



Innovative Learning and Innovative Learning Spaces

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ABSTRACT:

The purpose of this article is to identify, analyze, and discuss the current state of the art in innovative learning spaces and next-generation learning spaces. The article focuses on the ongoing efforts to combine space, technology, and pedagogy to ensure learner success. The concept and characteristics of innovative learning spaces are discussed and elaborated. So are global challenges to the educational sector. In the discourse of rethinking traditional learning spaces, aligning them with learners' expectations and the joy of learning are highly emphasized worldwide. Learning is ubiquitous today. It can take place anywhere, anytime and in many formats—formal, informal, and non-normal. Space, whether physical or virtual, can have a significant impact on learning. Those who create learning environments, such as faculty, learning technologists, librarians, estates, and administrators, understand that learners' expectations influence such spaces. These learning environments creators also understand the principles and activities that facilitate learning, and the role of technology and digitization in learning. However, the most important stakeholders are the learners, who in the 21st century are co-producers, controllers, and orchestrators of their own learning. In the 21st century, from the pedagogical perspective, to offer and implement innovative learning spaces is a matter of taking into account the rights of learners. This means that the learners can expect and have the rights to modern, and high-quality environments which facilitate and empower learning in and for the 21st century.

KEYWORDS: Cross action space; Innovative learning; innovative learning space; next-generation learning space; quality of learning and teaching

1. INTRODUCTION

Learning is ubiquitous in human experience. Today, learning has many forms: it can be formal, informal, and non-formal (Cedefop, 2015), and it can take place by anyone, anywhere and at any time (European Commission, 2013). In the 21st century, learners take the lead in their own learning. Moreover, education has become possible for everyone, at any time, and in any location through the open access to the Internet

and through open and free content, such as open educational resources (OER) and massive open online courses (MOOC). The range of learning choices is larger than it has ever been. Whoever we are and wherever we live, we are presented with opportunities to learn every day throughout our lives: as the Swedish say, *humans learn throughout life, as human life is learning, or as the Chinese saying one is never too old to learn*. The only requirements are access to the Internet, an electronic device, and digital literacy. More

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people are connected to the Internet than ever before. They use digital devices and services not only at work but also in all aspects of their lives in addition to learning in formal and informal environments that is, *learning spaces*. This revolution has been fueled by the rise of the mobile broadband, which enables the participation in the digital economy of an increasing number of people around the globe.

The educational sector worldwide, including higher education and K-12, faces tremendous challenges because of the changes caused by globalization, demographics, and the increasing use of technology and digitization in all social sectors. According to the United Nations Educational and Scientific, and Cultural Organization (UNESCO), the access to lifelong, quality education is a human right (UNESCO, 2015). It is at the heart of UNESCO's mission to build peace, eradicate poverty, and drive sustainable development. Education is crucial in this process because education transforms lives. UNESCO recognizes that education is a singularly significant goal because it is essential for the success of all other sustainable development goals and is therefore at the heart of the 2030 Agenda for Sustainable Development. Therefore, UNESCO intends to realize SDG4 by launching and implementing the Global Education 2030 Agenda. The process in achieving this goal is the Education 2030 Framework for Action (FFA), the key elements of which are access, inclusion, lifelong learning, equity, equality, quality, and democracy. The Incheon Declaration (UNESCO, 2015, p. 8) provides guidance for implementing Education 2030.

The era in which we live has been termed the *fourth industrial revolution* (Schwab, 2017; Schwab, Davis, & Nadella, 2018). Moreover, according to Schwab (2017), we stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything

humankind has experienced. Although it is not yet known how this transformation will unfold, it is clear that the response to it must be integrated and comprehensive, involving all stakeholders in the global polity, including the public and private sectors, academia, and civil society.

To be proactive and to cope with the fourth industrial revolution and learners in both the present and the future, traditional learning spaces must be rethought and optimized to reach the goals of learning for all. Because learning spaces should work for everyone, the concept of innovative learning spaces should be embraced (Keppel, Souter & Riddle, 2012; Kroksmark, 2011; Kjällander, 2011) to emphasize active learning (Cormier, 2008). Active, authentic learning requires innovative learning spaces (Cormier, 2014; Sharples et al., 2016). Space, whether physical or virtual, affects learning (Adams, 2017; Bates, 2015). It not only brings people together but also empowers, encourages, and facilitates exploration, collaboration, and discussion. In educational contexts, the learning space can be physical, virtual, digital, or online (Massey, 2007). However, space can also be considered a living space, physical space, social space, and intellectual space (Santoianni, Ciasullo, De Paolis, Nunziante, & Romano, 2017). The discourse of rethinking traditional learning spaces and aligning them with user expectations, and the joy of learning are international highly emphasized (Jahnke et al., 2012). Space must be considered in both informal and formal learning, which are increasingly blurred and even merged. Innovative learning spaces require that innovative leadership and management are realized, embedded, embraced, and sustainable (Ossiannilsson, 2018a 2018b). In addition, the concept of quality must be aligned with innovative learning spaces (Ossiannilsson 2018c).

This article aims to present an overview of the state of the art in the field of learning spaces and to explore how innovative learning spaces can contribute significantly to enhancing and cultivating the joy of learning.

This article is informed by the author's research and experiences in this field as well as by relevant literature. It is developed around the following issues:

- Toward the digital transformation in society, education, and learning
- Learning in the 21st century
- Space as change agent
- Learning spaces and evolving pedagogical approaches

In the final section, conclusions are drawn, and recommendations are given. A framework with examples is proposed regarding the incorporation of innovative learning spaces in the learning experience as well as the roles of teachers, leaders, and administrators in this transformation.

2. TOWARD THE DIGITAL TRANSFORMATION IN SOCIETY, EDUCATION, AND LEARNING:

The literature review results showed links between Net Gen learners and emerging trends in education, particularly their relevance to the concept of innovative learning spaces. Oblinger and Oblinger (2006) define the Net generation as the Generation who has grown up with information technology. The aptitudes, attitudes, expectations, and learning styles of Net Gen students reflect the environment in which they were raised—one that is decidedly different from that which existed when faculty and administrators were growing up.

The definition of learning space has broadened to become increasingly inclusive over the past decade.

The educational sector worldwide, both higher education and K-12, is facing tremendous challenges because of the changes and challenges due to globalization, demographics, technology, and digitization in all sectors of society. The fourth industrial revolution (Schwab, 2017; Schwab et al., 2018) will change not only what we do but also who we are, how we act, how we communicate, and how we learn. Schwab (2017), and Schwab et al. (2018) emphasized that the response to the fourth industrial

revolution must be integrated and comprehensive, involving all stakeholders in the global polity, including the public and private sectors, academia, and civil society. Moreover, he stated that this revolution will affect our identity and all concerns associated with it: our sense of privacy, our notions of ownership, our consumption patterns, and our work and leisure time. The fourth industrial revolution will also influence how we develop our careers, cultivate our skills, meet people, and nurture relationships. Nonetheless, despite digitization, the attitudes, values, and behavior of people will remain primary. Thus, we must shape a future that works for all of us by putting people first and empowering them.

Because of the global challenges caused by this transformation, several global organizations, such as UNESCO (2015), the Commonwealth of Learning (COL, 2018), the Organization for Economic Cooperation and Development (OECD, 2018), the European Commission (EC)(2013), and others around the globe advocate opening up education to serve the needs of learners in this era. Hence, UNESCO (2015) recommended that international policy statements must be turned into actions to ensure equity, access, inclusiveness, quality education and lifelong learning opportunities for all. In particular, this is to respond to the scale and urgency of need for higher education in the period 2015 to 2030 due to the expected massive growth of students.

Global actions are aimed to encourage, facilitate, and embrace the power of open, flexible, and online higher education for the future and for sustainable global development. These actions are based on the recognition that education must be accessible anytime, anywhere, by any person, and on any device. Blessinger (2017) argued that the open education movement is part of the wider movement to democratize knowledge, to democratize tertiary education in particular, and to treat lifelong learning as a human right. The idea of open education is also part of the movement to create a culture of openness and inclusion in society. Thus,

there are requirements to consider in relation to the concept of opening up education. Massive open online courses (MOOC) and Open Educational Resources (OER) provide unprecedented numbers of offers and resources. New business models have been applied not only to the economic sector but also to open learning (European Commission, 2013, Ossiannilsson, 2018a 2018b). For example, MOOCs are used not only for lifelong learning and to obtain nano-degrees and academic degrees but also for continuing professional development (CPD). A significant example of the utility of MOOCs and OERs is the ability to meet the enormous needs of refugees for continuing and higher education. MOOCs have also raised pedagogical questions about open online learning (Ossiannilsson, 2018d). Methods used in previous centuries cannot be used to educate today's students for an unknown future. Some of today's jobs will not be viable in the future, or they may be performed by robots or machines. Moreover, in the future, previously unknown jobs will be created. Hence, there is a huge need for innovation and entrepreneurship to meet the demands in the global society both now and in the future. Furthermore, opening up education requires that we must go beyond MOOCs and OER to find new opportunities for learning, especially personal learning, that is, "just for me and just in time" learning, in and through new innovative learning spaces.

The need for innovative learning spaces is accompanied by the need for innovative and rethinking leadership in the digital age, which requires that leaders and managers understand the consequences of digitization for learners to become active global citizens (Ossiannilsson 2018a 2018b). They must also understand that working environments and learning arenas are changing and will be transformed by the

rise of digitization and the fourth industrial revolution (Gulliksen, 2015). Administrators must be proactive with regard to incentives, recognition, allocation of time, costs, and other resources, as well as capacity building and continuing professional development (CPD) of all staff, not just the academics. In addition, the concept of quality must be reconsidered, including its criteria, to align with global challenges. Accordingly, the quality in higher education should be based on efficacy, faculty involvement, and the impact for individuals, learners, and staff as well as the institution and society.

As the educational paradigm changes and with the unbundling movement and development, the real purpose of higher education institutional offers and services has to be reconsidered.¹The neologism "unbundling" refers to the process of breaking something into smaller parts. The term is used to describe the effects of the ubiquity in the 21st century of mobile devices, Internet connectivity, consumer web technologies, social media, and information access (Watters, 2012) on traditional institutions (e.g., education, broadcasting, newspapers, games, shopping, etc.). By "break[ing] up the packages they once offered, [unbundling provides] particular parts of them at a scale and cost unmatched by the old order" (Chatfield, 2012), which will drive profound changes in our daily lives over the coming decade, radically altering how we consume, produce, learn, and work (Schwab, 2016). As in all transformational changes, unbundling presents us with great opportunities and significant challenges. Only a decade ago, the classroom was accepted as the primary locus of learning. Other spaces, such as the library, faculty offices, small group rooms, and even the neighboring café were sometimes also recognized. However, the classroom was by far the single most important space for learning (Brown, n.d.).

However, much has changed. The rise of the web has led to a plethora of new, network-based applications from digital

¹N.B. Although higher education is mainly referred to in this article, there are general considerations for all learning spaces, including K-12.

music stores to new venues for scholarly publishing. In the last two or three years, a variety of offerings in a variety of sectors have emerged on the Internet, such as for books (Amazon), music (Spotify), film (Netflix), taxis (Uber), events and leisure time (TripAdvisor), hotels (Booking.com), and accommodation (Airbnb).

Perhaps one of the most recent innovations is Woolf University, which academics at Oxford University launched as the world's first "blockchain university" (Broggy et al., 2018; Pells, 2018). The Blockchain University might need to be explained somewhat further, as Blockchain is a new phenomenon. The development of Woolf University is the first major move in the educational context toward blockchain and bitcoins, in which an app replaces a physical campus. Woolf University will not consist of a physical campus but instead will be based on an app that links academics to prospective students who then use the Woolf platform to select study modules that fit their academic needs. The blockchain technology will be used to track academic progress, to establish contracts, and to process payments. The records created on the blockchain can be used to gain formal accreditation by traditional universities. This first blockchain university holds promise for unbundling, which has been called the great "disruptor." In OERs and MOOCs, content is available free or at minimal cost and no prerequisites are necessary. The open access publishing movement and the open badge movement, related to recognition for informal and non-formal learning are other examples of "disrupters" in the unbundling landscape.

In higher education, one of the most outstanding missions is to educate people to solve the global challenges of today and tomorrow. Accordingly, because educational content is now freely offered and available at any time and in any location through the Internet, traditional educational formats are challenged. A main role of universities, in addition to

research, is to provide unique learning opportunities in stimulating environments. In addition, competitiveness among universities, changing expectations of students, increasing fees, new frameworks for quality and for teaching and learning, and the rapid evolution of technology has revised the entire educational landscape. Hence, the fourth industrial revolution has implications for both teaching and learning in authentic, cross learning spaces in the unbundled educational landscape. Therefore, learning spaces can and should act as change agents (Downes, 2018; Harrison, 2018; Oblinger, 2016; Open Education Europa, 2018a 2018b).

3. LEARNING IN THE 21ST CENTURY:

Today's life and work environments require far more than thinking skills and content knowledge. Because of rise of technology and digitization, the learners of today have grown up using computers and other networked devices (Oblinger & Oblinger, 2005). Consequently, electronic technology is essential in their learning, leisure time, and work. According to Brown (n.d), in previous generations information technology (IT) was an exotic novelty or an optional tool, but in the net-generation of digital natives, IT is essential. Indeed, today's learners can be said to have a symbiotic relationship with IT. The characteristics of this cohort mesh with the increasing mobility of IT, its availability, and its increasing value as a communication tool. In addition, today's learners are social and team oriented; they are comfortable with multitasking and generally positive in their outlook. Moreover, they have a hands-on "let's build it" approach, which is fostered by the availability of the IT resources and digital devices at their disposal.

In addition, their rapid and enthusiastic adoption of IT has influenced its development, particularly with respect to web-based services.

The net-generation and the digital natives have grown up with Internet, social media and digital devices, and their abilities correspond very well with 21st-century competences, which are expressed in the

Partnership for 21st-century learning (P21) framework for 21st century learning (Figure 1). The domains of these competences comprise the following: i) content knowledge and 21st century themes (key subjects); ii) [life and career skills](#); iii) learning and innovation skills, which comprise the four Cs, which are critical thinking, communication,

collaboration, and creativity); iv) information, media and technology skills (Partnership for 21st Century Skills [P21], 2007). In addition to these four competence domains, standards, assessments, curricula, instructions, professional development, and learning environments must be flexible in embracing in any learning situation and task.

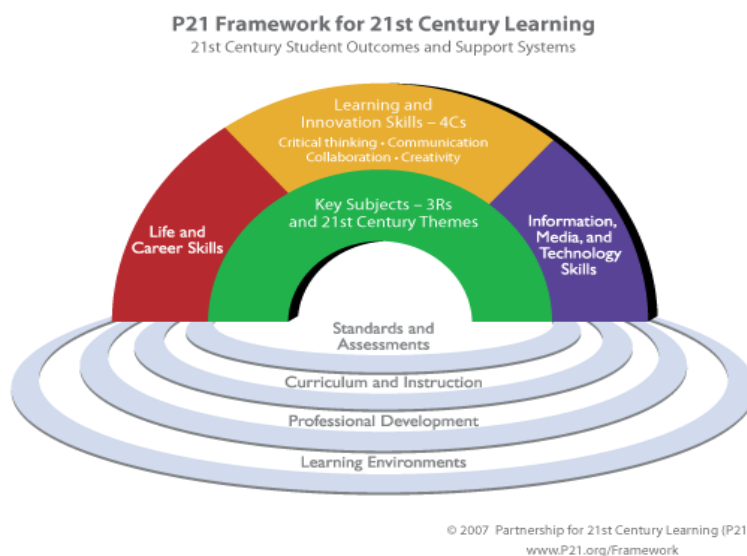


Figure 1: Partnership for 21st-century learning P21 framework for 21st-century learning

The need to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to their development of adequate life and career skills. Hence, life and career skills need to be explored in educational contexts, particularly in innovative learning spaces. According to P21 (n.d.), these include social and cultural skills, flexibility and adaptability, initiative, self-direction, productivity, and accountability. Furthermore, life and career skills include leadership and responsibility. A comprehensive overview of life and career skills, according to Partnership for 21st-century learning (P21) (n.d.) is provided in Table 1:

In the 21st-century, the skills outlined in Table 1 will influence how innovative learning spaces are considered and developed. The next section is focused on

learning spaces as change agents.

4. LEARNING SPACES AS CHANGE AGENTS

Learning spaces are the change agents of educational transformation, implementation, offers and services to be aligned with the 21st century opportunities and demands. Learning spaces are hence change agents of innovative pedagogical approaches, embracing both physical and online spaces.

In the last decades of the 20th century, the rapid advancements in economy, technology, and society led to increasing demands on the educational system. Hence, in the 21st-century, competences, more than subject knowledge, are widely emphasized to be an active citizen and for the labor market. The basic competences that students and citizens of today and of tomorrow require not only to fill the demands of industry but also to survive and function in society are critical thinking, collaboration, innovation,

Table 1: An overview of life and career skills according to Partnership for 21st-century learning (p21).

Flexibility and adaptability	<i>Adapt to Change</i>	Adapt to varied roles, jobs responsibilities, schedules, and contexts. Work effectively in a climate of ambiguity and changing priorities.
	<i>Be Flexible</i>	Incorporate feedback effectively. Deal positively with praise, setbacks, and criticism. Understand, negotiate, and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments.
Initiative and self-direction	<i>Manage Goals and Time</i>	Set goals with tangible and intangible criteria of success. Balance tactical (short-term) and strategic (long-term) goals. Utilize time and manage workload efficiently.
	<i>Work Independently</i>	Monitor, define, prioritize, and complete tasks without direct oversight.
	<i>Be Self-directed</i>	Go beyond the basic mastery of skills and/or curriculum to explore and expand personal learning and opportunities to gain expertise. Demonstrate initiative to advance skill levels toward a professional level. Demonstrate commitment to learning as a lifelong process. Reflect critically on past experiences in order to inform future progress.
Social and cross-cultural skills	<i>Interact Effectively with Others</i>	Know when it is appropriate to listen and when to speak. Conduct oneself in a respectable, professional manner.
	<i>Work Effectively in Diverse Teams</i>	Respect cultural differences and work effectively with people from a range of social and cultural backgrounds. Respond open-mindedly to different ideas and values. Incorporate social and cultural differences to create new ideas and increase both innovation and the quality of work.
Productivity and accountability	<i>Manage Projects</i>	Set and meet goals, even in the face of obstacles and competing pressure. Prioritize, plan, and manage work to achieve the intended result.
	<i>Produce Results</i>	Demonstrate additional attributes associated with producing high-quality outcomes, including the following abilities: -Work positively and ethically. -Manage time and projects effectively. -Multi-task. -Participate actively, as well as be reliable and punctual. -Present oneself professionally and with proper etiquette. -Collaborate and cooperate effectively with teams. -Respect and appreciate team diversity. -Be accountable for results.
Leadership and responsibility	<i>Guide and Lead Others</i>	Use interpersonal and problem-solving skills to influence and guide others toward a goal. Incorporate the strengths of others to accomplish a common goal. Inspire others to reach their absolute best via example and selflessness. Demonstrate integrity and ethical behavior in using influence and power.
	<i>Be Responsible for Others</i>	Act responsibly with the interests of the community in mind.

entrepreneurship, information and communication technologies (ICT), digital literacy, addictiveness, and learning to learn (European Commission, 2013), OECD, 2018). Consequently, the topic of rethinking traditional learning spaces and aligning them with users' expectations and the joy of learning are discussed and emphasized worldwide. Moreover, next-generation learning spaces are discussed in response to the high demands and changing trends in the changing learning landscape. To be proactive in coping with the fourth industrial revolution (Schwab, 2017; Schwab et al., 2018), to achieve the SDG4 (UNESCO, 2015), and meet the needs of learners in both the present and the future, traditional learning spaces in educational institutions must be redesigned. Schwab argued that the fourth industrial revolution, change the way we act, perform work and learn, but also how we interact and communicate with each other in different spaces. Hence innovative learning spaces have an impact and can serve as change agents to foster collaboration, interactivity, activities, and actions, and to modernize education and pedagogical approaches.

Learning spaces should work for everyone, and extended learning spaces must be created to promote active learning (Kroksmark, 2011; Kjällander, 2011). In the recent annual reports of New Media Consortiums (NMC), learning spaces are emphasized as main topic. In 2017, NMC anticipated that redesigning learning spaces would be a mid-term trend aimed at driving the adoption of Ed Tech in higher education during the next three to five years (Adams et al., 2017).

Because learning spaces, whether physical or virtual, have a significant impact on learning, they are considered a key element for empowering motivation, ownership and the joy of learning. Effective learning spaces bring learners together by encouraging and facilitating their exploration, collaboration, and discussion (Adams, 2017; Sharples et al., 2017). Learning spaces, which are

increasingly blurred and even merged, must be suitable for both informal and formal learning.

The concept of learning spaces focuses on how learners' expectations influence them, the principles and activities that facilitate learning, and the role of technology from the perspective of those who create learning environments: faculty, learning technologists, librarians, and administrators. Information technology has brought unique capabilities to learning spaces by stimulating greater interaction through the use of collaborative tools, by videoconferencing with international experts, and by opening virtual worlds for exploration. Combined, learning spaces, technology, and pedagogy empower learners to achieve successful outcomes.

"If you can design the physical space, the social space, and the information space all together to enhance collaborative learning, then that whole milieu turns into a learning technology, and people just love working there, and they start learning with and from each other" (Brown, n.d.).

New ideas about learning spaces represent a significant opportunity in education to increase the success of learners and learning. Through the application of information technology, today's learning spaces have the potential to promote the new learning paradigm and meet the needs and expectations of the most recent generation of learners, the net generation (Harrison, 2018; Blessinger & Bliss, 2017; Jahnke et al., 2012).

Based on the core mission of higher education, learning and the space in which it takes place are of the utmost importance. In order to best serve education, learning spaces need to be designed to optimize the convergence of the net generation, current learning theory, and information technology.

The concept of the learning environment has been extended and transformed since the introduction of the world wide web. Many people nowadays use the Internet as the primary source of services, information, and communication. New technologies have also proliferated over the past decade, such as artificial intelligence, big data, blockchains,

cloud computing, the Internet of Things, machine learning, mobile applications, nanotechnology, and 3D printing, among others (Sharples et al., 2017).

Online-enabled mobile technologies are becoming increasingly integrated into formal learning environments. The fields of education and ICT are merging to create new kinds of learning spaces, including cross-action spaces (Bates, 2015; Jahnke, 2015) based on the use of social networking and social media. In these spaces, learning can take place “on the go” through mobile devices while learners are mobile in their daily lives. In the workplace, micro-learning is frequently used “on the go” to update knowledge (Gassler, Hug & Glahn, 2004). Learning spaces are among the several learning methodologies and frameworks that are available to educators today. The focus of learning spaces is the creation of innovative, comfortable, accessible, flexible, collaborative, and aesthetically pleasing technology-enabled spaces, including their performance assessment (Adams et al., 2017). According to Brown (n.d.), the virtual space is taking its place alongside the classroom and other physical locations as a locus for learning. The result is that we are compelled to expand the concept of the space in which learning occurs. Learning spaces now encompass the real and the virtual, the classroom and the chat room. Bastes (2015, 2016) suggested that effective learning environments should embrace physical locations, networks, and traditional media.

Innovative, next-generation learning spaces bring together a large variety of professions with interests in next-generation spaces, both physical and virtual online spaces, such as academics, and librarians, but also architects, estate staff, administrators, senior managers, rectors, and not at least students. In addition, stakeholders’ collaborate in the discourse, research, and implementation of next-generation innovative learning spaces (Adam, 2017; Bates, 2015, 2016; Ossiannilsson, 2018c). Hence, teamwork

is required more than ever, which requires transparency, the understanding and acceptance of cultural diversity, and flexibility. The benefit is that all stakeholders are involved from the beginning when courses are planned and designed. Hence, all stakeholders gain a sense of ownership and responsibility for the process instead of merely applying emergency fixes and Band-Aid solutions (Ossiannilsson, 2018d).

The topic of innovative learning spaces has raised a huge amount of interest worldwide. Awareness has been increased regarding the need for innovative learning spaces that involve a broad group of stakeholders, not only academics. Annual conferences are now held on innovative learning spaces: examples are Next Generation Learning Spaces Asia, Next Generation Learning Spaces US, Next Generation Learning Spaces Australia, and Next Generation Learning Spaces China. In Europe, at least two large conferences have been held annually on innovative learning spaces: Luxatia International and Next Generation Learning Spaces by the International Quality & Productivity Center (IQPC) in the UK, which in 2018 was in held in collaboration with the University of Manchester. Both conferences were focused on the topics of re-imagining learning spaces and how it could foster learning. The review of the literature published currently in research journals revealed that common topics why learning spaces matters and how it can facilitate learning and serve as a change agent, are the following:

- Student engagement
- Design and implementation of cost-effective, flexible, and future-proofed spaces to ensure that learning environments can adapt to future demands and continue to deliver world-class teaching and learning opportunities
- Pedagogical approaches linked to learning space planning and design
- Collaborative and individual learning in distributed learning spaces
- Driving innovation by engaging stakeholders and forming partnerships
- Estate transformations and learning experience design

- Teaching millennial and coping with digitalization challenges
- Design thinking and participatory design in re-imagining spaces
- Collaborative approaches to digital literacy, active learning, and technology
- Innovative, accessible learning environments for those with complex needs
- Meaningful engagement with stakeholders in learning space design

Because learning spaces influence learning, there is a need to cultivate a culture of innovative learning spaces. Indeed, because learning spaces are change agents in educational transformation, pedagogical approaches also must be transformed to align with 21st century competences and meet the demands of the fourth industrial revolution.

1. LEARNING SPACES AND EVOLVING PEDAGOGICAL APPROACHES:

Learning and education have become possible for everyone through the open access to and free content on the Internet, such as OER and MOOCs (Ossiannilsson & Abeywardena, 2018) The range, offers, and choices of learning are greater than ever before, only requiring access to the Internet, an electronic device, and digital literacy. More people are connected to the Internet than ever before. They use digital devices and services at work, in daily life, and in both formal and informal environments (Gassler, Hug & Glahn, 2004). This access has been fueled by the rise of the mobile broadband, or wireless Internet access, which has enabled the participation of an increasing number of people in the global digital economy. Accordingly, learning spaces need to be expanded beyond the traditional classrooms in schools and universities.

Cormier (2014) emphasized that society should be the curricula for active and authentic learning and that it should comprise and empower learning in real spaces. Active and authentic learning requires innovative learning spaces. The

learning space can thus act as a change agent for innovative learning approaches and pedagogy (Adams, 2017; Sharpels, et al., 2017). Net-generation learners require authentic, challenging learning. They are used to using the Internet and social media, which must be integrated into learning spaces because they promote interaction and cross actions (Jahke, 2016).

According to Adams et al. (2017), learning spaces, both physical and virtual, are key elements. Effective learning spaces bring learners together by encouraging and facilitating their exploration, collaboration, and discussion (Bates, 2015, 2016; Downes, 2018; Open Education Europa, 2018b). Learning spaces must be suitable for both informal and formal learning. The discourses on the rethinking of traditional learning spaces and aligning them with users' expectations, as well as the joy of learning, are highly emphasized worldwide (Ossiannilsson, 2018; Sharpels et al., 2017).

The transformative shift to innovative learning spaces calls for innovative leadership and management in the digital age. (Arnold & Sangra, 2018; Ossiannilsson 2018 2018b). Consequently, leaders and managers must understand the consequences of digitization for not only fostering active global citizens but also transforming the working environment across the globe (Guliksen, 2016).

Downes (2016) examined two metaphors of learning. The predominant metaphor is temporal, which is the linear and ordered progression toward a goal. The second metaphor is spatial, which is the non-linear exploration of a domain. In addition, Downes examined the tools, technologies, and learning support that should be considered in the rethinking of learning from a spatial perspective. Harrison (2018) argued that new methods and frameworks for analysis should be developed to consider the conception, perception, and implementation of digital spaces and their impact on the practices and approaches to teaching and learning within these spaces. Moreover, Harrison advocated going beyond the *metaphor* of the network to query *the material* infrastructures that provide and

determine access, including the construction of these spaces, who owns them, and how they shape educational spaces.

The disruptive developments discussed previously in this article include the locus of learning in education. A space can either empower or limit learning. For example, large lecture halls do not stimulate group discussions or dialogs; instead, they create barriers to communication. The notion of the classroom has been expanded; virtual space has taken its place alongside physical space (Mattila & Silander, 2015). It is now possible to bring much more diverse materials to the classroom mainly through the Internet and digital media as well as to enhance learning activities in a variety of ways and to devise new classroom activities for learners. As a result, the concept of the classroom has expanded to include other kinds of spaces in which the physical and the virtual are merged. Learning spaces can be adapted or moderated, and flexible learning spaces may empower and encourage actions, interactions, cross actions, and dialogs (Ossiannilsson, 2018d).

As universities implement strategies that incorporate digital elements and accommodate active learning in the physical classroom, physical environments must be rearranged to promote these pedagogical shifts. Educational settings are increasingly designed to support project-based interactions with attention to greater mobility, flexibility, and multiple device usage (Adams et al., 2017). To improve remote communication, institutions are upgrading to wireless bandwidth, and installing large displays that allow collaboration in digital projects. Many universities are exploring how mixed reality technologies can be used to blend 3D holographic content and physical spaces in simulations. Examples are the simulated experiences of controlling rover vehicles on Mars and enabling multifaceted interactions with visually detailed objects, such as the human body

in an anatomy lab. As higher education continues to move away from traditional, lecture-based lessons toward hands-on activities, classrooms are starting to resemble real-world work and social environments that foster organic interactions and cross-disciplinary problem-solving (Adams et al., 2017).

These new and often innovative learning space capabilities have sparked interest in new pedagogical approaches (Mattila & Silander, 2015). Wireless networking, for example, makes real-time or synchronous interactions (such as real-time polling) among all class participants a very real (and increasingly practical) possibility. Videoconferencing is already used, which makes it feasible for an invited expert from a remote institution to join a class session. Discussions, notes, and other in-classroom events can be captured and disseminated for further study. It is important to note that these approaches mesh well with the habits of net-generation learners by increasing their enjoyment of social interactions, their preference for experiential learning activities, and their use of technology. Hence, technology makes it possible to develop new and more effective pedagogies (Ossiannilsson, 2018d). Hence, the classroom and the activities associated with it are evolving.

With regard to quality, one dimension in open online learning, which used to be highlighted, is the level of interactions. In the late 1980s, Moore (1989) argued for three dimensions of interactions: with peers, with academics, and with the material. However, recently, Jahnke (2016) has taken an extended approach because of the development and increased use of social media in educational and learning settings. She has argued for the move from interactions to cross actions in learning and education. Because the digital world is a new form of multiple emerging communication spaces, human actions take place within and across multiple spaces, which Jahnke identified as cross-action spaces. Furthermore, interactions are not confined to the three types identified by Moore (1989, 2009). Through the use of social media,

learners and academics can collaborate with peers and colleagues, and they can network outside the traditionally defined group or class. In cross-action spaces, professional society can be brought into the classroom. Similarly, the classroom can be brought to professional society. According to Jahnke, bringing the world into the learning space will facilitate and enrich learning possibilities. Learning spaces include social media and learning through the crowd, as well as through the cloud. Hence, new innovative pedagogical approaches are required to foster and promote authentic and self-determined learning (heutagogy) (Hase & Kenyon, 2000).

The resources used in K-12 and higher education are increasingly digital, and they are increasingly delivered through the Internet. In addition, network connectivity is increasingly portable. These two developments make it possible for learning to occur informally in areas outside the traditional classroom, library, and faculty office. Student project teams can meet outside on the campus green, in a lounge, or in a campus café, and they can meet at any time of day. With the technology of wireless networking, numerous digital devices, and longer battery life, we are closer than ever to realizing the goal of fully ubiquitous access (Matilla & Selander, 2015). Hence learning can occur at any time and in any location.

Net-generation learners use a variety of digital devices, and they can turn almost any space outside the classroom into an *informal* learning space (Oblinger & Oblinger, 2006). Educators have an important opportunity to rethink and redesign these non-classroom spaces to support, encourage, and extend learning spaces. Students learn in diverse ways; therefore, the environment should facilitate learners' needs. Therefore, the design for learning is crucial. An interesting initiative is at University of Oulu, one of Finland's largest universities, where Dr. Pasi Matilla has developed a future learning space platform that

combines virtual worlds and virtual reality. Furthermore, it offers a 3D virtual learning environment that is accessed on mobile devices (Figure 2).

According to Mattila and Silander (2015), some believe that the learning environment must be transformed, whereas others focus on pedagogical change. Mattila and Silander emphasized that the development path for transforming pedagogical approaches is through changing the learning environment. Virtual learning environments enable the transformation of both the learning space and the pedagogical approach. According to Mattila and Silander, the virtual environment is intended to support phenomenon-based investigative learning and cooperation, crossing the borders between subjects, thus simultaneously enabling personal learning and interaction, in which the pupil is an active worker and the teacher is a learning resource. These authors advocated that including virtual 3D learning, utilizing gamification, or integrating technology-assisted spaces enables ubiquitous learning.

A virtual learning environment serves learners in distance education and supports social interaction (Keppel et al., 2012). Learners can have experiences that would not be possible in traditional education.

Learning management systems (LMS) and the virtual learning environment (VLE) have long been the primary learning space and the administration of learning outcomes. Some scholars have argued that LMS are no longer useful because they are too static and require passwords. Moreover, they are offered by institutions and teachers, and they are neither learner centered nor learner generated. However, they are being replaced by the next-generation digital learning environment (NGDLE) (Brown, Dehoney, & Millichap, 2015; Ossiannilsson, Eriksen, & Rung, 2015) Brown et al. (2015) emphasized the role of the VLE in NGDLEs, where learners can take the lead in their learning instead of the instructor or the academic. Education is transforming from the transmission model of education to one that is based on concepts such as active, personal learning, hybrid course design, and

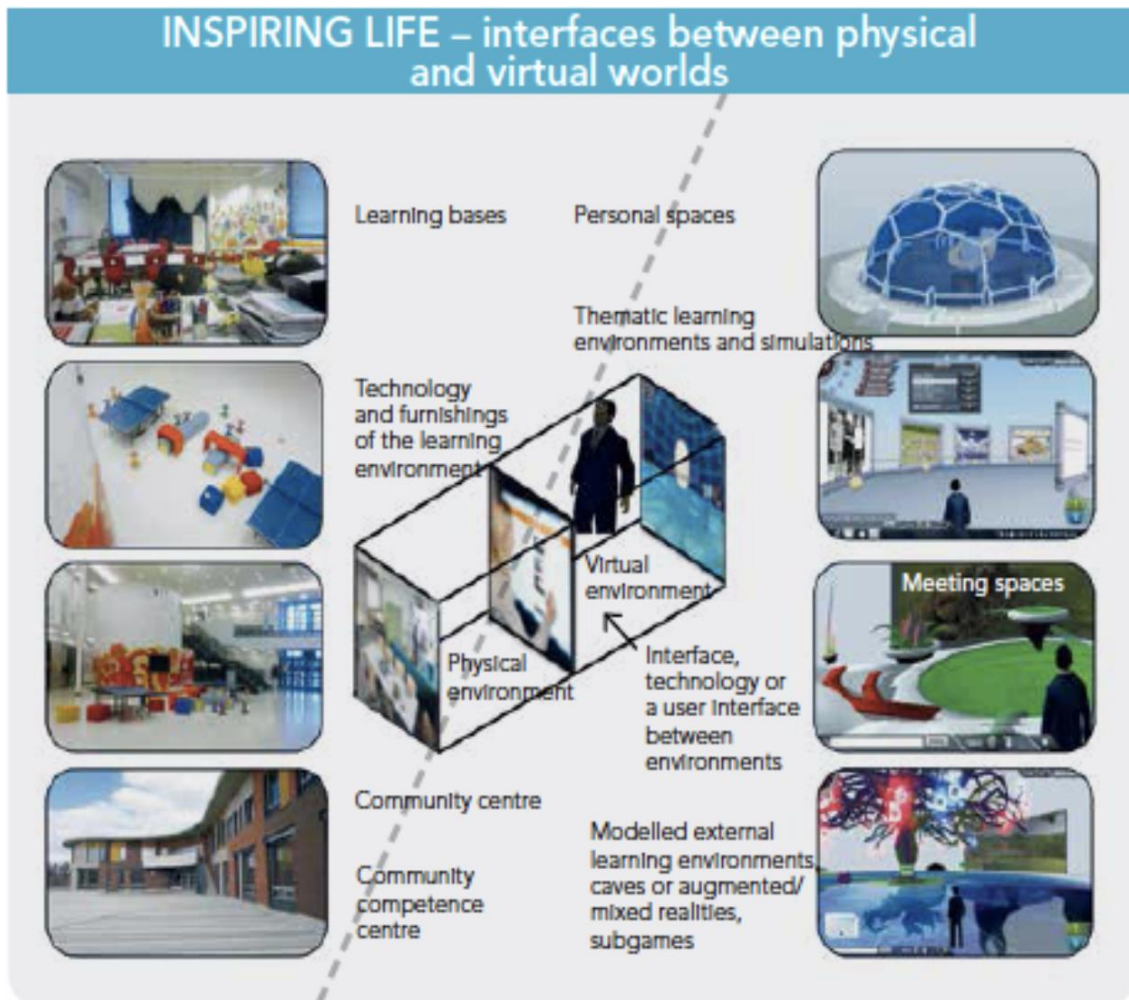


Figure 4. Combining physical and virtual learning spaces.

Figure 2: Combining physical and virtual learning spaces. Figure from (Mattila & Silander, 2015).

new directions for measuring progress. The term combines several key themes in what comes next: it must be based on innovative learning-centered models, and it must be digital because digital technologies have become a component of almost all teaching and learning practices (Brown et al., 2015; Ossiannilsson et al., 2015). The emphasis must be on learning, and it must focus on the learning ecosystem, that is, a dynamic, interconnected, ever-evolving community of learners, instructors, tools, and content (Brown et al., 2015; Ossiannilsson et al., 2015), which is illustrated in Figure 3.

The NGDLE strives to meet the changing needs of education, including

the principal functional domains of interoperability, personalization, learning analytics, of place, width, and movement and to the idea of places and spaces in which we organize our life; 2) *physical space*, which involves the idea that subjects can modify the physical spaces in which they move; 3) *social space*, which involves the idea that subjects build and modify space in relation to the socio-cultural environment they belong to; 4) *intellective space*, which involves the ideas that subjects imagine spaces by designing, planning, and organizing them (Santojanni, Ciasullo, De Paolis, Nunziante, & Romano, 2017, Stuart et al., 2013). Accordingly, evolving pedagogical approaches include unstructured

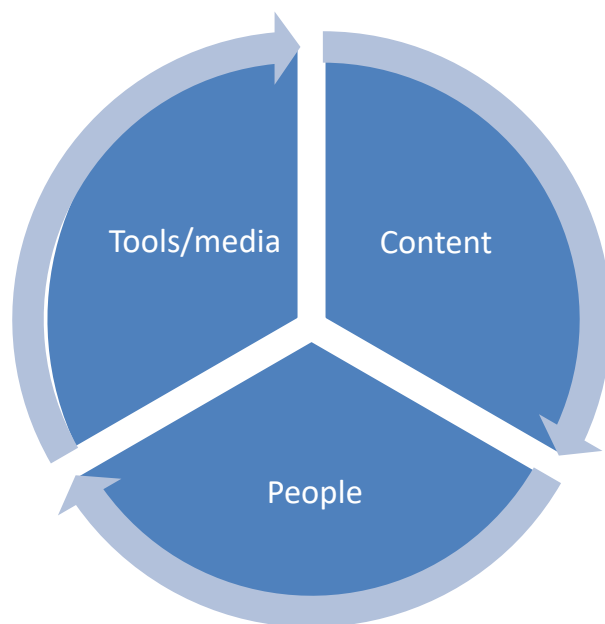


Figure 3: The next-generation digital learning environment (NGDLE)

learning, flipped classrooms, authentic learning, self-determined learning, learning through social media and, the community and competence-based learning. These approaches consider the merits of learning by failure in addition to how learning spaces can empower or limit learning.

According to Sharpels et al. (2017), in the 21st century, the evolving pedagogical approaches include the following:

- Big-data inquiry: thinking with data
- Learners making science
- Navigating post-truth societies
- Immersive learning
- Learning with internal values
- Student-led analytics
- Intergroup empathy
- Humanistic knowledge-building communities
- Open textbooks
- Spaced learning

In innovative pedagogical approaches, the learning space is a decisive factor. (Ossiannilsson, 2018c 2018d) Innovative spaces lead to innovative pedagogy, and vice versa. Evolving pedagogical approaches also concern leadership, as learning in and through open spaces requires a shift in mindsets that are related

to the allocation of time and resources, incentives, funding, capacity building, and so on, all of which involve the responsibilities of senior leaders and managers at all levels (Ossiannilsson, 2018a 2018b; Arnold & Sangra, 2018).

It is generally acknowledged that the quality of an educational system depends upon the quality of its teachers (Contact North, 2018). Teachers are responsible for preparing young people to meet new challenges in a fast-changing world, which is the reason that innovative teaching practices have become essential to engage learners. There are many documented examples of innovative teaching practices. However, to simply direct teachers to a set of tools and techniques is not necessarily the best way to help them innovate in the classroom.

Innovation in the classroom is not fostered by supplying teachers with techniques. Every situation is unique, and it is not always clear how such tools can be adapted in practice. The OECD report (2018) has advocated a different approach. Instead of viewing teachers as technicians that adopt tools to improve the learning outcomes of their students, the report deems them competent professionals who are able to find solutions to new problems. If the main

challenge in educational practice is to meet the diverse needs of every student, then teaching needs to be acknowledged as a problem-solving process that is rooted in teachers' professionalism.

To attract and retain learners, as well as to improve their engagement and produce better outcomes, the learning space of the future must utilize physical space effectively while incorporating technology driven innovations that support both the learning environment and pedagogical approaches (Blessinger & Bliss, 2017; OECD, 2018). New campus development, as well as renovating and retrofitting existing spaces, can create opportunities to disrupt traditional ways of teaching and transform the way in which students interact and learn. However, these measures must be based on effective approaches. The teaching profession also faces rapidly changing demands, which require a new, broad, and sophisticated set of competences. The ubiquity of digital devices and applications requires educators to develop their digital competence. Thus, leadership and management are crucial because the transformation is not a question of merely allocating resources. They must ensure that missions and visions are understandable to all stakeholders, who must be empowered to facilitate incentives, recognition, continuing professional development, and capacity building.

Hence, individual teachers or the academic staff cannot be responsible for the successful outcomes of learners. Furthermore, it is also a question of including students and recognizing them as collaborators and co-producers. In addition, attitudes, values, and mindsets must be taken into account in cultivating a culture of innovative quality learning spaces (Ossiannilsson, 2018c 2018d).

5. CONCLUSIONS AND RECOMMENDATIONS:

The concept and the characteristics of innovative learning spaces have been discussed and elaborated throughout this

The global challenges for the educational sector have also been emphasized. The global discourse of rethinking traditional learning spaces and aligning them with learners' expectations and the joy of learning provided the impetus for this work. In the 21st century, the access to modern learning spaces is considered a human right. The only justification for educational organizations and higher education is to educate students to be able to solve problems in the global world, which include issues that cannot be predicted. Hence, we cannot educate today's students by using yesterday's methods for a future that is unknown to us.

The domains of 21st century competences should be integrated in learning activities in innovative learning spaces by using innovative pedagogical approaches. In addition to its benefits for students, the concept of open learning is relevant to a variety of professions with an interest in next-generation learning spaces, such as academics, librarians, architects, estate staff, administrators, senior managers, and rectors. Teamwork and collaborative work are required to implement these innovative learning spaces. However, in the 21st century, this work requires transparency, the understanding and acceptance of cultural diversity, and a substantial amount of flexibility. However, digitization concerns people more than technology. Related to this vision on innovative learning spaces and space as change agents, even innovative leadership, strategies, and values are crucial for the implementation and use of innovative spaces, but also for teamwork, and sustainability. Leaders must ensure that the vision is understood and implemented in all departments within an institution in order that innovative learning spaces positively affect students' success, motivation, and outcomes as well as the joy of learning.

The adoption of innovative learning approaches and innovative learning spaces can result in optimal student engagement, retention, and academic results. It is crucial that the design and implementation of cost-effective, flexible, and future-based spaces ensure that learning environments can adapt

to future demands and continue to deliver world-class teaching and learning opportunities. It is also important to collaborate effectively with all stakeholders throughout the entire projects to avoid cost overruns, time delays, and missing briefs, and communication. In addition, it is important to select,

integrate, and utilize technology, drive innovation, and optimize learning processes to meet students' expectations both now and in the future. Key metrics must be developed to monitor and measure the performance of new learning spaces as well as to identify areas for improvement and to justify investment.

I



Figure 4. A framework for creating and cultivating innovative learning spaces.

A framework for creating and cultivating innovative learning spaces includes the following: 21st century competences, agility, digitalization, ethics, flexibility, innovation, open pedagogy, space, quality, serendipity, safety, the ecosystem, time, and last but not least, the joy of learning for life (see Figure 4).

Finally, the following recommendations for further engagement and research are provided based on the need to be proactive in implementing innovative learning spaces in the 21st century.

One of the most important recommendations to start with is to have inclusion and access in mind, as the spaces are created and used by people. Accordingly, the joy of learning, and the learner's ownership of their own learning, has to be embraced and empowered in all means. It is also important to take into

considerations that innovative learning spaces are not just about physical spaces, but they are also online, virtual, and social.

As learning takes place continuously and everywhere, learning contexts from informal, non-formal and formal learning, and the merged of them have to be empowered. A consequence of that is that spaces should be varied, diverse and purposeful.

Additionally, the insights gained by open education, and the use of social media has led to the development of innovative teaching methods with design practices, have to be embraced. Moreover, engaging, interactive, and collaborative environments are often more joyful, and effective for both teachers and learners. In addition, research in the area of innovative learning spaces and their impact for learning have to be facilitated and empowered.

Finally, it is recommended that a framework for creating and cultivating

innovative learning spaces should be considered. As spaces are created and used by people, it is likewise recommended that all stakeholders should be involved at all levels, to succeed in the development, and transformation of attractive, engaging innovative learning spaces.

These recommendations serve as a foundation to kick off, and to empower of cultivate a culture of innovative learning spaces and to move from awareness raising to actions.

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