

THE ROLE-PLAYING GAME AS AN INNOVATIVE DIDACTIC PROPOSAL TO PROMOTE ATTITUDES AND VALUES FOR THE ENVIRONMENT IN HIGH SCHOOL SCIENCE STUDENTS

Erika Gonzalez-Sanchez (Spain)¹, Vito Brero ¹, Maria del Carmen Acebal¹

University of Malaga¹

This research is part of the R&D project of Excellence "Development of competences in daily life problems through scientific practices of argumentation, investigation and modeling in secondary and university education", financed by the Ministry of Economy , Industry and Competitiveness in 2017, reference: EDU2017-82197-P. It continues a previous line of research, whose aim of study is the role-playing game as an innovative methodological strategy for the teaching of science and environmental education in A Level (secondary education). In this case, it is focused on the evaluation of the didactic proposal for the 2nd grade of Secondary Education, through the analysis of the qualitative information given, specially, by the assessment questionnaires which include the participants' opinions and experiences. The results obtained seem to show that the role-playing game also constitutes an appropriate strategy to promote attitudes and favourable behaviours toward the environment in the students of 2nd grade of secondary education.

Keywords: Science Education, Society and Environment Education, Secondary School

INTRODUCTION

The line of research, which this work is framed within, is about the role-playing game as an innovative strategy in the teaching of science, to promote the attitudinal change and the development of favourable behaviours in secondary education (from this point forward SE) students.

The previous works analysed the impact of the role-playing activity on A level students (González-Sánchez, et al., 2015). These laid the basis to this third stage, which continues the process of investigation. In this study, both the design and the put into practice share the guidelines -regarding structure and organization- followed by the first stages. Therefore, the present text will deal with this stage, sometimes from a complementary perspective, and other times from a comparative one, in relation to the previously mentioned works.

THEORETICAL FOUNDATION

Our line of research is based on three essential foundations: a) the scientific education and the Science-Technology-Society approach (from this point forward STS), b) the work based on competences, c) the educative advantages of the role-playing game.

The STS approach has been described and investigated by numerous studies, which have been a guide for our didactic proposal (García y Cauch, 2008; España Rueda and Blanco, 2012; Prieto, España and Martin, 2012). From this perspective, our didactic proposal is based on the selection of contents which bring the students closer to real life situations, paying special attention to the procedural contents to solve socio-environmental problems and promote positive attitudes that contribute to their role as citizens.

The work based on competences constitutes the second foundation for our proposal and that can be observed, as it was the case in the previous stages, in the design of the proposal. Firstly, the design focuses on the competences exposed in the current legislation in matters of education for our territory at the moment of the development; secondly, on the key and basic competences, which have been considered in studies of great interest for this process of design (López-Gay, 2012; de Pro, 2013); thirdly and in a special way, on the

scientific competence, through authors such as Caamaño, Cañal, de Pro and Pedrinacci (2012) and Blanco, España and Rodríguez Mora, 2012.

Finally, many authors have investigated the educative advantages of the role-playing game and the argumentation, which is a process of undeniable importance for the development of this kind of activities. Likewise, the works of Díaz and Troyano (2013) and Hamari and Koivisto (2013) about gamification are taken into account, since it is a line of research which provides our study with interesting perspectives about the desirable characteristics of the game, to favour its influence in the promotion of the attitudinal and behavioural change in the participants.

METHODOLOGY

The didactic proposal exposed in this third stage of the investigation consisted in the making in the put into practice of a role-playing activity framed within a didactic unit about the Sustainable Development, in the subject of Biology and Geology in the 2nd grade of CSE during the school year 2014/15 at Málaga (Spain). In total, 93 students from four class-groups participated, and they worked on the proposal during three class sessions.

The role-playing activity was based on “the promotion of the creativity, the teamwork, the capacity to speak in public, the autonomous learning and the use of appropriate methods of investigation –among other students’ competences-, using the information and communication technologies properly” (González-Sánchez, et al., 2017).

In order to assess the proposal of the role-playing activity, the same instruments used in the previous stages were carried out: teachers’ diaries, external observers, video recordings and assessment questionnaires. These questionnaires, answered by the students after the activity, constitute the principal aim of analysis for the present work. They include the students’ perceptions about the contribution of the role-playing game to their own learning and to the promotion of attitudes and favourable behaviours towards the environment. Finally, the students’ previous ideas were explained in a pre-test (written before the role-playing game) and also their opinions after the activity. The analysis of this information was useful to determine if the students’ attitudinal change and/or a change in their opinion occurred, in relation to the topic of the activity: the construction of an offshore wind farm next to their city.

ANALYSIS OF RESULTS

The qualitative information included in the teacher diary, in the notes taken by the external observers and the video recordings were categorized to be analysed. As well as it happened in the previous stages, this information showed that the students were really participative and that the role-playing game was of great interest and motivation (both during the preparation and the development of the activity).

The pre-post test consisted in a unique question, in which the students were asked to reflect on their own opinion about the construction of an offshore wind farm next to their city. The analysis of the answers offered the following results: before carrying out the role-playing game, 39% of the participants were in favour, 44% were against and 17% preferred not to give their opinion; after the role-playing activity, 74% of the students were in favour of the construction of the offshore wind farm, while only 24% were against and 2% did not give their opinion. Those who did not opine before carrying out the role-playing game, explained that they did not have enough information to decide about it or that they did not know the topic. After the game, the main reason not to give their opinion was the lack of information. In this case, the students did know the topic but they could not decide between advantages and disadvantages.

Finally, the analysis of the assessment questionnaires also confirmed a high motivation in the participants. At the precise moment when the activity was explained in class, 77% of the survey respondents thought it was a good idea. Likewise, it also showed a high level of implication: 75% of the students said they have visit at least some of the websites suggested to look for information (37% assured that they have visited all of them).

With respect to the impact of the activity on the participants, 99% consider it an useful activity to the Development of their communicative skills in public, 87% think that it can help them to improve the searching and selection of information and 96% declare that they have learnt something new thank to the development of the activity.

Finally, among the positive aspects mentioned by the students, the following can be found: the coordinated work and the effort of all the group-class, the respect for the speaking time and the opportunity to express and defend their opinions. Regarding the contributions of the activity to the daily and academic life of the survey respondents, the improvement of the oral expression and the acquisition of knowledge about an unknown topic are stood out.

PRELIMINARY CONCLUSIONS

The qualitative investigation carried out in this third launch of the methodological proposal, with the students of compulsory secondary education, shows an information which is really similar to the first investigations with the students of post-compulsory stages (A Level): on the one hand, in relation to their perceptions about the influence of the role-playing activity in their own learning, and on the other hand, to the impact of this methodological strategy on the daily and academic life of the participants.

The data obtained and analysed still point to a positive contribution of the role-playing game to the competencies and attitudinal dimensions. Therefore, it is considered that this third stage consolidates the preliminary conclusions from the previous stages.

REFERENCES

- Caamaño, A., Cañal, P., de Pro, A. Pedrinaci, E. (coord.). (2012). *11 ideas clave. El desarrollo de la competencia científica*. Barcelona: Editorial Graó.
- Blanco López, Á., España, E., Rodríguez Mora, F. (2012). Contexto y enseñanza de la competencia científica. *Revista Alambique, Didáctica de las ciencias experimentales*, 70, 9-18.
- Díaz Cruzado, J., Troyano, Y. (2013). El potencial de la gamificación aplicado al ámbito educativo. *II jornadas de innovación docente de la facultad de ciencias de la educación de la Universidad de Sevilla*, 1-9. Sevilla: Facultad de Ciencias de la Educación.
- España, E., Rueda, J.A. y Blanco, A. (2012). Juegos de rol sobre el calentamiento global. Actividades de enseñanza realizadas por estudiantes de ciencias del Máster en Profesorado de Secundaria. *Revista Eureka sobre Enseñanza y Divulgación de las Ciencias*, Vol. 10, Nº Extraordinario, 763-779.
- España Ramos, E., Rueda Serón, J.A., Blanco López, A. (2013). Juegos de rol sobre el calentamiento global. Actividades de enseñanza realizadas por estudiantes de ciencias del Máster en Profesorado de Secundaria. *Revista Eureka sobre Enseñanza y Divulgación de las Ciencias* 10 (Núm. Extraordinario), 763-779.
- García, J.J., Cauich, J.F. (2008). ¿Para qué enseñar ciencias en la actualidad? Una propuesta que articula la tecnología, la sociedad y el medio ambiente. *Revista Educación y Pedagogía*, 21 (50), 111-122.
- González-Sánchez, E., Acebal Expósito, M.C. y Brero Peinado, V. (2015). Metodologías áulicas innovadoras en ciencias para promover actitudes y valores. Segunda etapa. *Opción*, 31(4), 564-580.
- González-Sánchez, E., Acebal Expósito, M.C. y Brero Peinado, V. (2017). Contribución del juego de rol al desarrollo de la competencia científica en educación secundaria. Percepciones del alumnado participante en una experiencia de juego de rol y dramatización sobre energías alternativas. *Enseñanza de las ciencias: revista de investigación y experiencias didácticas*, (Extra), 4769-4774.

- Hamari, J. (2013). Transforming Homo Economicus into Homo Ludens: A Field Experiment on Gamification in a Utilitarian Peer-To-Peer Trading Service. *Electronic Commerce Research and Applications*, 12 (4), 236-245.
- López-Gay, R. (2012). Los docentes noveles ante la preparación de las clases de ciencias. *Revista Alambique: Didáctica de las Ciencias Experimentales*, 72, 65-74.
- Prieto, T., España, E., Martín, C. (2012). Algunas cuestiones relevantes en la enseñanza de las ciencias desde una perspectiva Ciencia-Tecnología-Sociedad. *Revista Eureka sobre Enseñanza y Divulgación de las Ciencias*, 9 (1), 71-77.
- De Pro, A. (2013). Enseñar procedimientos: por qué y para qué. *Alambique: Didáctica de las Ciencias Experimentales*, 73, 69-76.