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**FROM PANIC TO PLANNING: EXTENDING THE NOTION OF PRESENCE TO
CREATE SUSTAINABLE DIGITAL LEARNING ENVIRONMENTS**

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Abstract: *The transition from physical learning spaces to fully digital learning environments in annus horribilis 2020 has challenged Institutions and educators in re-thinking teaching in a time of crisis. E-learning is now phasing out from the initially “Fight-or-Flight” mode in handling panic during the first lockdowns and is currently trying to cope with the pandemic from a more sustainable long-time perspective. Issues have been enlightened concerning teaching and learning on a broader scale, focusing on the need to reconsider traditional teaching practices that nowadays seem not only obsolete but often incompatible with online teaching and learning. It is crucial to give the students flexibility and several possibilities in how, when, and where they engage with their Institution, curriculum, tasks, and peers. Nevertheless, there is a need for a clear structure or framework to aid and guide the students, providing shared arenas for feedback, teamwork, peer learning and social interaction in both physical, hybrid and fully digital learning environments. Through these contact points, we can build a sense of co-presence and mutual understanding between educators and learners to remove barriers that prevent learning. The notion of “presence” has often been discussed and used as an argument in the comparison between “on campus” and online education, strengthening the position of those who deem e-learning to be less useful and less engaging, namely because of the lack of physical presence. However, Institutions and educators need to recognize the current “state of things” as a part of the new norm and a point of no return. It is a question about combining the qualities of physical “in locus” education and the potential of digital learning in a post-pandemic world. By sharing first impressions from a research project at the Norwegian University of Science and Technology (NTNU), this paper attempts to balance and re-direct the discussion towards extending the notion of presence and human interaction to develop sustainable digital learning environments independently of the pandemic situation.*

Keywords: *Social presence; hybrid and digital learning environments; pedagogy; equality in education*

INTRODUCTION

2020 will be remembered as the year when education went fully online, being globally pushed out of school classrooms and universities’ crowded auditoria and forced into the few inches of a computer screen. While still struggling with the economic and social consequences of the consecutive series of lockdowns and tentative opening-ups of society from March 2020, national governments have now to confront themselves with the first research results on the impact of COVID-19 on Education.

There are no countries worldwide where the pandemic hasn't brought up major disruptions in the educational sector with severe consequences for learners and educators across the whole sector. Even in countries with a well-developed network of infrastructure and better access to digital learning platforms and learning resources, the issues exposed by the necessity of digital learning in a time of crises have exacerbated an ongoing debate on the very nature and meaning of learning [1]. Understanding the consequences that the age of COVID-19 currently is having for Education will hopefully enable society at large to take the necessary steps towards a levelling of the existing inequalities and inadequacies of school, adult and higher education systems that the sudden shift to online education has brought to light [1].

In this paper, we want to focus on the notion of presence in digital learning environments and its importance for the effectiveness of teaching and the perception of learning. In the first part, we will argue for the need of online education in re-shaping a more sustainable post-pandemic future for educational institutions and the subsequent necessity for a substantial change in the way we think about learning and design learning environments. In the second and final part, we will then present some of the lessons learned from running an innovative Master study program in "Music, Communication and Technology" co-located at two Norwegian universities and designed with a strong focus on student active learning.

I. EDUCATION 4.0

Even for millennials or so-called digital natives, education, and in particular higher education, has mostly happened in physical spaces and specific buildings that administer the cultural legacy of centuries of knowledge passed down from generations. The very essence of education for most of us lies still in the "brick-and-mortar" of our Schools and Universities [2]. There is an undeniable physicality in how people perceive learning, as it is bound to happen in a physical space and in the form of knowledge transfer from master to disciple, with social interaction acting as the glue in our learning experience.

This idea of education, and consequently of learning, cohesively linked to physical presence seems almost imprinted in our genes as the sense of human presence is a psychological construct mediated by physiological processes through our senses [3]. We are raised to believe that in order to learn and then make something of ourselves in life we must go to school and then university, sit in classrooms and at lectures with peers who happen to be both friends and competitors in the hunt for higher marks. We must listen to what teachers and professors have to say, get tested on what teachers and professors have said, and assume that we have learnt accordingly to the hierarchy of grading systems that measure our ability to reproduce existing knowledge. Finally, we enter society to find (or not) our place in it mostly based on the very same belief system we learnt in the course of our education.

There is no doubt that the abrupt transition to digital education has now shaken the fundamentals of these century-old buildings and beliefs and revealed the cracks and flaws of what appears to be a fundamentally unequal and inadequate system [4]. The inequality of the educational system is apparent when institutions cannot guarantee learning continuity due to a lack of resources and infrastructure. The inadequacy of it lies in the inability to use accessible resources and infrastructure in innovative ways.

In the fight and flight mode of the first months of the pandemic, educational institutions just tried to survive. Digital solutions brought classrooms and auditoria online, but technology has been mainly used to preserve and perpetuate existing structures in teaching and learning. Those structures have mostly been operating since the first industrial revolution when Learning and Education started to be considered goods to mass-produce. Drawing on Marxian theories, Bainbridge [5, p.749] argues that as

"the Industrial Revolution led to a dramatic increase in technological innovation as each factory owner sought to be more efficient and profitable than their competitors. Likewise, in contemporary education teachers and lecturers compete against each other in the hope of finding new schemes or models to make their learners more "successful", whilst educational institutions search for their "unique selling point" and governments continually tamper with policy in the hope of scoring more highly in global league tables and fuelling economic growth."

If something useful is coming out of this last global crisis is a radical critique of obsolete economic and educational systems. The Marxian emancipation of the worker can also be used to start a serious debate on the emancipation of the learner to "reconnect the learner with an education that has the breadth and depth of human learning as its focus" [5, p.750].

The Digital revolution experienced by the last two generations has paved the path to what in the educational sector is known as Education 4.0 [6]. Based on an even more widespread availability and convergence of new emerging technologies, the Fourth Industrial Revolution will rapidly change the shape of known societal structures, the educational sector included. The merge of diverse technologies such as artificial intelligence, extended reality in all of its forms (virtual/augmented/mixed reality),

robotics, 3-D printing and nanotechnology, genome editing, blockchain-tech and smart materials are already rapidly re-shaping the way we think, learn, create, communicate and distribute value.

While still a generic and somewhat opaque term, Education 4.0 entails the implementation of advanced technology to improve teaching, learning and assessment throughout the entire sector. The question is *not whether* smart schools and universities will engage in the change, as they are bound to adapt to survive, but *how* they will engage and adapt [6]. As Bonfield et al. illustrate in a comprehensive literature review, Education 4.0 "will require a fundamental transformation in our approach to the design and delivery of teaching and learning, and the provision of smarter learning spaces, services and learning tools" [ibid, p.224].

Adaptation and disruption will be key factors in the future evolution of the Educational sector. However, even if the pandemic might have forced us in taking the first steps towards that future, the road ahead is treacherous.

II. TECHNOLOGY AND THE NOTION OF PRESENCE

In the first months of the pandemic, we witnessed educational institutions in a frantic race to purchase technology solutions to run teaching activities online in order to mitigate the lockdown's effects on education discontinuity. Little thought was given at first to the nature of those activities and which implications they might have on the perception of teaching and learning for both educators and learners.

E-learning in time of crisis has mostly consisted of replicating online the traditional teaching paradigm of the classroom or auditorium, even when research has shown that the conventional lecture model of teaching doesn't necessarily lead to learning [7, 8].

To further complicate the matter, emerging research from the field also shows contradicting results on learners' and educators' reactions to fully online teaching and learning. While there is a conspicuous number of sympathizers who praise the advantages of online learning in terms of flexibility, the possibility for more open communication and cost-effectiveness, there are also many who legitimately direct the attention to the limitations of online learning.

The dependence of instructors and students on technological infrastructure and the ability to access online connections, educators' highly variable competence and experience in using digital tools for teaching activities and the constraints of digital learning environments on hands-on activities are all been named as deterring factors to online learning [9, 10].

III. SOCIAL PRESENCE

Much of the debate has revolved around the notion of presence and the perceived need for physical presence for optimal learning conditions [11]. It is argued that online teaching and learning present a challenge in that many educators teaching online feel disconnected from their learners, and many learners having to take online courses feel disconnected from their classmates and instructors with a subsequent feeling of separation that leads to disengagement and loss of learning [11, 12].

The notion of presence and particularly social presence has been thoroughly investigated by Whiteside et al. [12]. Despite being the most commonly used term to describe and explain engagement in online teaching and learning environments, social presence is defined and conceptualized differently in the literature. Whiteside distinguishes three different perspectives on social presence —social presence as technologically facilitated, social presence as learners' perceptions, and social presence as critical literacy.

3.1 Social presence as technologically facilitated

Different communication technologies have different characteristics. Social presence theory has evolved from a focus on the inherent characteristics of a medium to focus on how technology is used. The perspective of social presence as technologically facilitated underlines that it's not the media alone that establish social presence; people establish social presence within mediated environments [12, p.41].

3.2 Social presence as learners' perceptions

Because the sense of presence entirely depends on the persons engaging in the online environment, different learners will perceive different levels of social presence even in the same environment and will correspondingly behave differently. [ibid. p.63].

To address the complexity of this dimension and give practical insights into how educators should use technology, the Communication of Inquiry framework (CoI) by Garrison, Anderson & Archer [13] placed the notion of social presence in the context of a social constructivist view of higher education underlying the important relationship between the development of a sense of community in the learning environment and the learning process itself [13 in 12, p.64]. Consequently, digital learning environments that are designed with the possibility to engage learners in social based activities such as group-work or discussions are believed to contribute to students' satisfaction and retention [14]. Another important factor is indeed the social presence of the educator and the educator's ability to create an "online persona" that feels real and authentic to students [12, p.94].

3.3 Social presence as critical literacy

It is this emotional element that supports learning, and it is within this context that Whiteside proposes a Social Presence Model (SPM) based on Vygotsky's zone of proximal development where five integrated components serve all to create, support and sustain social presence and meaning-making processes (learning): affective association, community cohesion, instructor involvement, interaction intensity, and knowledge and experience. Within this model, social presence become a critical literacy encompassing the abilities educators and students alike need in digital learning environments to "build intentional cross-cultural connections and relationships with others - in order to pose and solve problems collaboratively and strengthen independent thought - and to - design and share information for global communities to meet a variety of purposes" [12, p.138]

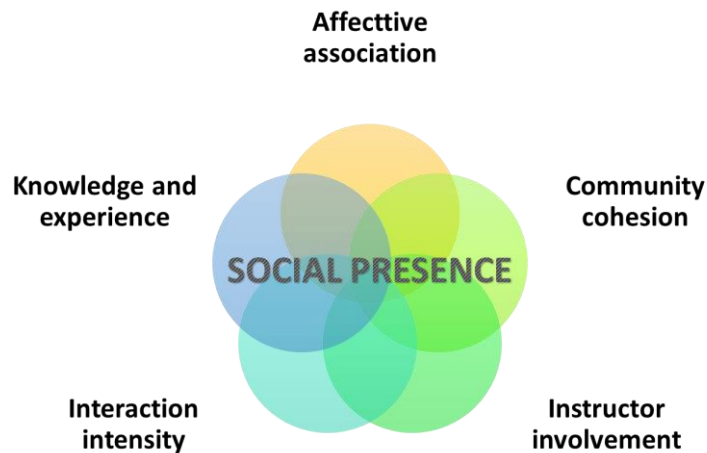


Figure no. 1. Whiteside's SPM

Whiteside's proposed SPM as critical literacy well elucidate the crucial aspect educators should take into consideration when teaching in digital learning environments.

There is an undeniable consensus on what constitutes the most evident difference between teaching and learning in a physical space versus fully online. Physical presence is not the same as presence in a digital environment [15]. Elements of non-verbal communication such as body language and other sensory references are not reproducible digitally (at least not yet), but as human beings, we are intrinsically designed to value those very human aspects more than anything else. That is perhaps why educators and students still seem to prefer physical teaching and learning environments over digital ones. Many educators during COVID-19 have for instance lamented frustration regarding the inability of reading "the face and mood of students" due to switched-on black screens, while learners at all levels

in the educational system have reported a lack of motivation due to less meaningful interaction and the impossibility for immediate feedback [11, 16].

3.4 Is physical presence synonymous with social presence?

The fact that the lecture model still is the preferred one by educators and students even when research tells us lecturing is not an effective way of learning, rather a cost-effective way to instruct large numbers of pupils and students [7], exemplifies a deeper assumption about knowledge and learning that very much survives as a vestige of the first industrial revolution.

How do we understand the notion of presence in this context?

At a recent international conference, David White [17], Head of Digital Learning at the University of the Arts London, refers to traditional physical teaching and learning environments as Presence Machines specifically designed to enhance physical presence as the glue that holds the house of cards of our educational institutions together. What are schools without classrooms? What is a university without its aulas and auditoria? What are those spaces without a teacher or a professor addressing an audience?

3.5 Smoke and mirrors

Even if pedagogical theories have evolved from a mechanic behaviouristic view of learning to an understanding of learning as a complex cognitive and social process, none of them has postulated the annihilation of physical educational institutions. Hence, the transition to digital teaching and learning environments has in most cases witnessed the mere reproduction online of traditional teaching models rooted in the human experience of physical presence. It doesn't come as a surprise that online lectures don't work, that students in the lack of perceived engagement turn their screens black and educators get frustrated over learners' diminished interest and commitment to learning.

In physical spaces, we take presence for granted. But physical presence doesn't always mean social presence or engaged presence. Nonetheless, we rarely question whether the mere physicality of the experience necessarily also can account for the sense of social presence, engagement and shared construction of meaning that is linked to learning. A look at a high-school classroom will quickly disclose how many learners are not socially engaged in classroom activities and learning even when physically in their seats, and students in an auditorium are in many respects fooled to believe that the sole experience of being physically present contributes to their actual learning. Even when lectures are tedious, the shared physical experience of that with other students causes an increased perception of learning because of the sense of social presence that we are used to link to it. When that very shared physical experience is stripped away in digital environments, the sense of social presence as well risks collapsing.

If we take into consideration the example of "screens-of VS screens-on" again, is that then just an example of poor digital etiquette or a symptom of poor pedagogy?

If educators are unable to create a sense of social presence in their teaching environment, providing learners with meaningful activities and enabling social interactions, how can learners feel engaged?

On the other hand, if learners don't take responsibility for their social presence and active engagement in the digital environment, and rather act as passive spectators, how can educators learn what to do, to do better?

In the following section, we will share our vision and some practical advice on how to re-think and implement innovative teaching and learning practices in digital environments based on a work-in-progress research project at the Norwegian University of Science and Technology.

IV. LESSONS LEARNT FROM SALTO

Støckert and colleagues [15, 18, 19] have in previous contributions presented the pedagogical vision behind a joint master's program in Music, Communication and Technology (MCT) between the Norwegian University of Science and Technology (NTNU) and Oslo University (UiO). They have extensively discussed the challenges related to the pragmatic implementation of such vision within the

two universities and have come with suggestions based on their experiences with student active learning in a hybrid (physical and digital) learning environment.

The MCT-program also constitutes "the living lab and testbed" for the research program SALTO. The scope of the research in SALTO encompasses the development, investigation and evaluation of cross-campus, cross-university and hybrid solutions while being solidly anchored within Radcliffe's Pedagogy-Space-Technology (PST) framework [20] for sustainable design of both physical and digital learning spaces.

In their preliminary research, conducted through a questionnaire and the participation of 16 students from the program, Støckert et al.[15] discussed the notion of presence in MCT's specific digital learning environment, the Portal, which acts as an incubator where educators and students alike can explore and experiment with new convergent technologies, pedagogical methods and multimodal ways of interaction and collaboration.

In the course of 2020, the SALTO project has been extending and methodologically structuring the data gathering process to include semi-structured interviews of both students and educators at MCT. 20 students from different enrolling semesters have been interviewed, previous to and under the COVID-19 pandemic. In addition, we asked 6 educators to contribute with their experiences. Three of them were primus motors back the program's beginning and organization, and the other three came later in, in various capacities.

While we are still working on finalizing data analysis and cannot yet introduce our final results, we wish nonetheless to share our initial research impressions and some of the lessons learnt from three years of actively running MCT. Our attention is focused on the aspect of social presence and the role it plays within the theoretical pedagogical framework of the program (PST).

Student active learning and social learning are at the centre of MCT's pedagogical vision. Much of the attention in developing MCT's spacial and technological learning arena has been directed to a concretization of such vision by exploring and including teaching methods that could allow for student-centred learning activities and support student's learning autonomy through collaboration-based and "hands-on" learning tasks inspired by Mazur's Peer Instruction [8].

As a joint two-campus university program, MCT has been encountering different challenges on the administrative side due to the difficulty in changing organizational structures rooted in different cultural structures of leadership [18]. However, the most exciting challenges have been those related to a deeper change in the way university culture traditionally has considered and defined "learning".

In Lee's et al. interpretation of the PST framework [21], pedagogy is enabled by space and enlarged by technology; space embeds the technology and encourages pedagogy, and technology enhances pedagogy and extends the existing space [21, in 22 p.15].

In our interpretation and implementation at MCT, Pedagogy is the holding pillar informing and underpinning both the designing of the space and the choices about technology in use.

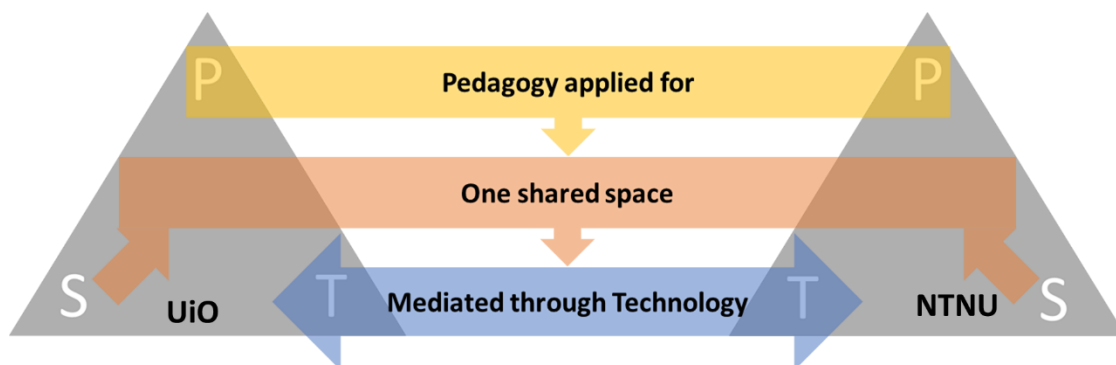


Figure no. 2. PST-framework adaption for MCT

Examining the aspect of social presence in light of our interpretation of the PST framework, we have harnessed experiences that allow us to describe a 4-steps guide to design more sustainable hybrid and fully digital learning environments where students and educators can share and create new knowledge.

4.1 Adaptation: Challenging the traditional idea of the teacher as the primary source of knowledge

If there is a take-home message Education 4.0 is confronting us with is the globally perceived need for a transformation of the teacher's identity, from *magister-orator* to *magister-excogitator*, or from teacher-speaker to teacher-designer of the teaching-learning experience [23, 24, 25]. Despite some still critical voices, recent works in Connectivism, as one of the learning theories best suited to describe how the very notion of learning has changed in our digital age [26], have shown "a broad awareness and acceptance of the role of networks in learning, and significantly, the positive impact of network principles such as autonomy and interactivity" [ibid.]. There is no doubt that the way technology has changed our relationship to what, where and how we learn, also has challenged the role of the teacher as an indisputable source of knowledge.

The MCT – Portal as an open, work-in-progress learning arena has allowed students and educators with different backgrounds and level of expertise to exchange knowledge and collaborate. In this scenario, the teacher has taken on the role of facilitator of learning and communication, co-designer of learning spaces and in some cases also co-learner of new technologies. Our experience is that such a role is a prerequisite for a successful social interaction among students and between students and teachers that, in turn, lays the foundation for a more sustainable perception of social presence, particularly in the case of digital learning environments.

4.2 The social glue: Transporting social presence to virtual learning spaces

In section 4, we have presented and discussed the notion of social presence. One of the challenges educators face when teaching in hybrid or fully digital learning environments is how to recreate the sense of social presence through a screen.

We have experienced that downsizing student cohorts in units of 4-5 individuals is the simplest way to allow a more natural communication flow and interaction and collaboration dynamics. Educators have also become aware of the need to create "corridors" for social encounters as the ones that would have occurred naturally in physical spaces. Giving students the time *and* space to freely organize their own way to collaborate on a task or project, have contributed to the establishment of a learning community which boundaries are not restricted by what we usually intend as "regular" lessons and traditional learning spaces. Informal collaboration dynamics within these virtual corridors has actively contributed to develop a higher sense of social presence and perception of learning.

4.3 Hands-on learning activities: Developing relevant skills for real-life tasks

There is a solid body of research from the past 30 years already that have demystified the efficacy of traditional lectures on the learning process. Reproducing the "lecture model" to explain complicated theoretical aspects of a subject through screens is, therefore, a recipe for disaster. New convergent technologies can be employed in flipped classroom modalities to engage students before, and also after a theory session.

At MCT, hands-on learning activities have been at the centre of the curriculum, and technology has provided shared spaces and ways for communication, interaction and collaboration. We consider hybrid and fully digital learning environments alike as arenas where students are not just required to reproduce knowledge to pass an exam but are encouraged to explore, acquire and create new knowledge that mirrors their needs and interests. To do that, educators have shared much of the responsibility to define and negotiate the very content of the curriculum with the students, moving the focus from classroom-performance culture to a culture of learning for life where students are intrinsically motivated to learn.

4.4 Student Learning autonomy: Taking charge of your future

Life-long learning has been a busy concept in education for a good decade now, but there is no life-long learning without learning autonomy. If students are not encouraged to be independent and are not given the tools to learn how to become independent, there cannot be a life of learning, just a life of exams. How can students learn to be autonomous in their learning? They need support. Traditional educational institutions don't necessarily prepare students to learn how to learn. They need educators who actively can show them how to do that, who can guide but not steer, who can suggest and not decide, who can trust and monitor and not over-control and over-test. All learners need a community of

learning based on reciprocal trust in which the educator has a paramount role in facilitating the learning experience, designing activities that can allow students to learn by doing and collaborate on the doing with their peers. This scenario is valid for any kind of learning environment, physical, hybrid or fully digital.

In our experience, when educators share the responsibility for the learning environment itself with their students, it became possible to create a sustainable community of learning that actively support learning autonomy.

V. CONCLUSION AND DISCUSSION

The sense of presence in learning environments is a complex concept to define, describe and convey.

In this paper, we have outlined and discussed the notion of social presence by linking it to the PST-framework employed in a joint master's program between two Norwegian universities. Based on our experiences from running the program and our first impressions from the SALTO research, we have compiled a 4-steps guide for designing more sustainable learning environments irrespective of modality (physical, hybrid or fully digital) and with a look to the post-pandemic future of the educational sector.

Our conclusion is that technology is not enough without pedagogy. Technology alone cannot re-create physical presence, but technology-mediated pedagogical practices can extend the limited notion of presence to create a higher feeling of social presence and engagement among learners and between learners and educators that can cater for a higher perceived feeling of learning.

From the *panic mode* that made institutions purchase expensive technology solutions to move all lectures online, we need to switch to the *planning mode* that employs technology to provide meaningful teaching and give learners the right tools to adapt to society and develop the skills they need to understand and solve complex problems.

To evolve, technology-based Education 4.0 must take into account learners' actual needs and prepare them for the further global challenges that most likely will appear in the future [4]. It is therefore of critical importance to consider and discuss which changes the Educational sector can implement to promote "resilience, continuity and equality in education in times of both calm and crisis" [ibid.].

5.1 Limitations

This paper must be read as an introduction to the complete research study from the SALTO-project that will be finalized in the course of 2021. As such, we haven't yet presented our data analysis, rather our first impressions from the research.

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