

A model for evaluation of Innovative universities

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Abstract

The paper presents an evaluation model for measuring innovative universities in the direction of employing innovation for improving university functions performance (education, research, internationalization, management, competitiveness, human progress, technology transfer, science advancement). The model is based on a literature review over current diverse educational challenges and an analysis of the prospective educational innovations in the near future. The model summarizes 19 groups of educational innovations which aim at assessing the performance of universities when it comes to innovation management. The paper contributes with generalizing the innovation driven paths for universities and provides a tool for assessment of their innovativeness.

Key words: educational innovation; innovation management; innovative university; measuring innovation; education management;

Introduction

Innovation and higher education do often cooperate and go hand in hand. Innovation and university have been researched from many diverse points of view starting from education as main driver of innovation [1], university as main place for developing research and innovation [2]; university with its central role in collaborating between industry and science [3], higher education as teaching actor in innovation for any science and field [4], university and research centres as main producers of patents [5], university as an appropriate space for developing start-ups [6], university as an accelerator and incubator for start-ups [7]. In general, innovation and university have three dimensions of their cooperation and interconnectivity: (1) education on innovation; (2) developing of emerging innovation and (3) employing innovation for improving university functions performance (education, research, internationalization, management, competitiveness, human progress, technology transfer, science advancement). As the first two areas are widely researched, the third area, the one exploring how universities utilize innovation for their own needs has not been clarified and systematized completely yet. This research emphasizes on how universities utilize innovation in all its divergent spheres as: innovations in teaching; innovation in administration; technological innovation in training; innovation for more effective teaching and learning; innovations to stimulate science in universities; process of innovation in universities and process modification; innovation training and education; educational innovation to

stimulate the development of innovation; robotic and automation of processes in education and higher education; innovation related to gaming; social innovation in higher education institutions; pedagogical innovations; online-based innovations, etc. The research aims at building a model for evaluation of universities for their innovativeness.

Literature Review and Analysis

Innovation is considered as the main driver for growth and a determinant for organizational and sectoral productivity, efficiency and competitiveness [8], [9], [10]. Many organizations have declared that improving and increasing innovativeness and the ability to develop innovations are amongst the most substantial factors for growth [11]; [12]; [13]. Innovations are equally important for the private and governmental sectors, important for the humanity in general. Since it has been clarified that innovations are the most reliable tool for transforming the past and present up to a superior level, the issue how more effectively and successfully innovations should be managed is still valid. The issue is critical when it comes to education as this is the other recognized growth engine for humanity.

Educational innovations are defined by Taylor et al. [14] as any novel teaching technique, strategy, tool, or learning resource that could be used by an instructor to lead to effective (or promising) instructional techniques that benefit student learning and engagement. According to Fullan [15], educational innovation must contain three elements: use of new revised materials (curriculum materials or technologies); use of new teaching approaches (teaching strategies or activities); alteration of beliefs (pedagogical assumptions).

Much research has been done on problems that education is facing. Utilizing the idea of problem driven innovation [16], the current research aims at extracting some commonly identified problems and challenges because of the understanding that these would be the directions for education innovation in the future. According to OECD [17] the main issue in education and the starting point for innovation in the sector are productivity and efficiency. In education, efficiency means the balance between resources invested and the outcomes in terms of students' performance and equity.

According to Kozma [18], educational innovation means supporting a shift from traditional paradigms towards emerging pedagogical approaches based on information and Communication technologies (ICT) solutions such as fostering learner-centred and constructivist processes, and the acquisition of lifelong learning skills. Hannon [19] refers innovation to a complete shift in the educational paradigm,

driven by the four principles of social innovation, i.e. openness, collaboration, freedom, and direct participation of those involved. Innovation has become an essential ingredient in creating and sustaining a culture of performance in higher education and keeps transforming higher education [20].

Cortes-Robles et al. [21] emphasized on the importance of ICT in education and linking educational innovation and challenges to the integration of ICT into a higher education institution as a tool to innovate teaching practices, as well as providing the possibility of including new didactic strategies that arouse the interest and motivation of students to improve the quality of teaching-learning processes inside and outside of the classroom.

Staley and Trinkle [22] formulated ten trends in managing higher education and respectively referring the educations innovation. These are: Increasing Differentiation of Higher Education; Transformation of the General Education Curriculum; Changing Faces of Faculty; Surge in Global Faculty and Student Mobility; The New “Invisible College”; The Changing “Traditional” Student; The Mounting Pressure to Demonstrate Value; The Revolution of “Middle-Skill” Jobs; College as a Private vs. Public Good; Lifelong Partnerships with Students.

Creativity has been identified as a key ingredient of educational innovation in many researches. But in practice, there is still widespread ignorance of creativity in the formal education’s field and a lack of scientific research about creativity and education, particularly in teacher training [23]. According to Nosari [24], exactly creativity would be the criteria of future transformation in education. The aspects of creativity are described by Lee [25] as vividness in physical-physiological sphere, cooperation in social sphere, quest in rational sphere, virtue in moral sphere, beauty in artistic sphere, and belief in religious sphere and are defined as the properties of value ability and presented the educational purpose. Cheung [26] arises the entrepreneurship to the top priority in modern education since entrepreneurs have been so important to our economy, schools should be responsible for cultivating in students a suitable entrepreneurial spirit and skills. Venera [27] analyses a series of facilitators that determine creativity and innovation in teaching learning processes, emphasising the role of assessment, organizational culture and information technologies as relevant and essential elements of the educational processes. ICT plays a crucial role in the way of learning and allows changes in education for an innovative and creative school environment. These technologies could act as a platform to encourage creative learning and innovative teaching, while providing a variety of opportunities for a constructive change. Clements [28] and Levi [29] have encouraged the trends of educational innovation circles by insisting to apply innovation teaching in the teaching profession. E-learning in university education as a source of innovation is driven by the lack of clear approach for delivering e-learning technologies [30] and is also identified as a challenge for universities. The rapid changes and increased complexity in today’s world and dynamics in the education for the future put new challenges and demands on the education system in the perspective of online learning. There has been generally a growing awareness of the necessity to change and improve the existing system towards online learning [31].

Online learning is also examined as a collaborative learning environment and departmental management [32]. Still, the acceptance of e-learning by the employees and students is a challenge in many spheres [33].

Cortés-Robles, Luis García-Alcaraz and Alor-Hernández [34] pointed out in their research that organizations achieve innovation performance under challenging conditions and these for instance are: the technologies are not always accessible, the workforce does not have the required competences or demand constant training not easily available; the lack of techniques to facilitate the assimilation of new technologies and to learn from others; A limited perception about the technical side of innovation, which produces the impression that this process depends on a random creative effort, and no less important, a low assimilation degree of tools for planning the evolution of a product or an innovation system. Wächter et al. [35] identified key entrepreneurial university activities related to teaching and learning such as lifelong learning, flexible learning paths, e-learning, blended learning and massive open online courses, student-centered learning approaches, interdisciplinary programs, collaboration with the sectors of industry and business, and internationalisation of education.

Ebersole [36] has defined the following challenges which higher education leaders face: a trend toward competency based education, tougher accreditation standards, an emphasis on assessment, voids in leadership, and the growing diversity of students as challenges that will plague higher education in the coming years. Wai [37] detected globalization and collaboration as big challenges, which the educational innovation should be, addresses as cross-disciplinary collaboration received increasing attention. Sustainability has also been identified as a crucial factor for as to encompass the different effects of human resources for sustainable development [38].

Methodology

The methodology employed in the research for the purpose of building a theoretical assessment model for innovativeness of universities steps on a literature analysis on educational innovation, conducted on the base of an initial collection of 116 articles in Open Source databases. The articles were chosen by using of the key word “educational innovation”. A review of articles’ abstracts outlined key research papers and case studies and 45 articles were selected for further investigation. The selection criteria were relevance of the content, impact of the article, diversity and the expertise of the authors.

The model differs from the already available rankings for innovative universities, which aim at measuring the innovation productivity and capacity of university in their ability and performance in producing innovation. The most recognizable assessments are Top 100 Innovative Universities from Thompson Reuters and The Times Higher Education World University Rankings. However, they both measure and assess the capacity of university when it comes to Teaching (the learning environment); Research (volume, income and reputation); Citations (research influence); International outlook (staff, students and research); Industry income (knowledge transfer) and do not examine employing innovative

practices which may promise their performance, productivity and efficiency in university functioning in the future. This is important since innovation supports exactly the existing of effective vision for the future development.

The university performance in the research has been viewed from the perspective of all university functions and their progress via innovations. These university functions have been extracted from a Researchgate discussion involving 26 researchers from all around the world and raised by Gülin Ülker from Sakarya University [39]. The mentioned university functions in the discussion are: teaching and learning; research; assessment; technology development; invention and innovation; guiding and mentoring young generation; advising the society; knowledge transfer; administration; community and humanity progress.

The selected 45 research papers have been used for formulating the types of educational innovations and using them as a base of the assessment model. After identifying the selected 45 main areas of educational challenges and innovation potential areas, a cluster procedure has been performed via analytical methods. As a result, 19 main areas for educational innovation are formulated.

Educational Model; Transformation; Faculty management; Mobility; Creativity; Culture; E-learning; Complexity; Accreditation; Leadership; Globalization.

The theoretical model for measuring innovative universities is based on the fundamentals of the categories for educational innovations. The purpose of the model is to measure the performance, efforts and to formulate some future projects for educational innovations. The future expected results of applying the testing model across universities' efforts, performance and educational innovation projects will be assigned to the identified university functions. These all will result in the following outcomes: a trend for educational innovations; good practices for educational innovation development; a ranking of innovative universities.

The model is visually presented at fig. 1.

Conclusion

In conclusion, a summary of the next steps in validating the model will take place as well as the future directions of the research. This first step was setting the scope of the assessment model. Next step is a questionnaire to be created and it to be distributed to a large number of universities so as to make it clear which of the educational challenges are with higher priority

worldwide and what are the current actions in these directions. Further actions will be setting a global network for innovative universities [40].

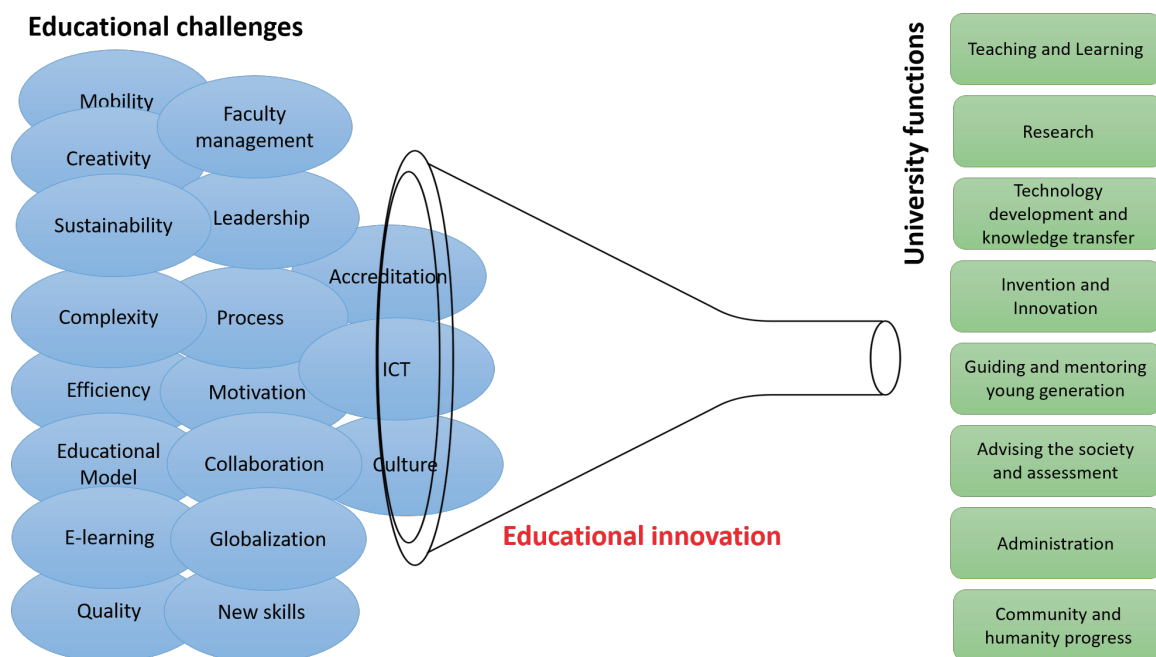


Fig. 1 Theoretical model for education innovation testing

Results

The process of identifying the educational challenges groups starts with selection of the main challenges extracted from 45 research papers based on their diversity content, impact and expertise of the authors. They were analysed and resulted into a short list of 19 educational challenges for educational innovation.

The formulated short-listed educational innovation areas are actually the identified educational challenges from the literature analysis. These are: Efficiency; ICT; Process; New skills; Collaboration; Sustainability; Motivation; Quality;

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