students can, you know, repeat it, if it's a bit too compressed […] But I just do it for the sake of their bright eyes. I don't get extra hours for the extra work […] But I cannot in decency do otherwise.*

Another learning design focused on the fact that the e-learning students and the teacher were located at different physical places, which resulted in the teacher inviting these e-learning students to group counselling in Adobe Connect at several occasions. In this way, the teacher focused more on engaging in dialogue than on delivering a monologue; the point of departure for these dialogues was often rooted in the students' problems, interests and chosen focus. In this learning design, the teacher tried to keep the technology

transparent and thematised the embodiment relation in the telepresence meeting. Because he only had to focus on one group of students at a time, he could be present with them in the same topos.

Yet another example of learning design experiments considered the opportunity of a doubled reversibility of perception in e-learning as an advantage. In this case, the teacher encouraged the students to video record their transfer of patients, and afterwards they were to examine both their own and their fellow students' videos in order to discuss different perspectives and for example good and bad practices (Tripp & Rich, 2012). In this learning design, the recorded phenomenological body (Merleau-Ponty, 1969) is then transformed into an objective and acting body that can be seen and reflected upon by all the students in the classroom. Thus, if technology is made visible by using it consciously in a learning design, the objectification of one's own body is possible. This is very desirable particularly in professional programmes like physiotherapy where knowledge about one's own acting body is very important. In this learning design, the student has an opportunity to see him/herself as an acting and actively perceiving body as with the eyes of another (Cooley, 1992).

6. Teaching in virtual and physical places: *idiotopic* and *polytopic* learning designs

A closer examination of the abovementioned learning designs will enable us to see that the visibility of technology affects the learning *topos* in different ways. In the first example, the teacher produced the podcast at home or in her office, and the learning was planned to take place elsewhere including, for example, when the student was at home, on the train, etc. The activities that were related to the podcast were therefore located in one place at a time. Similarly, in the group counselling, although the teacher and the students were not in the same physical room, they talked about their meeting place as if it were happening in the *same* place:

> 'Where would you like to meet?'
> 'In Adobe Connect like last time?'
> 'Yeah, you won't find me on Skype, I don't like it there anymore, 'cause I won't pay for it!'

Finally, in the last example we saw that although the videos were produced at home or in a clinic during placement, the primary learning activity was designed to take place in a single *topos*, namely in the classroom on campus.

In order to be able to analyse these learning *toposes* across virtual and physical locations, we will use the concept of *idiotopos*. *Idio* is Greek and means 'the same' or 'the specific', while *topos* means 'place' or 'location'. Using this concept allows us to group the on-line and off-line learning activities and discuss these according to time and the experience of presence.

Some of the activities in blended learning happen while the students are together at the same time. In physiotherapy education, these synchronous *idiotopic* activities take place when the e-learning students and the on-campus students are together in the classroom with the teacher on campus. In this setting, the teacher usually controls the learning goals, activities, content, progression, collaboration between students and evaluation of the learning. However, *idiotopic* activities also take place asynchronously. This is the case when the students watch and listen to the recorded versions of the class lectures, when they prepare for class or when they write assignments and download or upload documents in the Learning Management System (LMS). 'We don't really like Fronter, because it's so ugly, but it's a great advantage that it keeps everything in one place', a teacher said during field work. The e-learning students were sometimes encouraged to write assignments in GoogleDocs, which was directly connected to Fronter in order to 'let the students work in only one place'. These asynchronous e-learning activities were also deliberately designed *idiotopically*, because the *idiotopic* setting let the teacher maintain the control over learning goals, progression, content and so on.

If we take the use of the concept of *idiotopos* a step further, we can look deeper into what happens to the classroom when digital technology expands the room via Adobe Connect software, cameras and microphones. Although the well-known traditional teaching synchronicity is maintained in this setting, from the teacher's perspective, the teaching *topos* doubles. In order to refer to this setting, we will introduce the final concept of this paper, which is the *polytopic* e-learning setting. *Poly* is Greek and means 'more' or 'multi'; and, as mentioned above, *topos* means 'place' or 'location'. A *polytopic* e-learning setting exists when the teacher and/or the students are synchronously or asynchronously present in more than one virtual or physical place. In the physiotherapy case, the *polytopic* learning settings were found in the on-campus classroom; however, they

were also found in asynchronous settings, when the students were present in more virtual spaces and worked independently.

7. Poly-topic and idiotopic e-learning designs

During the interviews and the participant observations conducted in the context of on-line classes and clinical placement, findings showed that the students were very aware of the opportunity that e-learning created for them in relation to flexibility in time and *toposes*.

> 'To me, e-learning has something to do with flexibility. I can be where I need to be'.
> 'Yes, you can control it yourself. You don't need to be there from this time to that time. Yeah, it's the flexibility again that I like'. ('Oliver' and 'Maya', focus group 1, spring 2013)
> 'I thought it would be more flexible. It's fine that we're supposed to be here [on campus] three days every second week, of course: It's physiotherapy, but when we're then suddenly told that we must be here some of the other days too, it makes no sense to call it e-learning. It's not flexible!' ('Trine' focus group 3, spring 2013)

Because of digital technology and the nearly omnipresent access to the Internet, it is possible to be present in more *toposes* simultaneously. However, *polytopic* presence is also found in the on-campus teaching in the case where the students were both physically present in class and present online, for example, on Facebook. When the teacher was lecturing, the students were also very often present on different social media; they also occasionally sent text messages or even visited online stores. They therefore sometimes paid attention to the lecture 'from a distance', and they shifted rapidly between activities in the classroom and on line. As a post on a student's Facebook wall said, 'By the way, why are you inhere? shouldn't you be in class today?' The student replied: 'I AM'.

The students liked to be able to shift between *toposes*, and by the same token, they would like their teachers to plan the teaching according to these *polytopic* opportunities:

> 'Group work can be organised so that you shift between online activities and physical meetings. But we're supposed to find out ourselves'. ('Karl', focus group 3, spring 2013)

Some of the students worked in more *toposes* on their own, and they searched for information and answers independently. A few of them kept blogs during clinical placement or used other online tools as a way of 'keeping track of what we learn and what I think'. In doing so, the students worked in *polytopic* settings and shifted between these settings as they pleased. However, all the e-learning students had jobs in addition to their studies, so it was difficult for some of them to find the time to explore additional virtual workplaces that were relevant to their studies beyond the ones chosen by the teachers.

During the field work period, it was clear to see that the *idiotopic* learning settings were chosen and designed for by the teachers and, furthermore, they felt inspired by this way of using e-learning technology. However, although *polytopic* e-learning settings took up a big part of the way e-learning was enacted in the physiotherapy programme, the teachers designed for this setting much less actively. Activities such as discussions, exercises and group work were designed to take place in the classroom, and the recorded and edited versions of the lectures, podcasts and other specially made course material were uploaded to the Fronter room. Furthermore, the e-learning students were expected to work independently with the material outside the classroom settings.

The e-learning activities can be categorised into groups concerning space and time as follows:

Places\ time	Synchronous	Asynchronous
Idio topos (same physical or virtual place)	Participation in on-campus teaching and in clinical placement; online group counseling in e.g. Adobe Connect, Hangout	Uload and download of material in LMS, including recorded video lectures and assignments; collaboration in e.g. GoogleDocs
Poly topoi (more physical or virtual places)	Online video conferencing, texting, shopping. Active presence in social media in class	Keeping blogs, participating in discussion forums, watching videos, reading texts

Table 2: Examples of e-learning students' activities distributed at the same/not the same time (synchronicity/asynchronicity) and one/more than one place (idio topos/poly topoi)

To sum up, the learning designs in the *polytopic* setting were designed as if it were *idiotopic*. The asynchronous *polytopic* learning design therefore consisted of the students' own choices of learning spaces and independent work. By the same token, a lot of the e-learning students mentioned independence, discipline and the ability to structure their own learning as key words in e-learning in their education. They also emphasised flexibility and freedom as the central advantages and challenges in their experience of this programme.

Thus, the case findings showed that while the teachers created learning designs for *idiotopic* settings, the students also found great value and freedom in working in *polytopic* settings. Studying in e-learning settings asynchronously or synchronously is a great advantage for the students because they are able to combine their studies with their physical training, work and family life. However, learning designs for *polytopic* synchronous and asynchronous settings still need to be developed in the physiotherapy education case, particularly learning designs that consider the *polytopic* presences of both teachers and students.

8. Conclusion

The focus of this paper has been on the different ways technology affects the teaching in a hybrid synchronous classroom when a webcam is put in front of the teacher in order to broadcast and record his/her teaching. It has been argued that technology plays different roles depending on the following factors:

- Whether it is transparent and thereby establishes an embodied relation between student and technology, which can be the case in telepresence meetings or video conference teaching;
- Or whether technology seems less transparent, which is the case when the lecture is recorded. It can thus contribute to a transformation of the teaching from the traditional understanding of it as a process to a learning artefact that can be interacted with;
- Or whether technology is anything but transparent, which can be the case from the teacher's perspective in the hybrid synchronous classroom. It can then cause an experience of disembodied presence that compels the teachers to experiment with different learning designs in order to try to overcome the challenge arising from the e-learning students' potentially invisible presence.
- It has also been discussed how e-learning enables multiplications of the traditional learning space and thereby makes it useful to differentiate between *idiotopic* and *polytopic* learning designs. The findings in the present study shows that in order to cope with the experience of disembodiment in the *polytopic* setting, the teachers are more inclined to create *idiotopic* learning designs, whereas the e-learning students tend to design for *polytopic* settings. This was found to be the case in both hybrid synchronous settings, in the on-campus teaching and when the e-learning students studied independently.

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