

Olaia Martinez Gonzalez, Jonatan Miranda Gomez, Virginia Navarro Santamaria, Iñaki Etaio Alonso, Igor Hernández Ochoa, Idoia Larretxi Lamelas, Marian Bustamante Gallego, Arrate Lasas Elgezua, Edurne Simón Magro, Diego Rada Fernandez de Jauregi & Itziar Txurruka Ortega

Chapter 20. Implementation of Sustainability and Social Responsibility Competencies in the Degree of Human Nutrition and Dietetics

20.1. COURSE SUMMARY

Table 20–1

Audience and level of studies	Students (Bachelor)	
Group size	26–50	
Course duration	16 weeks (for overall subject)	
Credits	9 ECTS (for overall subject)	
Workload	Presence: 6h Self-study: 14h	Total: 20h
Contents/primary topics	<ul style="list-style-type: none"> Aspects of sustainability and social responsibility in the nutrition and diet of specific groups (here especially of elderly people) 	
Main course objectives	<ul style="list-style-type: none"> Optimise resources and management of public canteens for elderly people following criteria of sustainability and social responsibility 	
Main teaching approaches	<ul style="list-style-type: none"> Collaborative learning Active learning 	
Main teaching methods	<ul style="list-style-type: none"> Case study In-class role play Group discussion 	
Learning environment	Classroom (face-to-face learning)	
Link to Sustainable Development Goals	SDG 2 Zero Hunger End hunger, achieve food security and improved SDG 3 Good Health and Well-being Ensure healthy lives and promote well-being for all at all ages	

Table 20–2

Impact assessment:	(None) Low/Medium/High	Explanation
1. Degree of student participation / activeness	High	Students analyse a problem, propose possible solutions, make decisions and design a resolution plan that, in turn, includes a preventive plan.
2. Degree of student collaboration / group work	Medium	Students are working in assigned groups in class.
3. Degree of student emotional involvement	Medium	Students get the opportunity to anticipate results of own actions and empathize with other people.
4. Degree of inter-/ transdisciplinarity	Medium	Throughout the course, students have to propose solutions, make decisions and design a holistic solution under consideration of different positions.
5. Degree of student (self-) reflection	Medium	Students have to reflect about the consequences of the programmed actions.
6. Degree of experience of real-life situations	Medium	Students work on an own project using real data.
7. Degree of nature-related experiences	(None)	
8. Degree of stakeholder integration	Medium	Students conduct an interview with a representative of a stakeholder group.
9. Degree of integration between theory and practice	High	Students use real data provided by stakeholders for direct application of the theory explained in class.

20.2. COURSE INTRODUCTION

This contribution focuses on one part of a subject titled “Nutrition and Diet of Specific Groups”, which is taught over a period of four months within the framework of a degree in Human Nutrition and Dietetics. The *degree* equips health professionals with competences for the assessment of the nutritional status, interventions on individual or collective eating behaviour, and the prevention and treatment of diseases. The degree includes 240 ECTS that are taken over four years. Dietetics and nutrition graduates and dietitian-nutrition professionals are key to promoting sustainable eating patterns and consumption of foods produced in a more environmentally friendly way. Moreover, their work can be devoted to solve malnutrition rates and reduce the healthcare costs that it carries. Therefore, sustainable development and social responsibility are transversal competencies that these graduates should develop to integrate them into their professional work. The *subject* “*Nutrition and Diet of Specific Groups*” consists overall of nine credits. It addresses the nutrition and diet of

three groups: children, athletes and elderly people. The activities described in this chapter are developed for the *part of elderly people*. Within this part, the physiological process of aging is studied. It is analysed in depth what nutritional requirements and recommendations exist for elderly people. Additionally, guidelines for designing a balanced diet are discussed and a focus is put on strategies to adapt those to the conditions of the group of elderly people. It must be taken into account that in master classes students first receive a brief description of the sociology of elderly people.

This chapter presents an example of the way that sustainability and social responsibility can be integrated in the mentioned subject. According to the bibliography (Anderson, 2015; Vega-Marcote et al., 2015; Wiek et al., 2011), sustainability and social responsibility competencies have been first divided into three sub-competencies in order to facilitate tackling them:

- Holistic approach to the problem (C1): This sub-competency describes the ability to study complex systems from different spheres (society, environment, economy, health, etc.) and at different levels (from local to general).
- Predictive or anticipatory capacity (C2): This sub-competency is defined as the ability to propose, analyse and evaluate, as a team, various possible future scenarios related to sustainability. It implies training to anticipate the future evolution of current problems, contexts or measures.
- Strategic competency (C3): This sub-competency describes the ability to design and/or implement transformative strategic interventions or actions related to sustainability, finding solutions to real problems.

Based on this, the lecturers involved in this subject design activities that allow students to achieve these sub-competencies gradually throughout the course. Those comprise active methodologies such as working on a case study and engaging in a role play. Through these activities, students receive information and reflect on sustainability and social responsibility in an active, collaborative and continuous way, during the whole course. Moreover, the activities enable students to integrate the skills into their usual behaviour.

Evaluation rubrics (adapted to each level of learning) are designed to verify the development and acquisition of the three described sub-competencies.

20.3. LEARNING OBJECTIVES

Table 20–3

Learning objective dimension (UNESCO, 2017)	Learning objective	Competency referred to framework described in subchapter “Course Introduction”
Cognitive	Ability to define indicators from the evolution of a problem to provide proposals related to health and nutrition Additionally respect the problem analysis: to identify, analyse and integrate diverse environmental dimensions (social, cultural, demographic, economic, political, physical, biological, media, attitude models ...)	Holistic approach (C1)
	Ability to anticipate the future situation of affected people in case of not acting	Anticipation competency (C2)
Socio-emotional	Ability to design and evaluate transversal plans or proposals to solve problems related to sustainability. Note: Respect the design, students' approach to social responsibility is assessed, taking aspects such as solidarity, education, multidisciplinary and commitment into account.	Strategic competency (C3)
Behavioural	Ability to play the role of people involved in a problem: politicians, administrative workers, nutritionists, chefs from public canteens, social workers, psychologists, etc.	Holistic approach (C1)
	Ability to interview the main stakeholders implied in a problem	Holistic approach (C1)
	Ability to design and evaluate transversal plans or proposals to solve problems related to sustainability	Strategic competency (C3)

20.4. COURSE OUTLINE

Table 20–4

Structure		Session focus	Homework
Subject “Nutrition and Diet of Specific Groups”, Part on elderly people	Session 1 (1h)	Spontaneous reflection about the implementation of collective canteens to improve autonomy, food security and nutritional status of the elderly	Classification of problems and proposal of possible solutions
	Session 2 (2h)	Interview with a technical manager of collective canteens of the city to collect real data; Analysis of proposals in other countries	Design of a strategy to tackle the problem (group work)

Structure		Session focus	Homework
Subject "Nutrition and Diet of Specific Groups", Part on elderly people	Session 3 (1h)	Role-play session	Collection of different perspectives and the severity of the problem
	Session 4 (1h)	Realistic and achievable planning under consideration of different agents, perspectives, solutions and costs of the problem	Report including the strategy to solve the problem and anticipation of its consequences
	Session 5 (1h)	Discussion about the designed strategies	Individual argumentation

20.5. TEACHING APPROACHES AND METHODS

Active and collaborative methodologies are used for the development of this project. These methodologies have been studied in depth in recent years due to the obtained positive results at any educational level (Aranzabal, 2014; Freeman et al., 2014; Prince, 2004). According to literature (Freeman et al., 2014; O'Byrne et al., 2015; Vega-Marcote et al., 2015), it is preferable to work on sustainability by strengthening relationships and reflections with other people, for which active teaching methodologies are most appropriate.

Regarding the three sub-competencies of the complex cross-curricular skill of sustainability and social responsibility, for the development of a holistic vision, it is necessary to combine social and environmental aspects (O'Byrne et al., 2015; Watson et al., 2013). In order to make students understand and integrate such a vision, problem-solving skills must be developed, scientific and social knowledge deepened, and an awareness and sensitiveness about the relationship between human beings and the environment created (Mitchell & Walinga, 2017). Traditional lectures do not enable the development of sustainability in detail. Based on constructivist theory (Ertmer & Newby, 2013), active methodologies are a more suitable tool for students to acquire complex skills. Cooperative work, active participation, reflection, debate and a critical attitude are a fundamental part of sustainability that can be fostered through active methodologies. In these cases, the development of knowledge depends on the participation and reflection of the student (Collins & O'Brien, 2003). Of course, the implementation of such methodologies requires dedication and specific training from teachers (Ashmann and Franzen, 2017; Etaio et al., 2018; Frame et al., 2015; Vega-Marcote et al., 2015).

Active methodologies identify students as true protagonists of their learning, which must be situational, through authentic tasks, that is, related to their professional future. Methodologies such as working on a case study or conducting an in-class role play reinforce this objective. Moreover, cooperative learn-

ing is supported as well through the dynamic of peer-teaching, that encourages positive interdependence among students, and other tasks or exercises, which place students in different perspectives of the same problem and force them to reach consensus.

As mentioned above, in the present subject “Nutrition and Diet of specific groups” (especially the part for elderly people described here) the case method is used in order to facilitate the development of the complex cross-curricular skills of sustainability and social responsibility. A real case is exposed to students with real data about the lack of accessibility to foods among elderly people, which leads to malnutrition problems. This methodology is carried out along the whole course, combined with group discussions and role-playing activities in order to make students deepen in the case, preview its evolution and find the most sustainable solution.

20.6. EXERCISES

The exercise described below (in the form presented to students) covers the whole part focused on throughout this contribution.

Case-exercise: “Public canteens now!”

You are a worker from the administration with responsibility that receives information about the following real problem:

The number of elderly people is increasing in our society as life expectancy increases. However, measurements to ensure their quality of life are not increasing at the same rate. The administration has to meet this challenge. Nursing homes cannot care for more people because they are overcrowded and, moreover, financially inaccessible for some people. As a result, many people are left without a place to go. Who can take care of them? On the other hand, some of these people could live on their own, being able to maintain their "autonomy" with a little help. Furthermore, some cases of food poisoning have occurred due to improper food handling at home. An increasing number of people with malnutrition, such as sarcopenia, are in the hospitals. Even more serious is that some people are dying alone at home, without anyone noticing their absence. As a result, elderly people are taking to the streets to denounce this situation. Society is demanding solutions, starting with the demand for public canteens for them. Their slogan is "Public canteens now!"

You need to analyse the situation from different perspectives, design a resolution proposal to face the problem and consider its possible consequences. For this purpose, the following key questions are provided and discussed in the first session:

- Who can take charge of the problem?
- The problem can be analysed from many different aspects: could you define them? Categorize these aspects, study how affects each one to the problem and propose possible solutions.
- How do you think this problem will evolve?
- Prepare a feasible and realistic four-year strategic plan. Consider the most important aspects that affect to the problem and give solutions.

After, in the second session, you will have to work on an in-depth analysis of the problem, taking into account the problem from different perspectives and based on the real indicators provided: malnutrition range among elderly, demographic details, the available canteens, catering services for elderly people living alone, dysphagia ranges, nutritional campaigns carried out in order to improve the nutritional status of elderly people, etc. This holistic analysis must also contain a forecast of the future situation in case of failure to act.

In the third session, we will carry out a role-playing activity. You will be divided into different groups and each one will have to represent a different person involved in the problem, such as different administrative workers (politicians from different departments), nutritionists, chefs from public canteens, social workers, psychologists, etc. The purpose of this activity is to find the most important roles involved in the problem in order to clarify how the solution needs to be designed.

In the fourth session, you will work on a second deliverable that contains a strategy to solve the problem. For that purpose, you need to contemplate in your proposal the information analysed in the first deliverable. You will have to describe aspects such as: which elderly (all or specific groups) are you going to cover with your solution, how many people will you contract, how many menus can you afford, which funds are you going to use for the projects, etc. Finally, you should consider also the foreseeing of your plan, the consequences that it will have in the future.

Finally, we will carry out a fifth session with a final discussion about the problem and the designed strategies.

20.7. ASSESSMENT

Bearing in mind that this is a fourth-year subject and that aspects of sustainability have been worked on in previous years, it is expected that this activity will help students achieve a high degree of deepening in each of the three sub-competencies. Learning outcomes are measured by three assessment rubrics: the first one for the holistic approach competency (C1), the second one for the

anticipatory competency (C2) and the third one for the strategic competency (C3) (see Table 20–5).

In the assessment rubric for the *Holistic approach competency (C1)*, the learning outcomes consist of identifying or interpreting dimensions, analysing and integrating them. The assessment rubric for the *Anticipatory competency (C2)* is considered at a medium level of abstraction. The students have to foresee and analyse the evolution of the problem, integrating this evolution into the solution. The *Strategic competency (C3)* is the one with the highest level of abstraction. The assessment rubric contemplates the analysis of the plans that tackled specific sustainability problems as well as their design and evaluation. In the matrix, the scale has been divided into four levels (0, 1, 2 and 3) that allow establishing the degree of acquisition of each skill. This activity represents 10 % of the overall final grade for the “Nutrition and Diet of Specific Group” subject. The other 90 % are comprised of a written assignment from classroom practices and the final exam.

Table 20–5

Learning outcomes	Evaluation criteria and grading			
	0	1	2	3
C1 Holistic approach competency				
To integrate dimensions.	They have not integrated or all that they have integrated are wrong.	They have integrated half or some of the dimensions but not correctly or less than half correctly.	They have integrated all of the dimensions but not all are correctly or they have integrated most of them and correctly.	They have integrated all correctly.
C2 Anticipatory competency				
To predict the evolution of the problem development	No, they do not predict the evolution of the problem.		Yes, they have raised any (one or more) aspect(s) concerning the evolution and/or future aspects of the proposed problem.	
To predict, argue and evaluate the evolution of the problem.	They only consider a current perspective of the proposed problem.	They have set out an aspect concerning the evolution of the proposed problem in the future and they argue it.	They have set out an aspect concerning the evolution of the proposed problem in the future and they argue it taking into account one dimension of sustainability.	They have set out an aspect concerning the evolution of the proposed problem in the future and they argue it taking into account different dimensions of sustainability (2 or more).

Learning outcomes	Evaluation criteria and grading			
	0	1	2	3
To predict, argue and evaluate the possible consequences of an intervention.	They do not consider the possible consequences of the proposed intervention.	They have set up an aspect concerning the possible consequences of the proposed intervention and they argue it.	They have set up an aspect concerning the possible consequences of the proposed intervention. They argue it taking into account a dimension of sustainability.	They have set up an aspect concerning the possible consequences of the proposed intervention. They argue it taking into account different dimensions of sustainability (2 or more).
C3 Strategic competency				
To find and debate contextualized action plans for solving problems related to sustainability.	They have designed an action plan but it is not related to any of the dimensions proposed in C1.	They have designed an action plan that considers some of the dimensions analysed in C1.	They have designed an action plan that considers most of the dimensions analysed in C1.	They have designed an action plan that both considers most of the dimensions analysed in C1 and is in accordance with the anticipatory view of the situation (C2).
	They have not considered formative plans, multidisciplinary, and promotion of behavioural changes (and solidarity).	They have considered one of the following aspects: formative plans, multidisciplinary, promotion of behavioural changes (and solidarity).	They have considered two of the following aspects: formative plans, multidisciplinary, promotion of behavioural changes (and solidarity).	They have considered more than two of the following aspects: formative plans, multidisciplinary, promotion of behavioural changes (and solidarity).

20.8. PREREQUISITES

- Prerequisites for students: Students should have passed previous subjects from the Human Nutrition and Dietetics degree, such as, “Food Chemistry and Biochemistry”, “Human Nutrition” or “General and Applied Dietetics” where theoretical contents for understanding the subject “Nutrition and Dietetics in Specific Groups” are laid and problems related to sustainability are proposed to students, which they have to solve.
- Prerequisites for instructors: Any teacher who is an expert in the subject (graduate or PhD in Health Sciences) and aware of sustainability and social responsibility related problems can carry out the present course.
- Required tools: the proposed bibliography and the methodological guide written by the ZEHARGAITUZ research team and published by the Univer-

sity of the Basque Country (see here <https://addi.ehu.es/handle/10810/53790>) can result very helpful.

20.9. RECOMMENDED RESOURCES

- Lozano, R., Ceulemans, K., & Scarff Seatter, C. (2015). Teaching organisational change management for sustainability: designing and delivering a course at the University of Leeds to better prepare future sustainability change agents. *Journal of Cleaner Production*, *106*, 205–215
- Mitchell, I. K., & Walinga, J. (2017). The creative imperative: the role of creativity, creative problem solving and insight as key drivers for sustainability. *Journal of Cleaner Production*, *140*, 1872–1884.
- Navarro, V., Martínez, O., Miranda, J., Rada, D., Bustamante, M. A., Etaio, I., Lasa, A., Simón, E., & Churruca, I. (2020). Including aspects of sustainability in the degree in Human Nutrition and Dietetics: An evaluation based on student perceptions. *Journal of Cleaner Production*, *243*, 118545.
- O'Byrne, D., Dripps, W., & Nicholas, K. A. (2015). Teaching and learning sustainability: an assessment of the curriculum content and structure of sustainability degree programs in higher education. *Sustainability Science*, *10* (1), 43–59.
- Perez Salgado, F., Abbott, D., & Wilson, G. (2018). Dimensions of professional competences for interventions towards sustainability. *Sustainability Science*, *13* (1), 163–177.
- Rose, G., Ryan, K., & Desha, C. (2015). Implementing a holistic process for embedding sustainability: a case study in first year engineering, Monash University, Australia. *Journal of Cleaner Production*, *106*, 229–238.
- Stough, T., Ceulemans, K., Lambrechts, W., & Cappuyns, V. (2018). Assessing sustainability in higher education curricula: a critical reflection on validity issues. *Journal of Cleaner Production*, *172*, 4456–4466.

20.10. GENERAL TIPS FOR TEACHERS

- Sustainability should be developed gradually throughout the academic courses of an university degree.
- Teachers and teaching teams who wish to work on sustainability in their subject or degrees must first consider the three competencies: the holistic perspective, the anticipation competency and the strategic competency.
- Working on sustainability through active and cooperative methodologies and in dynamic groups increases students' conscience and involvement about sustainable development.
- The sustainability teaching proposals must be adapted to the students' profile, in terms of their age and their future professional practice.

REFERENCES

- Aranzabal, A. (2014). Enfoque “Aprendizaje Basado en Proyectos” para enseñar sistemas de potencia de gas y vapor. *@tic. revista d'innovació educativa*, 13, 138–148.
- Ashmann, S., & Franzen, R. L. (2017). In what ways are teacher candidates being prepared to teach about the environment? A case study from Wisconsin. *Environmental Education Research*, 23(3), 299–323.
- Collins, J. W., & O'Brien, N. P. (2003). *The Greenwood Dictionary of Education*. Greenwood Press.
- Ertmer, P. A., & Newby, T. J. (2013). Behaviorism, cognitivism, constructivism: comparing critical features from an instructional design perspective. *Performance Improvement Quarterly*, 26(2), 43–71.
- Etayo, I., Churrua, I., Rada, D., Miranda, J., Saracibar, A., Sarrionandia, F., Lasa, A., Simón, E., Labayen, I., & Martínez, O. (2018). Cross-curricular skills development in final-year dissertation by active and collaborative methodologies. *Interactive Learning Environments*, 26(2), 175–188.
- Frame, T. R., Cailor, S. M., Gryka, R. J., Chen, A. M., Kiersma, M. E., & Sheppard, L. (2015). Student perceptions of team-based learning vs traditional lecture-based learning. *American Journal of Pharmaceutical Education*, 79(4), 51–51.
- Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences of the United States of America*, 111(23), 8410–8415.
- Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education*, 93(3), 223–231.
- UNESCO. (2017). *Education for sustainable development goals: Learning objectives*. UNESCO Publishing.
- Vega-Marcote, P., Varela-Losada, M., & Álvarez-Suárez, P. (2015). Evaluation of an educational model based on the development of sustainable competencies in basic teacher training in Spain. *Sustainability*, 7(3), 2603–2622.
- Watson, M. K., Lozano, R., Noyes, C., & Rodgers, M. (2013). Assessing curricula contribution to sustainability more holistically: Experiences from the integration of curricula assessment and students' perceptions at the Georgia Institute of Technology. *Journal of Cleaner Production*, 61, 106–116.
- Wiek, A., Withycombe, L., Redman, C., & Mills, S. B. (2011). Moving forward on competence in sustainability research and problem solving. *Environment: Science and Policy for Sustainable Development*, 53(2), 3–13.

