Welcome Program and Tutoring Plan for New Students at the Faculty of Engineering of Vitoria-Gasteiz

JOSE MANUEL LOPEZ-GUEDE[1], AMAIA MESANZA[2], JAVIER SANCHO[3], RUPERTA DELGADO[2], ESTIBALIZ APIÑANIZ[4], INMACULADA TAZO[5], JOSE ANTONIO RAMOS-HERNANZ[6], IÑAKI OCHOA DE ERIBE[7]

[1] Department of Systems Engineering and Automatics
[2] Department of Mining and Metallurgical Engineering and Materials Science
[3] Department of Nuclear Engineering and Fluid Mechanics
[4] Department of Applied Physics I
[5] Department of Thermal Machines and Engines
[6] Department of Electrical Engineering
[7] Department of Graphic Expression and Engineering Projects
Faculty of Engineering of Vitoria-Gasteiz
University of the Basque Country (UPV/EHU)
Nieves Cano 12, 01006, Vitoria-Gasteiz
SPAIN
jm.lopez@ehu.es, amaia.mesanza@ehu.es, javier.sancho@ehu.es, ruperta.delgado@ehu.es

Abstract: - The main objective of this paper is to describe two innovative experiences that are being developed at the Faculty of Engineering of Vitoria-Gasteiz (Basque Country University, Spain). The first one is being carried out during the last three years, and in short it is a Welcome Program for the new students. Its objective is to improve the adaptation of this group to its entrance to the university, as well as to try to reduce the dropping out rate of studies during their first academic year. This is the unique initiative of the type at the University of the Basque Country - Euskal Herriko Unibertsitatea (UPV/EHU). The second experience is developed once that the course has begun, offering to these same students a Tutoring Plan, where they can be guided and advised by teachers of the Faculty in order to maximize their academic achievements.

Key-Words: - Welcome Program, Tutoring Plan, Success rate, Dropout rate, Integration, Competences, Skills

1 Introduction

The moment in which a person starts his university career is an important milestone in his life, not only at an academic but also at a personal level. The university involves new knowledge, new learning methods, new responsibilities, new partners and in many cases, even a new home. Students need time to adapt to this new reality and as they achieve it, it will also be reflected in their academic results.

Engineering students are often creative persons, who want to learn new things and find applications and solutions to daily issues. However, during their first year, given the generalist nature of the subjects that they must study, they are not able to find the relationship between theory and practice. This, added to the practically full-time dedication that is required, generates in them a clear lack of motivation, which leads to high dropout rates [1].

At the Faculty of Engineering of Vitoria-Gasteiz, a series of initiatives are being carried out during the last years focused on addressing and improving all these issues. Thus [2] shows a first experience in a remote laboratory for the organization of a basic course in Control Engineering. After some years, once the Bologna framework was implemented, a series of educational innovation projects were carried out both in the field of industrial computing [3] and in computing [4-6]. Some more generic experiences implemented at the Faculty can be found in [7-11].

During the last three academic years, in addition to these activities, we have been developing a 4-day Welcome Program for first-year students. It is developed during the week prior to the beginning of the course and attendance is voluntary, although we are observing a growing trend in the number of students attending it, currently close to 75%. The students, who in addition to attending, develop a small report, receive an ECTS credit. Some of the issues involved are about the engineering work, a

personal development program, the library, transversal skills and study techniques. In addition to this program is located the mentoring plan.

The structure of the paper is as follows. Section 2 states the main objective of the paper. The structure of the Welcome Program and the Tutoring Plan are described in sections 3 and 4 respectively, while section 5 gives the results of the evaluation of the Welcome Program carried out by the students. Finally, section 6 gives out most outstanding conclusions.

2 Objective of the project of educational innovation

At the Faculty of Engineering of Vitoria-Gasteiz we currently offer six engineering bachelor degrees, three of them from the industrial branch, a fourth that will start in September focused on Automotive, as well as the degrees in Engineering in Geomatics and Topography and in Computer Science. Around 100 teachers work in the Faculty, plus 24 people of administration and services. Currently the number of students enrolled is close to one thousand.

As already mentioned, the engineering studies require an effort on the part of the students, as well as constancy from the first day. Sometimes the lack of motivation causes students to drop out of the Faculty mainly during their first year at university.

Therefore, in our school the dropout rates for the different degrees of the 2013-14 course were as shown in Table 1.

With these figures and with the clear objective of improving the results of our first year students, we decided to offer them a Welcome Program. After its completion during two academic courses, from the University of the Basque Country / Euskal Herriko Unibertsitatea we were awarded an educational innovation project of two years more called "Implementation of a Program of Welcome to new students at the Faculty of Engineering of Vitoria-Gasteiz" that ends in December.

Our main objective is on the one hand to improve the integration phase of students and decrease the dropout rate in all our grades. We think that it is important that students feel comfortable in their study centers and integrated into the collective. In addition, the less and less participation of the students in the activities of the Faculty invites us to encourage them to participate, but for this it is important a good communication as well as confidence in the staff of the center.

DEGREE	DROPOUT (%)
Bachelor in Industrial Electronic Engineering and Automatic	45.7
Bachelor in Computer Management and Information Systems Engineering	38.8
Bachelor in Mechanical Engineering	36.3
Bachelor in Industrial Chemical Engineering	36.8
Bachelor in Geomatics Engineering and Topography	24.0

Table 1. Dropout rates of academic course 2013-14

3 Description of the Welcome Program

The entire management team of the Faculty participates in the Welcome Program, as well as other 10-12 teachers of the center. As already mentioned, it takes place during the first week of September, just before the beginning of the academic year, over 12 hours, spread over four mornings.

Attendance is voluntary for students. However, in the three editions that we have noticed that the attendance figure has been increasing annually, being at the moment around 75% of the students enrolled.

The program is divided into four sessions, in which the activities described in the following subsections are carried out.

3.1 Module 1

This first session is divided into two parts. During the first one the students are grouped according to the degree to which they belong and during one hour they are provided information about basic aspects such as the visualization of the timetables, the search of university regulations or the management of corporate e-mail; i.e., basic managements for their day to day. To finish this part, each student is assigned a teacher of the Faculty who will act as tutor teacher during his four years of studies. This moment serves as a first contact. The tutoring staff is chosen according to the criteria of closeness and availability, that the students receive that first friendly face.

The second part of the day consists of a talk where recently graduated students of the Faculty comment their experiences both as students and after finishing their studies in the search of work and facing the world of work. It is well demonstrated that peer understanding works well, so what better than having some of our recent graduates for this task. The graduated students who participate in this second part are chosen so that there is one for each degree in such a way that all of them are represented, who are working in different areas of work. So the new students can visualize different future job prospects. The fact of seeing how newly graduated students present an attractive work experience can be an incentive to increase the motivation for the study of the first year subjects.

3.2 Module 2

The second morning is also divided into two parts. The first of them serves to let them know what is called Personal Development Plan (PDP). That is to say, it is a question of setting goals both at a formative level and at a personal level and trying to establish a form, or a guide that helps them to achieve it. It is important to set priorities in the short, medium and long term, trying in all cases to leave the comfort zone of oneself but without reaching the limit of being in a personal situation uncomfortable or unmotivated. Students are encouraged to make a SWOT, i.e., an analysis of their strengths, weaknesses, opportunities and threats, and are also encouraged to share them with a partner. The final objective is that the students realize the need to develop a PDP to improve his professional profile during these four years. In addition, at the end of the activity the NASA Space Game is carried out, as a result of which, one obtains in conclusion that, in solving complex problems, usually the solution offered by a work group is better than the best individual answer. This activity introduces the need to work the Teamwork competency throughout all the studies, as this will enable a future to solve the increasingly complex problems of the industry.

At the end of this session, the rest of the morning is spent learning the campus library. There, the staff of the library explains them how to find the bibliography they need, such as consulting in digital catalogs, how to request a book or an article that interests them but that may not be available in this library, how to make appointments when writing a dissertation or an article. Ultimately, aspects with which they will have to work every day and that will certainly be useful in their university career.

3.3 Module 3

This day is devoted entirely to study techniques. This is the only activity that is done with teachers from outside the center. It is developed with small groups encouraging motivation and personal reflection, thus favoring a greater participation. The student has the opportunity to rethink his situation, becoming aware of where he is in each area related to study techniques, in order to decide how to make this new trip in which he embarks, identifying strengths and weaknesses.

The knowledge and tools that are taught throughout the course are as follows:

1. Introduction: What are study techniques?
2. My starting point.
3. New requirements.
4. Motivation.
5. Strategies of the learning process.
6. The balance of strategies.

In short, in this module is intended that the students acquire adequate work and study habits to overcome the different subjects of the degree.

3.4 Module 4

This session is devoted to work on some transversal skills such as oral communication, creativity or problem solving. To do this, in addition to visualizing several videos, the students perform a series of group dynamics, so that they get to know each other, interact and lose a little the shyness of the first few days.

In this day the students are divided into four groups, which are formed in a random manner avoiding, as far as possible, several friends in the same team. Each group, always accompanied by a teacher, will try to give solutions to different situations raised by the teacher. The aim of the activity is not so much to achieve a correct result, but rather to encourage the use of creativity and critical reasoning to reach a common goal. In addition to performing the experiment, students should prepare in groups of 3-4 people a small explanation of the activity performed and expose it orally to their peers.

So far each year, nearly 200 students, registered both in Spanish and in Basque (the two official languages in which the courses are taught), have attended these two days.

We believe that it is fundamental that these types of programs to work optimally must have a workshop type format. That is why we do not work with the group as a whole, but we divide it into three smaller ones, in such a way that an agile dynamic is established. We, the teachers involved in the activity, are who repeat it throughout the week.

4 Description of the Tutoring Plan

As it was mentioned before that the new students are offered a Tutorial Plan, which aims to complement the Welcome Program, we are going to devote this section to describe briefly such plan.

All the students participating in the Welcome Program are assigned a teacher or tutor who is available for the accompaniment during the first course, being his function to carry out an individualized follow-up to answer his questions, address his concerns, his needs, his guides and his training process at the Faculty. Each teacher has an average of 20 students assigned and they carry out several follow-up meetings, identifying difficulties and advising in solving the problems presented to the student, as well as in the use of computer platforms of interest at the university (UPV/EHU).

The main objectives are the following:

- To facilitate the transition of new students to university life, favoring integration in the Faculty and in the university.
- To encourage student participation in university life.
- To knowing and to have a closer approach to the syllabus, to the own Faculty, to the services and resources, to the bureaucratic and administrative questions, to support the knowledge of the academic regulations, etc.
- To provide academic and administrative information to newly enrolled students to improve their stay at the Faculty.
- To identify the difficulties and needs that the students show and analyze the possible solutions.
- To improve the satisfaction and motivation of the new student, orienting learning and anticipating any difficulties that may arise.
- To provide support in the use of appropriate work habits for an engineering degree.
- To reduce the dropout rate. If, in spite of everything, the student leaves the Faculty, to collect the reasons for such abandonment.

In short, the tutor teaching staff has the functions of information, counseling, guidance and support to promote the academic, social and personal integration of the student.
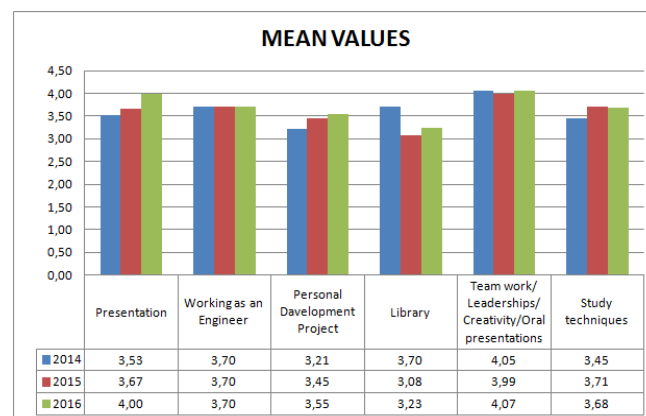

Figure 1. Results given by the students to each part of the Welcome Program (mean values)

	Presentation	Working as an Engineer	Personal Davelopment Project	Library	Team work/ Leaderships/ Creativity/Oral presentations	Study techniques
2014	3,53	3,70	3,21	3,70	4,05	3,45
2015	3,67	3,70	3,45	3,08	3,99	3,71
2016	4,00	3,70	3,55	3,23	4,07	3,68

5 Students evaluation of the welcome Program and results

After the end of the program, during the last session, the students fill out a small survey with their opinions about it. In general, they found the Welcome Program very interesting with an average rating of 3.7/5.0.

In Fig. 1 we can see these individualized assessments for each module, which are the following:

- Presentation of the school: the activity was interesting although they would have liked to know more spaces of the center. The fact of knowing its tutors teachers from the first moment was very well received.
- Working as an engineer: the possibility of listening to recently graduated colleagues was very well qualified, but asked for more information on how to cope with day-to-day studies, rather than how to face their exit to the world of work.
- Personal development program: they found it interesting, something different than usual, well explained and entertaining.
- Library: This activity was too extensive. Surely their delivery once the course is in progress would have a greater effect.
- Transversal competences: students enjoyed this module, being the best scored. They highly valued the idea of working in groups and getting to know their future classmates. The practical format of this activity favors the good host.
- Techniques of study: perhaps the time dedicated to this activity was excessive, although they qualified it as interesting.

6 Conclusions

After three editions of the Welcome Program and we have some interesting data to discuss, although we are convinced that it is a program that needs still more time to be fruitful.

It could be interesting to analyze how the Welcome Program has influenced the drop-out rate of the different degrees offered at the Faculty. The reality is that it is an indicator that is measured two courses after the students have enrolled in the first year of the degree, so that, in order to carry out a serious analysis of the impact of the Welcome Program on the degrees, it is mandatory to analyze the dropout rates in subsequent courses. In addition, it is important to take into account and to analyze carefully that there have been changes among the teachers who teach in the first year as well as in the applied teaching methodologies and to how they have influenced the value of the dropout rates, which are still especially high, so the analysis is not trivial.

It is considered necessary to implement more active teaching methodologies among first year subjects, and we can state that teachers are making a great effort to do so, but there is an unavoidable difficulty, which is the number of students per group in the subjects, which unfortunately makes impossible a more personalized attention to the students.

Table 2 shows the values of dropout rates for the last three courses. We should take into account that all the students of the industrial branch degrees that when they reach the third course are changed of specialty because the two first years are exactly the same for all degrees, are considered students that have dropped out the original degree, which in some way increments the rates disturbing the discussion. Anyway, the most recent results are the result of the first attempt of Welcome Program two years ago, and it has changed and improved in some aspects, but obviously there is a room to continuous improvement.

It must be taken into account that the dropout rate is an indicator that has is related to other variables such as the initial level of motivation of the students to attend an engineering degree (there is always a percentage of them that enrolls encouraged by his parents because of the excellent job prospects of the graduates in engineering). A relevant circumstance is the absence of an initial entry mark in all the degrees because at Spanish level, the number of engineering students is descending a 25% during the last ten years.

DEGREE	DROPOUT (%)		
	2013 2014	2014 2015	2015 2016
Bachelor in Industrial Electronic Engineering and Automatic	46	34	41
Bachelor in Computer Management and Information Systems Engineering	39	32	38
Bachelor in Mechanical Engineering	36	29	34
Bachelor in Industrial Chemical Engineering	37	27	47
Bachelor in Geomatics Engineering and Topography	24	17	26

Table 2. Comparison of the dropout rates of academic courses 2013-14, 2014-15 and 2015-16

That is to say, there is practically no selection of the students who enter into an engineering course, which could be related to the obtained academic results and consecutively, to the motivation of students to continue their studies.

In general we are satisfied with the result obtained these three years, since we believe that some of the objectives that we did raise at the beginning have been achieved, and the results obtained are consistent with the results of other experiences that have introduced cooperative learning techniques [12-14].

Finally, the participating students consider that the activities described in this paper are of great interest and, as a consequence, it is considered necessary to continue doing them in the future. In addition, other possible actions to be taken in the future are being analyzed to improve the indicators obtained.

References:

[1] Felder, R.M., Brent, R., Understanding student differences, *J. Eng. Educ.,* Vol. 94, No.1, 2005, pp. 57–72.

[2] Calvo, I., Zulueta, E., Oterino, F., Lopez-Guede, J.M., A remote laboratory for a basic

course on control engineering. *Int. J. Online Eng.* Vol. 5, 2009, pp. 8–13.

[3] Lopez-Guede, J.M., Graña, M., Larrañaga, J.M., Oterino, F., Educational innovation Project in the field of industrial informatics, *Procedia Soc. Behav. Sci.*, Vol. 141, 2014, pp. 20–24.

[4] Oterino-Echavarri, F., Lopez-Guede, J.M., Zulueta, E., Graña, M., Educational innovation: interaction and relationship inside a sub-module, *Procedia Soc. Behav. Sci, Vol.* 186, 2015, pp. 395–400.

[5] Lopez-Guede, J.M., Soto, I., Moreno Fdez de Leceta, A., Larrañaga, J.M., Educational innovation in the computer architecture area, *Procedia Soc. Behav. Sci.* Vol. 186,2015, pp. 388–394.

[6] Lopez-Guede, J.M., Experiencia docente mediante la metodología de aprendizaje basado en problemas. *IKASTORRATZA e-Revista de Didáctica,* Vol. 14, 2015, pp. 72–85.

[7] Lopez-Guede, J.M., Graña, M., Oterino, F., Larrañaga, J.M., Retrospective vision of a long term innovative experience, *Procedia Soc. Behav. Sci.*, Vol. 141, 2014, pp. 15–19.

[8] Lopez-Guede, J.M., Graña, M., Larrañaga Lesaca, J.M., Innovation in engineering: evolution and perception of teaching innovation initiatives at the faculty of engineering of Vitoria, *J. Altern. Perspect. Soc. Sci.* In press.

[9] Sancho, J., Ochoa de Eribe, J.I., Etxeberria, I., Calvo, I., Píldoras formativas sobre metodologías docentes en la Escuela Universitaria de Ingeniería de Vitoria-Gasteiz, *IKASTORRATZA e-Revista de Didáctica,* Vol. 14, 2015, pp. 1–3.

[10] Sancho, J., Olalde, K., Panorama global de aplicación de metodologías activas en estudios universitarios en ingeniería. *IKASTORRATZA e-Revista de Didáctica*, Vol. 14, 2015, pp. 4–22.

[11] Quesada, J., Sancho, J., Sainz, J.A., Sánchez, J., Gil-García, J.M., Sebastián, R., Castro, M., Combining moodle and redmine as e-learning tools in project based learning of industrial electronics, *IEEE Xplore Digital Library*, 2013, pp. 86–91.

[12] Ramos Hernanz, J.A., Puelles Pérez, E., Arrugaeta Gil, J.J., Sancho Saiz, J., Zubimendi, Herranz, J.L., Ruiz Ojeda, M.P., Aplicación del aprendizaje cooperativo en diferentes asignaturas de ingeniería, *IX Jornadas de Redes de Investigación en Docencia Universitaria.* 2011, Alicante.

[13] Lobato, C., Apodaca, P.M., Barandiarán, M.C. San José, M.J., Sancho, J., Zubimendi, J.L., Development of the competences of teamwork through cooperative learning at the university, *Int. J. Inf. Oper. Manage.* Vol. 3, 2010, pp. 224–240.

[14] Lobato, C., Apodaca, P., Barandiarán, M., San José, M.J., Sancho, J., Zubimendi, J.L., Cooperative learning at the university and dimensions of the competences of teamwork, *Proceedings of the IASK International Conference Teaching and Learning,* 2009.