IMPACT OF EDUCATE IN A SERVICE LEARNING PROJECT.
OPENING UP VALUES AND SOCIAL GOOD IN HIGHER EDUCATION

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ABSTRACT

In the academic course 19-20, the University of Burgos has launched a call for Service Learning Projects (SLP) with the aim of reinforce the academic skills of the students endorsing a societal transformation. These projects nonetheless pursue very worthwhile goals: to educate students at higher education not only in cognitive aspects, but also in personal growth. Service Learning is a groundbreaking and appeal methodology focused in acquire knowledge by doing community service work. This paper describes a real case scenario composed by students of the University of Burgos from two different careers at the University of Burgos (Degree in Occupational Therapy and Degree in Management Engineering). (N=23 3th, 4th grade students); all have contributed to resolve different challenges by using skills, competences and knowledge of their corresponding disciplines (health and engineering), more specifically, to design and manufacture low cost tools for helping disable people. The contribution adds a picture of how to achieve cognitive competences (technical), social competences (consciousness), ethical competences (compassion) and professional competences (productive versatility), among others. This novel scenario serve for a purpose: opening up values and social good in Higher Education.

KEYWORDS: Service Learning Projects, Innovative Education, Higher Education, Cognitive Competences, Social Competences, Ethical Competences, Professional Competences.

1. INTRODUCTION

The rate at which universities have been assimilating proposals in their educational environments has been constant. Since the first meeting at Praga in May 2001, efforts drive on getting improvements in specific and transversal competences of the students. Nowadays, eighteen years later, it is still present the way of doing innovation at the universities, and, the sustainable human development concept has been included within the topics and guides. Quoting Brotóns, (2009), "to improve the quality of teaching is mandatory to create real learning situations: with new innovative tasks, thinking in a positive ICT future and with acquisition, transfer and updating knowledge processes". Folgueiras, Luna and Puig (2011, pp.159) point out learning by using Service Learning tasks enhance students to "take part directly with those who are supporting, adapting to their needing's and facing up a realistic circumstances, really different from the classroom lectures and environments".

In order to reinforce the theoretical framework of the research, next it is highlight three approaches to the matter; firstly, the concepts of learning theories, and the ethical, social structure of SLP projects. Secondly, novel disciplines such as Design Thinking and its correlation with SLP Projects, and, lastly, an analysis of the impact of STEM education system (science, technology, engineering and mathematics) in our real case scenario.

2. LEARNING THEORIES, ETHICAL AND SOCIAL STRUCTURE FOR SLP PROJECTS

Nowadays, the development of medicine and the advances achieved in rehabilitation processes, generate the need to pay attention to the classic bioethical principles: non-maleficence, beneficence, justice and autonomy. These principles are rational criteria that enable conflicts resolution, although the difficulties of implementation lies in decision-making.

The principle of non-maleficence refers to avoid harming, recklessness and negligence. In the rehabilitation process, specialists must be cautious in decision-making and consider all the technical aspects and consequences of their prescription. Therefore, professionals must consider previous scientific research and adapt it to the needing of their users.

Beneficence is the principle in which healthcare professionals have been educated, therefore diagnostic and therapeutic procedures must be safe and effective. This principle also refers to doing what is good, not only to the user but to society as a whole. Keep in mind that good is a subjective concept, so healthcare professional have to have the necessary mechanisms to know, act and respect the user's necessities.

The principle of justice is about being equitable and fair with the distribution of health resources; that is, users who have the same rehabilitation needs should receive the same services and resources in terms of quantity and quality; and users with higher needs, higher services and resources. This principle guarantees that all users deserve a decent and fair distribution of all health resources.

The principle of autonomy is defined as the user's ability to make their own decisions related to their illness. This implies that the user has to know the consequences of their actions; therefore, health professionals must communicate reciprocally with the user about all the information, recommendations and alternatives for the user about their rehabilitation processes.

The applicability and knowledge of bioethical principles are necessary for quality professional practice. All healthcare professionals must provide their users with efficient, equitable, fair and adequate care in order to reintegrate them into the changing society. This implies the application of all bioethical principles without any hierarchical order, i.e., the principles are all equally important and all they are mandatory. However, clinical practice generates situations where the negotiation among them is required. These situations are real and arise with some frequency in professional practice, so every health professional must have a thorough training in bioethics.

The learning of bioethical principles must be included together with the rest of the subjects of the different health disciplines. All students acquire essential knowledge and skills for their profession, but they must also know the social, cultural and ethical environment before the different situations that may arise in the exercise of their profession (Vera, 2017). Therefore, the learning of bioethics facilitate the student a thinking of the bioethical principles in different situations, and not be limited to the teaching of theories of bioethical attitude.

Bioethics, therefore, is a transversal academic discipline that provides students with skills that allow them to handle the conflicts of values that may appear in clinical practice (Garzón & Zárate, 2015). Current education emphasizes the training of students in competencies, understanding competence as a whole of knowledge (knowing and understanding), skills (knowing how to act) and human attitudes (knowing how to do) that allow excellent clinical practice appropriate to the bioethical context. Bioethics learning encompasses all kinds of skills, both transversal and specific to each discipline and profession, since bioethical principles must be present in all situations.

Learning bioethical principles requires that academic subjects allow the student to become an informant, counsellor and collaborator for users when prescribing a rehabilitation process. Therefore, in many colleges, students receive two types of training; the first relates to the ethical codes of their professions and, the second, focuses on the formation of ethical reasoning. The ultimate goal of bioethical learning is to train professionals to be able to act according to their structured ethical reasoning.

In order to achieve this final goal of bioethical learning, one of the most appropriate ways to teach bioethics is giving the student the chance to see real-life situations where ethical dilemmas can occur, always with the possibility of giving students an accompaniment by teachers. A pedagogical framework where the protagonists of learning are students is "learning and services" (SLP), in which students, guided by a teacher, detect a need in society, develop a project, carry it out and evaluate it.

SLP methodology arises from the continuous search for pedagogical methods that encourage motivational, practical and dynamic learning (Zayas, González Pérez & Gracia, 2018). The SLP is considered an educational proposal that combines learning processes and community services, in which participants learn by working on real needs of the environment in order to improve it (Uruñuela, 2018). That is, it establishes an active relationship between theory and practice, giving the student the opportunity to learn while contributing to society. It is a pedagogical method that integrates the benefits of experimental learning and community service.

SLP is considered a dynamic educational method, proposed to meet educational objectives, including changing the role of instructor to facilitator by teachers. Students have the most active role in their learning by providing a context where they can learn ethics and social responsibility and teach interdependence and partnership within society; due to this, SLP is one of the most appropriate methods to teach students bioethics. Bioethics, like ethics, depends on the cultural, historical and social environment; SLP Projects offers the opportunity to understand those environments that guide how society thinks and behaves (Ventres, 2017). SLP Projects have a structure for preparation, reflection and evaluation of bioethical principles that provide a great opportunity for students to integrate experiences that favour their personal and professional development.

For all the aforementioned, it is appropriate to use the SLP methodology so that students understand the importance of ethical principles (non-maleficence, beneficence, justice and autonomy) that guide their professional practice when establishing rehabilitation processes, since real experimentation of cases creates different situations that improves this learning and allows society to obtain some benefit since the SLP Projects facilitates it.

3. DESIGN THINKING AND ITS CORRELATION WITH SLP PROJECTS

Design Thinking (DTh), refers to a methodology that aims to create innovative solutions to real problems; quoting Tim Brown (2010), DTh is a "person-centred innovation". DTh methodology focus on innovation within interdisciplinary work, including different professional profiles in teams. According to the Hasso-Platter-Institut (HPI, 2020), DTh process is composed by six phases: Understand, Observation, Defining the point of view, Ideation, Prototyping and Test. The team goes through the different phases not necessarily in order of appearance.

The first phase (understand) consists of acquiring the basic knowledge about the problems that lack the potential users of the service to innovate. The second (observation), empathizes with the users and connect with their necessities; the third (definition the point of view) seeks to create the profile of the typical user; in the next phase (ideation), teams must generate all the possible ideas, preferentially without filters and go to the next phase to make real prototypes. Finally, it is about testing the prototypes, not only in laboratory conditions, but also with the users in situ.

According this concept, Steinbeck (2011), talks about the Design Thinking as an innovative pedagogical strategy, which aims to provide students analytics and creative competences. Using DTh methodology in the university context, the author identifies four key points: teams with students from different branches of knowledge, teachers from diverse disciplines, relation with the industrial sector and, workspaces where different teams can work at the same time (mobile furniture, variety of technologies, etc.). In addition, motivate the students and help to achieve the competences with the schedule of the different milestones along the process, such as training and consolidation of the teams, deliver prototypes or the final presentation of the developed device in a Design Exhibition.

There are previous experiences about the application of DTh in the training of health sciences professional (Lori & Reed, 2019; Falcao, Savoy & Markey, 2020). These experiences underline the need to train these professionals within multidisciplinary teams, as well as develop their creativity.

3.1. Analysis of the Design Thinking Model and SLP Experience

The comparison between the Design Thinking Model and the SLP proposal "With you I am Capable" has been carried out at the University of Burgos from two different perspectives: (1) from the DTh as a pedagogical strategy and (2) from the DTh as an own methodology for create new products.

Related to the first perspective (DTh as pedagogical strategy), is important to highlight that the four key points are achieved, although the one related to facilitate common workspaces need to be improved. Due to the milestone of the project, meet the needs of specific disabilities, diversity in the composition of the teams of students and teachers is relevant, it is, Health Science and Engineering.

Moreover, the projects are developed in some organizations; the university contact with them, sign the collaboration agreement, stablish the contact person between the organization and the institution), look for the practical case, and act as a coach providing required knowledge about the user and the necessities to resolve. Regarding the workplace, there is a specific area, called UBUmaker, what is a digital room. Students can fabric their products when prototypes are ready.

Summarizing these framework reviews, Table 1 relate key DTh points according to Steinbeck (2011) and de SLP Projects.

Table 1. Comparison between DTh as pedagogical strategy and SLP project.

DTh Key points as pedagogical strategy	SLP Project	Comments
Students from different branches of Knowledge	Yes	Two degrees: Occupational Therapy and Management Engineering
Diversity disciplines (Teachers)	Yes	Two degrees: Occupational Therapy and Management Engineering
Contacts with the industrial sector	Yes	Through participant organizations
Different Teams work in a specific Workspace	Yes, with improvements	Try to allocate fixed workspaces to favour interaction since the beginning
Training and consolidation of the teams	Yes, with improvements	To stablish a specific plan for set up and consolidate the teams
Schedule milestone delivery	Yes, with improvements	To provide timeline from the beginning of the project
Design Exhibition	Yes	The products were exposed along two weeks in an exhibition

Source: own elaboration

Continuing with the DTh analysis as pedagogical strategy is necessary to mention not only the key points, but also check with the milestones defined by Steinbeck (2011). Accordingly, the training of the teams and its subsequent consolidation was done naturally as the project progresses; however, DTh as pedagogical strategy implies a faster consolidation, what will need to be improved in the next experiences. Likewise, it is identified as a future improvement, the necessity of a better planification of the milestone delivery in the early stage. Finally, the devices were presented through a conference supported by the local council. The participant teams showed their final devices, which after the presentation were also exposed for two weeks, allowing citizens to learn about the innovations made by students and at the same time, highlight the connection of the university with society.

Before starting with the comparative analysis of the DTh as own methodology to create new products, we underline that all students received a specific training about DTh methodology. Table 2 summarize the actions carried out within the SLP Project in comparison with the mentioned methodology.

Checking how the six phases defined by HPI are applied, phases 1 and 2, *Understand* and *Observation*, were done practically at the same time, therefore, students had at least two meetings in order to identify and evaluate their user's necessities and abilities. This evaluation was done through observation, but also through specific Occupational Therapy (OT) assessments; thus, it was made a fusion between DTh methodology and the own process of OT. The aim of this fusion was to develop a factible device. The third phase (*Defining the point of view*) in not applicable to this project, because DTh is typically applied for groups or collectives and SLP project conducted is focused on specific human being with functional diversity.

The *Ideation,* 4th phase, was carried out within each group, with the team members themselves who leaked the best ideas that passed to the *Prototyping* phase; This penultimate phase, had more support from teachers and external collaborators, advising students on better design options, selected materials and feasibility.

Table 2 Comparison between DTh as design methodology and SLP Project

Phases	Project SLP	Comments
Understand	Visit centres and users	Aim: To identify necessities
Observation	Evaluation according OT process	Aim: to evaluate abilities
Defining the point of view	-	It is design for specific individual, not for a collective
Ideation	Intragroup	-
Prototyping	Intragroup with support from teachers and collaborators	-
Test	Intragroup and with the particular user	Tiny changes (parameterization and materials)

Source: Own elaboration

Finally, the *Test* phase needs to join the *Prototyping* phase, following the DTh concept model (HPI, 2020). As long as the prototypes are created, are being tested, first by the students and later, by the final user; all products need to be improved with tiny changes (parameterization and or materials).

4. METHODOLOGY

According the methodology, the scheme of work in the SLP Projects has consisted of four stages: the first one for organizing the students in teams and groups of work; the second one, for acquiring conceptual and practical knowledge by doing learning workshops; the third one, for developing the projects (students use a novel Technological Center of the University of Burgos equipped with new and recent IT technologies such as 3D Printers, electronic devices, machines and material for design and manufacture the support products, and, the fourth one, supervisors have developed a survey for collecting data of satisfaction by using a rubric based on Campo (2015). The expectation about the effects of the use of new learning methodologies (Service Learning Projects) for Higher Education and its repercussion on cognitive competences, social competences, ethical competences and professional competences are the basis of the Hypothesis.

4.1. Empirical Study

In order to complete the study of the SLP Projects at the University of Burgos, participants have answered a survey based on a Rubric developed by Campo (2015). The questionnaire consists in 13 questions (Campo, 2015) and 2 more questions (own elaboration), which matched the structural areas of SLP Projects, such as the approach of learning, competences, level of participation, evaluation, transdisciplinarity, impact and social projection, professional field, resources and multiculturalism. The complete questionnaire can be found at page 15 of the

publication[1], but a sample of the rubric used is included in Table 3. All are qualitative questions can be transformed to numerical values quite straightforwardly; by assigning a score number ranging from 1 (leftmost option) to 4 (rightmost option), depending on the answer selected. The students completed this survey in an anonymous way in order to prevent unintended data recollection and to encourage the student to answer in the most honest possible way. For the quantitative analysis, the mathematical tool used is SPSS v24.

Table 3. Rubric (summarize) for evaluating SLP Projects (survey).

Parameter	Level 1	Level 2	Level 3	Level 4
Learning Approach	SLP Projects are based on memorize concepts and fulfilment institutional requirements with no possible attitude changes.	SLP Projects develop learning that aims to make students change their way of seeing the world, be creators of their reality and encourage metacognition.	SLP Projects develop learning that aims to make students change their way of seeing the world, be creators of their reality. In addition, there is a specific space for reflection on PhD studies.	SLP Projects propose learning strategies that are based on students' interest in maximize understanding and satisfy their curiosity. There are specific spaces for this.
…	…	…	…	…

Source: own translation from Campo (2015, p. 15)

5. ANALISYS OF RESULTS

Due to the novelty of the implementation of the LSP Projects at the UBU, in the current state of our study findings come from a relatively low quantity of students (23 students). Nevertheless, this study is an ongoing research that will try to reach a much greater number of students in the next academic years in order to obtain more statistically significant conclusions.

In the sample, the 52.2% of the students are from the engineering field while the 47.8% come from the health discipline. Figure 1 shows the results of the survey. Valuing the percentages, the most relevant findings are the next:

1. Learning Approach: students of both disciplines agree with the idea that by developing these projects they have changed the way of seeing the world, being creators of their reality and encouraging metacognition.

2. Competences: engineering students have improved their transversal skills, such as autonomy, creativity, critical thinking, personal initiative and sensitivity. Health students have improved their specific proffesional skills.

3. Level of involvement: 75% of the engineering participants consider participation has been projective (determine the project, objectives, design, planning, implementation and evaluation); 17% of them consider participation has been purely consultative. As far as health students, 36%, value the participation as proyective, 36% metaparticipation and a mere 27% purely consultative. Summarizing results, three-quarters of the

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[1] https://doi.org/10.1344/ridas2015.1.6

students value the item participation as proyective and metaparticipative and, the others, purely consultative.

4. Evaluation of the project: all students perceive the project is checked by all participants (institutions, associations and tutors). Nevertheless, the 27% of health students do not notice the service offered to the community.

5. Academic monitoring: 50% of engineering students consider there is an academic follow-up, 50% perceive there is follow-up between the entities and the training institution. Regarding the health students, all sample perceive the follow-up is evaluated between entities and institution.

6. Transdisciplinarity: more than the three-quarters of the students (both disciplines) notice all them work on the same challenges with the need to complement each other.

7. Social impact and projection: 60% of engineering sample realize they work on real and proximate needs and influence society. The 33% point out with these projects is feasible to provide tools to the community when the work is completed (empowering it). Thus, health students (91%) value these experiences can be addressed beyond their execution.

8. Work in nets: all students feel they work in collaboration agreement projects to build a common work, and, the 35% out of them consider it is possible to exchange reflections and improvements in regular meetings.

9. Proffesional field: 17% of engineering students notice these projects contribute to open a vision of the proffesional field with greater emphasis on knowledge generation (any health student observe it). 42% of the engineering students and a 27% of health students value the projects developed similar to their disciplines. By contrast, 73% of health sample and a 42% of engineering sample see the possibility to open up new proffesional challenges within the community and social implication; still, add the possitive view of working with different disciplines.

10. Academic institutionalization. Projection: the whole sample (both disciplines) notice these experience help the promotion of service learn work and point out the importance of doing sistematically.

11. Acadmic institucionalization. Academic support resources: 75% of the students value the projects are located in any structure of the university (subjects). They point out a major support and recognition.

12. Academic institutionalization. Availability of other resources: 33% of engineering students and a 9% of health students recognize the flexible groups of work and open schedules to go ahead with the activities. Approximately the same percentage of students in both disciplines (40%) consider that auhtorizations, agreements and conventions are facilitaded. Only 25% of engineering students, compared to 45% of health students have seen contacts facilitated for project networking.

13. Academic institutionalization. Relevance and visibility: 83% of engineering students and 63% of health students see some institutional recognition and celebration, but it is not institutionalized nor systematized. The most opposite perception is whether these projects favour social recognition through awards and grants, an opinion expressed by 8% of engineering students compared to 36% of health students.

Figure 1. Survey results SLP Projects.
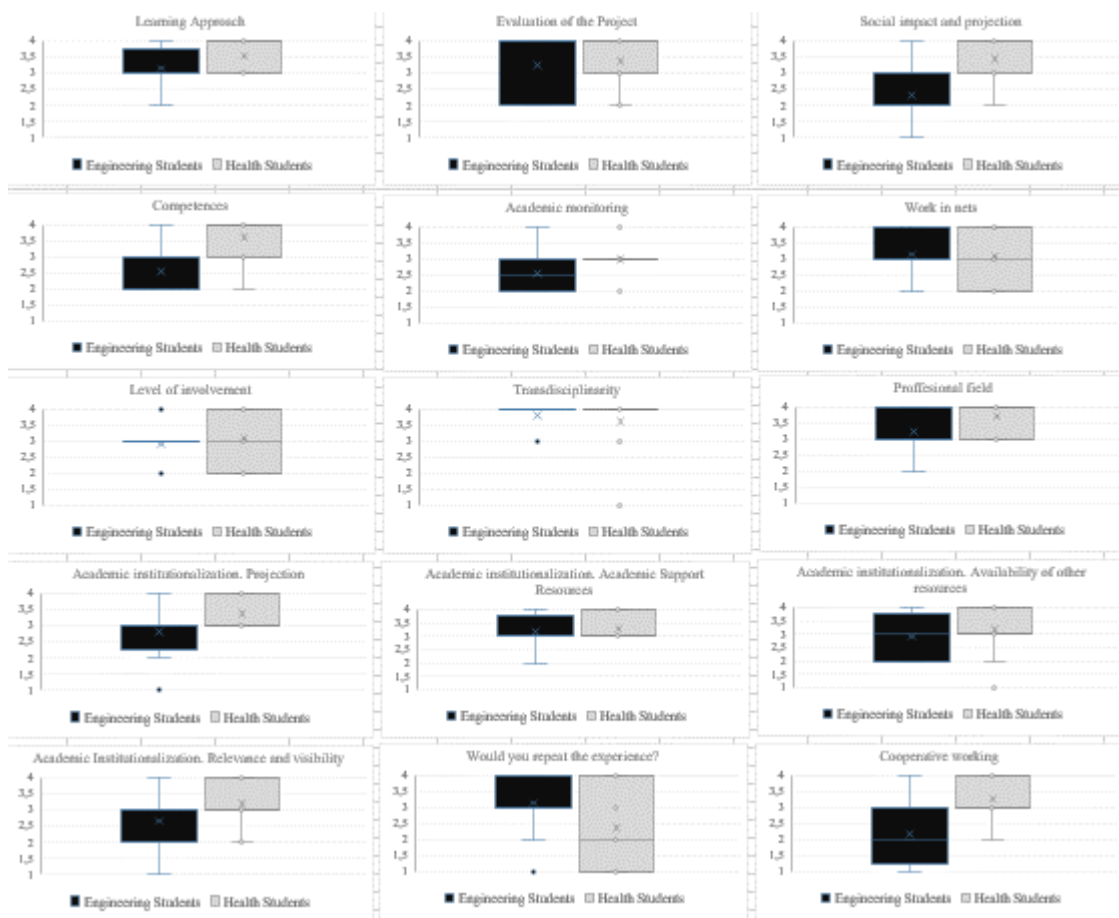
Source: self-elaboration based on Campo (2015)

6. CONCLUSION

The benefit of this research is the contribution for a universal benefit: the impact of educate university students in SLP Projects. This line of work has raised the possibility to opening up values and social good in higher education.

Results in our study inferred there is evidence that student from both disciplines value the experience because the learning approach, level of involvement, transdiciplinarity and collaborative work; as consequence, positive gradient in their academic marks. Specifically speaking, engineering students have improved their transversal skills, such as autonomy, creativity, critical thinking, personal initiative and sensitivity. Health students have improved their concrete proffesional skills.

The future line of work is based on enhance the items with lower percentages, such as, follow-up intervention from all entities involved, impact on society and the possibility to open up new proffesional challenges within the community and social implication.

Overall, in accordance with university responsibility on educate in excellence and values, the proposal of SLP Projects in higher education enable students, professors, stakeholders and society for running a cohesive consortium.

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