

Saite AVA

Experience Report on the Construction of a Virtual Learning Environment for Learning Paths Methodology

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Abstract: In the education modality known as Distance Learning (DL), the virtual learning environment (VLE) is the main platform that students use to take courses. Therefore, it should be designed to meet users' expectations and needs and to be appropriate, following the innovations in the field of technology and education. This paper aims to perform a detailing of the VLE of UNA-SUS/UFMA: the Saite VLE, which is based on the methodology of Learning Trails. Saite VLE operation from user's perspective will be explored, highlighting the most important and ground breaking aspects. In addition, it is intended to report the production process of this VLE from the point of view of the teams involved: pedagogical, graphic design and technology. Finally, it is highlighted the importance of applying updated teaching methodologies in DE courses, considering the innovations that constantly emerge in education.

1 INTRODUCTION

The concept of Distance Learning (DL) is about students and tutors in different places and time, partially or all the time, teaching and learning by means of some kind of technology (Moore; Kearsley, 2007).

Distance Learning (DL) has become a fundamental method in the process of continuing education and professionalization in Brazil, especially in health area, since it is a flexible teaching and learning modality that bets on the autonomy of its members for the production and sharing of knowledge. According to the Census EAD.BR 2016, currently 561,667 students are enrolled in regular distance learning courses. This information highlights the potential that DL has to meet the demands for education (CENSO EAD.BR, 2017).

The Distance Education is one of the strategies used by the Brazilian Ministry of Health to perform Permanent Education of professionals who work in Brazilian National Health System (SUS), aiming to

transform the practices and consolidate the quality of services provided in this system. In this context, the Open University of Brazilian National Health System (UNA-SUS) is composed of a network of educational institutions that work in the formation of health professionals linked to Brazilian health system, using the distance education.

In the state of Maranhão, the Federal University (UFMA) is the higher education institution that is part of the UNA-SUS network. In a partnership with the SAITE Research Group, the institution has already developed more than 35 systems to support the distance education activities and it has reached hitherto more than 200,000 enrolments of health professionals.

To the continuous training of professionals who compose the 'More Doctors' Program, the Ministry of Health has emphasized the need to use the Learning Paths methodology, which comprehend itineraries consisting of a set of resources that the individuals can use according to their specific needs, in order to achieve certain levels of competence.

Therefore, with the technological advance and new educational approaches, it becomes necessary the adaptation and development of tools, systems and educational resources.

This paper aims to report and describe the experience of developing a virtual learning environment (VLE) interface applying the Learning Paths methodology, covering the procedural matters presented according to the competences of the teams involved in this project.

2 UNA-SUS/UFMA, SAITE RESEARCH GROUP AND TECHNOLOGICAL RESOURCES PRODUCTION

Brazilian Ministry of Health created the Open University of Brazilian National Health System (UNA-SUS) network to training, developing and improving the professionals of the Brazilian National Health System (SUS), using Distance Learning as a teaching and learning modality, increasing the reach of educational activities through Innovation and Communication Technologies (Oliveira et al., 2014). It currently has the support of 36 public higher education institutions throughout the country.

UNA-SUS is included in the context of the activities of the National Policy of Permanent Health Education (PNEPS), whose objective is the transformation of the practices developed in SUS and the consolidation of quality in health services (Barth et al, 2014).

The concept of Permanent Health Education emerges from the Pan American Health Organization (PAHO) in the 1980's, based on the perception of the reduced impact of professional training and knowledge updating programs (Continuous Education) in the resolution of problems concerning the professional practices and the services provided in the health area (Vicent, 2007).

In Brazil, the Permanent Health Education (PHE) is a strategy of the Ministry of Health with the Management of Health Education Department (DEGES) and the Secretariat of Work and Health Education Management (SGTES), focusing on Brazilian National Health System (SUS) and approved by Brazilian National Health Council (CNS).

This articulation is aimed at promoting the training and improvement of health professionals, going beyond the basis of teaching-learning and encompassing the health education policy, consisting

of a learning process in which the knowledge production occurs from the everyday experiences in health institutions, incorporating students' context and perception.

The Federal University of Maranhão (UFMA) is the higher education institution of this state that supports the Project. Currently, is the institution with the largest offer of courses within the system, regarding training, specializations and improvements.

To develop technological products and provide support in strengthening research and innovations, UNA-SUS/UFMA relies on the partnership of Saite Group, a research group registered at the National Council for Scientific and Technological Development (CNPq) and certified by UFMA. The group operates in the areas of Technology and Innovation in Health Education, with interinstitutional partnerships such as the School of Dentistry of São Paulo (FOUSP) and Federal University of Health Sciences of Porto Alegre (UFCSPA), among other Higher Education Institutions. Its mission is the development of research and educational resources favourable to the construction of knowledge to offer innovative experiences that add value to society. This partnership for developing technological resources with UNA-SUS/UFMA has already resulted in several systems registered at the Brazilian National Institute of Industrial Property (INPI) as well as several serious games and mobile applications produced for Android and iOS platforms.

3 LEARNING PATHS

Learning paths are defined as interactive web-based tools that support the learning of specific concepts by enhancing, amplifying, and/or guiding the cognitive processes of learners (Smet *et al*, 2016).

In this context, "Learning Paths" can be considered structures conducive to interdisciplinary dialogue between the participants in the teaching and learning process through a set of technological resources and tools, which provide a breakthrough in the construction of new knowledge (Alves; Almeida, 2013).

Learning Paths Methodology emerge as an alternative to conventional programs of education and training, as routes are developed by which individuals can go according to their specific needs in order to reach certain levels of competence (Brandão, 2011, Jesus e Moreira, 2014).

Thus, going through their learning paths allows students to identify themselves as individual and

professionals in the scope of their practices, due the possibility of relating the contents to their own individual aspirations (Brandão, 2011).

Based on this methodology, following the Ministry of Health guidelines for the 'More Doctors' Program, UNA-SUS/UFMA initially developed 6 learning paths: Public Health Management; Advanced Topics in Primary Care: Equity Policies; Advanced Topics in Primary Care: Infectious Diseases; Acute Complications in Home Care; Attention to Women's Health; Attention to Children's Health. The construction of these paths was done through groupings of modules according to the most relevant thematic areas that complemented the previous training of the professionals of the program in the specialization.

4 EXPERIENCE REPORT ON THE CONSTRUCTION OF SAITE AVA

The use of the Learning Paths methodology in UNA-SUS / UFMA courses resulted from the need to offer courses that complement the training of professionals of the "More Doctors" Program.

These professionals, after joining the program, complete the first phase of training with a duration of 1 year: the specialization in Primary Health Care (450 hours) that was planned in order to provide additional training to professionals. It uses teaching methodology that integrates the daily practices of the professional assisting in the resolution of problems encountered in patient care, thus strengthening the performance of physicians.

After completing this stage the students are enrolled in the 2nd cycle of training that consists of the training that uses the methodology of learning paths: a set of modules made available according to thematic related areas. The students can choose the modules they wish to attend, according to their needs and interests, their reality in the workplace, thus providing greater autonomy, flexibility and "personalization" of learning. Certification may occur individually for each course or the entire course.

A feature of this project is the reuse of modules in the path, that is, the same module can be present in more than one path according to the interdisciplinarity of the content addressed.

In this way, arose the need to create a virtual learning environment that could work with this new methodology, providing a fast and practical

navigation, since many of the professionals in the program come from other countries.

SAITE AVA was developed through a partnership between UNA-SUS/UFMA and Saite Group, aiming to unify in a single VLE the execution of two modalities of courses: Extension Courses - held individually; or the full paths - improvement courses.

For its construction, a process was structured, involving a multidisciplinary team composed of professionals in the areas of pedagogy, graphic design and information technology. This process was divided into three stages described below according to the competence of each area.

4.1 Pedagogical Team: Needs Assessment

At this stage, the pedagogical team carried out a survey of all the needs and peculiarities that the environment should contemplate. Specific aspects of the offer, student profile, student follow-up process, among others, were discussed with the graphic design and technology teams that were able to highlight features and construct sketches of what the VLE design would look like.

4.2 Graphic Design Team: Design Proposal

Using these informations and conducting research in other virtual learning environments, the graphic design team elaborated the construction of the screen drawings taking into account the most effective way for the student to find the information and access what he wanted.

In addition, the entire visual identity for the environment was constructed, as well as the standardization of the iconography system used to indicate student performance.

Three presentation meetings, feedbacks and adjustments were made to achieve the expected result.

4.3 Technology Team: Programming

The virtual environment was built on the Moodle 2.9 platform, with a custom interface. Moodle is an open-source, customizable LMS (Learning Management System) platform. The tool is plugin-oriented and provides a REST-style service oriented layer.

In this version of Moodle, there was no available plugin with the functionality of reusing modules on

more than one path, a necessary element of the course offer.

Based on this definition a theme was created, evading all the standards specified by the architecture, where it was coupled to the environment through APIs (Application Programming Interface) REST. This type of approach allows the flexibility of the room structure and with this it was possible to offer the student a new experience when facing this type of environment. All the architecture of the theme was written in AngularJS. Its interface was developed with the support of Angular Materialize.

5 SAITE AVA DETAILING

According to the explanations in previous chapters, the need to develop a virtual learning environment that was adequate to the innovations in educational methodologies was realized. Technological development transforms many areas, and can not be different in the case of education (Lima, 2016).

The VLE has resources that help with students' autonomy, such as: tutorials, updates alerts in the environment, iconographic system, student dashboard, among others.

5.1 Homepage

When accessing Saite AVA through the browser, the user visualizes the available learning paths, the new

paths that are being launched, highlighted by a tag with the word "NEW". In addition, icons have been established to inform about the paths (number of students enrolled, total workload, number of courses that make up the path and indicative of certification availability), with tooltips for icon labeling. The icon might go beyond the barriers of language and represent meanings in a synthesized and condensed manner (Cardoso; Gonçalves; Oliveira, 2014). To facilitate user search for specific paths of interest, the "Search" field has been added.

In the upper right corner, there are three functions: Call Center - communication system integrated to Moodle, which allows the student to open calls to clarify their doubts; How it works - which features a tutorial with basic VLE information, courses, student follow-up process and certification; Login - field for login, which provides basic access instructions.

5.2 Student Dashboard

When logging in to the system, the user has access to the Student Dashboard, where the Performance Monitoring Area can be found on the left. This provides information about the history of notes and their performance in the course, represented by a graph that indicates the current user status with color, percentage, and a dialog box that indicates whether student performance is satisfactory or not.



Figure 1: Saite AVA homepage.



Figure 2: Student dashboard with satisfactory workload preview.

Other functionalities that can be found: My courses - where the student visualizes the courses that he is doing at the moment; My paths - view the paths currently performing; and Other trails - provides access to the other paths available for registration. In addition, below the boxes of the courses and tracks, there are icons that show the information: Course workload; If the student has finished reading the content; if one has already performed the activity; and whether the certificate is available. All accompanied by labeling tooltips.

5.3 Paths

By clicking on a trail on the left, the user finds descriptive information about the content covered in the courses that comprise it. To the right, the user finds the courses that are part of this path. That way, the user has access to all the information on a single screen, requiring less cognitive effort to locate the content they want to study.

5.4 Course

When selecting the desired course, the user will find, just below the course title, the "Related paths" button, that informs in which tracks that course is present. In this way the user can easily locate other tracks of his interest.

Just below, there is a menu with the following features: The course - which brings a presentation of

the course, with information such as workload, educational objectives, schedule, etc; Multimedia resources - which brings the e-books of the course; Activities - which presents the course questionnaire and a forum for interaction among students; Warnings - where the student is notified of any news, organized chronologically; Files - which are supplementary course materials; Finally, the button Evaluate the course - this feedback is essential for the institution, because at this moment the student answers questions about his profile and his experience with the course materials, knowing who will interact with the information artifacts, how and why this interaction occurs are important steps for the production of artifacts that are suited to the needs of individuals (Spinillo, 2013).

5.5 Permanent Components

In addition to the features shown previously, some components are permanently fixed in the virtual environment. The "Call Center" and "How It Works" buttons were always kept so that the student can consult this help information whenever a question arises.

To improve usability, breadcrumbs are used as a resource to facilitate student navigation and location within the system, reducing the effort to reach a page. There is also a sign at the top of the screen that indicates if the student is enrolled in that course or not. If it is not, this sign has the functionality to be clickable, so that the student can enroll.



Figure 3: Paths Screen.

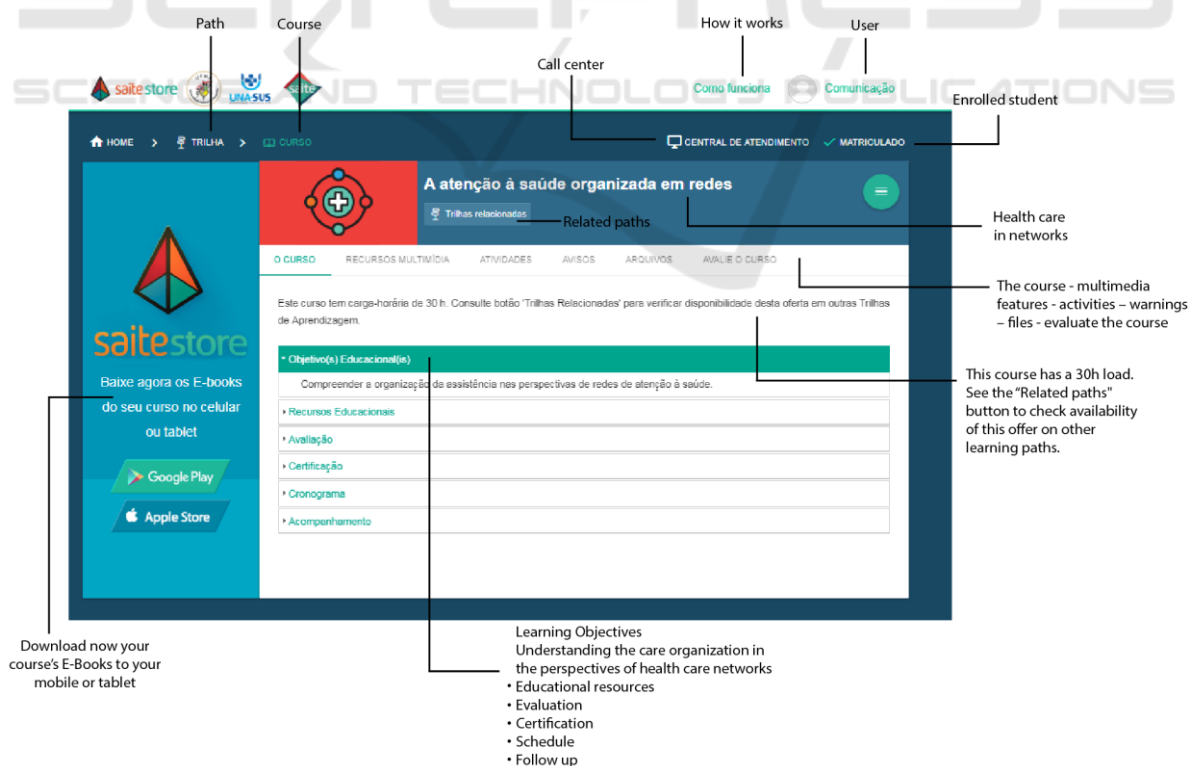


Figure 4: Courses screen.

5.6 Menus

In the upper right side, the student can access a personal menu, indicated by his name and photo, where he can access: Messages - a room where the students can talk; Settings - to adjust information about your account; and the Exit option.

Below, indicated by an icon, the user will find information directly related to the course he is doing, such as the number of participants, documents, certificates, etc. and frequently asked questions where it is directed to a document with the main clarifications on the course offer and progress.

6 CONCLUSIONS

In the context of Permanent Health Education, there is a need to present the content covered encompassing situations and experiences similar to those that the professionals face every day at work, thereby promoting a contextualized teaching-learning process and presenting actual challenges in the health area.

Furthermore, in the context of Distance Learning, it is observed the necessity of providing more flexibility and autonomy so that the students can study in their own time and place.

Therefore, when developing tools for these activities, it is also important to apply the proper pedagogical methodologies in the content presentation. Then, the learning paths contribute to the interdisciplinary dialog, using educational resources and technological tools that guide the students through this process.

In this context, the virtual learning environments need to cover the necessities that emerge from these innovations, allowing the student to have a satisfactory performance in the learning process.

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