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Problem Solving Incorporated into Blending Learning in Nursing Masters Degree

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Abstract. Online and face-to-face learning are integrated in a teaching format called blended learning. In recent years, educators have begun to use blended learning for a number of education related purposes. Typically, blended learning is used to involve the nurse students in a more active and constructive learning process. In a pilot project, five modules of a Masters nursing course were redesigned and implemented in blending learning format. While redesigning the modules, the first challenge was to assure the balance between online and face-to-face classroom activities. The second was to incorporate problem solving phases into blended learning in an efficient way. Moodle is the learning management system used for the online teaching and learning activities. The preliminary results concern the description of the redesign process of the five modules and their implementation. Some critical issues emerged and they must be corrected to improve the teachers' involvement and the redesign.

Keywords: Nursing Education, Ill Problem, Mind Map, Problem Solving, Blended Learning.

1 Introduction

Experiment of Enhanced Learning (EXEL) is the University's project of innovation in education (2017-2019). It is devoted to the promotion of innovative teaching and learning methods and an educational approach that combines classroom and distance learning.

The strategic aim of EXEL is to educate the teachers about student-centered teaching and learning rather than only being concentrated on the teacher and on the discipline, called teacher-centered approach [1]. This is done by the use of active teaching and learning methodologies and technologies.

The EXEL actions are planned in short, mid, and long period of time. In the short term, meetings with groups of teachers were organized to guide them in the teaching and learning innovation process. The innovation process is focused on the crash course "Arena blended curriculum ABC" (adapted to the Italian system with University College London collaboration) [2] and the online course "How to re/design your course with blended learning" (adapted to the Italian system with Utrecht University collaboration)[2].

The Nursing Masters (second cycle, 120 European Credit Transfer and Accumulation System ECTS) program has been included in the EXEL project as a pilot project.

The redesign of the five modules was the aim of the pilot project for the Health and Prevention Health Care in the Community project. In this course, lot of the nurse students are already working, so the blended learning was seen as an effective way to facilitate both an active-constructive learning process and a redistribution of the teaching and learning hours.

The University's rule of the pilot project allows that only 10% of conventional hours in classroom can be used as online activities. So concretely, a module of 1 ECTS was divided into 2 hours of online activities, 6 classroom activities and 17 autonomous study hours (1 ECTS=25 hours).

While redesigning the modules, the challenge was to assure the balance between online and classroom activities and the resonance between three components: learning design, student's learning experiences and the practice of the learning discipline¹. The redesign of the modules took place in the first six months of 2018, while the implementation of the modules began in November of the same year and ended in 2019, January 31.

Moodle is the learning management system used for the online teaching and learning activities of the students both in small groups and in autonomous study.

2.1 Tuning the balance between online and classroom activities

Health and Prevention Health Care in the Community is the integrated course of the masters program that was redesigned to incorporate blended learning. It comprehends

eight modules (one module=1 ECTS), of which only five were redesigned, as you can see in figure 1. The redesign of the course did not include three modules because of three teacher's reluctance to replace their traditional forms of face-to-face teaching. While studying the five redesigned modules, some elements effected the balance between online and face-to-face learning activities. Of these elements the following were observed: more involvement of the students in the construction of their learning; more interaction in the classroom; more interest of students toward specific topics; deeper learning instead of memorizing; more capacity to analyze and synthesize health needs in the community. Based on the learning outcomes of the Health and Prevention Health Care in the Community course, the work started by focusing on the need to strengthen the coherence and the synergy between the five modules instead of the past method.

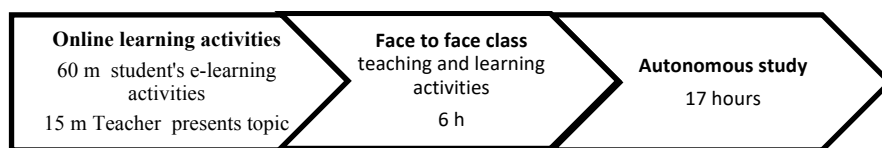
The coherence and the synergy between the five modules were considered essential components, in promoting in the students a mental habit aimed at seeking alternative solutions to prevention and care priority health needs of people at different stages of life and in continuous care.

Synchronic coherence required the tuning of the balance between online and face-to-face in classroom teaching and learning activities (how the learning on a number of separate, but synchronously taught, modules is experienced [3]). So the question was how to facilitate the students experience throughout the five modules? An online interactive activity was the solution. Concretely, in this online activity the students worked in small group to analyze three ill problems, as a first activity in each of the modules. Thirty minutes were removed from the total times scheduled for student's activities in each module (sixty minutes instead of ninety). This was done to give the students time to be able to do common online activities from the five modules (Table 1).

Another essential question was the sequential didactic coherence inside each individual module and the balance between online and classroom activities. In the case of doing online activities first, students came better prepared to the class. This is before the class the student had read documents watched videos uploaded online by the teacher about specific topics (Figure 1).

Table 1. Architecture and timing of the five modules

Teaching and learning activities in common in the five modules (light blue space)	Contents of activities	Online activities		Face – to-face class
		Teacher presents topics (Dispensing activity)	Student e-learning activity (Interactive activity)	
The five modules (white space)		30 m	90 m	
First meeting	Presentation modules			60 m
Pre-test	Student's prior Knowledge		25m	
Analysis ill problems, mind map	e-Activities in small group		90m	
General clinic and pediatric nursing	Specific topics	30 m	60 m	6 h
Obstetrics and gynecology	Specific topics	30 m	60 m	6 h
Nursing and midwifery	Specific topics	30 m	60 m	6 h
Medical genetics	Specific topics	30 m	60 m	6 h
General and subspecialty pediatrics	Specific topics	30 m	60 m	6 h
Solution ill problems	Written Papers			

**Fig. 1.** Single module architecture and timing

2.2 Method and theoretical framework

The following learning outcome “Identify alternative solutions to priority health problems, along the life cycle, in prevention and continuous care” was the reference point

for the redesigning of the five modules. This learning outcome embraces decision making, as an essential component in the nursing profession. In the modern health community environment, even with a high chronicity and disability level, nurses must be able to resolve problems of both the single patient and specific groups of people and try to do this effectively, efficiently and safely. So from a practical point of view nurses must make and justify decisions, reflecting on social and ethical responsibilities as well as nursing and nursing science issues and if necessary carry out analysis that results in an adequate basis for decision-making [4].

Nursing students need to receive training to foster strong problem solving and decision-making skills that can be utilized in the field [5]. Decision making and problem solving are two linked processes involved in the reasoning and the analysis of problems and the generation of solutions.

In the generation of solutions nurses often need to go beyond routine and acquire creative thinking to make beneficial decisions [6].

In Chan's systematic review, it is suggested that when designing a course to teach creative thinking, educators should provide activities, assignments or problem cases that allow students to use their creativity freely. Educators should value all ideas, encourage students to think, and give feedback that will guide students in the right direction. Group work and group interaction should also be considered as they may promote creative thinking [6].

Everything written above comprises the elements, which determined the choices of how to redesign the teaching and learning activities and their contents of the five modules incorporated into blended learning. Basically the problem solving method was adapted in a creative way, to seek the best way to marry the online activities with the need to grow the capacity to analyze problems and generate solutions by the students.

The principal components of problem solving incorporated into blended learning are: ill problems, mind maps, small group work, teacher's topic presentation and written solutions of ill problems. These components were organized into two steps of the method. In the first step, we define the problem framing by expanding our perspective [7]. A very significant part of this involves making sense of a complex situation in which the problem occurs, so we can pinpoint what the problem is. The second step, generating and evaluating alternatives, involves opening minds to see the problem solution from different point of view.

In the redesign of the five modules, three ill problems were introduced at the beginning as an initial learning situation. This approach helps the students to understand what they are learning in the five modules.

The first online activity for the students was an autonomous reading of the ill problems to identify some significant questions raised by them. The ill problems, in contrast to being well-structured, may have many possible answers and are complex and poorly defined. Ill-structured problems, require the development of higher order thinking skills and the ability to construct a convincing argument for a particular solution as opposed

to all other possible solutions. So, for the problem to be effective for the purpose it must generate perplexity, confusion or doubt [8].

In Moodle platform a shared environment was opened and there the students found and read the three ill problems uploaded by the teachers.

The second online learning situation was designed for a small group context aimed at analyzing the problems and at constructing two mind maps for each of the three ill problems. The students were divided into five randomized groups where to work collaboratively to shape, elaborate and deepen understanding[9].

Each of the small groups worked on the platform Moodle with Wiki to share the analysis of ill problems, and write down their questions and ideas related to each of the questions. The picture of this Wiki's environment shows the result of a virtual brainstorming session inside the small group.

A Chat was opened in Moodle, where the small groups, in asynchronous discussion, compared their questions and ideas and chose those more significant in the definition of ill problems. After that, each of the small groups synthesized its decision in two mind maps for each of the three ill problems. Due to the lack of the mental mapping tool in Moodle, students were asked to use Power Point. The mind maps built by Power Point were sent to the teachers through the Wiki's section File.

This approach to the collaborative group, shows that analyzing ill problems and synthesizing priority question and ideas in mind maps, is consistent with the idea that working together allows the students to compare alternative interpretations, correct each other's wrong ideas and form more holistic pictures of the problem. According to some authors, effective learning, is collaborative and social rather than isolated, and working with others increases involvement in the learning process [10].

The mental maps were used by the students to organize ideas around a central topic question, visualizing associations and deductions through cross-links. The mind maps are principally association maps, and spontaneous thinking is required when creating them [11].

2.3 Teaching and learning online and face-to-face activities in each module

Each of the five modules was redesigned by the teacher as showed in figure 1 (one teacher in each module). The time for online activities inside the module are fixed at sixty minutes for e-learning interactive activities. Then there is also thirty online minutes for the online dispensing activities (the material uploaded by the teacher can last a maximum of 15 minutes, so the student can look at the material at least twice within the 30 m provided for the online dispensing activity). On the Moodle platform there was an autonomous environment for each of the modules, where the students could find the material uploaded by the teacher. A Moodle board was also opened for interactions and quick feedbacks.

The sequential coherence was studied by the teachers, aligning the learning activities with specific learning outcomes and monitored the students online and face-to-face activities. The decision to do the students online activities before the face-to-face class activities, was aimed at having students come better prepared to class. In this way the class became a place of discussion under the direct supervision of the teacher.

2.4 Conclusion

Unfortunately, as the implementation of the five modules ended in 2019 January 31, the results of students feedback are not available in this presentation. Therefore the presentation was focused on the redesign of the five modules of the Health and Prevention Health Care in the Community Course, which were described in their didactic components and how they incorporated blended learning. However, some reflections about critical issues are possible to make.

Unstructured interviews were conducted with the teachers of the five modules, to deepen their perceptions of the various components of problem solving incorporated into blended learning.

Teachers perceived an increase in their workload because of the need to find, select and upload the online material that students had to learn before the classroom activities (15 minutes in which the teachers dispensed the material to the students). This additional work was done to prepare for the face-to-face lessons in the classroom. The teachers are aware, however, that this increase in workload will not occur in subsequent applications of the redesign, because it will only be necessary to replace or update the material already loaded.

Some teachers also point out the difficulty of finding educational published material in Italian, such as videos, suitable for students of the nursing masters degree. This difficulty has been perceived as an obstacle to an effective use of online learning and requires the preparation of ad hoc material to be overcome.

Moodle technology has been a novelty for teachers and the various functions available have not been used to the full. This is because a competent use of Moodle would have required a longer period of training than the teachers actually had. That being said the teachers, however, have positively evaluated the technological support received for the uploading of the material online, but they complain about the need to acquire greater autonomy.

The limited autonomous use of Moodle technology by the teachers and the limited time available to learn how to use it has caused a very poor realization of the interactive online activities (only one teacher has been able to use this online interactive activity for discussing a clinical case). Teachers consider it important to integrate their modules with these activities, in particular with case discussion groups and exercises, to make the best use of the 60 minutes available to them for interactive activities.

The problem solving method used as a common activity in the five modules has been positively evaluated by the teachers. They believe that the mind maps produced by students, working online in small groups, are useful in getting to know the students' ideas regarding the three ill problems. According to the teachers, understanding these ideas helps them in their approach to the teaching of the contents of the modules and thus facilitate the students in finding solutions to the three ill problems. However, the teachers consider it necessary to improve the context of the problem framing, making the best use of technological resources to manage the online activities in small groups. A conference call environment is needed to enable the students to collaborate effectively in problem analysis and mental map processing. In this conference call, the presence of a tutor (even the teacher themselves) should be guaranteed to assist the students and, if necessary, to intervene, to urge, and to restate the problem in different ways, and to select those ones best suited for exploration. In addition, more specific tools for building mind maps should be integrated into Moodle, to visually organize what is known about the problem.

The results of the interviews reveal some critical points but at the same time hypothesize solutions that will be used to correct the application of the redesign of the five modules and create a more effective strategy of problem solving incorporated into blended learning. Feedback will also be conducted with the students, whose insight will be used to discover other ways of improving education through online resources. The online resources in blended learning are a very important aspect as it is more adapted to the educational needs and lifestyle of students, especially working-student

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