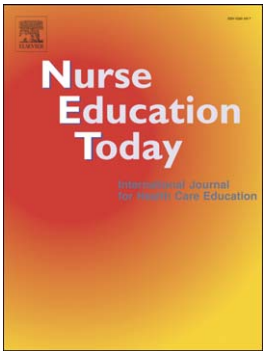

Accepted Manuscript

Effect of a PBL teaching method on learning about nursing care for patients with depression

Marta Arrue, Begoña Ruiz de Alegría, Jagoba Zarandona, Itziar Hoyos

PII: S0260-6917(17)30047-3
DOI: doi:10.1016/j.nedt.2017.02.016
Reference: YNEDT 3499

To appear in: *Nurse Education Today*

Received date: 30 September 2016
Revised date: 21 December 2016
Accepted date: 21 February 2017

Please cite this article as: Arrue, Marta, de Alegría, Begoña Ruiz, Zarandona, Jagoba, Hoyos, Itziar, Effect of a PBL teaching method on learning about nursing care for patients with depression, *Nurse Education Today* (2017), doi:10.1016/j.nedt.2017.02.016

EFFECT OF A PBL TEACHING METHOD ON LEARNING ABOUT NURSING CARE FOR PATIENTS WITH DEPRESSION

Word count: 4.981

- Marta Arrue. PhD, RN. Faculty of Medicine and Nursing. Department of Nursing. University of the Basque Country (UPV/EHU). Barrio Sarriena, 48940 - Leioa (Spain).

  Tel. +00-34-633261971 e-mail: marta.arrue@ehu.eus

- Begoña Ruiz de Alegría. PhD, RN. Osakidetza, Basque National Health Service, Spain.

  Tel. +00-34-635741887 e-mail: begona_ruizdealegria@ehu.eus

- Jagoba Zarandona. MSc, RN. Osakidetza, Basque National Health Service, Spain.

  Tel. +00-34-649629167 e-mail: jagoba_zarandona@ehu.eus

- Itziar Hoyos. PhD, RN. Faculty of Medicine and Nursing. Department of Nursing. University of the Basque Country (UPV/EHU).

  Tel. +00-34-679667214 e-mail: itziar.hoyos@ehu.eus

Acknowledgements

The authors are grateful to their colleague Jenaro Guisasola for discussion regarding this work and for his valuable advice.

Funding source

The Education Advisory Service of the University of the Basque Country (UPV/EHU) provided financial support for the conduct of the research (grant number 6836).

There is no conflict of interest.

EFFECT OF A PROBLEM-BASED LEARNING TEACHING METHOD ON LEARNING ABOUT NURSING CARE FOR PATIENTS WITH DEPRESSION

Abstract

Background: Depression is a worldwide public health problem that requires the attention of qualified health professionals. The training of skilled nurses is a challenge for nursing instructors due to the complexity of this pathology.

Objectives: The aim was to analyse the declarative and argumentative knowledge acquired about depression by students receiving traditional expository instruction versus students receiving problem-based learning instruction.

Methods: Quasi-experimental study with pre-test and post-test design in experimental and control group to measure differences in the improvement of declarative and argumentative knowledge. Non parametric tests were used to compare the scores between the experimental group and the control group, and between the pre-test and post-test in each group. 114 students participated in the study. Implementation of the study took place during the 2014-2015 academic year in the third year of the Nursing undergraduate degree courses in the University of the Basque Country (UPV/EHU) as part of the Mental Health Nursing subject.

Results: The data indicated that there were no statistically significant differences between the two methodologies in regard to declarative knowledge in the care of patients with depression. Nevertheless, the argumentative capacity of the experimental group improved significantly with the problem-based learning methodology ($p = 0.000$).

Conclusions: The results of the implementation indicated that problem-based learning was a satisfactory tool for the acquisition of argumentative capacity in depression nursing care. Still, working examples of teaching sequences that bridge the gap between general clinical practice and classroom practice remain an important goal for continuing research in nursing education.

Keywords: Nursing, problem-based learning, mental health, innovation, depression, critical thinking, reasoning.

INTRODUCTION

Depression is a common illness throughout the world. The World Health Organization (WHO) estimates that it affects 350 million people, making it the leading cause of disability worldwide (WHO, 2015). Moreover, people suffering from major depression have a 40 to 60 % higher probability of premature death than the general population, due to physical health problems that are often left untreated (WHO, 2013). Therefore, there is a clear need for all nurses to receive training with the aim of acquiring the competencies needed to care for patients who present with depression. However, acquiring these competencies goes beyond merely possessing knowledge.

For many years now experts have insisted that the ability to reason is an essential competency for any nurse to have in order to face a daily clinical practice which is becoming more dynamic and complex (Gezi and Hadley, 1970; Burnard, 1989). Despite the years that have gone by, researchers continue to find evidence of insufficient development of this competency in nurses (Theisen and Sandau, 2013; Forsberg et al., 2014; Hooper, 2014).

Certainly many educators are concerned with improving the level of critical thinking in nursing students, however, the first obstacle lies in that such competence is not developed merely by individual or maturational factors, but rather through experiences of participation in activities (Kuhn and Udell, 2003; Terrón et al., 2012). In systematic reviews on critical thinking in nursing education, Chan (2013) and Kong et al. (2014) pointed out the second obstacle, the lack of consensus on the definition of the 'critical thinking' construct among the authors. Hence, although many authors have approached critical thinking from different points of view (Banning, 2008; Choi et al., 2014; Forsberg et al., 2014), none have explored the development of argumentation applied to depression nursing care with problem-based learning (hereafter, PBL) methodology.

Traditional transmission learning does not offer all the assurances for the development of critical thinking and the ability to solve problems (Lancaster, Wong, Roberts, 2012; Aglen, 2016; Gholami et al., 2016). In order to respond to this need, different authors have proposed incorporating active methodologies, such as PBL, in nursing undergraduate degree courses (Hodges, 2011; Forsberg et al., 2014, Hung et al 2015). PBL allows students to learn about problems that are similar to those that will probably arise in their professional lives (Valiga, 2012; Gould et al., 2015). That is, students are confronted with real-life problems which force them to analyse situations and seek solutions in a professional way, putting themselves in the place of someone who must take decisions. Moreover, emphasis is placed on the development of certain cross-disciplinary competencies that are very valuable in the professional environment such as teamwork, planning, communication skills, etc. (Gobbi et al., 2011), which are frequently under-developed among university graduates (Freeling and Parker, 2015).

However, the results obtained by different studies on the effectiveness of the PBL strategy for health sciences education are still contradictory. In medicine, Distlehorst et al. (2009) showed that the differences in performance were minimal in the residence period between PBL and the traditional method. Other studies conducted with medical and nursing students pointed more toward significant increases in the students' well-being or satisfaction (Bengtsson and Ohlsson, 2010; Hofsten et al., 2010; Henderson et al., 2012), than toward improvements in performance or attainment of skills in practice (Applin et al., 2011), and did not find that PBL is a better educational strategy. There are even authors with quasi-experimental research designs with pre-test/post-test groups and systematic reviews who have recommended studies of greater magnitude in regard to PBL in nursing (Cooper and Carver, 2012; Chan, 2013; Choi et al., 2014; Kong et al., 2014; Betihavas et al., 2016).

No experiment has been found that used PBL for developing the ability to reason (which in this study we define as argumentative knowledge) related to nursing care for patients with depression.

Hence, the research questions that guided this study were the following: 1) How should we use the PBL model to design a teaching/learning sequence about depression in the third year of the Nursing undergraduate degree courses? 2) Does this improve the declarative and argumentative knowledge about depression in the experimental groups compared with the groups of students that use traditional methodology in the third year of the Nursing undergraduate degree courses?

METHODS

In order to respond to the research questions, it was necessary to integrate the problems into the course curriculum (Gould et al., 2015), establish the sample and the strategy to be followed. Finally, it required to start the process of implementation that will now be briefly described.

Integration of PBL into the course

The complexity of the competence assessment made it necessary to design suitable strategies for us to be certain that the students acquired these competences. The learning outcomes (LO hereafter) deduced from the competences were more specific and, therefore, more objectively assessed. Hence, in order to carry out this assessment, different LO were determined for each competence. The competences and LO of the course curriculum that we selected to work on with PBL are shown in Table 1.

Insert Table 1

In this study, competence was defined as the 'set of knowledge, attitudes, and abilities required in order to carry out a given occupation' (Yániz, 2008), whereas the LO was defined as 'formulations about what the student is expected to be able to do, understand and/or be able to demonstrate once the learning process has finished' (Kennedy, 2007). Therefore, in this study the assessment activities were focused on LO's. As shown in Table 1, each LO enabled the measurement of declarative (DK) and argumentative knowledge (AK).

In order to measure the differences in the declarative and argumentative knowledge improvement, two problems were solved; one before receiving the training about depression (pre-test) and another in the final exam (post-test). All the students in the PBL group or experimental group (EG hereafter) and the control group (CG hereafter) took this test the same day and under the same conditions.

In this research, declarative knowledge was defined as the factual information stored in memory. It was a descriptive knowledge, e.g. knowing facts such as sign and symptoms, listing nursing cares, etc. Argumentative knowledge was understood as 'supporting statements with reasons'. That is, the students must explain each nursing care intervention and justify them with evidence-based data (Aglen, 2016).

Regarding the validity of the scenarios used both for teaching depression and for the pre and post-test, and their relevance for the study goals, two faculty members from the Department of Nursing from the University of the Basque Country and two psychiatric–mental health clinical nurse specialists with over 5 years' experience in the field confirmed that the content and questions of the problems were appropriate for any student taking the Mental Health Nursing subject. Additionally, a pilot study was conducted with a small student sample. This confirmed that students generally had no

problem understanding the meaning of the problems and the questions. The problem solved by the students in class is presented in Table 2.

Insert Table 2

All the students enrolled in the course answered the two written questions individually, applying the knowledge acquired to answer the questions.

With respect to ethical considerations, this study was not disadvantageous in any way for the participants. Identities were kept strictly confidential and all questionnaires were analysed anonymously. All the participants gave their consent. This research was supported by The Education Advisory Service of the University of the Basque Country (UPV/EHU), who provided funding for developing the research (REF: N. 6836).

Description of the sample and strategies

The research was conducted with third-year students taking nursing undergraduate degree courses at the University of the Basque Country enrolled for the first time in the Mental Health Nursing subject.

The design made for the purpose of comparing the results of implementation was a quasi-experimental one with a pre-test in experimental and control groups to measure the homogeneity of the groups, and a post-test in both groups to measure the differences, if any, in improvement in declarative knowledge (DK) and argumentative knowledge (AK) (Cohen et al., 2011).

Students were assigned randomly to the different groups by a computer application upon enrolment in the first course. Moreover, the EG was considered experimental only

because the lecturer assigned by the department to teach the course applied the methodology indicated in the previous section.

The learning program competencies, learning outcomes and content were the same for both groups. The time commitment for learning the topic of depression was the same; all students received 5 hours of lectures and 4 hours of workshops (Figure 1). Lecturers with extensive teaching experience from the Department of Nursing taught the classes.

Insert Figure 1

The experimental students approached the problem according to the methodology proposed, making use of the class hours, but without receiving extra classes. The difference with the CG was the distribution of time in the different activities, with problem solving prevailing over traditional transmission learning.

A total of 114 students in their third year of the Nursing undergraduate degree courses took part in the study described in this article. 50 % were in the EG group (n = 57) while the rest of the students received traditional instruction (n = 57).

Assessment of the normality of data was performed using Kolmogorov–Smirnov test and Shapiro-Wilk test. Because the data did not have a normal distribution, Wilcoxon's non- parametric test was used to compare the differences in the Post-test minus Pre-test scores between the EG and the CG, before and after the course instruction (pre-test and post-test). Friedman's test for paired samples was used to compare the pre-test and post-test samples in each group. A value of $p<0.05$ was considered significant. This analysis required the data to be balanced, with both measurements completed for each student,

pre-test and post-test. Finally, there were 55 students in the EG and 44 in the CG. The statistical software SPSS version 22 for Windows 8.2 was used.

For each LO a number of possible answers and arguments were established and, the score was calculated based on these. Each correct answer was given a score of 1, making the minimum score obtained zero and the maximum in each LO as indicated: LO 1 and LO 2 (0 to 5); LO 3 (0 to 15); LO 4 (0 to 10); and LO 5 (0 to 42).

Implementation

The implementation of the PBL occurred during October, November and December 2014, in the Mental Health Nursing subject. This course was worth 6 credits and was taught in the first term of the third year.

In a selected review of the problem-solving research, Taconis et al. (2001) showed that effective educational strategies were based on guiding the students to acquire good strategies and criteria that they could use to assess their own process, as well as providing students with feedback processes so they could acquire the problem-solving procedures. Therefore, the feedback with the students strived to be continuous and immediate in every activity.

The implementation of the strategy to approach problems in the classroom setting was based on the PBL protocol developed by Branda (2013). The stages of PBL were as follows:

1. The professor gave the students an open-ended problem situation to engage their interest. In their respective working groups, they tried to transform the situation posed into an approachable problem. The professor guided the discussion among the groups to reach a consensus.

2. Each work group approached the problem, analysed it, started to make the first hypotheses and evaluated possible strategies for solving it. That is, there was a first attempt in which interactions occurred among the different students of the group and between them and the different sources of information, such as textbooks, articles, Internet, etc. Responses were shared in class and the professor pointed out the conceptual and methodological difficulties of the solution, redirected the students and helped them to overcome any obstacles.
3. A few days after the previous sharing in class, and after a group activity done outside of the classroom, the students presented and defended their solutions to the problem with the rest of the class. The professor acted as a guide and moderator of any discussions that arose among the students and used questions to guide them toward the solution and allow the knowledge involved to emerge.
4. Students wrote written reports to summarise the solution to the problem and to state the main arguments, hypotheses and explanations used.

During the process, the professor presented the same problem to the whole class and the different groups of students worked simultaneously at each stage of the process.

The competencies attained by the students were assessed by the professor teaching the class and the rest of the members of the research group as described below.

RESULTS

The results covered two aspects: the improvement of declarative knowledge and the improvement of argumentative knowledge.

The results shown in Table 3 and 4 correspond to Learning Outcomes 1 to 5 acquired by the EG as well as the CG, which were assessed by answering the two problems related to the topic of depression. The results obtained in the EG showed a significant

improvement in the students´scores for LO.1 (Identifies depression) (p=0.000), LO.2 (Justifies the diagnosis of depression) (p=0.000), LO.3 (Identifies relevant data that can explain the problem) (p=0.000) and LO.5 (Justifies nursing strategies) (p=0.000) (Table 3). In the CG the improvement was not as relevant compared to the EG. In addition, the improvement of argumentative knowledge was not significant for LO.2 (p=0.059) and it was weaker than the EG for LO.5 (p=0.006) (Table 4).

Insert Tables 3 and 4

By observing the results of Table 5, where the improvement of each group between pre-test and post-test was analysed using Wilcoxon's test, we noticed that there were no statistically significant differences between the two groups in terms of identifying relevant data that can explain the problem of depression in the problem (LO.3) and listing the different nursing care options (LO.4). Therefore, it seemed that the methodology used did not influence the students' declarative knowledge. That is, the students of both groups were able to identify the memorised subject matter in the text (LO.3) and repeat it (LO.4). However, it become evident that the implementation of the PBL strategy improved the students' results with regard to the argumentative level used (LO.2 and LO.5).

Insert Table 5

When justifying the diagnosis of depression (LO.2) as well as justifying nursing interventions (LO.5), the students of the EG performed significantly better (LO.2, p=0.000; LO.5, p=0.000). The improvement between the pre-test and post-test was

found in a greater number of students in the EG. The examples presented below show this development between pre-test and post-test. In the first two examples transcribed from the pre-test, there are poor explanations of the decisions made:

> *'As a nurse I would give the following advice: relaxation techniques, help her sleep, help her talk about her problem, listen to her, encourage physical activity, make the person comfortable, do supportive therapy and help her not have low self-esteem' (Student 85, Control Group, pre-test).*

> *'Relaxation techniques, establish priorities, divide up work, do sports, psychotherapy...' (Student 44, Experimental Group, pre-test).*

However, after receiving the PBL instruction, there was a significant improvement in the EG, where the students based the nursing interventions on reasons, rather than just simply listing the interventions:

> *'Do physical activity: Scientific research has demonstrated the relationship between depression, anxiety and physical activity. Physical activity helps to release stress besides playing an important role as a distraction. Moreover, sport causes the body to generate endorphins and these act as a natural anti-depressant' (Student 30, Experimental Group, post-test).*

> *'Assessment of the suicidal ideation: according to studies, 90 % of suicide victims have depression. Therefore, it is necessary to be alert to the signs and symptoms (making a will, notes, mood swings...). The Beck scale can be used to measure the level of desperation' (Student 45, Experimental Group, post-test).*

To sum up, the teaching strategy used did not affect the declarative knowledge that students had on depression. However, in regard to the argumentative knowledge, the students of the EG improved signficantly compared with the CG.

DISCUSSION

When we analyse the learning outcomes achieved regarding the knowledge of nursing care for patients with depression, we find that declarative knowledge was consolidated by the traditional expository instruction as well as by the PBL methodology. However, the experimental group improved more than the control group in terms of argumentative knowledge.

Declarative knowledge is a key element to every professional action. This knowledge must provide the basis needed for the nurse to provide nursing care to a patient with depression. This type of knowledge was consolidated by the traditional expository instruction as well as by the PBL methodology. The students in both groups were to the same extent able to recapitulate the knowledge they had memorised (for example, list the nursing interventions given to the patient with depression) or identifying data that appeared in the problem. However, as observed after the analysis of the argumentative knowledge, this should not lead us to the conclusion that traditional methodology is sufficient to educate nursing professionals with a balance between what they need to know and how they use that knowledge (Thorne, 2006). That is to say, argumentative knowledge is necessary for professionals to discriminate between different situations in order to arrive at selecting the best interventions. In this regard, Benner et al. (2010) maintain that reasoning is a basic competency that nurses cannot disregard and that requires targeted development.

Kuhn and Udell (2003)'s research showed that the ability to reason was developed by experiences of participation in argumentative activities. In this context, the PBL applied in the Nursing undergraduate degree courses played a fundamental role in providing opportunities to develop an argumentative ability in the students. With this teaching-learning strategy, the student was obligated to explain the reasons for the interventions

and consequently achieved a deeper understanding of that learnt. From this perspective, argumentation is an essential tool for theoretical activity: beliefs can be maintained without arguments, but only arguments based on critical thinking can establish that they are correct. In this sense, the interest in promoting the argumentation competency not only lies in that these are an aim or an objective of development, but also that it is a means to attain greater knowledge.

Nonetheless, these results should not lead us to believe that all the students of the EG developed argumentative competency for depression nursing interventions, because, as reflected in the data, although a significantly higher number of students of the EG demonstrated argumentative competence, not all of them did. Therefore, as recommended in recent research by Aglen (2016), Forsberg et al. (2014) and Hooper (2014), we should continue working on the argumentative competence of students in the Nursing undergraduate degree courses.

As has occurred in most of these kind of studies (Bengtsson and Ohlsson, 2010; Hofsten et al., 2010; Henderson et al., 2012), students had a positive perception of the new teaching approach. In regard to this, the authors would like to emphasise, as other authors have done (Lambert, 2012; Betihavas et al., 2016), that while a relaxed atmosphere and a positive attitude of the students certainly help in the process, when choosing a methodology, we should not limit ourselves to the students' perception (questionnaires colloquially called "happy sheets"). On the contrary, it is essential to objectively assess the teaching-learning process and the results obtained.

Limitations and recommendations

First, it is necessary to explain that the introduction of the PBL methodology at the beginning of the course was costly and required a greater investment of time and planning than traditional instruction. Moreover, effective learning required the

integration of nursing students into the innovative teaching approach. Therefore, once the various problems that arose in the first four weeks of the course had been resolved, the pace of implementation increased and the students became familiar with the new way of working.

As reported in other studies (Missildine et al., 2013; Simpson and Richards, 2015) students complained of being overwhelmed at several points of the process. Perhaps this would not have occurred if the students had been familiarised with the methodology. Therefore, it would be advisable to familiarise the students with this methodology from the first academic year and employ the approach especially in the first years.

Finally, we also detected that the students' habit of only mentioning the depression nursing intervention without adding a rationale for it was difficult to change (Kuhn and Udell, 2003; Terrón et al., 2012). A significant part of the students still gave no scientific arguments for the interventions. This is perhaps more evidence that for students to develop argumentative competences they must apply them repeatedly and, for this, we must create learning environments in which the student is required to profoundly analyse problems and justify the strategies used. Therefore, a change in teaching strategies is needed throughout the whole education process and not just for one year.

CONCLUSIONS

PBL applied to the Mental Health Nursing subject module in the third year of the Nursing undergraduate degree courses at the University of the Basque Country presented the characteristics summarised below.

- The PBL model was integrated into the curriculum of the Mental Health Nursing module to produce a teaching sequence design dealing with depression in the third year of the Nursing undergraduate degree courses
- A significantly higher percentage of the experimental students constructed a rationale and were able to justify nursing interventions in the care of their depressed patient.
- Declarative knowledge about depression nursing care was consolidated by the traditional transmission learning via presentation of knowledge as well as by PBL.

The results of this research indicate that PBL is a satisfactory tool for the acquisition of the competences desired and emphasise the importance of reasoning as an appropriate method for acquiring the knowledge required to provide effective nursing care for depressed patients.

Although the study outcomes were positive, the teaching design feasibility and outcomes might vary in different contexts. In our experience, continuous modifications by instructors based on evaluations of prior implementations will be necessary. Working examples of teaching sequences that bridge the gap between general clinical practice and classroom practice are therefore an important goal for continuing research in nursing education.

REFERENCES

Aglen, B. 2016. Pedagogical strategies to teach bachelor students evidence-based practice: A systematic review. Nurse Education Today 36, 255-263.

Applin, H., Willians, B., Day, R., Buro, K., 2011. A comparison of competencies between problem-based learning and non-problem-based graduate nurses. Nurse Education Today 31 (2), 129-134.

Banning, M., 2008. The think aloud approach as an educational tool to develop and assess clinical reasoning in undergraduate students. Nurse Education Today 28, 8-14.

Bengtsson, M., Ohlsson, B., 2010. The nursing and medical students motivation to attain knowledge. Nurse Education Today 30, 150-156.

Benner, P., Sutphen, M., Leonard, V., Day, L., Shulman, L.S., 2010. Educating Nurses: A Call for Radical Transformation. San Francisco: John Wiley & Sons.

Betihavas, V, Bridgman H., Kornhaber R, Cross M, 2016. The evidence for 'flipping out': A systematic review of the flipped classroom in nursing education. Nursing Education Today 38, 15-21.

Branda, L.A. (2013). El abc del ABP – Lo esencial del aprendizaje basado en problemas. In M. Carrió, L. A. Branda and J.E. Baños (coord.), El aprendizaje basado en problemas en sus textos. Ejemplos de su empleo en biomedicina (p. 1-16). Barcelona: Fundación Dr. Antonio Esteve.

Burnard, P., 1989. Developing critical ability in nurse education. Nurse Education Today 9 (4), 271-5.

Chan, Z., 2013. A systematic review of critical thinking in nursing education. Nurse Education Today 33, 236-240.

Choi, E, Lindquist, R, Song, Y. 2014,. Effects of problem-based learning vs. traditional lecture on Korean nursing students' critical thinking, problem-solving, and self-directed learning. Nurse Education Today 34 (1), 52-6.

Cohen, L, Manion, L, Morrison, K., 2011. Research Methods in Education, 7nd ed. Routledge, New York.

Cooper, C, Carver, N., 2012. Problem based learning in mental health nursing: the students' experience. International Journal of Mental Health Nursing 21 (2), 175-83.

Distlehorst, L.H., Dawson, B.K., D.L. Klamen, 2009. Supervisor and self-ratings of graduates from a medical school with a problem-based learning and standard curriculum track. Teaching and Learning in Medicine: An International Journal 21 (4), 291-298.

Forsberg, E, Ziegert, K, Hult, H, Fors, U., 2014. Clinical reasoning in nursing, a think-aloud study using virtual patients - a base for an innovative assessment. Nurse Education Today 34 (4), 538-42.

Freeling, M., Parker, S., 2015. Exploring experienced nurses' attitudes, views and expectations of new graduate nurses: A critical review. Nurse Education Today 35 (2), e42–e49.

Gezi, KH., Hadley, F., 1970. Strategies for developing critical thinking. Journal of Nursing Education 9 (2), 9-14.

Gholami, M., Moghadam, P.K., Mohammadipoor, F., Tarahi, M.J., Sak, M., Toulabi, T., Pour, A.H., 2016. Comparing the effects of problem-based learning and the

traditional lecture method on critical thinking skills and metacognitive awareness in nursing students in a critical care nursing course. Nurse Education Today, 45:16-21.

Gobbi, M., et al., 2011. Tuning Educational Structures and Europe. Reference Points for the Design and Delivery of Degree Programmes in Nursing. Bilbao: Deusto University Press. Available at: http://www.unideusto.org/tuningeu/home.html

Gould, BH, Brodie, L, Carver, F, Logan, P. 2015. Not just ticking all the boxes. Problem based learning and mental health nursing. A review. Nurse Education Today 35 (10), e1-5.

Henderson, A, Cooke M, Creedy DK, Walker R., 2012. Nursing students' perceptions of learning in practice environments: a review. Nurse Education Today 32 (3), 299-302.

Hodges, H.F., 2011. Preparing new nurses with complexity science and problem-based learning. Journal of Nursing Education 50 (1), 7-13.

Hofsten, A, Gustafsson C, Häggström E., 2010. Case seminars open doors to deeper understanding: Nursing students' experiences of learning. Nurse Education Today 30 (6), 533-538.

Hooper, BL., 2014. Using case studies and videotaped vignettes to facilitate the development of critical thinking skills in new graduate nurses. Journal for nurses in professional development 0 (2), 87-91.

Hung TM, Tang LC, Ko CJ 2015 How mental health nurses improve their critical thinking through problem-based learning. J Nurses Prof Dev 31 (3): 170-5

Kennedy, D., 2007. Writing and Using Learning Outcomes. A practical guide. Ireland: University College Cork. Available at http://www.tcd.ie/teaching-

learning/academic-development/assets/pdf/Kennedy_Writing_and_Using_Learning_Outcomes.pdf (access 13.06.16).

Kong, LN, Qin B, Zhou YQ, Mou SY, Gao HM, 2014. The effectiveness of problem-based learning on development of nursing students' critical thinking: a systematic review and meta-analysis. International Journal of Nursing Studies 51 (3), 458-69.

Kuhn, D., Udell, W., 2003. The development of argument skills. Child Development 74, 1245-1260

Lambert, N., 2012. Ban happy sheets!--Understanding and using evaluation. Nurse Education Today 32 (1), 1-4.

Lancaster, J.W., Wong, A., Roberts, S.J., 2012. 'Tech' versus 'Talk': A comparison study of two different lecture styles within a Master of Science nurse practitioner course. Nurse Education Today 32, e14–e18.

Missildine, K., Fountain, R., Summers, L., Gosselin, K., 2013. Flipping the classroom to improve student performance and satisfaction. J. Nurs. Educ. 52 (10), 597–599.

Morrall, P., Goodman, B., 2013. Critical thinking, nurse education and universities: some thoughts on current issues and implications for nursing practice. Nurse Education Today 33 (9), 935-7.

Simpson, V., Richards, E., 2015. Flipping the classroom to teach population health: increasing the relevance. Nurse Educ. Pract. 15 (3), 162–167.

Taconis, R, Ferguson-Hessler, M.G., Broekkamp, H., 2001. Teaching science problem solving: An overview of experimental work. Journal of Research in Science Teaching 38 (4) 442-468.

Terrón, M.J., Velasco, P., García, M.J., 2012. Guía para el diseño de recursos docentes que fomenten el desarrollo y evaluación de las competencias transversales en educación. Málaga: Fundación Vértice.

Theisen, JL., Sandau KE., 2013. Competency of new graduate nurses: a review of their weaknesses and strategies for success. The Journal of Continuing Education in Nursing 44 (9), 406-14.

Thorne, S.E., 2006. Nursing education: Key issues for the 21st century. Nurse Education Today, 26:614-621.

Valiga, TM., 2012. Nursing education trends: future implications and predictions. Nursing Clinics of North America 47 (4), 423-34.

WHO, 2013. Mental health action plan 2013-2020. WHO Press: Geneva.

WHO, 2015. http://www.who.int/mediacentre/factsheets/fs369/en/ Depression. Fact sheet N°369 October 2015.

Yániz, C., 2008. Las competencias en el currículo universitario: implicaciones para diseñar el aprendizaje y para la formación del profesorado. Red U. Revista de Docencia Universitaria, número monográfico 1. Available at https://dialnet.unirioja.es/servlet/articulo?codigo=2749775 (access 13.06.16).

Figure 1. Process of the research

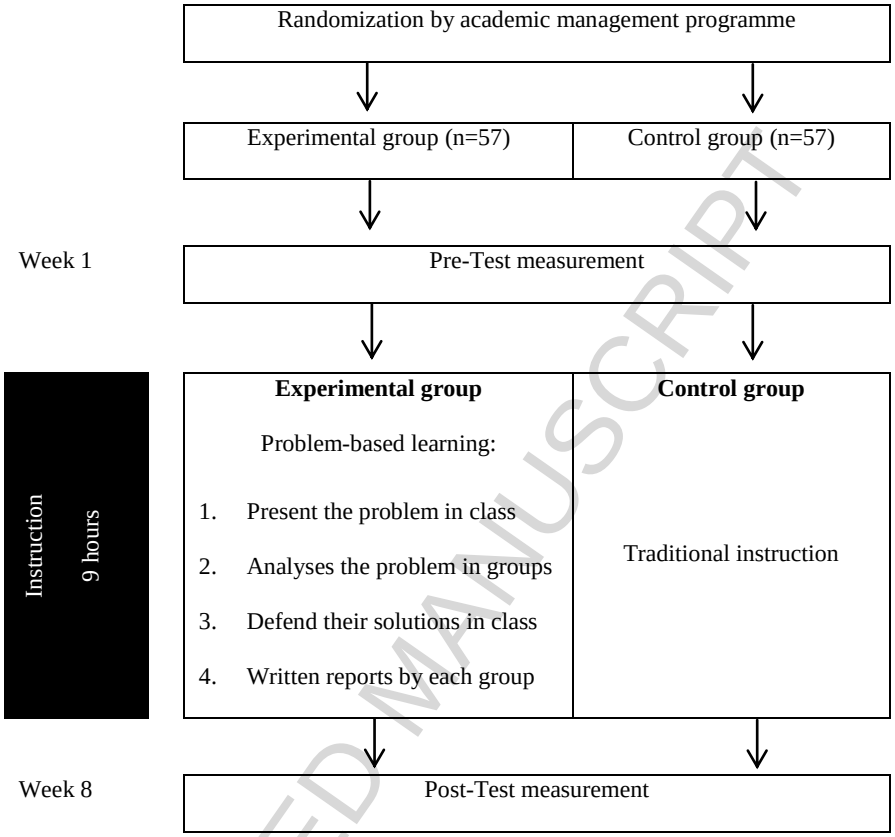

Table 1. Specific competences and learning outcomes worked on with problem-based learning.

Competence (C)	
C.1	Capacity to identify and analyze the influence of internal and external factors which influence the level of health of individuals, identifying the most relevant mental health problems in a community.
C.2	Capacity to recognize normal or changing signs of mental health, suffering or psychological incapacity of the person.
C.3	Capacity to establish a personalized therapeutic relationship with the user with mental problems.
C.4	Capacity to take decisions to respond to ethical or moral and legal dilemmas in the daily practice of the mental health nurse.
Learning outcome (LO)	
LO.1	Identifies the risk of suffering from depression. (C.1; C.2) **(DK)**
LO.2	Justifies the diagnosis of depression. (C.1; C.2) **(AK)**
LO.3	Identifies relevant data that can explain the problem. (C.1; C.2) **(DK)**
LO.4	Identifies the different options that the nurse has to treat the depression**.** (C.3; C.4) **(DK)**
LO.5	Justifies nursing strategies in order to be able to respond in situations of depression. (C.3; C.4) **(AK)**

Abbreviations: C (competence), LO (learning outcome), DK (declarative knowledge), AK (argumentative knowledge).

Table 2. Problem and activities worked on in class.

The 'Isabel's anxiety' problem
'45-year-old Isabel came to the outpatient clinic asking for treatment because in the last 4 months she had noticed that she was feeling anxious, not sleeping well and wanted to give up her job because she was feeling overwhelmed even though previously she had enjoyed her work. Her husband commented that she was well regarded and very popular at work '*she is very hard-working, very responsible, she isn't satisfied until everything is just right. At home she's the same; everything has to be done ...she is very orderly and she gets cross if the children or I leave things lying around, especially now ...she yells at us, cries for no reason'*. The patient acknowledged that she felt sad more often and had almost no enthusiasm for activity of any kind. She felt worse in the morning when she woke up but improved somewhat in the afternoon. She has lost about 7 kg in this time and doesn't sleep well. *'I wake up several times during the night and I find it hard to sleep, I can't stop thinking of all the things I have to do, I feel guilty for not being able to take care of the kids... I believe my husband is going to leave me, I'm irritable... I have thought that if I died things would be better. I don't feel like doing anything. I think about quitting my job. I can't stop thinking that things are bound to get worse; it's a vast feeling of sadness, it's different... it feels like a huge void*'.
Activity (A)
A1. Based on the symptoms presented, what condition does the patient have? (Define the sub-type and rule out the rest, providing a rationale for your answer.) Identify all of the characteristics that appear in the text before arriving at a conclusion. Do you believe that the patient may be suffering from other symptoms as well as the ones she has mentioned? If so, what are they? Why do you think she may be suffering from them but hasn't mentioned them?
A2. The patient has commented indirectly on several possibilities with regard to the aetiology of her problem. Do you think it is important to know what it is? If so, why? What do you think could be the

cause of this problem? Could there be some other cause? Provide a rationale for your answer.

A3. As a general nurse, what nursing care would you give the patient and her family? Do not lose sight of the fundamentals of an interview based on a supportive relationship and support your answer with argumentation.

Abbreviation: A (activity)

Table 3. Mean scores of declarative knowledge and argumentative knowledge in the experimental group.

Learning outcome (LO)	Total (n=55) Pre-test Mean	(SD)	Total (n=55) Post-test Mean	(SD)	Friedman test z	P-value
LO.1 Identifies the risk of suffering from depression (DK)	0.75	(0.55)	2.44	(0.97)	-5.97	0.000***
LO.2 Justifies the diagnosis of depression (AK)	0.15	(0.40)	1.33	(0.88)	-5.61	0.000***
LO.3 Identifies relevant data that can explain the problem (DK)	0.62	(0.49)	2.22	(1.08)	-6.05	0.000***
LO.4 Identifies the different options that a nurse has to treat depression (DK)	4.70	(1.82)	5.18	(2.01)	-1.51	0.131
LO.5 Justifies nursing strategies to respond to situations of depression (AK)	3.09	(1.60)	7.33	(3.74)	-5.47	0.000***

Abbreviations: DK (declarative knowledge), AK (argumentative knowledge), LO (learning outcome) and SD (standard deviation)

* $P \leq 0.05$

** $P \leq 0.01$

*** $P \leq 0.001$

Table 4. Mean scores of declarative dnowledge and argumentative knowledge in the control group.

Learning outcome (LO)	Total (n=44) Pre-test Mean (SD)		Total (n=44) Post-test Mean (SD)		Friedman test z	Friedman test P-value
LO.1 Identifies the risk of suffering from depression (DK)	0.91	(0.42)	1.32	(0.60)	-3.39	0.001**
LO.2 Justifies the diagnosis of depression (AK)	0.02	(0.15)	0.14	(0.34)	-1.89	0.059
LO.3 Identifies relevant data that can explain the problem (DK)	0.50	(0.50)	2.07	(0.97)	-5.41	0.000***
LO.4 Identifies the different options that a nurse has to treat depression (DK)	4.00	(1.85)	4.32	(1.84)	-0.79	0.426
LO.5 Justifies nursing strategies to respond to situations of depression (AK)	0.95	(1.01)	1.75	(1.84)	-2.73	0.006**

Abbreviations: DK (declarative knowledge), AK (argumentative knowledge), LO (learning outcome) and SD (standard deviation)

* $P \leq 0.05$

** $P \leq 0.01$

*** $P \leq 0.001$

Table 5. Comparison of the change scores of declarative knowledge and argumentative knowledge by group.

	Total (n=55)		Total (n=44)			
	Experimental group		Control group		Wilcoxon test	
Learning outcome (LO)	Mean	(SD)	Mean	(SD)	z	P-value
LO.1 Identifies the risk of suffering from depression (DK)	1.69	(0.16)	0.41	(0.10)	-5.98	0.000***
LO.2 Justifies the diagnosis of depression (AK)	1.18	(0.13)	0.11	(0.06)	-6.41	0.000***
LO.3 Identifies relevant data that can explain the problem (DK)	1.60	(0.13)	1.57	(0.16)	-0.22	0.982
LO.4 Identifies the different options that a nurse has to treat depression (DK)	0.49	(0.36)	0.32	(0.34)	-0.29	0.768
LO.5 Justifies nursing strategies to respond to situations of depression (AK)	4.24	(0.52)	0.80	(0.26)	-5.27	0.000***

Abbreviations: DK (declarative knowledge), AK (argumentative knowledge), PBL (problem-based learning), LO (learning outcome) and SD (standard deviation)

* $P \leq 0.05$

** $P \leq 0.01$

*** $P \leq 0.001$

HIGHLIGHTS

- PBL is a satisfactory tool for the acquisition of the desired competencies.
- A significantly higher percentage of the PBL students justify their decisions.
- Declarative knowledge is ensured by both instructions.