The interface between multidisciplinary learning and digital transformation: Insights in higher education and healthcare in the 2021 century

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Delba Fonseca Santos
Faculty of Medicine. Federal University of the Jequitinhonha and Mucuri Diamantina Valleys, MG.
CV: http://lattes.cnpq.br/9215909879803626
E-mail: delba.fonseca@ufvjm.edu.br

Maria Jesus Barreto Cruz
Faculty of Medicine of Mucuri. Federal University of the Jequitinhonha and Mucuri Valleys, Teófilo Otoni, MG.
CV: http://lattes.cnpq.br/7559091512055824
E-mail: maria.cruz@ufvjm.edu.br

ABSTRACT
The performance of universities and organizations in implementing the interface between multidisciplinary teaching and digital transformation is growing. This article sheds light on some relevant aspects of academic training on these two phenomena. Specifically, this work deals with insights between these areas to: 1) understand the connections between the themes and 2) identify gaps for advancement in the development of themes. This approach shows results from the literature on multidisciplinary work and digital transformation as key elements of changes in education and health systems. Quality health care responses depend on the engagement of different actors including educational institutions, teachers, students, policy makers and stakeholders.

Keywords: Multidisciplinary, digital transformation, higher education.

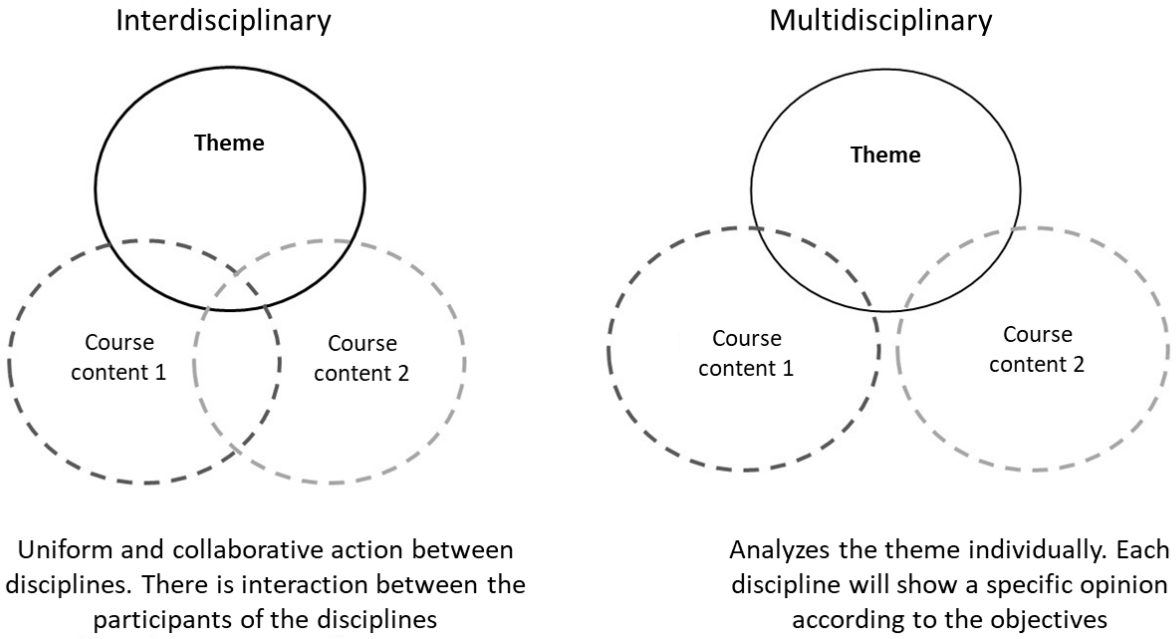
1 INTRODUCTION

Health systems face challenges, from demographic to multimorbidities, and are associated with increased demand for services with multidisciplinary teams and technologies (LI; TANG; LIU, 2023). This reality makes us think about vocational training skills to transform society and shape the future. To study training is to consider who these professionals are, what and how they learn and practice. It covers a diversity of subject areas on a continuum of undergraduate, graduate and continuing education.

This paper explores knowledge of the education of professions present in health systems. It aims to show the challenges and share with educators and stakeholders the theme in order to open paths of dialogue. Different training approaches are present in education for health systems and this goes through the digital transformation (DT). TD changes education, therefore, multidisciplinary discussion is necessary, since it is, by nature, multidisciplinary, and involves changes in strategy and organization (VERHOEF et al., 2021). Health systems are innovating with industry, the public sector and academia in order to improve health outcomes with quality care and fair prioritization of resources.

Of similar complexity is the adoption of terminologies related to multidisciplinary and TD. The term multidisciplinary is based on combining knowledge, theories and methods from different disciplines individually (MÅRD; HILLI, 2022) Figure 1.

Figure 1. Didactic model of application of the terms interdisciplinary and multidisciplinary.



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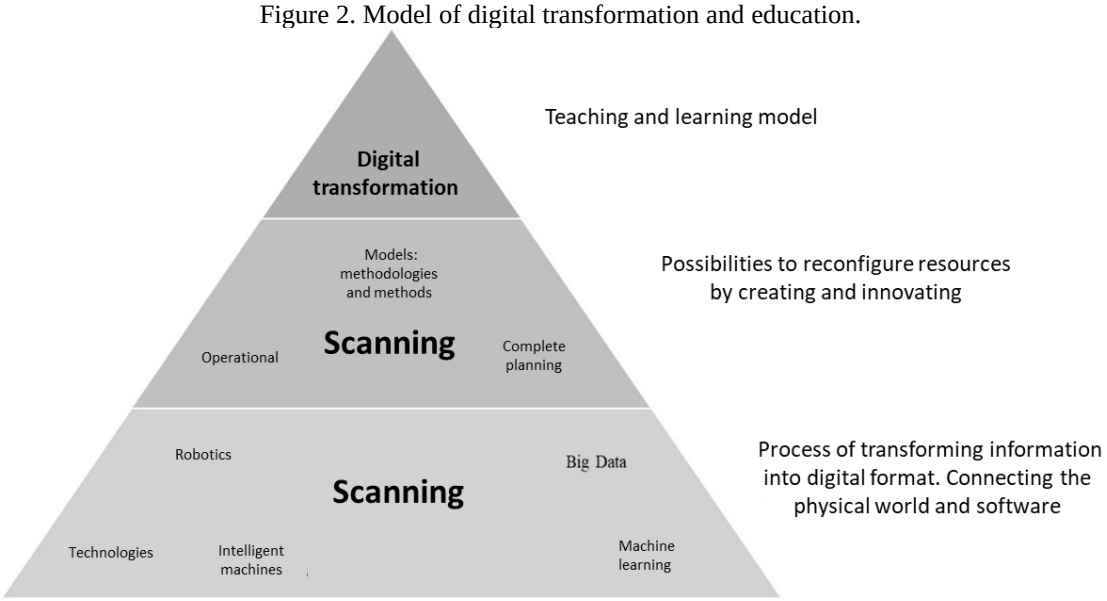
Digitization (e.g., process of transformation of information to digital format), digitization (e.g., reconfiguration of resources, creating and innovating operations in services) and TD (transformation of organizations via digitalization) (GUPTA, M S, 2020) (Figure 2).

Figure 2. Model of digital transformation and education.



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The development and use of TD is a topic of strategic interest in academic research and different stakeholders. Studies show the need for empirical investigation and development of theory in the educational context, especially in the practical daily life of the relationships between teachers and students (HANELT et al., 2021). And the importance of the role of technology in the learning process with approaches from various disciplines such as psychology, computer science and social, as well as multidisciplinary research (VLADOVA et al., 2023). Although it is observed, the absence of digital culture is considered an obstacle in the scope of academic training and continuing education.

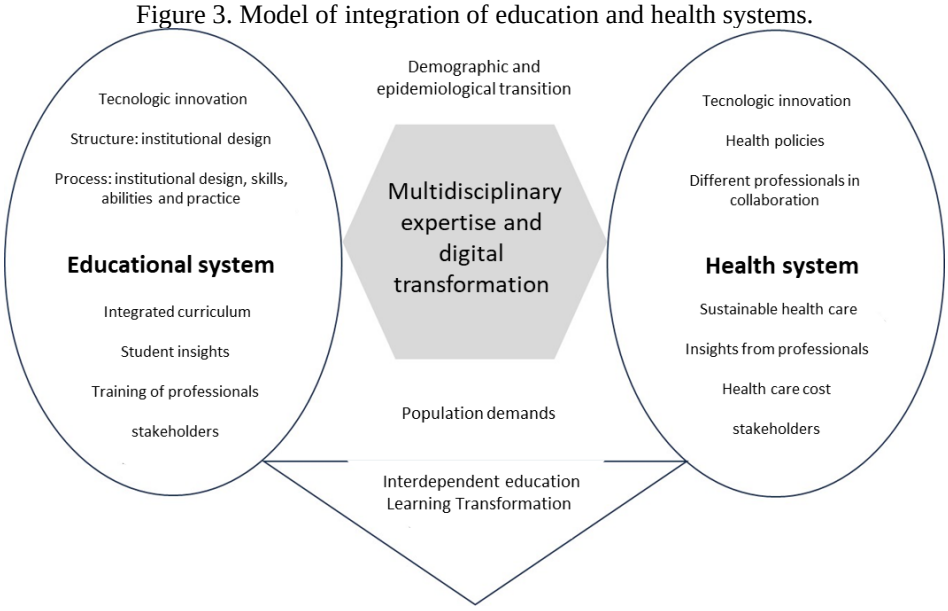
To ensure these interfaces there is a need for curricula based on sustainability, culture change and political environment and in addition, focus on the relations between environment, society, economy linked by the present and future (ŽALĖNIENĖ; PEREIRA, 2021). The capacity for innovation and coexistence of integration between science, technology and complex social problems are appropriate insights for changes in academic curricula. Students will need to develop interpersonal relationships with decision-making skills in collaborative and shared teamwork.

Universities need to look beyond learning and must adopt integrated curricula to solve these challenges. Teachers and students work with methodologies and techniques of teaching and learning from different actors (WOHLFART; WAGNER, 2023). And with emphasis on the four competencies of innovations and access to technology (4 Cs of education): Communication, Critical Thinking, Collaboration and Creativity (TORSANI, 2021).

Studying in a multidisciplinary way does not only mean courses with different disciplines, but curricular approaches that integrate disciplines simultaneously and create new knowledge and professional roles. This is done by combining scientific and technical knowledge through different learning domains (DANIEL et al., 2021; SCHWARTZSTEIN et al., 2020). To boost this reality, the multidisciplinary approach is a method of curricular integration that through different disciplines brings perspectives to illustrate a theme, subject or issue (UNESCO, 2016).

Curricula should prioritize digital literacy to transcend to practice in health systems (PONCETTE et al., 2020; SEEMANN et al., 2023). Health education tends to lag behind technological advances and leaves many professionals unprepared to provide care with digital skills (WALSH; RUMSFELD, 2017). Therefore, professionals need competencies and skills to adopt new forms of digital work (PANG; LEE; MURSHED, 2023). For example, clinical professionals will need support from TD teams with experience in clinical and non-clinical informatics Figure 3.

Figure 3. Model of integration of education and health systems.



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Not only students, but policy makers and technology companies need to develop multi-professional skills for the future and produce science for the benefit of society. A multidisciplinary approach is vital for the sustainability of universities by proposing to redraw the boundaries of collaborations between institutions and organizations (RICCIARDI et al., 2019). Universities have assumed the role of liaison between different stakeholders by taking responsibility for the training of future professionals and the implementation of knowledge and ideas (ŽALĖNIENĖ; PEREIRA, 2021). In this regard, COVID-19 has contributed substantially to the production of scientific knowledge and new standards of local and international cooperation, exchange of ideas and learning through technology.

The formation of leaders with a multidisciplinary paradigm brings together entrepreneurs and scientists through collaboration and generation of original ideas, a practice that will shape the future of innovation and education (BRODSKY, 2023). The advancement of technologies in the health system points to changes in academic teaching, and TD has provided education with new ways of organizing and producing pedagogical methods, and this has led to the transformation of technology-mediated care (DHRUVA et al., 2023; KERRAY; YULE, 2021). To fully obtain the TD benefits, health systems need qualified professionals in the execution of day-to-day work processes.

TD is changing the structures and organization of teaching and learning by offering means to shape the creation and transfer of knowledge. It involves having the competence and ability to work with artificial intelligence (AI); simulation; systems integration; internet of things; Big Data; cloud computing; virtual reality; robotics; entrepreneurship; information security, law, engineering and dealing with innovation (HALEEM et al., 2022). The use of technologies at work imposes intuitions to change the education of health professionals (GÓMEZ et al., 2018; TUOMI, 2018). As noted by Di Vaio et al (2020), the exponential advancement of AI and machine learning (DI, VAIO et al., 2020).

With growing demand for medical imaging and hospitals with a shortage of professionals, AI can be a solution, and advances in high-performance computing have transformed medical images into high-dimensional data (MCCAGUE et al., 2023).

In this trend has the Chat GPT and metaverns are promising changes in teaching and learning (UNIESCO, 2023). And the use of Big Data, described by Amitava Banerjee et al. (2023) published in The Lancet Digital Health as a machine learning method to subclassify and predict the heart failure outcomes of 313,062 patients from databases in the UK (BANERJEE et al., 2023). The study of data requires not only investing in infrastructure and interoperability, but also in the sustainability of professionals with a focus on the demands of health systems.

With the COVID-19 pandemic a variety and volume of clinical, genetic, behavioral and environmental data has been collected in health systems and much has been produced directly in digital format. The health service has learned to face the challenges of obtaining accurate information in real time and proposing efficient interventions. But it also showed structural and organizational failures in preventing morbidity and mortality in high, middle and low-income countries in the world (ALAKIJA, 2023).

Since then, there have been investments in multidisciplinary work processes in a technical and systemic way with the use of information and communication technology. Evidence shows that, in this period, telehealth in oncology with a multidisciplinary team led to effective and sustainable care models (PATERSON et al., 2020). And telepharmacy provided an improvement in the quality of medication use in terms of adherence to patient treatment (IFTINAN et al., 2023). These experiences have as an example the multidisciplinary care as a factor of quality of the Stroke services in the long-term support to the survivors (CLARKE; Forster, 2015).

Despite the promising benefits, challenges persist, such as the high cost for academic training and continuing education. Public and private sector partnerships can be a governance and management strategy. Human actions are based on anticipated futures. The future does not exist, but it is possible to use knowledge, imagine and make it happen. By understanding history and the present it is possible to understand the possibilities of the future.

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