

Engineering Education in Spain: Has it improved with the Bologna Process?

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Abstract—This Research Full Paper shows and analyzes the results of a study carried out by the IEEE-Education Society Spanish Chapter about several key aspects of the implementation in engineering degrees along Spain of the Bologna process, also known as the European Higher Education Area (EHEA). The study was divided into two surveys. The first survey consisted in an updated version of a previous one performed six years ago for comparison purposes. The main results were used to identify some key topics about the EHEA implementation along these years. The second survey involved new questions focused on the key topics identified in the first one. The main contribution of this paper is to offer a clear vision of the development of the EHEA in Engineering in Spain. It gathers the opinion of engineering professors related to which objectives of the EHEA have been met and which have not, and if it has really been worthwhile and our engineers come out better prepared than with the previous system. The findings of this study, as a main conclusion, show a general agreement about the lack of resources and support and the many different views about what Bologna indicates. Therefore, the need arises for a debate, not only in Spain but also in the EHEA, about the advantages and drawbacks of the Bologna process, and its possible improvements.

Keywords—Engineering Education; Bologna Process; EHEA

I. INTRODUCTION

The Bologna Process (popular name of the EHEA-European Higher Education Area) was a big chance in Spain to change the Spanish Higher Education System, moving from a teacher-centered system to a student-oriented one. Many illusions were placed in this change, as it would also allow mobility, both for teachers and students, not only within Spain but also throughout Europe.

The process of Bologna would involve the introduction of new learning methodologies, continuous evaluation as a fundamental method of assessment and greater dedication of the teacher to the student from being a mere transmitter of knowledge to a guide and facilitator of learning for the student.

A study about the opinion of teachers on various aspects of the implementation of the Bologna Process in Engineering Education in Spain was carried out six years ago, just one year after the full adoption of the EHEA [1]. This year 2018, with an experience of at least seven years in the EHEA, this study was repeated.

The objectives of this study are two: on the one hand, a comparison is made between the two studies to see the evolution in these years, and, on the other hand, it has been collected the opinion of the teachers on the aspects of the implementation of the EHEA that they consider important.

This study was structured into two surveys. The first survey is devoted to collect the results of the first objective, and the second survey is focused on those aspects related to the second objective.

The main contribution of this paper is to offer a clear vision of the development of the EHEA in Engineering in Spain. It gathers the opinion of engineering professors related to which objectives of the EHEA have been met and which have not, and if it has really been worthwhile and our engineers come out better prepared than with the previous system.

The findings of this paper about the implementation of the EHEA in Engineering Education in Spain can contribute to a reflexive debate not only in Spain but also in the international community about the improvement of the engineering degrees.

The structure of the rest of the paper is as follows: in section II the methodology of the two surveys is presented, together with some data about them. Section III describes the results of this second survey together with the pending ones of the first survey. Finally the paper includes some conclusions and indications for the future.

II. METHODOLOGY

This study was structured into two surveys. The first survey is devoted to collect the results of the first objective, basically focused on the following points: (i) the experience of the teachers in EHEA; (ii) the transformation of their teaching; (iii) the support of the institutions; (iv) the workload of teachers and students; (v) the assessment; (vi) the general opinion about the EHEA; (vii) learning methodologies and the resources used in EHEA; and (viii) the aspects of the EHEA considered important for the teachers. The questions related to points (i)-(vi) were implemented as closed-ended questions; the questions related to point (vii) were mixed closed and open ended questions; and the questions related to point (viii) were implemented as open-ended questions. The second survey is focused on the second objective, and it considers those aspects that the teachers considered important and were not included in the first survey (questions related to point (viii)). These questions were developed after an analysis of the two open answers of point (viii) of the first survey.

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The results of the first survey related to points (i)-(vi) were already analyzed and published [2]. In this paper the pending results about resources and methodologies (point (vii)) of the first survey are presented, together with the results of the second survey.

As in the previous surveys, a key goal was to achieve the major number of responses to this second survey, and therefore this had to be as short as possible. The survey included questions about professional information (e.g. university, department, years of experience, etc.), and then the proper questions of the survey (that will be described in the following sections), finishing with one open-ended question to give professors the chance to express whatever they consider important. All surveys were supported by Google Forms, and the time needed to fill out the second one was about 7 minutes.

The dissemination of the survey form was performed with the help of members of the IEEE Education Society Spanish Chapter [3] and the support of the CESEI (Acronym in Spanish of the IEEE Education Society Spanish Chapter) network [4]. CESEI network includes more than 100 professors along Spain interested on Engineering Education.

The general data of this survey and the previous ones is described in the table I.

III. RESULTS

The published results of the first survey [2] were focused on the age and experience of the professors in EHEA, on the transformation of their teaching, on the support of the institutions, the workload (of professors and students), the assessment and the general opinion about the EHEA.

In general terms, there were no significant changes with the survey of 2012 [1], maintaining the general opinions that the EHEA system is not better than the previous one, and that the workload of both professors and students has increased respect with the former system. The only significant increases compared to the previous survey in 2012 were:

- The character optional of the Continuous Evaluation (from 42.6% to 53.3%).
- The percentage of professors that allows students to have success only with the final exam (from 56.1% to 69.1%).
- The percentage of professors that think the number of students who fail is fewer than in the former model (from 51.2% to 61.8%).

TABLE I. SUMMARY OF SURVEYS

| Survey | Dates | Professors | Universities |
|-----------------------------------|-----------------------------|-----------------------------------|--------------|
| 2010/11 | March 22, April 12, 2012 | 570 24% female 76% male | 45 |
| 2016/17 1 st Survey | Nov 2, Nov 17, 2017 | 594 21.5% female 78.5% male | 37 |
| 2016/17 2 nd Survey | March 21, April 14, 2018 | 720 22.1% female 77.9% male | 37 |

In the following subsections the methodologies and resources (pending results of the first survey) will be presented, together with the new aspects of this second survey. These new aspects are: participation in the EHEA, evaluation (continuous evaluation and difficulty of exams), quality and bureaucratic load, objectives of EHEA, generals opinions about EHEA and an analysis of free answers.

A. Methodologies

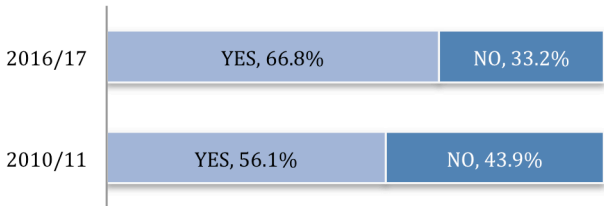
Fig. 1.a shows the percentage of professors that use new methodologies with respect the former system. It can be shown a significant increase with respect the previous survey (66.84% vs. 56.1%).

Fig 1.b shows the percentage of use of different methodologies in this study and in the previous one. The master class continues to be the most used methodology (76.3% vs. 78.4%), while the use of Project Based Learning methodology is notably increased (53.4% vs. 40.7%), as well as the use of Portfolio-based learning is significant decreased (3.7% vs. 8.9%). Finally, the use of flipped learning strongly arises (14.1%).

Other methodologies are used in a minority way, such as laboratory practices (1%), or role-play games in projects (0.1%).

B. Resources

Table II shows the use of different resources in both studies, the current one and the previous one. It can be seen a rise of the use of videos (52.9% use video, vs. 43% in previous study), and as a consequence more than a half of professors use videos.



(a) Comparing with the former system, do you use new methodologies in your classes?

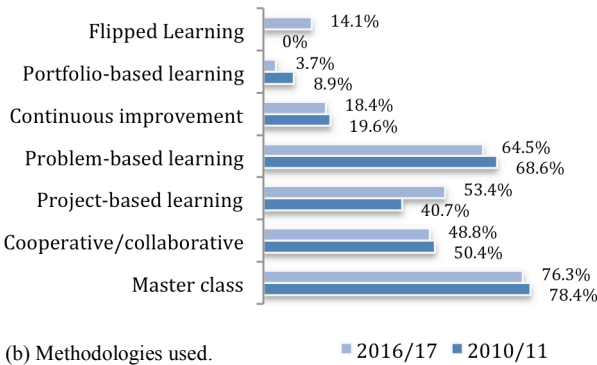


Fig. 1. Aspects related to new methodologies used in class.

TABLE II. RESOURCES (2010/11 vs. 2016/17)

| Resource | Not used | Used | |
|------------------------------------|-------------------------|-----------------------|------------------|
| | | As before | As new |
| Videos | 47.1% (57.0%) | 35.5 (30.9%) | 17.3% (12.1%) |
| Reusable Learning Objects | 59.3% (61.4%) | 33.5% (32.6%) | 7.2% (6.0%) |
| Games | 83.3% (88.6%) | 7.9% (7.7%) | 8.8% (3.7%) |
| Remote or Virtual Laboratories | 73.1% (69.8%) | 18.9% (26.0%) | 8.1% (4.2%) |
| Simulators | 39.1% (44.2%) | 54% (52.5%) | 6.9% (3.3%) |
| Open Educational Resources | 82.3% | 13.6% | 4% |
| Materials from Public Repositories | 34.5% | 55.7% | 9.8% |

For each row: top 2016/2017, bottom (2010/2011). Bolded the maximum value.

Also there is a slight increase on the use of Reusable Learning Objects (40.7% vs. 38.6%), and therefore near a half of professors use them, as well as an increase in the use of Games (16.7% vs. 11.4%), but in this case the percentage of professors that use this resource is still low. And it can be seen also a slight decrease in the use of Remote or Virtual laboratories (26.9% vs. 30.2%).

In this survey, two new resources were considered: Open Educational Resources (OER) and Materials from Public Repositories (MPR). In the case of OER, its use is low (17.7%), but in the case of MPR, its use is high (65.5%), being used as before by the 55.7% of professors. The low use of OER may be basically due to the low knowledge of the meaning of this term by the professors, and some OER may be used under the term MPR. There are also several resources used as before and as new not included in the survey (and therefore also not included in table II), with a percentage of use lower than 1%.

C. Participation in EHEA

In this section there are three questions aimed to know the opinion of the teachers about if the number of students in a class group has been decreased or not with the introduction of the Bologna Process. We must take into account that this process try to focus the learning model over the student. So, we can expect a change in the methodologies used in the classroom (which usually were restricted to the lecture class model), where the focus needs to switch from the teachers to the students.

One of the problems we can find in this new scenario arise from the fact that trying to introduce some of these new methodologies can be really difficult or even impossible, due to the number of students in the classroom. It is very difficult to put a personalized attention over a student, to guide him/her, to follow his/her progress, or to adapt the learning method to his/her specific needs and skills with the teacher has to face a classroom with a big number of students (or even overcrowded).

This is the main reason for trying to gather information about if the amount of students in every class group has decreased in the Bologna Process. Besides, we have done a distinction between the two first courses of the degree and the two last ones, because in the last courses there is a special type of class group that has specifically a reduced number of students (while in the first courses there is no such special reduced group). Also, we have asked a specific question about master courses, where the number of students in classroom is usually small.

We can see the results in Fig. 2. Related to the decrease of students in every group in the first courses of the degree (1st and 2nd ones) there is a 40,1% of survey respondents who opine that it has had a decrease of students (14,7% are strongly agreed with the assertion and 25,4% slightly agree), while the 46,3% opine the opposite (15,7% slightly disagree and 30,6% strongly disagree). A 13,6% do not know. Addressing the last courses of the degree (3rd and 4th ones) a 43,4% think that it has had a decrease of student for group (16,1% are strongly agreed with the assertion and 25,3% slightly agree), while the 39% opine the opposite (16,4% slightly disagree and 22,6% strongly disagree). In this case, a 17,6% do not know. We can conclude that there is no a clear opinion about this question in the degree courses, because there is a similar percentage of survey respondents agree with the fact that there was a decrease of students per group and the ones that disagree with this assertion. A deeper analysis about this question would be interesting as future work. For instance, grouping the answers by institutions could be a good idea to see a clearer tendency for every one of them.

Addressing the groups of the master, we can see a clearer opinion (although not for much) about the decrease of students per group. A 40,8% is agree with the assertion (26,9% strongly agree and 13,9% slightly agree) and 27,6% is disagree (11,9% slightly disagree and 15,7% strongly disagree). Here we can see a significant amount of survey respondents who do not know (31,5%), maybe because they do not teach in master courses.

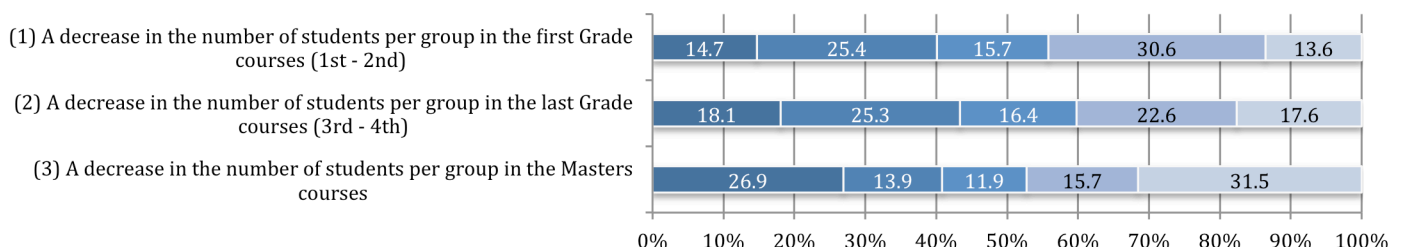


Fig. 2 The implementation of Bologna in my institution has meant: (1), (2) and (3). (Strongly Agree/Slightly Agree/Slightly Disagree/Strongly Disagree/Don't Know)

D. Evaluation

The obligatory nature of the continuous assessment is a recurring theme in the discussions about the EHEA process. Supposedly, continuous assessment is imposed by the Bologna Process, even without the option of being able to pass a course exclusively by taking only a final exam. It is therefore interesting to know to what extent this exclusivity is applied at the moment of passing a course by continuous assessment (without the option of a final exam or another alternative method). We can see in Fig. 3 that in a large majority of cases (79%) it is still offered the option of being able to pass a course without following a continuous assessment. Only in the 14.7% of cases this is not possible (there being 5.3% who do not offer information about it).

Fig. 4 shows us the results of the other four questions related to assessment. The first one is related to the assessment of competences, seen as the way to express the final learning results of a training period. That is to say, when we ask ourselves if an adequate assessment of competences is being carried out in an educational center, we are finally asking ourselves if we are assessing students correctly, in terms of what they have learned. A slight majority of respondents believe that competencies are adequately assessed in their centers (55.7% vs. 40%), with 4.3% having no opinion on this issue.

The next two questions address the subject of the pass rate of the courses. On the one hand, in terms of the pressure that teachers can feel to increase the number of students passing a course in relation to the previous Bologna Process, and on the other hand, as to whether (perhaps precisely because they feel this pressure) the exams given to the students are easier than the previously ones. As we can see, the teachers seem to feel pressured to get a greater number of passing students with the new process (66.6% vs. 30%), with 3.4% who do not have a clear opinion about it. It would therefore be interesting as future work to delve into the reasons why this pressure arises, which could be in some way related to the quality guarantees and objectives of success rates of the centers. In addition, this pressure could be one of the reasons (perhaps even the most important) for the Bologna Process exams to be considered

easier than the previous ones by a large majority of respondents (78.7% vs. 19.3%)

Finally, we wanted to point out in the method used to apply the continuous assessment, and to know if the respondents believe that in most cases this method is largely limited to attend a large number of small exams, which could lead to students to pass the courses more easily but with the side effect of quickly forgetting what they have learned. That is to say, the basic idea is to know if, in some way, the continuous assessment ends up being a way in which students prepare a little amount of material to be examined, and that if this knowledge is not necessary for subsequent exams, these will be lost in a short space of time.

Thus, it seems that a more global version of the courses is lost, causing excessive fragmentation of them, and with the consequent negative effects in terms of ensuring that the knowledge and skills acquired are effectively established in the students. In this regard, 60% of respondents believe that the continuous assessment consists of many micro-exams where students quickly forget what they have learned, while 36.7% think it is not (3.3% do not know if this is the case or not).

E. Quality

Quality assurance in higher education was one of the main purposes of the Bologna Declaration in 1999. A key idea was to develop comparable criteria and methodologies to promote the general quality of the system. In this way, the “Standards and Guidelines for Quality Assurance in the European Higher Education Area” were approved in 2005 and updated in 2015. Along all these years, educational institutions have adopted different procedures, processes and indicators. Some of these instruments are very discussed, but there is a general consensus related to the increase of the bureaucracy load. As it can be seen in Fig. 5, almost 80% percent of the responders indicated that the bureaucracy load increased a lot and 15.7% said it increased something. Just the 5.3% of the responders answered that this load did not increase at all.

This clear result related to the bureaucracy load confirms some of the more common critiques against Bologna, in the sense it involves a lot of paperwork without a clear benefit.

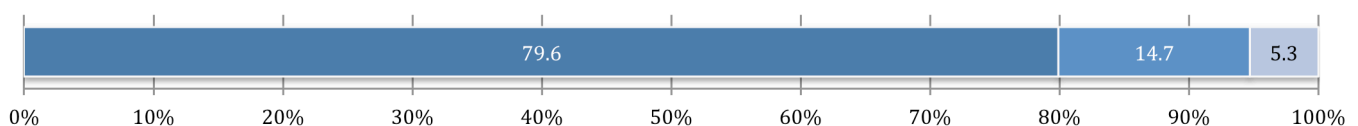


Fig. 3 In your institution, ¿Is it allowed that a student pass a subject without taking into account the continuous evaluation? (Yes/No/Don't Know)

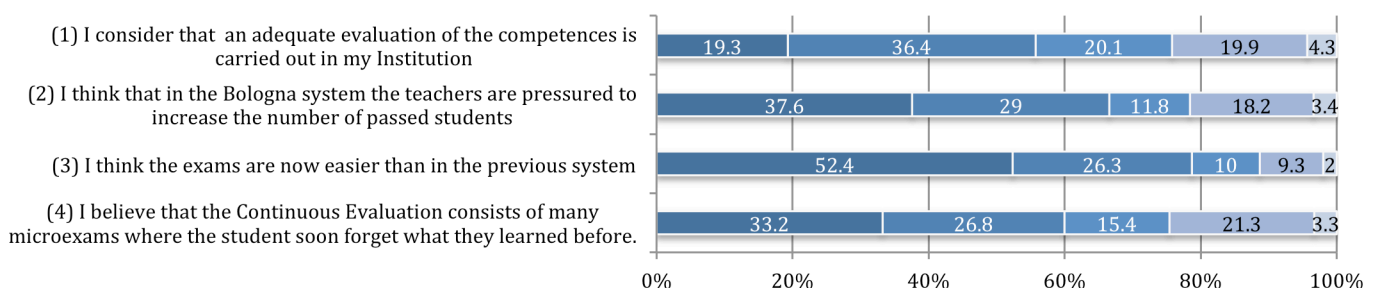


Fig. 4 Opinions about evaluation (Strongly Agree/Slightly Agree/Slightly Disagree/Strongly Disagree/Don't Know).

Indeed, the next question, shown in Fig. 6, inquires about the possible benefits that are pretended with such a bureaucracy. More than 50% of the responders strongly agree that the increase of load does make up for the increase in the intended teaching quality and more than 25% slightly agree with this point. In the contrary position, just 15% of the responders disagree.

In the Fig. 6 it is also asked for the recognition of the academic activities taking into consideration research and teaching. In Spain, these two facets of the academic work are recognized in a very different way. On the one hand, teaching recognitions can be obtained easily, under quite relaxed criteria. On the other hand, research recognitions involve the satisfaction of quite rigid and demanding criteria involving a number of publications in highly rated journals. There is a general feeling among academics that teaching recognitions are obtained by default, while research recognitions have to be gained. As a result, teachers devote much more effort to research than to teaching. In order to confirm this point, we asked teachers if the two activities were recognized equally then the teaching quality would improve. The answers shown in Fig. 6 indicate that almost 80% agree, while less than 16% disagree.

F. Objectives of the EEES

During the analysis of the open answers of the first survey we noticed some differences related to the objectives of the EHEA. The responders seem to have different conceptions about what the EHEA should attain and not. Therefore, we decided to prepare some questions to ask about them about EHEA objectives. These questions and the answers collected can be seen in Fig. 7. At a first glance, it is clear that some questions received a majority of answers in one way, while others show a clear dichotomy. In the next paragraphs we analyze the questions with more differences in the answers.

Question number 1 is related to the continuous assessment proposal. This has been one of the most controversy changes in the EHEA, some teachers already did continuous assessment

before, but many others were “forced” to use it with Bologna. Nevertheless, as it can be observed, the 33.8% of the responders said that continuous assessment, as the main assessment model, is not an objective of Bologna. Indeed, what Bologna says is that the assessment should focus on learning outcomes.

Question number 3 also shows a significant difference in the results. As it has been shown in the previous section, quality assurance is a main objective in the EHEA process, but this is not considered as such by 30.6% of the responders.

The questions that show more differences in the results are the two last ones, 9 and 10. Question number 9 about the reduction of the ratio teacher-learners received 36.8% Yes and 47.6% No. Many teachers considered this as something that should be produced within the EHEA, in order to enhance the quality of the teaching and to provide more assistance to students. Nevertheless, it is not recognized in this way by the majority of the responders, reflecting a clear misconception. Question number 10 also evidences a dichotomy among responders. Half of them consider that teachers have to program all the hours of work of the students, while the other half do not consider in this way.

From these answers we conclude that there exists important misunderstandings about the EHEA objectives. This is an important issue that should be considered by policy makers in order to clarify and provide clear instructions about what academic staff is expected to do.

G. Some general opinions

This second survey included a section with questions referred to some common issues detected in the first second. These questions are presented as sentences and the responder can indicate the degree of agreement/disagreement through a 4-point Likert scale with an additional option to indicate “Don’t Know”. The questions are presented in a row, but they can be grouped in accordance to different topics, as it is shown in the next paragraphs, cf. Fig. 8.

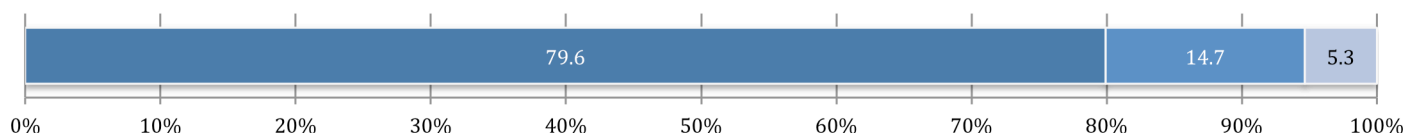


Fig. 5 With Bologna, the bureaucratic load increased... (Much / Little / Nothing)

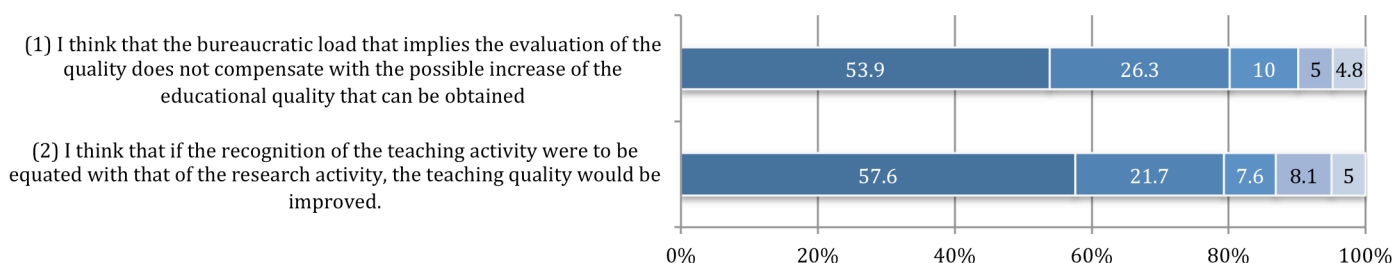


Fig. 6 Opinions about Quality (Strongly Agree/Slightly Agree/Slightly Disagree/Strongly Disagree/Don't Know).

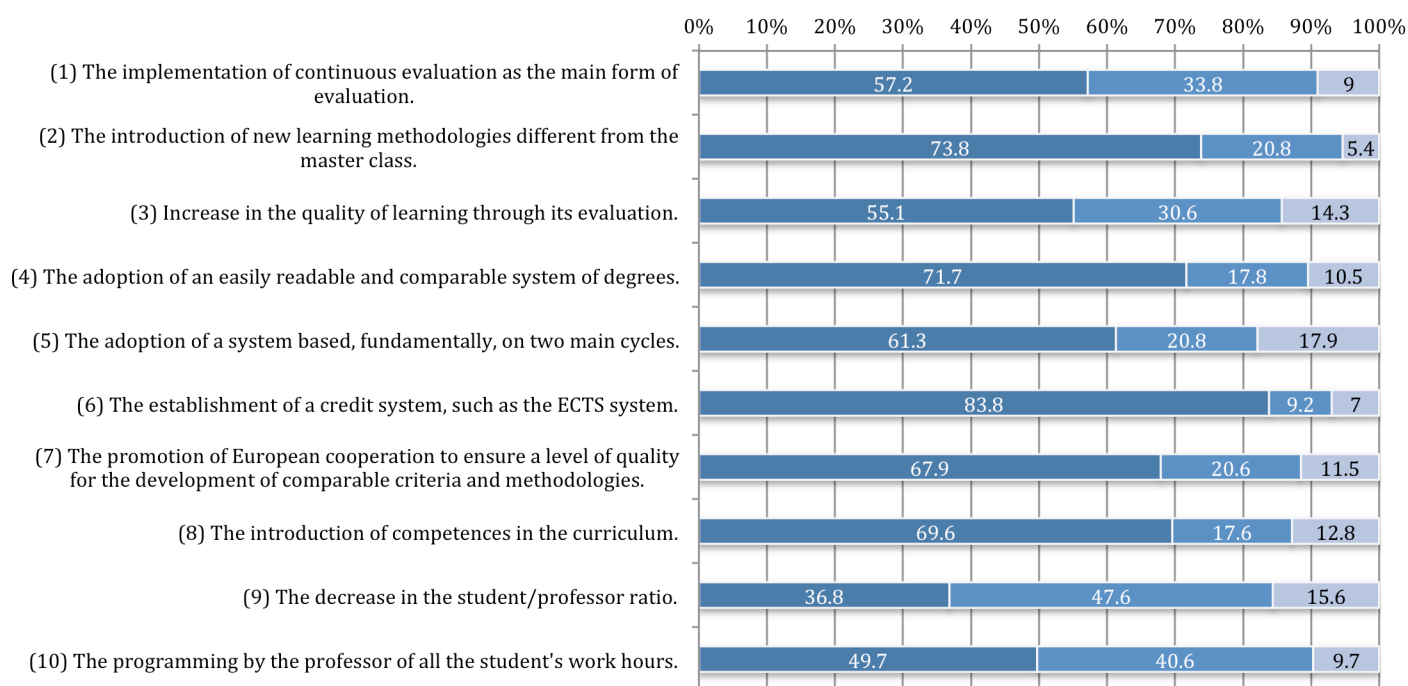


Fig. 7 I think that this is an objective EEES (Yes/No/Don't Know).

The first three questions (1-3) are about the preparation of the students when they finish their studies. Question number 1 indicates that the student is better prepared now for the professional practice. Clearly, most of the responders disagree with this position, 42.6% strongly disagree and 32.4% slightly disagree. Just 19.6% agree in some way.

Question number 2 presumes that companies have a better consideration about the learners, from the point of view of the teachers. The provided answers are more or less similar to the previous case, with almost the same disagreement, and a slight and significant fewer agreement. In this case, the number of "Don't know" answer is much higher, as it is reasonable because many teachers do not have a clear view about what companies think. In any case, these two first results show that teachers are not satisfied with the preparation of the students, neither from an academic nor professional point of view. This first block of three questions finishes with a very common sentence nowadays: "With Bologna, students pass more but know less than with the previous system". The answers show a clear agreement, 41.1% strongly agree and 33.8% slightly agree. Just the 19.9% disagree. These results confirm the poor satisfaction of the teachers with preparation of the students and, at the same time, their recognition that now students get better marks with worse performance. In other words, the level of demand to obtain good marks has decreased.

Question number 4 establishes that Bologna is appropriate for the last courses but not for the initial ones. This is an independent question that creates some controversy, as it can be observed in the answers. The number of agreements is 42.9% (16.7%+26.1%) while the number of disagreements is 42.55 (21.2%+21.4%). As a result, there is not a clear

conclusion or general trend that can be extracted. Probably, this depends on how Bologna has been implemented in the different universities.

Next, we included a block of sentences about the mobility of teachers and learners (5-9). This was a main objective of the Bologna process in general. From a first view to these sentences in Fig. 8 we highlight the large number of "Don't Knows", with levels between the 39% of sentence 5 to 25% of sentence 6. This is reasonable, because in general teachers do not have a direct knowledge of these topics. These first two sentences, 5 and 6, are respectively about the mobility of students inside Spain and outside Spain. There is a clear agreement that Bologna has facilitated the mobility outside Spain, 22.6% strongly agree and 31.9% slightly agree, but inside Spain the result is much more divided: 27.1% agree and 33.8% disagree. Sentence number 7 is about teacher mobility, and the results are quite similar to the mobility of students inside Spain: 25.7% agree that Bologna has facilitated it, while 35.2% disagrees. To conclude this block, sentence number 8 is about the recognition of degrees and number 9 is about the similarity of degrees in Europe. The percentages of agreements slightly differ, indicating that the recognition of degrees has improved (51.6% agreement against 20.9% disagreement), despite they are not more similar, because 32.6% agree and 39.3% disagree that they are more similar.

Finally, sentences 10 and 11 are about the resources required to implement Bologna. It is amazing the percentage of high agreement with the request of more resources shown in the sentence 10: 73.9 highly agrees and 17.5% agrees. This result is confirmed in sentence 11 referred to the resources involved by each concrete university. Just the 28.1% agrees

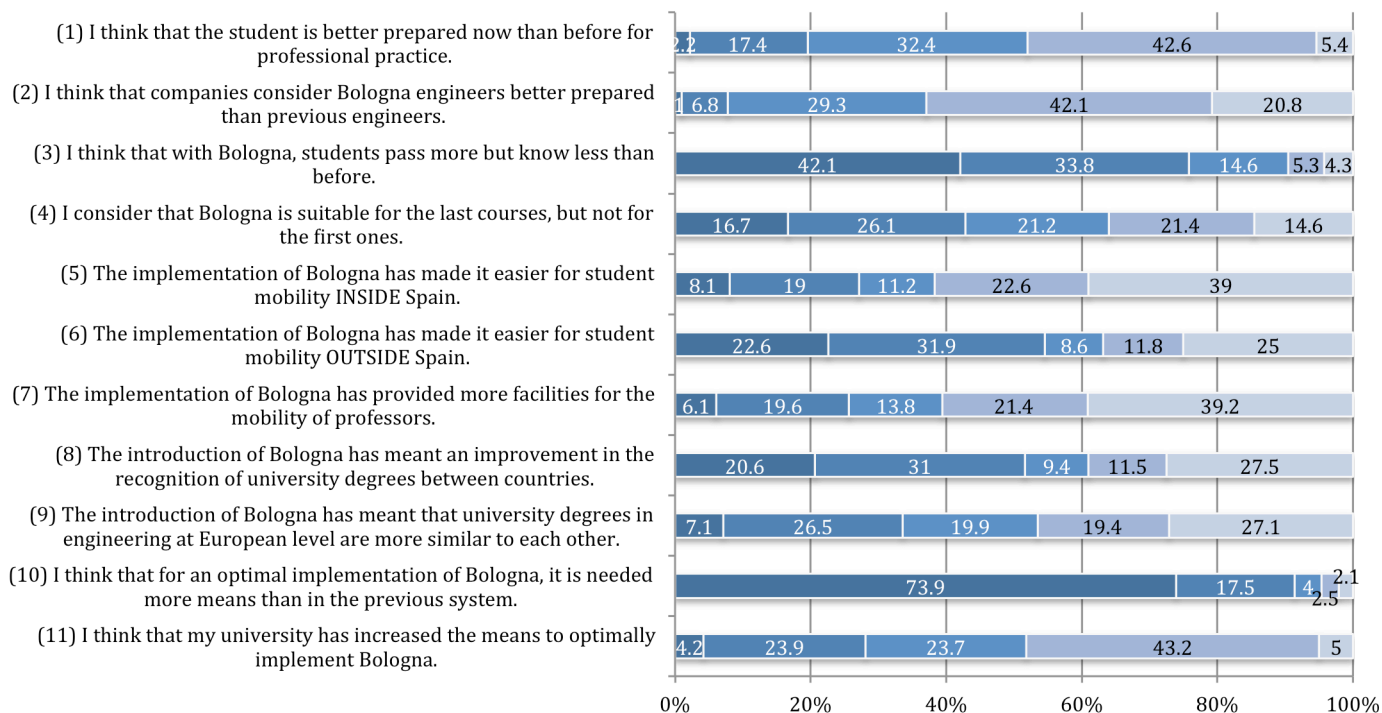


Fig. 8 Indicate your opinion on the following sentences (Strongly Agree/Slightly Agree/Slightly Disagree/Strongly Disagree//Don't Know).

that the university has increased such resources, while 66.9% disagrees. Furthermore, the president of the Conference of Rectors of Spanish Universities (CRUE) in a recent article [5] (at the time of writing this paper) in one of the most prestigious Spanish newspapers has acknowledged that "We have implemented the Bologna plans not only without the greater funding that other European countries have had, but also with much less money than we already had before that great reform".

H. Free opinions

This second survey included a last open-ended question where responders can make any opinions freely. 106 answers were collected to this question, offering a very varied view about the different issues and concerns considered about Bologna.

Most of the answers focused on two points. First, a great critique to the very scarce resources that the government devoted to the implementation of the Bologna plan. 11 of the free answers demanded more resources directly, and some others (4) also demanded that the learner/teacher ratio has to be reduced in order to allow teachers to perform their teaching activities in an appropriate way. The other common point is about the continuous assessment procedures. Many teachers directly consider that continuous assessment is not really involved in Bologna (10) and this should be reviewed. In addition, other ones indicate that the continuous assessment procedures create problems during the development of the subjects, because learners miss regular activities to focus on the assessment ones. Indeed, many consider that this assessment procedure makes that learners just focus on passing the

assessment activities, but not on learning, and in this way learners are less-well prepared.

In addition to the two previous main topics, there are other answers that have been proposed by several responders. Some issues are directly related to the implementation of the Bologna process, related to the arrangement of the engineering studies as 4+1 or 4+2 and to the lack of homogenization among the degrees at the European level. In general, this is seen as a missed opportunity and as a step back in relation to the previous situation. Instead of facilitation the mobility and the recognition of degrees among different countries, nowadays the mobility is more difficult, inside Spain. Another frequent topic is related to the increase of bureaucracy. The preparation of educational guides, the management of assessment activities, the quality assurance procedures and so on have demanded from teachers much more paper work that is not seen as productive in any way. As a third common issue, it is the lack of recognition for teaching in comparison to the recognition for research. Teachers themselves indicate that this causes to devote much more effort to research than to teaching.

Finally, there are some issues that are not so common and the previous ones but that have been indicated by some responders. An interested one is that the problems we are experienced nowadays are not just because Bologna, but also because the context in which it has been implemented. Circumstances such as the decrease in the number of students, the economic crisis, or the change in the students themselves as "millennials" cannot be attributed to Bologna, but have been present during the implementation of this model. Some other answers also indicate that nowadays learners are not so well

prepared as the past ones, when they arrive to the university. This seems a general conception that have been repeated historically by teachers about the new generations of learners and that can be traced back until Socrates. Finally, there are some answers that complaint about the devaluation suffered by the public education sector. These are concerned about the consequences for the future and show that all the changes involved in the Bologna process have not contributed to improve the general quality of the university. In any case, there are some positive answers (2) that consider that Bologna have brought many positive proposals and enabled a high step forward to university teaching.

IV. CONCLUSIONS AND FUTURE WORK

A study about several key aspects of the implementation of the Bologna process in engineering degrees in Spain was carried out by the IEEE-Education Society Spanish Chapter six years ago. Now, it is time to consider the evolution in these years and to collect the aspects of EHEA that teachers considered relevant. Thus, a new study was developed in two stages: The first one was published in [2] and involved 594 teachers. The second one is presented in this paper, with 720 professors interviewed. It tries to show a global vision of the development of the EHEA in Engineering in Spain.

From a theoretical point of view, Spanish teachers consider that the main objectives of Bologna Process were the following: i) to establish a common system of credits (ECTS); ii) to introduce new methodologies and iii) to adopt a system of degrees more comparable that includes competencies. Nevertheless, an important percentage (34%) said that continuous assessment is not an objective of Bologna; the 31% think that quality assurance is not a main objective in the EHEA process. Besides, teachers do not know if they have to program all the hours of work of the students or not. From these answers, it is possible to conclude that there exist important misunderstandings about EHEA objectives.

From a practical point of view, most of the interviewed teachers have introduced new methodologies, according to the theoretical point of view. However, the master class continues to be the most common methodology, above other like the Flipped Learning or the Project Based Learning methodologies, which have entered and increased its presence in this new study respectively.

More than a half of professors use Public Repositories (MPR), videos and there is a slight increase in the use of Reusable Learning Objects (41%), but there are many possibilities that teachers do not explore in their classes.

In most University institutions, students still can pass a subject without taking into account the continuous evaluation. However, teachers feel pressured to approve more students and consider that exams are easier than several years ago. Continuous evaluation is perceived as micro-exams after which students forget what they learned quickly. Teachers also think that the number of students who pass the exams is higher but they have less knowledge now for the professional practice. These results confirm the poor satisfaction of the teachers with

the preparation of the students and their recognition that now students get better marks with worse performance. This is a worrying set of conclusions that should be considered in the future by professionals and politicians.

In parallel, almost 80% of interviewed teachers indicated that bureaucracy has increased. This confirms some of the more common critiques against Bologna process: the paperwork increases but there is not a clear benefit. This point should be revised in order to define more efficient quality systems or tools.

Currently there is not a clear opinion about the decrease of students per group in degree courses. It could be interesting to analyze deeply this question, for instance, to study each university in order to see tendencies individually.

Although EHEA has improved the mobility of students outside Spain, the situation is not the same inside this country or between teachers. Jointly with mobility, the recognition of degrees has improved despite the fact that the similarities between engineering degrees in Europe have not increased.

In order to improve this hard context, several actions are pointed out: (i) increasing the resources devoted to implement the Bologna process; (ii) reviewing the continuous assessment procedures; and (iii) equating the professional recognition of the teaching activity with that of the research activity.

In addition, as future lines of work, it is necessary to raise again the diffusion about the EHEA objectives. It would be desirable for the universities to make a greater effort in the dissemination of the EHEA objectives among their professors as well as in the improvement of the aspects indicated above.

As future work, it would be interesting a debate, not only in Spain but also in the rest of countries of the EHEA, about the advantages and drawbacks of the Bologna process, and its possible improvements. In this sense we are planning a similar study on the rest of the countries of the EHEA.

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