



Contents lists available at ScienceDirect

Currents in Pharmacy Teaching and Learning

journal homepage: www.elsevier.com/locate/cptl

Experiences in Teaching and Learning

Active methodology and blended learning: An experience in pharmaceutical care

Alexandra Ingrid dos Santos Czepula^{a,*}, Wallace Entringer Bottacin^b,
Edson Hipólito Júnior^c, Roberto Pontarolo^b, Cassyano Januário Correr^b^a Departamento de Farmácia, Universidade Federal do Paraná, Curitiba, PR, Brazil^b Programa de Pós-Graduação em Ciências Farmacêuticas, Universidade Federal do Paraná, Curitiba, PR, Brazil^c Programa de Pós-Graduação em Ciências-Bioquímica, Setor de Ciências Biológicas, Universidade Federal do Paraná, Curitiba, PR, Brazil

ARTICLE INFO

Keywords:

Blended learning
Pharmaceutical care
Higher education
Bloom's taxonomy
Multiple-choice questions

ABSTRACT

Background and purpose: The aim of this study was to analyze the implementation of an active methodology in a blended model of education in the teaching-learning processes of students enrolled in two disciplines: Pharmaceutical Care I and Pharmaceutical Care II, both part of the undergraduate Bachelor of Pharmacy program at the Federal University of Paraná.

Educational activity and setting: The study design was quasi-experimental, prospective, comparative, following a pre/posttest format, where Pharmaceutical Care classes were the intervention. Identical pre- and post-intervention tests were designed based on Anderson and Krathwohl's (2001) revision of Bloom's taxonomy, and according to the three levels of the cognitive domain: remember and understand; apply and analyze; evaluate and create.

Findings: Participants were 133 students enrolled in the two Pharmaceutical Care classes. A significant difference between pre- and posttest results was observed, showing an increase in students' performance in the applied tests at all cognitive levels. This is the first study of its kind involving Pharmaceutical Care and Blended Learning.

Discussion and summary: By comparing the results of the diagnostic and summative assessments based on Bloom's taxonomy at all levels of the cognitive domain, positive results were observed regarding the students' performance in the two disciplines (Pharmaceutical Care I and II).

Background and purpose

National Guidelines for Undergraduate Education in Pharmacy (NGUEP) in Brazil are based on a generalist, critical, humanist, and reflective education. They are articulated with guidelines established by the Unified Health System, enabling pharmacists to exercise activities related to their general competencies and specific skills. After the implementation of the NGUEP in 2002, pharmacy programs in Brazil started discussing a curriculum reform in order to suit the current legislation through the development of new political-pedagogical projects.¹ Competencies and general skills established by the NGUEP align with competencies established by the World Health Organization (WHO) and International Pharmaceutical Federation (IPF) for pharmacy education in the 21st century.²

With the generalist curriculum recently implemented in Brazil, Pharmaceutical Care has become part of the essential content for undergraduate degree programs in pharmacy. Pharmaceutical Care became a novelty worldwide after the publication of *Opportunities and responsibilities in pharmaceutical care* by Hepler and Stand in the 1990s.³ It is related to the health-disease process of human

* Corresponding author.

E-mail addresses: aleczepula@gmail.com (A.I.d.S. Czepula), wallace.bottacin@gmail.com (W.E. Bottacin), edsonhipolitojr@gmail.com (E.H. Júnior), pontarolo@ufpr.br (R. Pontarolo), cassyano.correr@gmail.com (C.J. Correr).<http://dx.doi.org/10.1016/j.cptl.2017.09.013>

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beings, communities, and families, and it is also interconnected to professional and epidemiological realities.¹

According to the WHO, pharmaceutical care may be defined as: "a concept of professional practice in which the patient is the main beneficiary of the pharmacist's actions. The pharmaceutical care is the compendium of attitudes, behaviors, commitments, concerns, ethical values, functions, knowledge, responsibilities and pharmacists' skills in providing of pharmacotherapy in order to achieve therapeutic results defined in the health and the patient's quality of life."² This definition recognizes the benefit of pharmaceutical care for the whole community, and acknowledges the importance of the pharmacist's involvement with the health staff in disease prevention and health promotion.

For a long time, pharmacists had their role as health professionals overlooked in relation to health care. Historical changes in production processes and the influence of these changes in academic curricula culminated in a technical professional with compartmented knowledge, decontextualized from the multidisciplinary team, while maintaining a closer relationship with drugs rather than patients. Pharmaceutical care promotes the reestablishment of a relation between pharmacists and patients, which requires new competencies from this professional in relation to clinical pharmacy services (e.g., adherence to treatment, specialized dispensing, medication reconciliation).⁴

According to the NGUEP, in order for students in undergraduate pharmacy programs to develop the competencies and skills necessary for a generalist education, it is essential that active methodologies be implemented in the teaching-learning process. Such methodologies require that students abandon passive attitudes as well as their comfort zones, and instead adopt an active role in search for knowledge. This reorientation in the teaching and studying of Pharmacy in Brazil has become crucial.

One arguable way through which active methodologies may be implemented in pharmaceutical education is with the use of blended learning—a student-centered approach that integrates traditional face-to-face with computer-mediated learning through the use of digital technologies.⁵ The use of these technologies has allowed for the approximation of students and universities.⁶ Practices of blended learning have become widespread in educational networks around the world, providing students with more interesting and efficient education, which is personalized to their own needs. Hybrid teaching and learning based on competence form the foundation of a student-centered learning system. Students develop a sense of performance and prosperity for their progress and, consequently, the ability to conduct their own learning. This translates into the capability of becoming an eternal apprentice—a necessary characteristic in the rapidly changing world in which we live, where knowledge and skills become obsolete at an accelerated pace.⁷

However, there are very few studies that have documented and analyzed the use of active methodologies (with or without the use of blended learning) in pharmaceutical education in Brazil.⁸ In order to address this gap, the objective of the present study was to investigate the effects of an active methodology – designed within a blended learning educational model – upon the learning processes of undergraduate students enrolled in two Pharmaceutical Care disciplines of the Bachelor of Pharmacy program at the Federal University of Paraná. The active methodology adopted was based on Bloom's taxonomy, which is described in the next section. Results of diagnostic and summative assessments conducted with the students in a pre-/posttest format were compared.

Educational activity and setting

The study design was quasi-experimental, prospective, comparative, following a pre-/posttest format, where Pharmaceutical Care classes were the intervention. The study was conducted in 2014.

Participants

Participants of this study were students (n=133) enrolled in two classes: Pharmaceutical Care I (n=82) and II (n=51), of the Undergraduate Bachelor's Degree in Pharmacy at the Federal University of Paraná.

Course design

The two courses (Pharmaceutical Care I and II) were structured combining face-to-face and distance learning activities, taking into account the context of these disciplines, students, learning objectives, educational adequacy, and the virtual learning environment used by the university, called "Moodle UFPR" (*Modular Object-Oriented Dynamic Learning Environment* of the Federal University of Paraná).

The hybrid teaching model used was the enriched virtual model (Fig. 1). It consists of disciplines in which students have mandatory face-to-face lessons with their professors, and then are free to complete the remaining tasks online. Online education is the backbone of learning when students are in remote locations. The same professor prepared and conducted classroom activities and online tasks. The chosen model differs from a fully online course, because face-to-face lessons are mandatory.⁷

Course content from the syllabus was contextualized and problematized, with the aim of giving meaning to learning. Learning assessment occurred throughout the process, and the virtual environment for teaching and learning interface was used for assessments situations.

Bloom's taxonomy was used to support pedagogical planning, as well as to structure, organize, and set learning objectives linked to cognitive development – including acquisition of knowledge, skills and actions.⁹ This facilitated planning of an effective and enduring teaching-learning process.¹⁰

Per Bloom et al.,⁹ learning objectives are distributed in three domains: cognitive, affective and psychomotor. The cognitive domain is related to learning and mastering knowledge. It involves acquisition of new knowledge, skills, and attitudes. In this

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