

Agro-food democracy role game: exploring the EU decision-making processes for non human biotechnologies

Juego de rol de democracia agroalimentaria: explorando el proceso de toma de decisiones de la UE para biotecnologías

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PALABRAS CLAVE

Agrobiotecnologías; Pensamiento crítico; Aprendizaje basado en problemas; Juegos de rol; Competencias de ética.

RESUMEN Los estudiantes de ciencia y tecnología comprenden con facilidad los aspectos científicos de los cultivos GM y los argumentos a favor de su utilización en la agricultura y la alimentación. Pero, ¿cómo adentrarse en los aspectos controvertidos que rodean a las agrobiotecnologías en el ámbito internacional? Esta herramienta de aprendizaje activo emplea un enfoque basado en problemas y da a los estudiantes la oportunidad de desarrollar habilidades de pensamiento crítico relativas a los aspectos éticos, políticos, sociales y jurídicos implicados en las agrobiotecnologías.

KEYWORDS

Agrobiotechnologies; Critical thinking; Problem-based learning; Role-play; Ethical competencies.

ABSTRACT Science and technology students understand well the scientific approaches behind GM crops and the arguments for using them in cultivation and food applications. But, how can we introduce them to the controversial issues regarding the Agro-Food Biotechnologies? This active learning tool uses a problem based approach and gives the students the opportunity to develop critical thinking skills regarding the ethical, political, social and legal aspects involved in the agro-food biotechnologies.

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MOTS CLÉS

Les agro-biotechnologies; La pensée critique; L'apprentissage par problèmes; Jeux de rôle; Les compétences éthiques.

RÉSUMÉ Les étudiants de la science et de la technologie comprennent facilement les aspects scientifiques des récoltes GM et les arguments en faveur de leur utilisation dans l'agriculture et l'alimentation. Mais comment approfondir dans les questions controversées entourant la biotechnologie agricole sur la scène internationale? Cet instrument d'apprentissage actif utilise une approche basée sur les problèmes et il donne aux étudiants l'occasion de développer des compétences en pensée critique relatives aux aspects éthiques, politiques, sociales et morales impliqués dans la biotechnologie agricole.

Agro-food democracy-an active learning tool: aims and scope of a multidisciplinary project

In Europe the social debate about transgenic, or genetically modified (GM), foods appears to be insurmountable, with an overall large percentage of society opposed to (Schurmann, 2004), or undecided about, their commercialization (20% each, according to the 2010 Eurobarometer), and wide differences among countries. Science students understand well the scientific approaches behind GM crops, the scientific arguments for cultivating them and their use in food applications, and even the legal basics of the European authorization process (Escajedo, 2006). Yet, it is very confusing for students as citizens to interface scientific principles and data of agro-food biotechnologies with other societal issues related to food production such as organic farming, sustainable agriculture, food safety, the perceived control of seeds by transnational corporations, the perceived loss of biodiversity and traditional seeds and foods, or the anti-GM food attitude of most NGOs, among many other issues. These other aspects are generally not included in most science courses dedicated to agro-food biotechnology for a variety of reasons.

The process of adapting Undergraduate and Post-Graduate Degree Programs to the European Higher Education Area (EHEA) has changed the concept of student, so that they are now active participants in the teaching-learning process. That implies changing the design of course programs, as well as teaching methodologies. In the case of food ethics applied to agro-biotechnological developments we have considered that a Problem Based Approach will be useful, because it will make students immerse themselves in the debate. In addition to the factual information about various aspects of agro-biotechnology, we want them to understand the different opinions and the root of the conflict that opposes organic farming and defendants of GM crops and the difficulty to find solutions that are equitable for all.

In Europe the social debate about transgenic foods appears to be insurmountable, with an overall large percentage of society opposed to, or undecided about, their commercialization (20% each, according to the 2010 Eurobarometer), and wide differences among countries. Science and technology students understand well the scientific approaches behind GM crops and the arguments for using them in cultivation and food applications. Even the basics of the authorization processes are quite understandable for them. How can we introduce them to the controversial issues regarding the Agro-Food Biotechnologies? Why and how far are the principles of organic farming not compatible with those of agro-food biotechnology? Why do some European regions declare themselves as “GM-free” zones? Why do food producers have to advertise in the label that a product contains something that, in turn, could be objectionable for some people? Is GM food a new kind of pressure against developing countries? Who and how makes all the decisions regarding the agro-food biotech products in Europe? We have developed a role-playing game about a hypothetical European Union committee to decide the future of transgenic maize in Europe. Students will have to immerse themselves into the role of consumers and farmers of widely different opinions, scientists, NGOs, and biotechnology companies to arrive at a consensus. The results of using this game in a classroom situation in the 8 participating universities will be presented.

The aim of this presentation is to explain the background and approach of the *Agro-Food Democracy Project*, the multidisciplinary team made up of 20 people from 10 faculties in Spain, The United Kingdom and the United States of America, coming from a wide range of disciplines (from experimental sciences to law, philosophy, sociology, didactics and applied bioethics). The common denominator for all of them is their interest in transmitting multidisciplinary scientific issues to university students who, in their classes, will be exposed only to part of a given issue.

Description of the learning tool

GM foods are a good example of a many-sided, current, controversial subject fueling a heated social debate, at least in Europe. Therefore, we decided to use a problem-based approach to put the students in a situation in which they had to critically examine scientific, ethical, social, legal, and political issues related to GM foods. The students would have to exercise critical thinking when facing different points of view, learn to differentiate science-based facts from opinions, and in the end be able to make up their own minds. We have developed a role-playing game directed to our students from science, law, sociology and bioethics degrees.

The Agro-Food Democracy Project has developed a role-playing game to be played in courses with 10 or more students. In courses with fewer students each role would have to be developed by one or two students, whereas in larger courses students may work in groups to develop each role. Initially, it will be implemented in the following

courses (8 playing groups in total), in the second semester of 2012: 1) Law and Ethics in the Biosciences. Faculty of Science and Technology, Univ. Basque Country (EHU). Undergraduate Degrees in Biology, Biotechnology, and Biochemistry. 2) Transgenic Foods. Master in Food Quality and Safety (EHU); 3) Transgenic Foods. Master in Nutrition and Health (EHU); 4) Social and Legal Aspects of BT. Undergraduate degree in Biotechnology, University of León. 5) Genetics. Undergraduate Degree in Biology. Faculty of Sciences. University of Sevilla. Spain.

Understanding the social debate surrounding GM foods

The social debate surrounding GM foods in Europe appears to be insurmountable. According to the 2010 Eurobarometer, about one third of Europeans consider that GM foods should be encouraged. And this number is lower than that of the 2005 Eurobarometer. However, there are wide differences among countries. For example, in the United Kingdom 44% of the citizens think that GM foods should be encouraged, but only 10% in Greece have the same opinion on the matter. In countries where GM crops are grown (the Czech Republic, Spain and Portugal, for example), more people are in favor of GM crops than in countries where they are not grown.

Many issues get entangled around GM crops which favor controversy (Escajedo, 2006). Among them perhaps the most significant are the following: 1) the science behind it is not easy to understand; 2) among the many stakeholders involved there are widely different, and often opposing, economic interests; 3) positions “in favor” or “against” are backed by political parties who oppose them completely, or favor them completely. The question is so ideologized that it is almost impossible to discuss it in a relaxed and detached manner, taking into consideration the necessary scientific results; 4) there are also ethical and even religious issues which are very important for many people.

The science involved in understanding GM crops is not easy for many people. In addition to learning how transgenic crops are made, it is important to know what methods and technologies are currently used to improve the non-transgenic plants we eat. Then we will know that the genes of conventional plants are also modified, often with procedures that do not occur in nature. Safety considerations are, of course, of paramount importance and it is necessary to have a general idea about how transgenic plants are evaluated prior to commercialization. Environmental aspects have to be taken into consideration as well. And, at least from a scientific point of view, the question of whether organic farming is compatible with the use of GM seeds should be addressed.

From a socio-economic point of view, the involvement of large multinational companies is most questionable for many people. Certainly, there is a concern that multinationals could exert undue economic pressure in developing countries, or control

the seeds of important food crops. In Europe citizens get a mixed message from politicians: on the one hand, the European Commission widely supports biotechnologies, whereas on the other it tolerates the safeguard clause under which several European countries have prohibited GM foods and crops. Local authorities in many places have declared their territories “GM-free areas”, which is not legal. Citizens wonder about the safety of GM foods because they have to be labeled. Some multinational NGOs which are highly respected by society are adamantly against GM plants and foods with little opposition from politicians and political parties. Many people wonder how decisions are made in the EU and who makes those decisions.

We teach a variety of courses covering different aspects of science in general, and GM plants are considered as an example of what modern genetic engineering can achieve. It is very difficult to cover most of these questions in a formal manner in our courses because of their different perspective.

So a role-playing game appeared to be an excellent teaching tool which would make students get involved in real life situations, and take an active role in learning instead of taking notes. Discussions among themselves would force them to consider different points of view, look actively at data, and make up their own minds. In addition, they would have to practice teamwork skills.

Principles guiding the design and use of the learning tool

The principles followed during the design and use of this tool are coherence (all the participating elements help the learning process); construction (students are constructing their own learning process); and motivation (keeping the interest and answering questions is the duty of the tutors). The teaching tool that has been developed during more than a year creates a scenario for a continuous and significant learning experience (Ramsden, 2010).

Students will be presented with the following situation: “The European Commission has gathered a diverse group of stakeholders to express their opinion about the future of GM maize in Europe, specifically MON 810 which is one of the 2 crops allowed to be grown in Europe”. They have to come up with a proposal to continue its cultivation, or not. Among the participants there will be consumers and farmers of widely different opinions, scientists, NGOs, biotechnology companies, etc.

The instructor decides when and how to distribute the roles to the students and does so using a lot number. Depending on the course, students are given the complementary information needed to prepare their roles. For example, in my Transgenic Food courses I have to provide students with sources of information regarding agriculture and the primary sector: no-till farming, livestock raising, etc. Other members of the

research group who teach Law and Ethics in the Biosciences need to provide scientific information in an easily understood manner.

To answer the question, each role will have to examine the past and present of these type of crops, its pros and cons. Students present their roles in about 10 minutes with the help of a power point presentation. For the next hour they debate among themselves, asking questions, and providing further information as requested by others. Then, each role has to make a proposal trying to reach a consensus in the group, and the proposals are voted.

The consumer, who can be in favor or against (or both if there are enough students), is the person in charge of purchasing food for the family. They choose healthy, varied, good tasting food within the family budget. Would they buy transgenic foods? The primary —but not exclusive— concern of the *organic farmer* is to produce *natural* food, healthy, more nutritious, chemical-free, at a reasonable price, and in an environmentally friendly way.

The conventional farmer also wants to produce high quality food at reasonable prices, and they too are concerned with the environment. But they realize that some chemical products are necessary. European farmers find themselves at a disadvantage because certain transgenic foods can be imported but not grown in Europe. The scientist, who is developing draught-tolerant maize, should discuss what transgenic foods can contribute to the quality of life for people in Europe. The member of an NGO needs to find out what is important for small farmers in developing countries. Because situations are widely different and depend on the country, this person should focus on a specific developing country and learn about their needs. Would they advise them to use transgenic seeds? Any type? Certain types only? Which ones? Why?

Explaining the position of a *multinational seed company* which makes and commercializes transgenic seeds is not the students' favorite role. Yet, they need to understand their position, how the environment in Europe affects them, and what influence the situation in Europe has on the short-, medium-, and long term perspectives for them. *The European livestock producer* is affected by the current situation in Europe because feeding prices are raising well above production costs. To facilitate the work of the students, they should decide what animal products will they produce, and find out details about these operations. How do they see the future for their farm?

After presenting all proposals, the group will analyse and debate them. Finally, each role will present a second proposal attempting to take into consideration the interests of the largest number possible of stakeholders, so that the "committee" may reach a consensus. Once the role-playing game is finished, students will be given a thorough explanation of how these types of decisions are made in the EU, so that they may compare it with what they have just gone through. Afterwards, tutors will provide students with several questions to help them reflect on the complex relationship

among agro-food biotechnologies, politics and society. Each individual student will submit a written personal appreciation.

Assessing the experience

Our experience with this role-playing game has been very good. Even though it implies more work than a conventional written report or an oral presentation, both for the instructor and for the students, it is clearly worth the effort. Students enjoyed it very much, took an active part in their learning procedure immersing themselves in their roles, gathering relevant information, presenting and reasoning about it. From our point of view, it is preferable to a classical debate because, although students defend their roles, they can change their minds without feeling that “they gave in” to someone else’s data and reasoning.

During the game the autonomy of students to develop their own critical thinking (giving them the opportunity to build their own opinion on all the issues implied in the debate) is guaranteed. Furthermore, we will also guarantee that all students will acquire the necessary accurate scientific and legal information, as well as basic ethical information. Complemented by other methodologies, the game will allow students to develop abilities and attitudes, as well as transversal competences, such as critical thinking, listening to different opinions, taking into consideration various different interests particularly those of the least powerful and most vulnerable groups, and decision making strategies in plural contexts.

It can be easily adapted to situations in different countries by modifying the roles and the information they provide to the rest of the participants. We have realized that the information they could get on their own is so vast and sometimes so biased that one of the main goals for the team has been helping students accessing and assessing the kind of information they got.

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