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HIGHER EDUCATION IN THE DIGITAL AGE: THE IMPACT OF DIGITAL CONNECTIVE TECHNOLOGIES

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Review Article

Abstract

The dominant roles that digital connective technologies have in the 21st century are causing profound changes in all domains of life, which signal that we have reached a new age: the digital age. Education is one of the fundamental domains of life re-engineered to adopt to the changing landscape of what it means to function in this new age. The school paradigm which rests on the conditions and requirements of the industrial age appears to fall short in terms of meeting the needs and demands of the 21st century learner. The emerging digital connective technologies and the educational innovations they triggered such as open educational resources (OER), massive online open courses (MOOCs) and learning analytics are disrupting the learning processes and structures of the industrial age such that it is now an imperative to develop a new educational paradigm. These new innovations enable learners to extend learning outside the boundaries of traditional learning institutions through informal and enriched learning experiences using online communities on new platforms such as social media and other social platforms. The digital innovations aforementioned also free the learners from the shackles of time so that learners can, not only access but also create knowledge through social interaction and collaboration. The age we live in is ripe for unprecedented fundamental changes and opportunities for higher education (HE). Therefore, policymakers involved in education need to re-think the implications of digital connective technologies, the challenges and opportunities they bring to the educational scene while developing value-added policies regarding HE. This paper addresses the learner, instructor, learning environments and the administration dimensions of HE and how the digital connective technologies are impacting on these dimensions in the digital age. The paper also offers, as a conclusion, a road map for HE to better function in this age.

Keywords: Digital technologies, higher education, paradigm shift, digital age, open educational resources (OER), massive online open courses (MOOCs)

1. INTRODUCTION

Digital connective technologies in the 21st century have been deeply impacting all domains of life including the social, economic and the political. Such technologies of the 21st century have triggered dramatic changes in the ways people interact with content, communicate with one another and function in the society as well. Furthermore, the drastic changes are not simply

restricted to increased opportunities for written, audial and video communications through highly interactive media. The opportunity to access and communicate with others located in distinct parts of the same country of residence, or even the whole world in a wider context, and the distinct new ways to interact, share and relate to the information others have shared via new media have even taken part in pressurizing key governmental processes. In addition to increasing ways of communication, these new technologies have caused drastic changes in how people access information. Print books and encyclopedia in the traditional sense are not the sole information holders but information is now distributed across the network of connected digital technologies that allow access anywhere anytime wherever such connections are possible. Yet, the real transformation lies not in the increased and diversified ways of accessing information, rather in the increased opportunities for individuals to contribute to content production and knowledge building. Today, each and every individual has the potential to not only consume, but also produce information. The individual's production and dissemination activities play vital roles both in the academic realm and in the social concerning particularly areas of administrative processes in which the individual wishes to take part. The age we live in shows fundamental differences in how the society functions as a whole in that the world is connected through digital means in an unprecedented scale. Shortly, the tools people utilize – the digital tools – are inciting drastic changes in all domains of life in, what we may call, "the digital age". The complex and chaotic nature of these changes pressurized by the impact of the digital connective technologies are disrupting the very fabric of socio-economic structures of the society, which initiate transformational processes in attempts to better suit to the needs and the requirements of the digital age (Odabaşı, 2006). When all domains of life including the societal and economic structures are experiencing change pressures and striving to conform to the 21st century so as to function better in addressing the needs and requirements, it is only natural to expect such transformational changes in the educational domain so that it better serves the needs and demands of the society in this new age. The higher education institutions (HEIs), which have distinct roles in producing and disseminating knowledge, have been experiencing such change pressures much more strongly (Şahin & Alkan, 2016). Therefore, the global competition for knowledge economy fueled by the dominant roles of the digital connective tools (Rust & Kim, 2012) is forcing the HEIs to evaluate their current structures and take drastic decisions to improve these structures to better suit the needs and requirements of the 21st century (Odabaşı, Fırat, & İzmirli, 2010).

Aşkar (2013) summarizes the digital advancements forcing HEIs to transform and adopt to the 21st century. Among the forces for a reform in HE structures are; knowledge access and dissemination roles shifting away from HE; digital platforms bearing new interaction and affective expression schemes, new ways to express culture, its related artefacts, and values; social media effects; big data and learning analytics; massive online open courses (MOOCs) and open educational resources (OER); educational games and the advancement of digital platforms enabling increased interaction and collaboration between and among instructors and learners. However, it has been highlighted in the literature that the change pressures triggered by the digital connective technologies haven't found ample voice from HEIs and that they are struggling in their efforts to adopt to the digital age (Aşkar, 2013; Lonka, 2015). In addition to the digital innovations and the changes imposed by these innovations, HEIs are facing new

challenges peculiar to the 21st century including the changing and diversified learner profiles, increased learner mobility, lifelong learning and increased market based competition with the new tertiary education providers (Erdem, 2006; Şahin & Alkan, 2016). The administrative and structural changes imposed by the challenges HEIs have to deal with are addressed within three broad categories; 1) changes in delivery of services and finance of these services, 2) changes in administrative processes, 3) changes in the learning and teaching paradigm (Odabaşı, Fırat, & İzmirli, 2010). Erdem (2006), on the other hand, underscores the changes in responsibilities of the three distinct structures of the society; government, society and universities. Erdem (2006) posits that the dynamic relationships between HEIs and the state have been experiencing changes due to the advancements in the 21st century concerning increased accountability requirements placed on HEIs, the impact of digital technologies on delivery of educational services and realization of research practices, internationalization of HE and increased global competition. Yet, another challenge the HEIs are facing today is that they are seen as highly complex businesses as resources for knowledge society and knowledge economy, which impact deeply on internal processes and external relations that universities have with the non-academic community.

Digital tools are offered as solutions to the aforementioned structural and administrative challenges that HEIs face today. Regarded as affordances brought about by the digital connective technologies in the 21st century, the distance learning tools, sophisticated learning management systems (Glenn, 2008), online social networking tools, virtual and augmented reality (Şendağ & Gedik, 2015), OER and MOOCs are seen as innovations that contribute to enabling equal educational opportunities for all, accessing quality educational content, and supporting lifelong learning (Karip, 2013). On the other hand, the very same innovations offered as solutions potentially prove to be further challenges. The fundamental reasons for these innovations to act as further potential challenges are lack of proper policy and planning, insufficient resources allocation, shortage of qualified staff for instructional design and technical support, rapid and constant update requirements (Glenn, 2008). HEIs also act reluctant in their consideration for the integration of these innovations owing to the concerns such as causing distractions, plagiarism and cheating. For these reasons, while investigating how the digital innovations can effectively provide solutions to the challenges HEIs face in the 21st century, it is of paramount importance to examine the potential challenges and the ways to deal with these challenges they might imply for the educational landscape.

As previously stated, the HEIs are experiences multiple change pressures regarding structural and administrative processes due to digitalization and digital innovations as a result. Glenn (2008) highlights that more and more individuals demand access to HE in line with the developments in digital technologies and these technologies present a potential to address the needs and requirements of the diversified learner profiles. However, the considerably wide gap between what these technologies are capable and how HEIs function and operate currently in the 21st century causes discrepancies in terms of benefitting from the full potential of the digital technologies (Collins & Halverson, 2009). Therefore, HEIs need to redesign their structures and operations keeping the potentials alongside the challenges brought about by the digital connective technologies (Glenn, 2008). HEIs need to reconsider their mission and visions to

align with the developments in digital technologies and the pedagogical and structural implications of these technologies for the educational space (Şendağ & Gedik, 2015). In the 21st century, the HEIs need to improve on their research and development capabilities, competitiveness, and interoperability between distinct disciplines, innovation and problem solving capacities. They are also required to transform into institutions which can adopt to the digital age, have innovative and scientific productivity with a global vision. While doing all these, HEIs need to integrate with the society operating with a sense of entrepreneurship when managing their human and non-human resources (Şahin & Alkan, 2016). The age we live in is ripe for unprecedented fundamental changes and opportunities. Therefore, policymakers involved in education need to re-think the implications of digital connective technologies, the challenges and opportunities they bring to the educational scene while developing value-added policies regarding HE. This paper addresses the learner, instructor, learning environments and the administration dimensions of HEIs and how the digital connective technologies are impacting on these dimensions in the digital age. The paper also offers, as a conclusion, a road map for HEIs to better function in this age.

2. THE LEARNER

One of the fundamental elements pressurizing HEIs to change is associated with the learner. Not only is the population of learners increasing, but also the learner profiles are changing and diversifying. More and more individuals prefer to go back schooling after graduation for reasons such as professional and personal development needs since the qualities acquired at school years are not sufficient to tackle the problems faced in professional life in the 21st century. Additionally, technological advancements are deeply transforming the qualifications that the workforce need to develop today and in the future such that it is estimated that around 65% of the primary school children today will work in jobs that do not exist now (Şahin & Alkan, 2016). Therefore, one of the critical questions that HEIs have to deal with is what it means to be an educated individual in the 21st century (Glenn, 2008). In order to better function in society and succeed in professional life in the fast-changing digital age, learners need to develop 21st century skills including learning and innovation skills, information, media and technology skills, and life and career skills (AASL, 2007; P21, 2015; Dede, 2009). Various organizations including The Partnership for 21st Century Learning (P21), American Association of College and Universities (AAC&U), the Organization for Economic Cooperation and Development (OECD), American Association of School Librarians (AASL) have published reports underscoring the 21st century skills. These skills that learners need to develop for citizenship in the digital age are composed of hard skills which imply tool utility skills including digital literacies and soft skills which refer to flexibility, adaptability and information processing (Doyle, 2016). Although there are different descriptions as to what the 21st century skills include, these skills are categorized into three main categories and associated subcategories (Trilling & Fadel, 2009):

1. Learning and Innovation Skills include critical thinking and problem solving, communication and collaboration, creativity and innovation skills;

2. Information, Media and Technology skills include information literacy, media literacy and information and communication literacy;
3. Life and Career Skills include flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, leadership and responsibility skills

Since the main objective of this paper is not to differentiate between various definitions of the 21st century skills, the varying skill sets won't be presented here (for a comparison of 21st skill sets see; Dede, 2009). However, in addition to the three main categories offered by the P21 initiative, AAC&U (2007) has proposed the skill sets that learners at HEIs need to develop. Even though there are fundamental similarities between skills proposed by P21 and AAC&U, the skills by AAC&U are considered more relevant for the purposes of this paper because they are particularly designed for HE. For this reason, The Essential Learning Outcomes framework that includes the 21st century skills proposed by AAC&U is presented below (AAC&U, 2007, p. 3):

1. Knowledge of Human Cultures and the Physical and Natural World through study in the sciences and mathematics, social sciences, humanities, histories, languages, and the arts,
2. Intellectual and Practical Skills including inquiry and analysis, critical and creative thinking, written and oral communication, quantitative literacy, information literacy, teamwork and problem solving,
3. Personal and Social Responsibility including civic knowledge and engagement—local and global, intercultural knowledge and competence, ethical reasoning and action, foundations and skills for lifelong learning
4. Integrative learning including synthesis and advanced accomplishment across general and specialized studies

The question that arises from these two frameworks is whether HEIs are properly equipped and structured to develop the 21st century skills framed with these two frameworks. HEIs need to reconsider their structures including curriculum, learning environments and evaluation schemes.

In addition to the 21st century skills, the learner profiles are also changing. Learners have already integrated digital tools in most of the things they do (Oblinger, 2008). The tools that learners use so skillfully in their daily lives are already reshaping learning styles and habits (Dede, 2005). Thus, learners begin HEIs with a different mindset than the generation before them (Siemens, 2006). In a study carried out by Xerox in 2002 with 15 year-olds Brown (2002) discovered that learners today are equipped with different skills such as;

a. Multiprocessing which refers to the ability to multitask,
b. Information navigation and screen and image literacy besides text literacy,
c. Constantly discovering new things while browsing digital libraries,
d. Learning in situ

Learners today are surrounded by computers (desktop, laptop and tablet), mobile devices (smart phones) and by the applications installed on them. These technologies and applications are shaping the ways learners think and behave (Glenn, 2008). Learners today are more willing than ever to create online learning communities and take active roles in these communities (Glenn, 2008; Lonka, 2015). For this reason, according to Brown (2002) learning in the digital age is as social as it is cognitive for today's learners. For them, learning is a concrete concept rather than abstract and it is intertwined with discovery and reasoning. The digital platforms are not only places where they access information and social resources but also platforms for learning through social construction of knowledge. Within this regard, these learners are both consumers and producers of information (Dziuban, 2006). However, concerns in some aspects are raised as well. For example, experts are concerned that learners are not aware of the ethical and legal consequences of their online actions and discourses (Barkley, 2013). Furthermore, Lonka (2015) concludes that the students who are the most easily distracted and bored are the ones that are the most competent digital tool users. Additionally, according to Lonka, the fact that learners can skillfully use the digital tools and environments may not necessarily translate well into their ability to utilize them for educational purposes. The critical question here is whether these students do not possess the skills to utilize the digital tools and platforms for educational purposes or whether they are not simply provided with opportunities to learn using these tools in their educational processes. What is for certain according to some educators is that traditional teaching methods fail to attract learners today (Şahin & Alkan, 2016).

Another change in the learner profile in HE in the digital age is increased learner diversification. Today more and more individuals opt to pursue an additional degree at university or go back schooling through certificates, graduate degrees or online course due to professional requirements because the skills they acquired previously is simply not enough to carry out the tasks at work. Moreover, increased learner mobility enables various individuals from different ethnic and cultural backgrounds to get together in educational environments (Vardar, 2013). All these new dynamics indicate that learners with different demographics such as age, experience, culture and ethnics, learning styles and paces bring their distinct characteristics into the learning environment, which poses new learning potentials and challenges for the learning environment.

In conclusion, HEIs are experiencing serious challenges in terms of learners in the digital age. The skills and knowledge students need to acquire at the university are changing and evolving into the so-called 21st century skills. Also, the digital tools and platforms are reshaping how learners today think and behave and they begin the HEIs with skill sets different than those of the previous generations. Yet another challenge faced is the changing learner profiles due to increased learner mobility and learners returning HE. With their current structures and functions HEIs is struggling to meet the needs and demands of today's learner profiles. HEIs are advised to develop policies and practices in line with the developments in the digital connective technologies that support learner capabilities in the digital age focusing on the 21st century skills considering the diverse learner profiles.

3. THE INSTRUCTOR

The advancements in digital connective technologies in the 21st century trigger another change pressure in the roles and responsibilities of the instructors at the HE. Additionally, instructors also are required to be equipped with new sets of skills and qualifications in the digital age (Odabaşı, Fırat, & İzmirli, 2010). The role of the instructor in the educational landscape is changing. The past decades when the instructor was the sole information and knowledge provider is making way for an age in which information and knowledge is distributed across digital networks accessible anytime and anywhere wherever connections are possible. This means learners now have the opportunity to access information and knowledge not only at schools from the instructors or at libraries from printed books, but also from digital repositories, web sites, social media and online learning communities and networks. In short, learners in the digital age have access to a wide range of online resources and various knowledge experts through online social connections. However, the role of the instructor at the current HE structures is that of information provider (Collins & Halverson, 2009). What all this implicates is that not only does the resources for information and knowledge but also the content is varied. The learners are exposed to information that is sometimes at odds with that presented by the instructor. Therefore, the information provided by the instructor is constantly questioned and the information providing role is not sufficient in the digital age. For these reasons, the role of the instructors needs to be re-structured from the information providing 'sage on the stage' to the 'guide on the side'. The instructor's role needs to be that of learning designer, context and resources provider and a facilitator for the development of high order skills (King, 1993). While carrying out the new roles assigned, the instructor is required to make use of the innovations peculiar to the digital age such as social media, open educational resources, massive online open courses, sophisticated learning management systems, big data, learning analytics and adaptive learning (Lonka, 2015). Therefore, one of the fundamental roles of the instructor is that of a learning engineer who designs effective and engaging learning environments which address the skills and characteristics of the 21st century learner through the use of digital innovations (Karlı, 2013). However, this role is not that of a technician who writes codes and solves technical problems rather an intellectual who provides learners with individualized learning contexts and quality assurance and evaluations (Prensky, 2008). To be able to effectively fulfill this role, the instructor needs to develop new sets of skills in the digital age.
The American Association of Colleges of Teacher Education (AACTE) and P21 published a joint report on the skills that an instructor should develop in the 21st century (AACTE & P21, 2010, pp. 11-12) including;

- Successfully aligning technologies with content and pedagogy and developing the ability to creatively use technologies to meet specific learning needs,
- Aligning instruction with standards, particularly those standards that embody 21st
- century knowledge and skills,
- Balancing direct instruction strategically with project-oriented teaching methods,
- Applying child and adolescent development knowledge to educator preparation and education policy,

- Using a range of assessment strategies to evaluate student performance and differentiate instruction (including but not limited to formative, portfolio-based, curriculum-embedded and summative),
- Participating actively in learning communities; tapping the expertise within a school or school district through coaching, mentoring, knowledge-sharing, and team teaching,
- Acting as mentors and peer coaches with fellow educators,
- Using a range of strategies (such as formative assessments) to reach diverse students and to create environments that support differentiated teaching and learning,
- Pursuing continuous learning opportunities and embracing career-long learning as a professional ethic.

In conclusion, the roles and qualifications of the instructor is changing in addition to that of the learners because of the dominant roles of the digital connective technologies in the 21st century. The primary change in the role of the instructor is that from the 'information provider' to that of 'facilitator for learning'. This paradigmatic shift necessitates the instructor to leave his/her high seat and situate himself/herself by the learner's side as well as developing new skills. What HEIs need to do in this context is to take the necessary steps in determining the roles that the instructor need to play and the skills he/she needs to develop and take action in supporting the instructor as he/she puts these new roles into action. Yet, the current structure of the HEIs doesn't support these new roles and skills since research and publications-based evaluation schemes doesn't potentially allow for a transition from 'teaching' to 'facilitating learning'.

4. THE LEARNING ENVIRONMENT

The current emerging understandings on how learning occurs should be addressed before dealing with how the digital innovations are shaping the learning environments and the associated changes observed in the learning environments in the digital age. We are observing a shift from the traditional learning through information acquisition models towards collaborative knowledge construction models of learning in the digital age. In this age, in line with the pedagogical shifts, informal learning plays a vital role in shaping the learning activities of the individual (Lonka, 2015). For this reason, developing collective cultural practices along with both organizational and physical structures to support collaborative knowledge construction gains particular importance for educational institutions (Lonka, 2015). On the other hand, HEIs are currently struggling to provide the required organizational and physical structures for such practices. Colins and Halverson (2009) underscore the mismatch between the pedagogical and technological innovations and the current structures of HEIs. According to them, in order to realize the desired changes in the learning environments the following technology-based reforms should be considered (Colins & Halverson, 2009);

- Transition from standardized learning to individualized learning: each and every individual is expected to learn the same content in the same way and time. However, this practice contradicts the very nature of human learning considering the individual differences. On the other hand, one of the biggest advantages that the current digital

innovations have brought up is individualizations since these innovations enable to determine learning styles, interests and pinpoint the challenges and difficulties each individual is having through learning analytics and big data collected throughout the educational processes. This way, it becomes possible to make informed decisions and apply the necessary changes for custom designed deep learning experiences. In short, making use of the affordances brought about by these technologies allows the design of adaptive learning environments sensitive to individualized learning.

- Transition from standardized evaluation to specialization: standardized learning assessed through standardized evaluation via multiple choice tests implies that learners need to learn the same content. However, this falls short in realizing the 21st century skills. The digital technologies help to identify the learner's tendencies and provide individualized evaluation tools.
- Transition from knowledge-in-the-mind model to knowledge-in-external-resources model: according to the traditional model learning fully means internalizing without referring to external resources. Thus, learner's ability to recall information without referring to books, computers or web pages is assessed. However, in daily and professional life, individuals have to solve problems, access external sources for information and realize certain tasks. Their ability to effectively and efficiently access and utilize the external resources plays vital roles to be able to function effectively in social and professional life in the digital age.
- Transition from content coverage to knowledge discovery model: in the traditional school model the primary objective is to convey all the information that a learner will need after graduation from school. The curriculum has become more and more intense and course books much thicker with the increased knowledge treasures. It has become almost impossible to cover all the information and knowledge that learners will need in the future during their time at school due to exponentially increasing information and knowledge which also keeps updating incessantly. Therefore, learners need to develop skills such as accessing true and up-to-date information and learning how to learn.
- Transition from learning through acquisition to learning by doing: the traditional model of learning requires the learner to acquire concrete information, concepts, procedures, theories and formulas. On the other hand, digital tools help learners to carry out practice-based meaningful tasks. For this reason, these technologies allow for creation of learning environments suitable for learning by doing model.

The pedagogical shifts triggered by the digital innovations mentioned above requires the transition from one dimensional learning spaces (classroom, library, lab) to multidimensional collaborative learning spaces (physical, virtual and online) (Glenn, 2008). For deep and meaningful learning experiences in the digital age the creation of hybrid learning environments composed of socio-digital participation schemes which utilize the affordances of the digital, mobile, virtual, online, social and physical spaces is recommended (Lonka, 2015). Research suggests that learners develop better learning outcomes when they're exposed to hybrid learning environments compared to single learning spaces (Glenn, 2008). It is predicted that we'll see more of hybrid learning environments that are supported with tools that allow online collaboration, software that support individualized adaptive learning, sophisticated learning

management systems with social learning applications, online gaming and simulations and social media applications (Glenn, 2008).

We need to create hybrid learning environments that integrate physical, virtual, online and digital spaces and fully take advantage of the affordances each of these spaces aware of their complimentary features in order to design deep and meaningful learning experiences free of constraints from time and place (Karip, 2013). We also need to develop further understanding as to which platforms are more effective in supporting what kind of learning through what type of content and activities so that we can develop policies and strategies that inform the reforms reflecting the required in structural and organizational changes in HE.

5. THE ADMINISTRATION

The higher education institutions (HEIs), which are located on the top of the education systems, with their roles in producing and disseminating knowledge are involved in directing the social changes brought about by the digital connective technologies and they are influenced by these social changes in return. The roles, responsibilities and functions of the HEIs change depending on the socio-economic conditions of the ages they operate in (Şahin & Alkan, 2016). Today, the HEIs are expected to fulfil several roles including educating qualified individuals for the knowledge age through engaging and effective learning experiences. They are also expected to lead the technological advancements through research and development in collaboration with the society and the industry thereby contributing to the societal and economic development (Şahin & Alkan, 2016).

The digital innovations in the 21st century that impact on the learner, instructor and the learning environment also reshape the administrative functions of the HEIs. For instance, the online social network tools enable to keep constant contact with the graduates possible and thus career development practices are carried further into after graduation. Additionally, student information systems make student affairs tasks easier such as course registrations and scholarships. Digital libraries and learning management systems enable learners to access course resources regardless of time and space. However, while HEIs make use of the digital technologies effectively in terms of logistical support, policies regarding the provision of deep and meaning learning supported via the digital connective technologies are not developed as required. Digital age doesn't only imply the adoption of technological devices for logistical reasons only. Digital age also indicates a mind change for the realization of 21st century skills (Cabellon & Junco, 2015). Lonka (2015) highlights the discrepancies between the administrative functions of the HEIs and digital competencies and informal learning practices of learners today. Therefore, administrators and policy makers involved in the HEIs need to increase their understanding into how learning technologies shape learning in the 21st century and how these technologies impact on the interactions between learners, instructors and learning resources. They are also required to work collaboratively with learning designers and experts to design effective hybrid learning spaces for meaningful and deep learning (Collins & Halverson, 2009). Failure in development of political, administrative and pedagogical support will hinder the realization of the full potential the innovative digital technologies might bring

into the educational space (Schejbal, 2012). For example, the laptops distributed in a high school in the USA were taken back seven years later because they weren't serving learning and they were disrupting learning processes (Hu, 2007). Across the world in Turkey, the tablet computers distributed for the FATIH project were reported not to serve its purpose (Hürriyet, 2015). Yet, it was reported that in Finland the access to digital devices were sufficient but there was a lack of understanding as to how to utilize these tools for academic purposes (Lonka, 2015). These examples from various parts of the world show that without the required administrative, pedagogical and legal policies in place the integration of these innovative technologies into learning spaces might cause damages rather than benefits in terms of supporting meaningful learning. Therefore, when supporting learning through digital connective technologies effective administrative structures and functions need to be developed first (Karip, 2013).

In conclusion, the HEIs need to utilize the digital technologies not only for logistical administrative purposes but also as pedagogical tools for managing learning experiences and for the development of the 21st century skills that learners need to develop to better function in the society. Policy makers and administrators involved in HEIs should take steps in developing ethical, administrative and pedagogical policies and action plans for the integration of digital tools as pedagogical agents in learning spaces. HEIs need to foresee the future, plan ahead to take crucial steps and manage chance while initiating the reforms required of them.

6. CONCLUSION AND SUGGESTIONS

In the 21st century, which is marked by the digital innovations, economic, social, political and societal domains are being reshaped by the digital connective technologies in a scale unprecedented before such that it indicates that a new age has been reached; the digital age. Similar to the impact on the other domains of life digital technologies have been impacting on the educational domain as well (Glenn, 2008). In addition to the access, connection and interaction possibilities afforded by the digital technologies, exponentially increasing information, changing and diversifying learner profiles and new understandings developed as to what it means to learn in the digital age require the HEIs to reconsider their structures and functions which were developed centuries ago. The current advancements in these areas also raise suspicions as to whether the HEIs capabilities to function effectively resting on the paradigms of old. Digital tools and applications are offered as solutions to the challenges faced by the HEIs. Research suggest that hybrid learning environments that integrate the digital, virtual, online and physical environments are more effective in providing deep learning. It is observed in the 21st century that as the skills the learner needs to develop are changing so are the roles and skill sets the instructor need to have. In addition, the variety of the learning environments where learners can construct knowledge is also increasing. However, the HEIs are falling behind in dealing with these changes due to their traditional administrative structures. The dominant roles associated with teaching are distributed in the 21st century through new developments such as distance learning, open educational resources and massive online open courses, learning on the job, social media and informal learning, which point towards the advent of a new HE paradigm (Collins & Halverson, 2009). The cumulative effect of these innovative

approaches in the digital age is the distribution of learning across a variety of locations apart from the classroom exceeding the temporal and physical boundaries of school. Today, learning doesn't cease after graduation rather it extends to an individual's lifetime. Although the HEIs address these developments as positive, the adoption and proper utility of these innovations are hindered due to reasons such as the strict organizational culture, lack of pedagogical frameworks, leadership and lack of appropriate policies and legal regulations. Moreover, immediate issues related to distraction, cheating, plagiarizing and ethical misconduct are among the reasons for late and improper adoption. The current administrative and functional challenges also pose other hindering factors in the way for realization of value-added benefits (Glenn, 2008). The change pressures mentioned previously have come about impacting one another. Yet, they impact on the learning landscape both individually and collectively. All these innovative technologies and approaches need to be brought together in a strategic manner so that a holistic reform can be realized in the educational systems (Collins & Halverson, 2009). Even though the new paradigm that emerges from the synergy produced by these innovations carries traces from the traditional paradigm, it will also exhibit deep paradigmatic differences. For this transformation to take place systematic, consistent and sustainable policies that overcome the traditional teaching paradigm and support the learning paradigm (Barr & Tagg, 1995) in every dimensions of HE needs to be developed.

Dijital Çağda Yükseköğretim: Bağlantıcı Dijital Teknolojilerin Etkisi

Özet

Bağlantıcı dijital teknolojiler 21. yüzyılda yaşamın tüm alanlarında derin etkilere neden olmaktadır. Bu durum yaşadığımız çağın ötesinde bir çağa - dijital çağa – eriştiğimizin bir göstergesidir. Bu yeni çağda bireylerin toplum içinde etkin bir şekilde rol alabilmeleri için yeniden tasarlanması gereken alanlardan biri de eğitimdir. Sanayi çağının şartları ve gereklilikleri üzerine kurulu okul paradigması 21. yüzyılda öğrenenlerin ihtiyaç ve isteklerini karşılamada eksik kalmaktadır. Günümüzde ortaya çıkan bağlantıcı dijital teknolojiler ve bu teknolojilerin tetiklediği açık eğitim kaynakları (open educational resources), kitlesel açık çevrimiçi dersler (massive online open courses) ve öğrenme analitikleri gibi yenilikçi eğitim uygulamaları sanayi devriminden kalma öğrenme süreç ve yapılarını derinden etkilemektedir. Bu nedenle, yeni bir eğitim paradigması geliştirilmesine ihtiyaç duyulmaktadır. Sözü edilen yenilikçi eğitim uygulamaları, yeni çevrimiçi sosyal platformlarda yapılandırılmamış (informal) ve zenginleştirilmiş öğrenme deneyimleri sağlayarak öğrenmenin geleneksel eğitim kurumlarının dışına taşınmasına imkan tanımaktadır. Ayrıca bu yenilikler öğreneni zaman sınırlarından kurtarmakta ve öğrenenler hem bilgiye erşme hem de sosyal etkileşim ve işbirliği yoluyla bilgi inşa etme fırsatı elde etmektedir. İçinde yaşadığımız çağ yükseköğretim açısından köklü değişim sancılarına ve fırsatlara gebedir. Bu nedenle, eğitimle ilgilenen politika üreticiler ve yöneticiler bağlantıcı dijital teknolojilerin eğitim alanı bağlamında sağladığı fırsatları ve sunurları değerlendirerek yükseköğretime dair katma değeri yüksek politikalar ve uygulamalar geliştirmelidir. Bu makalede yükseköğretime ilişkin öğrenen, öğreten, öğrenme ortamları ve yönetim boyutlarının bağlantıcı dijital teknolojilerden nasıl etkilendiği ele alınacak ve sonuç olarak bu çağda daha iyi işleyebilmesi açısından yükseköğretim için yol haritası önerilecektir.

Anahtar kelimeler: Dijital teknolojiler, yükseköğretim, paradigma değişimi, dijital çağ, açık eğitim kaynakları (OER), kitlesel açık çevrimiçi dersler (MOOCs)

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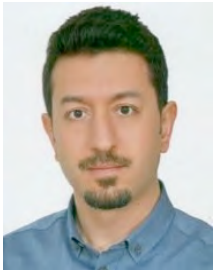

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