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Teaching research methods in nursing using Aronson's Jigsaw Technique. A cross-sectional survey of student satisfaction

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ABSTRACT

Background: To adapt nursing studies to the European Higher Education Area, new teaching methods have been included that assign maximum importance to student-centered learning and collaborative work. The Jigsaw Technique is based on collaborative learning and everyone in the group must play their part because each student's mark depends on the other students. *Home group* members are given the responsibility to become *experts* in a specific area of knowledge. Experts meet together to reach an agreement and improve skills. Finally, experts return to their home groups to share all their findings.
Objective.: The aim of this study was to evaluate nursing student satisfaction with the Jigsaw Technique used in the context of a compulsory course in research methods for nursing.
Methods: A cross-sectional study was conducted using a self-administered anonymous questionnaire administered to students who completed the Research Methods course during the 2012–13 and 2013–14 academic years. The questionnaire was developed taking into account the learning objectives, competencies and skills that should be acquired by students, as described in the course syllabus. The responses were compared by age group (younger or older than 22 years).
Results: A total of 89.6% of nursing students under 22 years believed that this methodology helped them to develop teamwork, while this figure was 79.6% in older students. Nursing students also believed it helped them to work independently, with differences according to age, 79.7% and 58% respectively ($p = 0.010$). Students disagreed with the statement "The Jigsaw Technique involves little workload", with percentages of 88.5% in the group under 22 years and 80% in older students. Most believed that this method should not be employed in upcoming courses, although there were differences by age, with 44.3% of the younger group being against and 62% of the older group ($p = 0.037$).
Conclusion: The method was not highly valued by students, mainly by those older than 22 years, who concluded that they did not learn more with it than with other traditional techniques. The results of this study question whether this form of learning meets students' learning needs and its compatibility with individual and group realities.

1. Introduction

Teaching and learning research methods in nursing science are relatively new in Spain, resulting from the inclusion of nursing studies within the university. Traditionally, the teaching of this discipline has followed the guidelines and prevailing currents in the distinct historical moments of the country, with the most common methodology being traditional lectures. Since 2010, Spanish universities have adhered to the European Higher Education Area (EHEA), following the guidelines set by the Bologna Plan, which places the student at the center of the entire teaching, learning and assessment process and assigns them a much more active role ("European Higher Education Area website 2010–2020 EHEA [WWW Document], 2014). Since then, independent and collaborative work has gained ground and consequently lectures have become less prominent.

The EHEA promotes collaborative learning in small groups, facilitating the acquisition of skills and knowledge through reflection, criticism and knowledge integration. This new model of teaching and learning requires a continuous and formative assessment through a close and productive lecturer–student relationship. The term "competence" encompasses a whole range of skills, attitudes and knowledge, as well as the complex processes of decision-making that encourage the required performance level at each moment (García-San Pedro, 2009).

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2. Background

Nursing studies in Spain are structured by practicums, using constructivism as a pedagogical reference, in which students learn to do and learn by doing, in a reflective, critical and inclusive dialogue between theory and practice (Kinsella, 2006). One feature of the Bologna Plan refers to competence assessment and continuous learning and evaluation (Keeling, 2006). This distinguishing feature requires new methods of collaborative teaching and learning that motivate students to acquire knowledge, skills and attitudes in an independent and collaborative manner, as in the case of the Jigsaw Technique (JT) proposed by Aronson et al. (1978). The JT is a methodology based on collaborative learning that goes beyond teamwork, as each student is essential for the whole group and each student's contribution is also essential to the task. Everyone in the group must play their part because each student's mark depends on the other students. Firstly, *home groups* are created with up to six students in which each student is responsible for becoming an expert in their topic. Secondly, groups of *experts* discuss together and learn from each other. Thirdly, students return to home groups and present the knowledge learned about the topic to the rest of the home group (Fig. 1 and Table 1). The JT is fairly similar to other collaborative learning methods, such as Problem Based Learning (PBL). The main difference is that using JT requires students to become "experts" in specific areas. Each "specialist" teaches the rest of the group; thus, not all the students in the home group have to study everything by themselves. The JT is also slightly more directive than PBL, leaving space for lecturers to intervene and explain contents when needed.

The JT has been used in various fields, such as mathematics (Camp Mora et al., 2007; Lluch Peris, 2007), microbiology (Baviskar, 2013; Soto et al., 2011), computer programming (Anguas et al., 2007), physical education (Navarro Leandro et al., 2008), chemistry (Davis-McGibony, 2010; Doymus, 2008) and medicine and nursing (Buhr et al., 2014; Renganathan, 2013), producing positive results in satisfaction and the acquisition of knowledge. The technique has also been shown to increase students' self-efficacy in French language and mathematics courses (Darnon et al., 2012). Conversely, studies such as that by Bratt (2008), using a large sample of adolescents ($n = 162$), did not show positive results following the use of the JT, especially regarding outgroup attitudes, common in group identity, empathy, or attitudes toward learning.

Table 1
Steps proposed by Elliot Aronson to develop the Jigsaw Technique.
Adapted from "The Jigsaw Classroom" (2015).

1. The whole class is divided into small heterogeneous groups of 5–6 students (mother groups).
2. Within each group, a leader or secretary should be chosen.
3. Divide the topics in 5 or 6 segments
4. Assign a segment to each student so that the student becomes an expert on the topic
5. Assign each student adequate time to work on the necessary materials
6. Set up discussion groups of experts in each topic, which will identify the strengths and weaknesses of the topic, and get the students to rehearse the presentation that will be given to their jigsaw group
7. Gather students within the jigsaw groups
8. Each expert explains his or her segment to the group. The rest of the group must intervene by asking questions to clarify concepts.
9. The teacher moves from group to group to observe the process and intervenes only when problems arise that the group leader cannot solve.
10. At the end of the activity students should conduct a quiz that demonstrates the importance and didactic goal of the activity.

Most publications report results related to intervention groups, without comparing the intervention with a control group. Thus, in view of these methodological limitations, results of the effectiveness of the technique should be interpreted with caution (Bratt, 2008; Moskowitz et al., 1985). Because of the lack of strong evidence and the variety of the results on the JT, lecturers in our center were unable to make an evidence-based decision; there was therefore a need to examine the method in our context and analyze the experience and the results obtained.

In the ESIM, the course on research methods in nursing has a workload of 6 European Credit Transfer System, equivalent to a total of 150 h, of which approximately 30% (45 h) involve face-to-face classroom work and the remaining 70% (105 h) independent work. This course had always been taught using expository traditional lectures producing low satisfaction among students and lecturers. At the end of 2011–2012, the lecturers and the dean agreed that the JT could be an

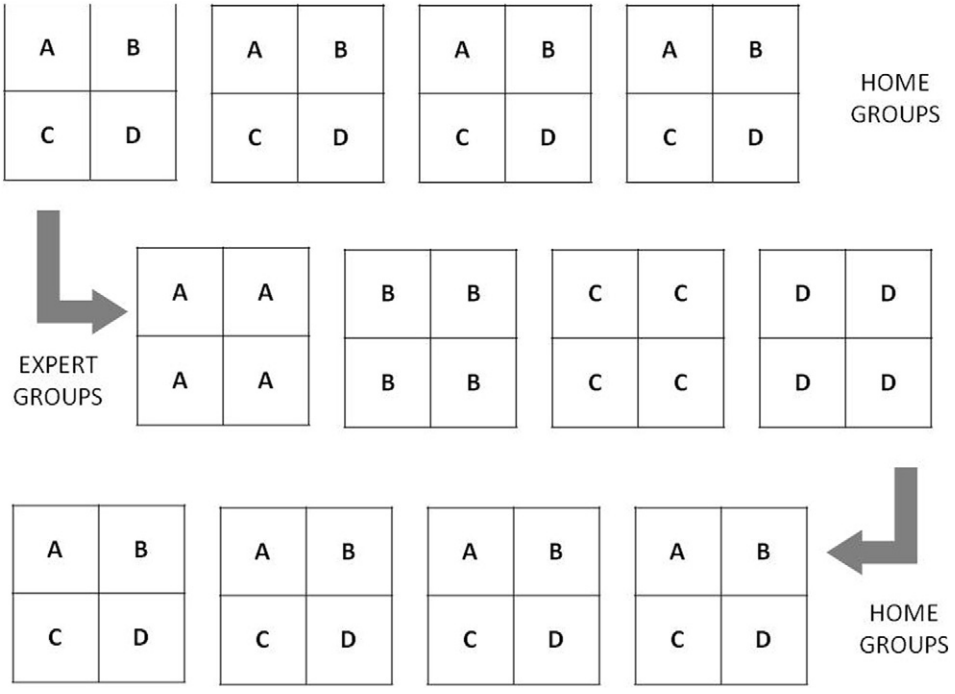

Fig. 1. Jigsaw Technique dynamics representation.