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Postgraduate Studies in Digital Health (eHealth): Developing a Blended-Learning Model and Real-Life Spaces

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Abstract

Digital Health (e-Health) is the use of the technologies of information and communication in the health area. We report the design and implementation of a course in e-Health for multi-professional postgraduate students. It was based on two key ideas: a blended-learning model and real-life spaces. The methodological triangulation approach included the educational planning of a course. In this work, we present and demonstrate the feasibility to use a blended-learning model to teach e-Health to postgraduate students based on interactive distributed learning spaces.

Keywords: *health education, learning, informatics.*

Introduction

Digital Health (e-Health) is the cost-effective and secure use of information and communications technologies in support of health and health-related fields, including health-care services, health surveillance, health literature, and health education, knowledge and research [1].

Most health professionals use information technology daily in their work, but few know how to adapt their roles and work processes to incorporate it for the most significant benefit [2]. In this respect, blended learning (b-learning) might be more suitable for health care training because of the need to combine hands-on, skills-based training at a practical level, as well as self–directed learning [3,4]. We report the development of a course in digital health, which combined both a blended-learning model and real-life spaces.

Methods

The course is an elective, open discipline, offered to post-graduate students attending the master's or doctorate on Mathematics and Technological Education (Edumatec) at the Center of Education of the Federal University of Pernambuco (UFPE) in Recife, Brazil. We, the teachers, used a design-thinking approach for the educational course planning with brainstorming and canvas map techniques, and analyses of future learning spaces and scenarios. The basic structure of the course considered the content (academic and real-life), the learning spaces (physical and virtual), and strategies (scenarios and activities).

The educational contents were digital health history and resources; and concepts, characteristics, and landmarks in education. The real-life themes included e-Health applied to the electronic health record, accreditation in the health area, innovation in health, telehealth, and development of personal competencies for health workers. All real-life contents were studied physically through visits plus chats with health or educational workers.

The physical learning spaces were the UFPE physical post-graduate classroom, a primary public health unit, a tertiary private health unit, a school of innovation, a telehealth unit, and a symposium attendance. The online learning spaces were an online classroom and a social media network. We used a freeware Learning Management System - LMS (MoodleCloud) on the Internet, office productivity programs (Microsoft Office, H5P) and interactions in social media software (Telegram), because of their availability and usability [5-8].

Three interdependent and simultaneous tracks of learning scenarios were envisaged: physical and real life (regular classroom and guided visits), online and interactive (virtual classroom and social media network) and innovative production (hackathon). As evaluation criteria for the course, we used pre- and post-tests, weekly task accomplishment, the Hackathon solution, and the degree of interaction of the participants.

Results

Thirteen students and two teachers were enrolled in the discipline for eight weeks. As a result, a thirty-hour course was developed in a b-learning model using an LMS platform, software, and social media. A myriad of activities were planned to better consolidate learning, both in real and virtual scenarios (**Table 1**). A hackathon with a real health problem was also created so that the students could follow the various phases of problem presentation, ideation, construction, validation, implementation, and solution presentation.

Table 1 - Structure and Timeline of the Course on Digital Health.

Structure / Week	0	1	2	3	4	5	6	7
Planning	Individual work Meetings	Classroom work Agreement	Guided visit Hackaton Interaction	Guided visit Hackaton Interaction	Guided visit Hackaton Interaction	Guided visit Hackaton Interaction	Guided visit Hackaton Interaction	Classroom work Products
Contents	Syllabus LMS Social Media Hackaton	Education Lanmarks Digital Health	Problem & ideation Electronic health registry	Ideation Accrediation in the health area	Construction Health innovation	Validation Telehealth	Implementation Compentencies	Presentations
Scenarios	Univerity	University	Primary public health unit	Tertiary private health unit	Technology park	Telehealth nucleus	Telehealth nucleus	University
Tools	Software	Software LMS Social media	Software LMS Social media	Software LMS Social media	Software LMS Social media	Software LMS Social media	Software LMS Social media	Software LMS Social media
Activites	Brainstorming Canvas Test Tool construction E-mailing	Conversatin circle Presentation	Visual documentation Brainstorming Bibliographic search	Guided visit Interview Wiki Canvas Biliographic search	Guided visit Interview Wiki Canvas Biliographic search	Symposium Wiki Bibliographic search	Guided visit Video confernece Wiki Bibliographic search	Concept maps Wiki Pitch
Resources	Personal experiences Scientific literature	Visual libraries Links Publications	Visual libraries Links Publications	Visual libraries Links Publications	Links to videos Visual libraries Publications	Presentations Virtual libraries Links Publications	Virtual libraries Links Publications	Virtual libraries Links Publications
Assessment	Academic approval Announcements	Pre-test Assignments	Assignments	Assignments	Assignments	Assignments	Assignments	Post-test

LMS= Learning Management System. Wiki= collaborative editing tool of the LMS.

Conclusion

We demonstrate the feasibility to design and implement a course in digital health for postgraduate studies, based on real and virtual complimentary interactive and innovative learning scenarios.

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