Chapter 15
Digital Competencies and Transformation in Higher Education:
Upskilling With Extension Actions

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ABSTRACT

Extension action promotes inclusive, equitable, and quality education, a goal of sustainable development that guides educational actions around the world. The development of digital skills is a differential, together with the encouragement of open educational practices. This chapter provides reflections, as well as lessons learned, through experience in a biomedical engineering course. Encouragement, through the development of actions that correlate important skills and abilities, is essential for professional development. The carrying out of teaching, research, and extension activities and actions contributed to promote the interdisciplinarity of the various fields of study, necessary for professional development in the digital age. Thus, the actions developed stimulated the investigation, improvement, and study of topics of interest related to education and health and technology areas related to the role of the biomedical engineer, the main protagonist of this project.

INTRODUCTION

Since March 2020, due to the Covid-19 pandemic, there is a need to address with greater emphasis on Flexible Open Distance Learning (OFDL). The challenge raised by the educational disruption is noticeable. The demand for open, flexible, and remote learning is a reality. Working and teaching online, open and at a distance is considered a milestone in the entire educational system, together with valuable experiences lived by a diversity of professionals.

Technological innovations are constantly presented, not only as proof of concepts, but as short, medium, and long-term economic and social benefits for society. Technological mediation in education, as well as innovation in instructional design, is essential in the context of physical distance. The digital transformation encourages the use of Digital Information and Communication Technologies (DICT). DICT combined with educational innovations are used as alternatives in care and educational situations (UNESCO, 2020), in addition to enabling collaboration. The variety of applications can be worked on when there is a need to involve many people, in addition to the difficulty of accessing information.

UNESCO's motto is a timeless inspiration "learning never stops". Lifelong learning must be nurtured and encouraged in vocational training. This action is fully aligned with sustainable development goal 4 (SDG), 2030 agenda (United Nations, 2015).

In 2019, the Ministry of Education of Brazil published a version of the National Curriculum Guidelines (DCN - National Curriculum Guidelines). In this updated version, improvements were introduced with a focus on meeting the demands of more and better engineers (MEC / CNE, 2019). This has been a growing purpose in this pandemic moment, where skills training, curriculum flexibility and pedagogical innovation (Ferguson et al, 2017) with the use of active methodologies are present in open and online education. The training of biomedical engineers covers a wide range of knowledge, such as engineering in general. The pandemic period raised some methodological and pedagogical issues in the view of open educational practices, both for teachers and students. Thus, the development of new skills is an explicit demand both for compliance with curricular guidelines and for meeting the requirements of emergency and distance education.

In this context, the objective is to present an experience report on the work with biomedical engineering students in the development of extension action. The vision will focus on teachers' knowledge needs versus required digital skills. In the presentation and discussion of results, the objectives achieved by the students, as protagonists of the proposed solution, focus on the development of important skills for participation in a dynamic and digital labor market.

This chapter will describe how the extension action, which has been fundamentally based on offline teaching and learning, met the challenge of encouraging young engineering students in the use of technological mediation, for the development of research and extension activities, in continuing education and for professional qualification.

BACKGROUND

This section presents the concepts considered important in the development of the work. In addition to clarifying aspects involving the challenges of teacher education in Brazil and the importance of open educational resources (OER) in the context of this initiative.

Epistemic Fluency

A trend that emerges in the educational environment is the search for comprehensive knowledge through the so-called "Epistemic Fluency". In education, researchers and teachers work on ways to stimulate students' "epistemic cognition" and help them become better trained for knowledge, that is, to develop "epistemic fluency" (Markauskaite; Goodyear, 2018).

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