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Role of Education in Enhancing Sustainable Innovation to Address Societal Challenges

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Abstract

Societies look up to universities to provide solutions to the problems prevailing in the society. Universities are no longer expected to just provide knowledge for the sake of providing but provide education that promotes sustainable innovation. The purpose of this review sought to establish the role of university education in enhancing sustainable innovation to address societal challenges. Reviews of researches done locally and abroad were analyzed and it was found out that the universities have made concerted efforts towards offering an education that advocates for sustainable innovation. This has been done by partnering and outreach, conserving the environment, education and research and through strategic leadership not forgetting formulating a curriculum that promotes sustainability. This has occurred both in developed as well as in developing countries.
Keywords: Sustainable innovation, Education, Research, Outreach

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Introduction

Education is at the heart of human progress and the UN Sustainable Development Goals (SDGs). It enables people to build better lives and equips business and society to address our world's interconnected issues and opportunities.

According to Organization for Economic Co-Operation and Development (OECD) "Innovation in the 21st century differs from the model embraced in the last century which was characterized as profit-oriented and nationally targeted. The underlying motive of innovation has been generating economic value. However, looking ahead to the society in the future, it is crucial to construct a new system that enables us to address social challenges through innovation by collaborating and acting globally. Thus there is a need to find ways to foster innovation which generates social and public value".

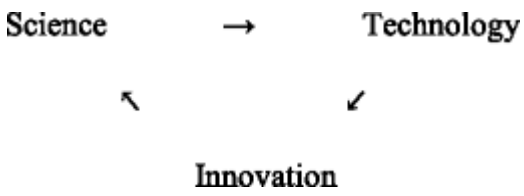
Innovation is becoming increasingly central in our society (Mota, 2009, 2011; Mota and Scott. 2014). It has become a sort of emblem of modern society and directly associated with the possibility of sustainable economic and social development. During the twentieth century, technological innovation became synonymous of the invention and also very often of innovation.

Schumpeter (1961) wrote extensively about innovation and argued that capitalism is a permanent creative destruction system and innovation is the cause of this phenomenon (Mota & Scott, 2013). Schumpeter (1961) identified five types of innovation: 1) introduction of a new good; 2) introduction of a new method of production; 3) opening of a new market; 4) conquest of a new

source of supply of raw materials; and 5) implementation of a new form of organization. Also, Schumpeter (1961) distinguished innovation from the invention by saying that "innovation is possible without invention and invention does not necessarily induce innovation", only when commercialized.

Deutsch et al. (1986) & Mulgan et al. (2007) introduced a broader understanding of innovation including also "social innovation" meaning either major advances in the social sciences, policy reforms for the betterment of society or solutions to social needs, coming from community sectors among others. A new wave of approaches for innovation includes original concepts like "open innovation", "democratizing innovation", "creative economies" and also areas like organizational and marketing innovation. All these elements are associated with a new characteristic that innovation comes also from many sources, not only traditional research. Innovation has become itself many times the origin of the research programmes, modulating and stimulating science to be produced as a consequence of the innovation. At the same time, the traditional assumption that innovation results from meeting demands nowadays is replaced by the idea that sometimes innovation generates demands never imagined before. (Mota and Oliveira, 2013)

Nowadays, a different way is more convenient:



Innovation is becoming more central, broader in concept, and it shares the role to be simultaneously the end and also the beginning of the process associated with knowledge or value creation. The way that knowledge is developed, disseminated and applied affects not only the cultural richness of the society but also the global competitiveness (Mota and Oliveira, 2013).

The quest for a sustainable social and economic development and the challenges associated with competitiveness will demand new strategies for education in general and a deep discussion about the methodologies compatible with the formation of professionals in a scenario where innovation and sustainability are central(Mota and Oliveira, 2013).

There is need to embrace social Innovation which refers to new strategies, concepts, ideas and organizations that meet social needs of all kinds- from working conditions and education to community development and health- and that extend and strengthen civil society (OECD, 2011).

Purpose of the study review

- To determine the role of education in enhancing sustainable innovation to address societal challenges.
- To establish the role of university education in enhancing sustainable innovation to address societal challenges.

Justification of the Study review

Innovation, sustainability and education are strongly connected. An educated workforce is essential to a country's competitiveness and productivity. As pointed out by Mota and Scott (2014), workers who have received little formal education can accomplish only simple manual tasks and find it almost impossible to adapt to more complexes production processes and techniques. Consequently, lack of education becomes a constraint on business development, making extremely difficult to produce sophisticated or value-intensive products, which depend on existing human resources. Paradoxically, David Orr reminds us that the global issues that face us cannot be attributed to a lack of higher education: "that those who contribute to exploiting poor communities and the earth's ecosystems are

those who have BAs, MBAs, MScs and PhDs and not the 'ignorant' poor from the South?' (2004 p.).

The paradigms deeply embedded in our higher education knowledge systems and relationships are contributing to unsustainable development. The 'UN Decade in Education for Sustainable Development International Implementation Scheme' echoes this perspective and calls for Higher Education's Commitment to Sustainability (UNESCO, 2005). The University education requires the unpacking of social, economic, cultural as well as environmental assumptions which seek to subscribe to the status quo (UNESCO, 2002). The universities being the institutions that offer the highest level of education need to have a central role in spearheading education for sustainable innovation. Therefore this study seeks to make an inquiry into the role of university education in sustainable innovation.

Findings of Role of Education

Mota and Scott, (2014) have presented independent learning as an appropriate strategy and an open fresh opportunity to prepare students, contributing to the formation of professionals able to face the challenges associated with a new scene where innovation and entrepreneurship are central priorities. The CDIO™ Initiative is a good example of how innovation and sustainability can be articulated for the case of Engineering. It is presented as "an innovative educational framework for producing the next generation of engineers". The system provides an education system composed of syllabus and methods stressing engineering fundamentals set in the context of Conceiving — Designing — Implementing — Operating real-world systems and products. Many important engineering institutions, such as MIT, Delft University, and California State University have adopted it as the framework of their curricular planning and outcome-based assessment (CDIO, 2019).

A global framework initiative not only for engineers but with focus on the innovation and sustainability values could be the key for a new educational paradigm able to build the next generation of citizens capable of building a sustainable society, which will have a better wealth distribution all over the world. In this new educational framework, the incentive on innovation based on independent learning, the high level of awareness about the earth sustainability issues and the global coverage with intense international cooperation can be the starting point for building a better society through education (NRS, National Research Council, 2011).

Education can play a major role to enhance social innovations. Social innovations are innovative responses to unsolved social problems and needs, which have not been successfully tackled by the State or the market. Social innovation is needed because many social challenges are resistant to conventional approaches to solving them. They require novel approaches, inventive actors and new forms of co-operation among them, thus bringing together different kinds of expertise, skills and tangible and intangible assets (OECD, 2011).

According to the United Nations, there is a need for inclusive strategies and technological innovation. According to the World Economic and Social Survey 2013, the number of people living in slums might triple by 2050 if no policy framework is established to address this issue. Innovation can help address various social challenges—social exclusion, poverty, substantial levels of inequalities, as well as health and demographic challenges. Innovation can address social exclusion by reducing unemployment and providing employment opportunities for disadvantaged groups. Moreover, new products and services (e.g. cheaper and simplified versions of existing goods) can help reduce inequalities and differences in living standards between groups in society.

Quality higher education is definitely strategic for economies competing beyond simple production processes and products in a globalized economy increasingly requiring innovation and well-educated workers, able to perform complex tasks and adapt rapidly to new technologies and the new demands of the economy. The majority of the universities engaged with sustainability are preoccupied with the greening of the campus. The evidence for this can be found within research papers published in journals of higher education but also across institutional webpages which

document extensive sustainability efforts to minimize waste and energy consumption (NRS, National Research Council, 2011).

Research councils and funding agencies, such as the European Union, are increasingly recognizing the need to uncover new conceptual and practical spaces for research. In recent years, they have directed resources and attention to inter-disciplinary and recognize it as a new source of insight to advance human understandings of the sustainability challenge (Tilbury, 2011). In Australia, for example, the Australian Teaching and Learning Council has invested in research informed resource development (ALTC 2011); Similarly, in Africa, Mainstreaming Environment and Sustainability in African Universities (MESA) has received funding to support situated inquiry that is seeking to influence institutional thinking and practice (Mota and Oliveira (2013).

According to Grinberga-Zalite and Mazure, (2017) "it is important to integrate social awareness in higher education by strengthening the collaboration among education, state institutions and business entities, thus more efficiently involving students in searching solutions to really existing and topical social problems in Latvia"

Through partnerships and outreach, the university sector has learnt that it must reach beyond the university walls to address sustainability within the communities of practice which they serve (Ryan et al 2010; Mochizuki & Fadeeva, 2008; Lozano, 2007; Lotz-Siskita, 2011). For example, the University of Western Sydney is particularly active in issues of watershed management, the King Abdullah University of Science and Technology runs a community-wide recycling and compost scheme (Salame, 2011).

In the Philippines, teacher education partnerships have redefined town and gown relationships (Galang, 2010). Whilst at the University of Gloucestershire in the UK an edible garden has engaged the local people in learning skills in permaculture design, food awareness and community building. Lotz-SisKita, (2011) reports a parallel trend in Africa where, universities are seeing sustainability as an opportunity to redefine university-community relationships by making tangible contributions to local communities through addressing issues of peace, security, conflict resolution and HIV/AIDS.

In ensuring that education offered is for learning for sustainability the focus has been on developing new specialist courses on sustainable development (e.g. University of Phillippines; TERI India; Dalhousie University) which are improving the sustainability literacy and capabilities of those interested in pursuing careers in this area. Ryan et al (2010) advance that the Asia Pacific region has played an important role in directing attention to pedagogy and learning for sustainability across education.

The Australia Research in Education for Sustainability(ARIES) through its business education (Martin and Steele, 2010; Thomas and Benn, 2009; Tilbury et al., 2005b) and teacher education (Steele, 2010; Ferreira et al., 2009; Ferreira et al., 2007) has challenged dominant assumptions within existing programmes; developed inter and intra-university partnerships to support systemic change; built staffs' confidence and expertise in sustainability; addressed the professional capacities as well as responsibilities of the students; as well as embraced the dual challenge of pedagogical and curriculum development for sustainability. Swedish, UK, Australian, Canadian, Japanese and Dutch aid agencies have played an important role in funding curriculum development for sustainability in Africa, Asia as Higher Education's Commitment to Sustainability (e.g. SIDA, 2011; MedIES, 2010; Aus Aid, 2010).

There is also evidence from Latin America and parts of South East Asia that university education programmes are being challenged to reorient themselves towards sustainability by school and community education initiatives whose influences are slowly making their way in higher education curriculum (Galang, 2010).

A review of journal articles accompanied by a web search reveals that there are several leaderships styles for sustainability initiatives across the globe which essentially target senior managers from the corporate sector (see for example the Cambridge Programme for Sustainability Leadership). Universities do operate like the business at one level but at another level, academic

change for sustainability requires a different model of leadership and thus existing programmes are of limited value to senior management teams working with higher education concerns. The lack of leadership development opportunities for higher education managers may go some way to explaining why progress towards sustainability in higher education has been piecemeal (Lozano, 2007; Tilbury, 2011).

Education can enhance both technical and organizational innovation which can contribute towards addressing health challenges by providing more personal, predictive and preventive health care products. Recent scientific advances provide significant opportunities for innovations to improve the quality of human health, such as by scientific discoveries. According to Kingori, and Theuri, (2016), Entrepreneurship training was found to have had a substantial impact on the performance of enterprises thus influencing the growth of the business of Mombasa County, Kenya. This, therefore, implies that education can foster innovation which would enhance growth and performance of business thus reducing unemployment which is a major challenge in Kenya.

Africa has all resources and education can play a major role in enhancing innovation which would address challenges many countries are facing which include poverty, insecurity, poor health services, inadequate infrastructure, debt burdens, corruption among others. Education can address the developing countries very high dependency level. Universities should come up with innovation policies and enhancing partnerships to enhance industry linkages and Public-Private Partnerships.

Summary and Conclusion

The study reveals that universities both in the developed and developing countries have made a marked effort in offering an education that is focused on sustainable innovation. This has been done in different ways such as taking care of the environment, aligning their curriculum with sustainable innovation, having strategic leadership that promotes sustainable innovation and outreach, partnership and research. The efforts that have been made towards sustainable innovation is recognizable such that the impact of the university is not limited within its walls but it is felt outside. The universities are transforming from the custodian of old knowledge but the creator of new knowledge that brings innovation.

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