THE IMPORTANCE OF TECHNOLOGICAL TOOLS IN THE EUROPEAN AREA OF HIGHER EDUCATION.

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The European Higher Education Area (EHEA) establishes that the students must do a research work while they are finishing the grade studies. The objective of that research work is that all students develop the competences they acquired during the years at their University. Each student will be assisted by a professor who will conduct and supervise that work. The use of technological tools involves a training novelty that favors communication between them, and makes director advisory tasks much easier. Therefore, communication becomes quicker and more fluent. Besides, the use of techniques associated to recent technologies facilitates data collection for the empirical side of the work. Likewise, bibliographic queries notably improve using specialized search engines. Then, we consider that the use of technological tools remarkably improves the quality of research, and makes director-student communication easier. The main conclusion of this work is that, when we are facing a new training methodology, the use of new technology-linked tools and methods becomes indispensable.

Keywords: European Higher Education Area (EHEA), competences, technological tools, methodology
1. Introduction

Bologna Process proposes that all students who complete their degree must be enabled to carry out a research project. This goal implies that regular teaching of the grade should be oriented so as to allow them to acquire and develop the competences they need to reach it. The Final Year Dissertation will help to check whether those competences have been actually achieved.

The RD1393/2007 Law (regarding university studies setting up in Spain), rules all ‘official teaching’ at grade level, but it doesn’t indicates the way each University must certificate the competence evaluation. Each University must establish different ‘Grade competences’ and different methods to evaluate them. The Final Year Dissertation is mandatory for all Universities and it is used for a final evaluation of the students.

Technology fits properly in an active learning framework like the one projected for degree studies within the European Area of Higher Education. The use of technology and, in particular, new digital media and devices, has aided to perform the Final Year Dissertation for several reasons: it facilitates bibliographic selection, it allows the use of a text processing software that helps the director to post corrections, and it enables communication between the director of the project and the student. Besides, technology helps to use new media along with speeches or lectures easily available for students.

2. Bologna Process: learning to do research

Law 1393/2007 rules all ‘official teaching’ at grade level and develops the agreement of the European Ministers of Education in 1999, commonly referred as Bologna Process. Neither the Process nor the Law specifies the convenience for the student of being taught in research. The Law highlights that the FYD must have between 6 and 30 credits, be performed and the end of the grade, and be oriented to the assessment of the competences linked to the degree. The RD 861/2010 law, that modifies the previous law on this concern, doesn’t show the training in research methodology as a competence the student must acquire either. However, it establishes that in the graduate studies the student must “have got and understood knowledge that provides a basis and an opportunity to build, apply and develop original ideas, often in a research context”. In the doctoral thesis case, one of the competences to be acquired by the student is learning of research methods.

The Joint Declaration of the European Ministers of Education (D.M.509/99) determines that the student must be enabled to perform a research at the end of the grade period to show he/she has acquired generic, transversal and specific competences. Generic competences are common to every graduate student, regardless the technical knowledge of the grade.

The concept of competence was developed in psychology and it is defined as the ability of react to demands in his environment that experiments satisfaction or a sense of efficacy (White, 1959). Nowadays, the grade competences are being designed according to the classification proposed by the Tuning project (González y Wagenaar, 2003). Following Menéndez (2009), el Tuning Project defines competence as the ability the individual can have at his disposal, that is, what enables a competent performance. This project establishes that those competences may be divided into three groups: systemic, instrumental and interpersonal.
This way, general competences are ‘common to the academic level of any degree. However, specific competences are related to a field o a degree, and are oriented to achieve a specific profile’ (García y Martínez, 2012: 33). Regarding transversal competences, these refer to the ones that should be embedded somehow in different curricula.

Rullán, Fernández, Estapé and Márquez (2011) highlight that the competences at grade are related to the four levels in with it must be structured: the aim of the purposed education; the objective that education pursuits; the formulation of specific and transversal competences following Tuning project (2009); and the professional profile of every knowledge field.

Competences “would represent a combination of attributes, and describe the level or grade of sufficiency of somebody who is trying to carry out them” (Meneses, 2011, p. 31). This is one of the main changes Bologna Process tries to implement: active learning, because competence assessment means that the student is enabled to perform in practice the acquired qualification.

Valderrama et al. (2010) made a guide for evaluating competences in the Final Year Dissertation within Engineering arenas. They made a survey among Computer Engineering Professors, aiming to determine the competences that should be taken into account. They were asked to choose the five more relevant amongst those purposed in the Tuning Project. Professors chose five for the Final Year Dissertation and five for the Master thesis. Three of them were coincident: ability to apply knowledge, ability to organize and plan, and knowledge of field of study (Valderrama et al, 2010).

Bologna Process insists in competence acquisition as a way to enable and train students. The assessment to check whether the student has actually achieved them turns out quite necessary. In this sense, the Process avers that the student must defend the research work before an evaluation or assessment committee. The problem lies in the lack of specification of the competences to be developed and the evaluation criteria that committee must consider to determine if the student has reached research competences.

3. The Final Year Dissertation

Bologna Process doesn’t establish mandatory guides on the structure of the work, but it states that it is convenient that includes introduction, intellectual framework, methodological framework, data collection awareness – in case it is provided, conclusions and research perspective. This issue is covered in the teaching guide of each University. Given the freedom to determine the structure of the Final Year Dissertation, it would be interesting to make a study on the University teaching guides, so as to note differences and similarities.

Garcia (2010) defines the teaching guide (syllabus) as the tool that is going to orientate and steer the teaching-learning process. Rue (2007) says that it is more than program of the course because it determines the competences to be developed in it.

The realization of a work with these features implies that the student must take academic education to perform it effectively. Besides, it is necessary to assist him/her for making a study that includes data collection. Therefore, he/she must be taught in qualitative and quantitative methodologies, suitable software for data collection and statistical analysis in the case of quantitative questionnaires.

3.1. Final Year Dissertation (assessment) evaluation
Different evaluation methods evolved for years. The current system postulates the competences evaluation (Yániz y Villardón, 2006), following Bologna Process proposal. Álvarez y Pascual (2012) point out that it is convenient that the student be aware of the evaluation criteria of the Final Year Dissertation from the beginning.

The Final Year Dissertation Assessment should evaluate his own specific competences. In this sense, it is important to determine those specific competences that must be evaluated and the indicators that measure each one of them. Regarding the organization, it is convenient that each University, in general or at grade level, determines evaluation phases, who is responsible in them, and the weight on the final mark of each phase.

It is crucial that the evaluation committee have clear and known criteria. Alvarez y Pascual (2012) proposes that the Final Year Dissertation mark should be a weighted average of the marks of each phase.

The way each University is set to evaluate competences in the Final Year Dissertation is an interesting issue. Villardón (2006) states that competences are evaluated as they are exerted. Consequently, indicators are required. Then, competences will be considered as learnt if the student is able to exercise them (Bosón y Benito, 2005).

Bologna Process establishes the final year dissertation evaluation as an assessment tool for generic grade competences achievement. Competences evaluation has to be carried out checking abilities performance and measuring them with precise indicators. Technological tools facilitate this evaluation with questionnaires and other ways, and also make statistical data processing easier.

4. Tutor advise in Final Year Dissertation elaboration

The student needs a conductor in the process of learning because he/she doesn't know the way to do and design research. The majority of all Universities call them tutor.

Rekalde (2011) made a study on the Final Year Dissertation guidelines in diverse universities. According to this survey, the basic functions of the director of the Final Year Dissertation are the following: orientate and watch the fulfillment of the targeted objectives, perform monitoring, allow the presentation of the work and prepare its defense. There is no agreement on individual tutoring of students; most of them have set up group sessions.

The role of a research tutor is academic, but it will also influence the attitude of the student so as to follow the timeline (López, 2010). In this regard, to achieve this double-sided objective, it seems that personal tutoring is the best way to carry out this task.

The help to be provided by the tutor may be settled on three grounds: training, direction and correction of the final year dissertation.

4.1. The tutor as researchers’ instructor

The tutor must ensure that the student has acquired the needed competences to do research. In case the tutor finds out a lack of them, he/she must manage to solve it accordingly. The Bologna process suggest that the lecture is not the only path to foster a promote students’ learning. The professor has wholly designed the lecture and it seems more adequate that the student be accountable for his/her learning in grade studies. The professor would exercise design, advise, monitoring and final evaluation
of the process tasks within this framework (Martínez, 2003). The student's learning must be active providing that the way to evaluate competences must consider their performance.

The use of technology may help to give training in several modes and with different tools like videos, podcast, for instance any particular issue linked to a proper development of the research work. This kind of training may be available for the student any time, make the achievement of research abilities much easier.

4.2. The tutor as research director

The work of the director can’t be reduced to the writing correction exclusively. Besides this, he/she must help in the research design, the bibliographic selection, and the election of a suitable methodology to reach the initial proposed goals. Generally speaking, previous training is required for this sort of tasks the student must complete. Therefore, it is crucial that the director constantly guide the student, showing what it should be modified, amended or added.

The tasks of the tutor or director of the work cover the following items: the choice of a topic, bibliographic orientations, work organization approval, revision and work approval (Muñoz-Alonso, 2011).

5. Benefits of new digital technologies while building Final Year Dissertation

Generally speaking, digital technologies enhance works in 4 directions: access, speed, cost and usability. The first three are the more relevant in the context we were dealing. Access could be understood in two ways: ability to reach information or communicate, and availability of people or information. Infrastructure, protocols, standards and product development of connected devices decisively influence access. Network relations provide multiple paths to share and increase the quality and quantity in access. Speed is related to the infrastructure and digitalization and compression software tools. The cost has been dramatically diminishing for years, and, nowadays, is free for multiple purposes. Usability is less relevant, but it is important since makes change management easier.

Mayer (2005) adopts a three-stage process for active learning in which technology plays a key role for selecting, organizing and integrating, but its effect is limited to contents via multimedia tools.

The framework of Luppicini (2005) provides a broader view of the impact and benefits of technology. Tools, techniques, and methods are under the ‘educational technology’.
The use of new technologies applied to the final year dissertation elaboration makes its performance for the student easier. And it does in the dimension we were referring to and within that framework. We focus its impact in four key elements. Thus, we may say that it is useful so as to establish bibliographic selection, to improve the communication between the director and the student, to facilitate the research work, and to prepare the field study via data collection.

Students have several tools and devices at their disposal, considering that new technologies are effective to improve developing research. The student starts doing research by choosing the topic and outlining the problem, what is necessary to design the research project.

The use of technological tools facilitates tutor’s direction task. In this sense, the director must help the student outlining the study, in order to make an original contribution out of the research. The study delimitation is essential, because it will imply a different research design and bibliography.

5.1 The bibliographic selection

The analysis of the documentation on the chosen topic is indispensable for the further development of the research, because the work must be original and take into account previous research. The work requires a selection of bibliography and, therefore, the student demands an advise from the director in this process. This orientation is truly a need since the student doesn’t know relevant research related to the subject.

The student will use several search engines available in the Internet to explore bibliography. Thus, new technologies save time while performing investigation and allow a search based on concepts, themes or authors. Other resource that makes the research easier is the availability of documents and articles online itself. Digitalization of multiple research works and accessibility via the Internet leads to an easier and faster availability.
5.2 The Communication with the director

Before the use of new technologies, communication between the director and the student was on campus or via phone calls. Nowadays, the use of other way of communicate, such as the email, facilitates communication between the director and the researcher. The student may send its research attached to an email and the professor may amend or make suggestions in the document itself. For this purpose, there are multiple options: change control, comments notes, etc. This turns communication flexible. Besides, the director may help to write the document with precise suggestions.

The use of technological tools saves time while communicating intended amendments. Word processing software programs allow to make more detailed and specific indications or suggestions.

Amongst the issues that require verbal communication, we may point out the following: the approach of the topic, the general objective delimitation, the research design, or the methodology to be employed. Verbal communication in this particular case hasn’t to be on-campus, necessarily. It may be carried out via different software programs that deliver communication of voice, image and documents, such as Skype or Google hangouts.

5.3 Writing a research work

The first step in writing the research dissertation is the outline or approach of the problem. In this phase, the student should draft the state of the question to be studied, that is, to determine (fix) the topic and show of there are authors that did research and made substantial contributions previously. The student should outline the design of his/her research and remark whether data collection is needed, based on a proper rationale. This approach becomes the basis to develop the work on. In a certain way, it could serve as an introduction to the work.

In the phase of writing, the use of communication via email helps to quicker responses and reception of convenient indications. One of the tasks of the director is to help the student with a work plan.

The sections they have to take care the most are introduction and conclusions. The first one should introduce and encourage the reading of the research work, and highlight its objectives. However, conclusions section must be written appealingly, without repeating what has been already mentioned (Germano, 2008).

5.4 Data collection in empirical studies

The student will have to determine the appropriate methodological strategy to obtain the objective that it has been proposed, at the beginning of the research design. The student, assisted by the director, will establish the use of quantitative methodology (with a questionnaire) or qualitative methodology (with the help of interviews, case study, etc.).

Depending on the field of study, the subject, and the general objective, an empirical study (research) could be performed. It’s about student that outlines the analysis of a particular topic, based on a study on what it’s actually happening. Conclusions must be supported by data in any case.

The use of new technologies allows the fulfillment of questionnaires with fresh and innovative possibilities from specific software. Statistical tools may be employed to quantify and process information and results obtained. If they are dealing with a quantitative kind of questionnaire it is
important to make an adequate selection of the sample, so that results can be extrapolated and lead to reliable inferences. The student will need help to design the questionnaire and determine the kind of questions suitable to get conclusions. This implies the validation of the questionnaire. The Director will decide whether the performing of a pilot test of the questionnaire is needed to ensure its validity.

6. Conclusions

Bologna Process establishes the necessity of qualifying students for doing research works once they finish their degree. The objective is to ensure a practical learning of generic, transversal and specific competences. The evaluation of these competences must be developed according to their performance.

The Tuning Project (2009) detailed basic competences for degree level. This, considering those competences, made possible the rise of many evaluation methods. Defining the most useful indicators for this evaluation is a task to be carried out by each University.

There is no guideline on the final year dissertation either. Besides, law 1393/2007 doesn't establish its description. Based in the lack of specification, Universities ought to fix regulations, rules that the student should know in order to make the Final Year Dissertation. It seems convenient that it be an original contribution to the academic arena, showing that the student has developed the basic competences of the degree level.

The achievement of this objective requires that the student have the support of a professor as his/her tutor. There is agreement on the tasks in which the tutor must help the student. Tutor must advise the student on research methodology and became the director of the research. This direction task has a personal side, since it has to encourage the student so as to make him do the research work appropriately.

Technology, and digital or Internet based technology, has transformed our society in recent years. Benefits from adoption of them in the educational arena may be classified in four dimensions: access, speed, cost and usability. Some of them may be found in a key element of the European Area of Higher Education: the Final Year Dissertation. Therefore, it may positively affect evaluation of competences linked to it. It is especially important since it's been settled as a multi-purpose tool for students and professors.

New technological tools and devices, while applied to perform the final year dissertation, led to a serious improvement both in students and in professor work. These advantages may be observed in tasks such as bibliography selection, director-student communication, and writing and data collection.

Likewise, the use of these tools is also proposed for student training. Equally, it may be suitable their use for evaluating competences. Each University must determine the way of making it, and students should be aware from the beginning.

We focused in four elements, but further research on this field can be aimed to others as well as to new tools and platforms and their impact in different aspects of the Bologna Process or the European Area of Higher Education.
7. References


