International Journal of Innovation in the Digital Economy
Volume 13 • Issue 1

Development of Innovation and Digital Fluency in the HEI Curriculum as an IR4.0 Enabler

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ABSTRACT

The Industrial Revolution 4.0 (IR4.0) has changed the world in various fields including education. The technological advancements and digital environment offer the power to transform the teaching and learning process in higher educational institutes (HEIs). This involves the state-of-the-art infrastructure developments using the technology as open education resources and innovative curriculum to enhance the student learning experiences. This involves the development of student and staff digital literacy skills and the development of collaborative communication tools through the curriculum too. This paper argues the necessary knowledge, skills, and efforts that are needed to develop such a new teaching and learning environment in HEIs as an extension to conventional tools and analyzes their impact. The empirical research of this work discusses the development of abilities, skills, and curricula using information communication technologies (ICTs) in HEIs. Sharing innovative practices and enabling the curriculum to train students and staff on digital skills can realize IR4.0.

KEYWORDS

Collaborative Communication Tools, Culture of Innovation, Digital Environment, Digital Literacy, Innovative Curriculum, Requirements of IR4.0, Student Learning Experience, Teaching and Learning

INTRODUCTION

World Economic Forum (2016) discusses the higher education prospects in relation to Industry Revolution 4.0 that demands strong academia-industry relations. The IR4.0 has combined the physical and virtual world using technologies based on artificial intelligence (AI) and internet of things (IoT) (Jazdi, 2014). The IR4.0 demands for cyber physical systems and computer enabled automation of the processes. Sound digital gadgets are now an integral part of our society. Digital gadgets such as computers, laptops, tablets, and mobiles are physical devices while digital technologies are developments, solutions, improvements in designs, and the efficient use of these devices. According

DOI: 10.4018/IJIDE.292008
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to the Organization for Economic Co-operation and Development, 40% of the job market was based on the digital intensive sector between 2005-2016 (OECD, 2019). The new graduates coming out of HEIs need innovative and digital fluency skills to meet the needs of the work industry. The HEIs are to respond to these requirements since the emerging technologies are re-defining our work norms at a rapid pace. This not only involves familiarizing students with new technologies but also to build their skills in computational thinking and their ability to design digital solutions. Government entities and their affiliates all over the world are sparing resources and efforts to meet such new challenges.

The higher education sector is in transformation in recent decades changing the overall educational set up. The skill sets to be infused in students are to be sorted out. The HEI Curriculum is to be designed and updated to uplift student skills for pre-graduation and post-graduation employment needs. Education 4.0 is a term evolved in response to the needs of IR4.0 where human and technology are aligned to enable new possibilities. Education 4.0 is to promote learning the knowledge and skills and to identify the source to learn these knowledge and skills and to plan for future education strategies to enable students with necessary knowledge and skills. It also enables the practitioners to become lifelong learners, think out of the box, learn how to research and find information they need, evaluate the available information and take it to the next level in a real world context. Many HEIs have developed teaching and learning strategies to digitally literate their staff and students and various funding schemes have been introduced along with defining their key performance indicators (KPIs), policies, and procedures. One of the important areas is to re-define the curriculum of the higher educational institutes to cater to such needs. The curriculum should not only teach students how to be versed on these digital gadgets but should also make them understand the basic principles of designing the digital technologies enabling them to meet the challenges of IR4.0. In advanced countries, the graduates of many HEIs are required to complete courses which are aligned with requirements of the IR4.0 (KAMEL, 2019).

This article explores the development of innovation and digital fluency in students through the curriculum of the HEIs. The first section discusses the role of curriculum in teaching and learning process providing background of the study and then discusses how to strengthen digital skills using the curriculum by presenting a conceptual framework. Third section explores the major issue in implementing this framework to enhance the digital fluency of students and staff while the fourth section provides recommendations to overcome these issues. The final section concludes the discussion.

ROLE OF CURRICULUM IN TEACHING AND LEARNING

First, the education sector has to improve STEM (Science, technology, engineering and mathematics) subjects, by enhancing the investment in ICT (Information and communication technologies) and training the teachers on skills that students need to learn in a new context of learning. The enhanced industry academia interaction is required to support training of staff and students while the main challenge is to re-define the curriculum of the higher educational institutes to cater to such needs. The challenge is how to redesign teaching and learning strategies to meet the needs of Education 4.0 and to identify how HEIs will be reshaped. In the current situation of the pandemic, most governments around the world have temporarily switched the higher education system to complete online learning and statistics claim that this change has affected the 91% of the world's student population (UNESCO, 2020). This transition of regular education to completely digitally online has placed an impact on overall education system and has compelled the educators to think to reform their curriculum. In literature, the curriculum is defined as a steady organized path, a roadmap that has a series of activities and goals to achieve. The curriculum outlines concepts from basic level to increasingly complex topics and creates a learning environment where goals for each subject area are well specified teachers should teach outlining what in a given time period such as term or a year and what should be the learning outcome of the teaching and learning process for the students. Shared objectives make it simpler for