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# Improving General Cross-Curricular Skills in Attendance and Virtual Environments

Guadalupe Ortiz
*University of Extremadura Spain*

## 1. Introduction

The different European Union countries try to get closer to the Sorbone (Allegre et al., 1998) and Bologna (Einem et al., 1999) declarations in 1998 and 1999, respectively, in the area of education. In this regards, recent adaptations of educational curricula to the European Higher Education Space (EHES) enabled many education professionals to adopt new teaching methodologies into their daily practice. Although the transmission of the main theoretic and practical concepts of the subject in question must remain the main focus, the improvement of students' general skills claims for special attention not only in the EHES but also with a view to business requirements.

A varied range of activities and methodologies can be used in order to promote general cross-curricular skills such as addressing an audience, team work, preparing documentation, etc. Including new methodologies aimed at promoting these skills into classroom practice can prove challenging, not only in the sense of being able to integrate such activities within the current development of the subject, but also in terms of motivating students to deviate from their traditional passive way of learning.

On the other hand, the mobility of teachers and students among European universities has increased notably: regarding the teachers they often have to attend several conferences to exchange their research ideas with other experts in the matter and it is also becoming quite common for teachers to go for research or teaching stays abroad for several months. In the case of students, the most common situation is that they are awarded an Erasmus scholarship and spend at least one year in a foreign university. Both positions are very positive for teachers and students and shouldn't be avoided for the sake of not missing lectures. Furthermore, it is also quite common that students start working before they have finished the degree, or even that they start studying a new one once they have started working. These students, although they are not abroad may not be able to attend lectures on a regular basis due to their work commitments.

In this regard, we also have to look for new alternatives under the scope of the EHEA, so that education can be followed up without a mandatory requirement of attendance to lectures, and which, at the same time lets us improve students' cross-curricular capabilities. Both tasks are already a challenge, but when faced together the challenge is even bigger. Education through e-learning environments was already approached by several authors in various interesting approaches - (Bitterberg et al., 2008), (Gerval et al., 2003), (Jalobeanu,

1996), (Popovici et al., 2005), (Comai et al., 2007) -; however, most of them do not consider cross-curricular capabilities.

In this chapter, we are going to see how this problem was tackled under the sphere of the *Telematic Engineering* degree at the University of Extremadura, specifically in a mandatory subject called *Data Transmission* and in an optional one called *Web Services,* an attendance and a virtual non-attendance subject, respectively. We will describe the experience of the author and what the results obtained were.

## 2. Context

In this section we are going to describe the subjects in which the e-learning experience has being carried out and are their curricular and cross-curricular skills in order to analyse in the following sections how new activities in the classroom and in virtual environments could be used to improve such skills and carry out lectures virtually.

### 2.1 Data Transmission

*Data Transmission* is particularly connected to two professional profiles: on the one hand to *planning and management of networks* and, on the other, it is linked to *auditing and design of networks.*

The *capabilities specific to the qualification* which are mainly linked to this subject are *design, installation and management of telecommunication networks* and *planning and evaluation of networks, systems and telematic services.*

The *cross-disciplinary capabilities* related to the professional profiles to which this subject is normally linked are the following: *appropriate application of the learned technologies and their integration into the socioeconomic structure, Interaction with users* and *responsibility for own learning.*

Based on these capabilities, the objectives established with regards to the academic and disciplinary abilities are the followings:

• To introduce the student to the spectral theory of signals and the understanding of the different types of signal and their representation in the frequency domain.

• To know the behaviour of physical devices when signals go through them, to know Matlab and Simulink and apply their theoretical knowledge to practical tasks with them.

• To master the mechanisms of error control and flow control at link level.

After studying the general personal capabilities of the degree and the specific disciplinary ones considered in this subject we concluded that suitable objectives with regards to personal and professional capabilities are the following:

• To develop the ability to differentiate several types of signal in communications and their codification.

• To be able to identify and decide on the type of transmission medium to be used in an installation and the consequences of that choice.

• To know how to solve a problem according to a set of requirements.

• To be able to work as a team effectively and to improve the ability to address an audience.

### 2.2 Web Services

*Web Services* is particularly connected to three professional profiles: *design and development of telecommunication services, design of distributed applications oriented to the administration and electronic commerce* and *teaching and research for the development of new technologies and services.* The *capabilities specific to the qualification* which are mainly linked to this subject are *to know and design tools related to security in communications and networks, designing communication software incorporating the new technologies TIC to productive processes in the business* and *knowing and applying scientific and technological base knowledge to adapt to technological changes.* The *cross-disciplinary capabilities* related to the professional profiles to which this subject is normally linked are the following: *development I+D+I, design and analysis of telematics applications and services, managing telematics products and services, application of the learned technologies and their integration into the socioeconomic structure, interaction with users* and *responsibility for own learning.*

Based on these capabilities, the objectives established with regards to the academic and disciplinary abilities are the following:

• To introduce the student to the Web service technology, their standards and their development tools as well as the way to model and compose them.

• Besides, students have to be able to research on the named technologies and to be able to acquire and apply new knowledge in the area.

After studying the general personal capabilities of the degree and the specific disciplinary ones considered in this subject we concluded that suitable objectives with regards to personal and professional capabilities are the following:

• To develop the ability to understand, and enable others to understand, knowledge related with Web service technology, to be able to learn themselves about the named technology.

• To be able to work as a team effectively.

• To be able to acquire Web service related knowledge when provided in English.

## 3. Classifying and Selecting the activities

Before trying to discern what kind cross-curricular activities can be carried out when teaching the subjects described in the previous section, we have to decide what general types of working group are suitable for them: some subjects are mainly theoretical, other more practical ones require work in a laboratory, whereas others may require work in small groups or to do field work. In our case, we can affirm the following considerations:

• Theoretical lessons are completely necessary. In the case of *Data Transmission* this is because the contents covered by the subject are completely new for the student who comes from secondary school and even though the application of the subject content is very practical, we need to provide a wide range of basic theoretical concepts. In the case of *Web Services,* the need of theoretic lessons is due to the concepts of the subject are a completely new domain for the students.

• Practical working groups are also needed. We have just mentioned that the application of *Data Transmission* is mainly practical, therefore the students have to experiment different applications in a laboratory. Besides, the main goal of *Web Services* is to apply the main theoretic concepts in a practical domain.

• Finally, working in small groups may be a questionable decision. We considered that it is important, since this will be the usual situation when they start working in the industry:

they will have to solve relevant-related problems in groups, probably formed by different specialists on the topic. Therefore, this type of working group was also considered when building the plan for these subjects.

Specifically, we divided subject credits by assigning the following percentages to each type of activity.

• Whole class activities, that is, those activities in which all the students who study the subject attend at the same time: 25% percent for *Data Transmission* and 10% for *Web Services.*

• Laboratory activities: in this case we divide the whole class into smaller ones which fit in the laboratory and are small enough to be supervised by the teacher during practical lessons; that is between 15 and 20 students per group. This time we established 10% for *Data Transmission* and 20% for *Web Services.*

• Small groups -also called tutorial activities- are formed for those activities which have to be carried out in small groups and for whose supervision several meetings with the teacher are scheduled. The percentage only measures the time in which the teacher is present and is 2% for *Data Transmission* and 5% for *Web Services.*

• Finally the remainder of the time (60% for *Data Transmission* and 65% for *Web Services)* is allocated for the student to work on his own, or with other students, but without the presence of the teacher.

Once we have all the possible types of working group we have to select what types of activity will be developed by each type of group. After considering the activities developed in previous years and evaluating their success and having attended several courses in order to improve and learn such types of activity, the following ones were selected for each type of working group (each type of activity is thoroughly explained in the following section):

• Whole class activities: magisterial lectures, problem solving competition, discussion and debate, role play, judgement simulation, problem-based learning, mind map elaboration, topic presentation, theoretical exam.

• Laboratory activities: Laboratory lecture, laboratory exam.

• Tutorial activities: problem solving and research in groups.


## 4. Activities

In this section we are going to describe in depth all the activities carried out during the instruction of *Data Transmission* -that is, in an attendance subject-, in the order they were mentioned in the previous section.


### 4.1 Whole class Activities

• *Magisterial lecture. Data Transmission* is taught in the first year of the *Telematic Engineering* degree. Being a first year subject, the magisterial lecture has great importance. A set of basic knowledge on the subject must be acquired by the student, which will help him gain a deeper knowledge of the subject topics, besides being covered from different perspectives. These lectures are more frequent in the first semester and decrease in the second one, being complemented with alternative activities explained throughout the remainder of this section and the following subsections.

• *Problem solving competition.* The main goal of problem solving is the empirical application of theoretical knowledge acquired in magisterial lectures. In the case of *Data Transmission* this is done by a kind of problem-solving competition (see (Ortiz, 2007) for further

information), in which the members of a group explain doubts to each other, which is useful for the explainer as it settles her knowledge and for the listener as he obtains new knowledge.

• *Discussion and debates.* Any undergraduate student should be able to speak to an audience, arguing her opinions logically and reasoning appropriately about the discussed topic. Moreover, the student needs to learn to listen, not only to hear, and to respect established talking turns. Besides, they must be able to rebut other people's opinions in an argued and reasoned manner.

• *Role play.* In the same line as the previous activity, we consider role play a way to improve the ability to talk to an audience and to establish and respect turn taking. Besides, the student has to be able to acquire and defend knowledge and opinions which may be different from her own.

• *Judgment simulation.* Also in the same line as the previous activity, professional behaviours can be judged to see how a student can defend professional decisions related to the subject in question firmly and confidently or to judge clearly if other professionals' decisions were right or wrong.

• *Problem-based learning (PBL).* One student or a group of them can solve a problem over a week, a month or the whole semester following a set of steps. In order to do so, the student has to search and filter the information necessary to solve a real problem and to face it with her partners by applying the theoretical knowledge. The teacher will set partial submission and revision deadlines in order to help the student.

• *Mind Map Elaboration.* It is important to know what are the main concepts to be learned in a subject. In this regard, mind maps help by clarifying the key ideas in a topic. The map may be created by the teacher, by the student or by both. Besides, the student has to be able to infer the whole subject from the information on the mind map.

• *Topic presentation.* The student should be able to present the learned topics correctly, creating resources for the presentation when necessary, which may be useful when revising for the exam later.

• *Theoretical exam.* Students will also have to sit a theory exam in order to show they have acquired enough knowledge on the subject and their ability to solve problems in their specific scope.

## 4.2 Laboratory Activities

• *Laboratory.* The objective of the laboratory is to apply the knowledge obtained in theoretical classes, both in magisterial lectures and problem solving lessons, in a practical way.

• *Practical exam.* Students will also have to sit an exam to show they are able to solve a practical exercise within a reasonable amount of time.

## 4.3 Tutorial Activities

• *Problem resolution in group.* In the first semester, the students will solve a set of problems in groups of about 4. The students will be assisted by the teachers during tutorial hours. The first tutorial will be used to assign the problems and provide indications for their resolution. In the second session, the work developed will be reviewed and if any error is detected more guidance will be provided and the steps to be taken for the presentation will be

explained. The problem's solution will be presented in the final tutorial. This activity will be assessed based on a common group mark and an individual one based on each student's performance.

• *Group research.* The students will do a research project in groups of about 4 during the second semester. The work will be supervised by the teacher during tutorial hours. The first tutorial will be used to assign the project topic and provide guidance as to where to look for information on the topic. In a second one, the work developed will be discussed and if any error is detected further orientation will be provided together with indications about how to improve the project and steps to be taken for the presentation will be suggested. Finally, the result will be examined during the third tutorial and the presentation slides will be reviewed as well. The students will present the work to the class, improving their capacity of addressing an audience. The project will be assessed based on a common group mark and an individual one based on each student's performance.

### 4.4 Non Attendance Activities

• *Bibliographic searches.* The student's ability to learn by himself and to generate knowledge is specially valued in the convergence process. In this sense, it is important that the student learns how to search for information about the studied subjects and that he is able to acquire new knowledge independently. In this sense not only does the student need to be able to search for information, but also to validate it and extract the concepts in which he is interested. This skill may be developed in tutorial projects, *PBL* or any other activity which requires teacher-given information to be complemented.

• *Studying.* The student will have to learn the contents taught during lectures.

## 5. Virtual Activities

In this section we are going to describe all the activities carried out during the instruction of *Web Services* -that is, in a virtual subject-, in the order they were mentioned in the previous section. Before examining how these activities can be developed under a virtual environment, we are going to describe briefly the virtual platform which was used in the experiment.

At the University of Extremadura we have got a Moodle-based virtual platform available for any subject teaching, among other uses (for further information on Moodle Platform and on the Virtual Campus at the University of Extremadura, see http://docs.moodle.org/en/Main_Page and http://campusvirtual.unex.es/, respectively).

With this tool there are currently several virtual elements available, enumerated in the following lines:

• Files repository: the teacher can upload any file and may or may not make it available for the students at any moment.

• Forums: the teacher can create several forums. For each of them he may decide between three different possibilities: forums in which only the teacher can write, forums in which the teacher is the only person authorized to start a topic and the students can comment on it, and those where both teacher and students can start a topic.

• Wikis: the tutor can create wikis so that students can interact with them. The platform saves the historical data of the wiki so that the teacher can evaluate the students' progress.

• Questionnaires: the teacher can elaborate several types of questionnaire in this platform - true/false, multiple choice, etc- The students can see at the end of their attempt the mark they got and also what would be the right answers. Limited slots of time can also be established for these activities.

• Delivery activities: some tasks may be requested by the students and uploaded onto the platform. They may or may not be set as "visible" for the rest of the students.

There are more activities available but we are not going to describe all of them due to space limitations. The above ones are the most relevant ones for this paper. In fact, in the following lines we are going to explain how this tool can be used to develop the previously described activities.

### 5.1 Whole Class Activities

• *Magisterial lecture. Web Services,* being a third year subject, needs fewer magisterial lectures than the subject presented in the previous section. Thus, attendance to magisterial lectures can be replaced by virtual activities: information about the current chapter of the subject can be provided through a virtual platform so that students can download it and read and ask, through the same platform, whichever doubts they may have. Besides, the teacher can elaborate a quiz for the virtual platform which may be taken by the students as many times as they want to check whether the have learned the lesson correctly.

• *Problem solving competition.* No problems are solved in the subject *Web Services. Discussion and debates.* Discussion and debates can be carried out through the virtual forum: the teacher may propose several topics for discussion and then students have to show their arguments for their solutions. Although they do not improve the skill of addressing an audience strictly speaking, since they are not talking to an audience in the virtual environment, they do take the first steps to do so, that is thinking and reasoning about their ideas and using their arguments to rebate others. Later on, they can also use a Webcam to really improve the way to address an audience.

• *Role play.* In the same line as the previous activity, once the roles are assigned and the problem is described by the teacher, virtual forums can be used for the performance of their roles in this activity.

• *Judgment simulation.* Also in the same line as the previous activity, professional behaviours can be judged through the virtual forum.

• *Problem-based learning (PBL).* In order to solve the problem there will be a wiki in which each member of the group can add new information or improve the one that is already inserted. The status of problem solutions will be checked by the teacher through the wiki, so that he can guide students and advice them on how to continue the problem solving exercise.

• *Mind Map Elaboration.* For group mind map elaborations we can also use tools such as CMap tool (see http://cmap.ihmc.us/ for further information on CMap), which allows the elaboration of conceptual maps in a collaborative way. The teacher can assign the different maps to be developed by the students and can also access the collaborative map to check how the work is progressing or even to add clues when necessary.

• *Topic presentation.* Students should be able to present the learned topics correctly; to do so first of all they can update their slides in the virtual tool so that the teacher can make suggestions about them. Then he can also give a talk using the virtual environment and a

Web cam and at the same time the remaining students and the teacher could visualize the slides in their own computers.

• *Theoretical exam.* Ican also be done though the virtual tool. Bearing in mind that the exam will not consist of just repeating the learned theory but on building new knowledge from it, it is even beneficial for them to sit the exam through the virtual environment, where they can also check for previous acquired knowledge to build the new one.

### 5.2 Laboratory Activities

• *Laboratory.* Third year students do not need traditional attendance lectures classes to learn how to use the provided software for lab classes, thus they can deal with laboratory lessons virtually. The teacher can provide them with some helpful information and references at the beginning of the lab task and they can ask any doubts through the virtual environment.

• *Practical exam.* The same we have said for the theoretical exam can be applied here.

### 5.3 Tutorial Activities

• *Problem resolution in group.* This activity is developed once the students have received enough lectures through the virtual environment to work on their own. The review meetings can be done through the virtual platform where the students may have elaborated a wiki, for instance, with their resolved problems and the teacher can check it tell them how to continue. Besides, the teacher can evaluate the work each of them has done by following the historic of the wiki.

• *Group research.* Analogously to the previous activity, a wiki can be elaborated for this purpose so that the work will be supervised by the teacher at the established dates.

### 5.4 Non Attendance Activities

• *Bibliographic searches.* Obviously this task is perfectly done virtually by the student. He can show his results through the virtual platform, too.

• *Studying.* This is another task currently done by the student on his own. However, he can also benefit from virtual platforms where, for instance, several questionnaires can be available so he can check how much he has learned, or frequently asked questions about the subject may have been elaborated and he can consult them, or he may use the forum to ask additional questions, even he can download pre-elaborated conceptual maps so he can organize his knowledge better, etc.

## 6. Experiences Developing Cross-Curricular Capabilities

Making use of the previous activities we can encourage students to work cross-curricular at the same time, whilst working the main concepts of the subject, as we explain for an attendance and a virtual subject in the following sub-sections.

## 6.1 Data Transmission

*Data Transmission,* as previously mentioned, is a first year subject and several attendance lessons had to be developed at the very beginning of the first semester; however, for the reasons explained in the following lines, we had to make use of the virtual scope for particular occasions. For instance, along the first semester in several occasions the teacher had to travel abroad for conferences or stays at other universities. First of all, during these periods, students worked on their own making use of the virtual platform. Several tasks were requested and students had to upload them onto the platform by the given deadline. Besides, they could ask their questions through the teacher's e-mail or through the platform forum available for this purpose.

Secondly, they had to develop problems in group so they had presential meetings among students and reported about them through the virtual environment, where they could also require the help from the teacher.

Thirdly, for lab lessons, students had to update the week practical exercise in the virtual platform each week, where the teacher could check them and provide them with a constructive evaluation. After that, they could also improve and re-upload it. Finally, after every chapter of the subject collaborative mind maps had to be elaborated in teams. The mind maps of the other teams could be examined by the others, so they could improve their own maps with a view to studying for the final exam at a later date. During the second semester, the chapters with the main subject contents reduce their complexity. In this regard, several alternative activities were proposed to work on the subject: documentation about the topic in question could be downloaded by the students from the repository in the platform. In different weeks, diverse activities were proposed to do based on these documents. For instance, several parts of the same chapter were assigned to different students so that they had to do some research on the topic and collect additional information, and after that explain the contents through the virtual environment. Forums were enabled for the remaining students to make questions. Another task was to present a complex problem to be solved in groups over a period of at least a week; first of all they had to collect information related to the topic, then they had to solve it and update it in the platform. Once every group had updated them they could see the solutions of the other groups and, through the use of the forum, discuss which was the best solution and why. The remaining activities previously described -i.e. role play or judgement simulation- would be developed similarly; also mind maps were elaborated during the second semester. On the other hand, the students who were taking the subject from abroad had already taken the subject the year before, so that they had already attended the basic lessons and they also already had some experience in learning independently. Thanks to the virtual platform they could follow the subject and interact with the remaining students at the home university and also be evaluated as any other student.

## 6.2 Web Services

Since this is a third-year optional subject, as previously mentioned, we can consider that the students are already experienced enough to know how to acquire new knowledge themselves. Besides, since it is an optional subject, we can also assume that the student taking it is really interested in it so he can be motivated to do some research himself. For this subject, at the beginning of every new chapter, basic information on the topic in question was provided by the teacher through the document repository. Afterwards, students had to

extend the contents and elaborate a complete document through a collaborative wiki, which was later used for several purposes: firstly, the teacher read the document and asked several questions in a forum in order to start a discussion about key issues; this way the students had to argue about them and thus got a better understanding of the subject. Then, both the wiki and the forum were used for the evaluation of the topic. For the practical part of the subject, teams of two were created. They had to collect information about a topic, which had to be updated in the virtual platform and which showed the results they had obtained so far. The teacher could check the progress of their work and provide them with additional suggestions about how to carry on. Any enquiries could also be done through the virtual platform. For practical enquiries, face to face meetings could be arranged if necessary, however they could still be asked in a virtual manner: depending on the complexity of the questions, several captured screens could be sent to the teacher so he could suggest a solution or even a virtual terminal could be made available for him so he could test the problem himself.

It is also important to notice that this subject is very oriented to work, in a company so many students who choose it are already working, so they cannot attend lectures or do the work related to the subject at the usual hours. In this regard, thanks to the virtual learning environment they can follow the subject as any other student and they do not miss out on the opportunity to learn something else useful for their work.

## 7. Results of the Learning Experience

Students' first reaction to any change in the educational methodology is always negative since they feel very secure doing what they have always done (mainly attending magisterial lectures and studying on their own for a written exam). From the point of view of the type of activities, these methodologies make them participate more during lessons, being especially encouraged by the virtual format, therefore bringing them back from their passive behaviour. Obviously, this also implies a very negative attitude on their part when moving on to a new methodology. Nevertheless, once they get used to it and once hearsay has run from one year to another, they understand there is no other option and face the subject with a much more positive attitude. However they still have their preferences: it was noticeable that they got used to problem solving in groups after two or three lessons; however those activities which were developed casually (role play, judgements, PBL, etc) still somehow scared them since they are not used to them and feel out of their comfort zone, therefore lacking confidence to complete the tasks naturally. In any case, after the experience one can decide which activities work better for the subject and type of students in question, so some of them may not be used some years, to be included other years when the circumstances are more appropriate. An activity which may result in an interesting experience is to organize a simulation of a research conference and assign the different common roles in conferences to different groups of students (program committee, organizing committee, authors, keynotes and so on), the topics being the contents of the subject. This way, as they learn the main concepts of the subject, they work as part of a team and have to talk to an audience. If the experience works it can also be very fulfilling for them to see how they have been able to organize an event with the whole group.

Eventually, although they have to work harder from the beginning of the academic year, they realize that they learn and acquire more concepts more easily than they used to. They

soon feel confident enough to ask any doubts and to make comments in the forums, even to spontaneously rebate about a topic to one of their partners; and this is not quite a usual atmosphere in the university scope, even through a virtual environment. This change of mentality alone would make the effort of improving the teaching methodology worthwhile, however, as we well see in the following section, this is not the only improvement. On the other hand, they seemed to be very surprised when they were told that they did not have to attend lectures regularly in the virtual subject, and they even thought that they might not learn the subject contents properly. However, as soon as they started doing the virtual activities, they realized that they still had to work hard on the subject and that indeed they were going to acquire the correspondent knowledge.

Once the year ended (in this case we are talking about results from the academic year 2006-2007), *Data Transmission* students' marks and aptitudes showed the following general results: the percentage of students who passed the subject increased by approximately 10%, most of the students who passed the subject did so in the June call, not in the September one and the general marks increased by at least 1 point (over 10) in average. Moreover, the students who did not pass the subject felt confident to register for the subject the following year (in the past, many students who did not pass the subject took two or three more years before re-registering for it) and most of the students felt much more confident when talking to an audience at the end of the year than at the beginning. Besides, several problems which the students encountered at the beginning of the year were solved, at least enough to present the group's work at the end of the year successfully.

Concerning *Web Services,* the results showed an improvement of at least 10% compared with the marks the students obtained, plus, I would say, a great improvement in cross-curricular skills and self-learning. Therefore, we can affirm that the methodology piloted with this subject improved not only cross-curricular capabilities, but also efficiency in learning the subject contents through virtual e-learning environments and that the methodology is efficient for students from first to last year.

## 8. Conclusions

As every education change, adaptation to the European Space has defenders and detractors. The presence in curricula of cross-curricular capabilities as specific targets to be met will no doubt improve our students' training and education. Besides, the decrease in the number of magisterial lectures and their replacement by other more dynamic and virtual activities has been very positive, since these activities motivate students and help them be more active. At the same time, the usual current way of teaching has changed, evolving towards greater mobility for both students and teachers and toward the development of several tasks simultaneously. In this regard, e-learning is also acquiring more importance within the EHEA. Furthermore, with the new activities carried out in the virtual environment we promote supervised work in teams. The resolution of projects without a without the teacher being present makes the student feel able to learn independently; besides, they will learn to abstract the main ideas of a text and to express them should it be necessary for the presentation of their work and of course they will improve both highlighted cross-curricular abilities: addressing an audience properly and working as part of a team successfully. Therefore, we can conclude that with this proposal not only do we work cross-curricular capabilities, but we also dynamize the subjects in an attendance or non-attendance

environment, providing the possibility of choosing the subject to those who cannot do it presently, and not interrupting lectures during possible teacher absences. Besides, we complement the student learning experience with activities focused on students' personal work, which are useful for their development both at professional and personal level.

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**Advances in Technology, Education and Development**

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From 3rd to 5th March 2008 the International Association of Technology, Education and Development organised its International Technology, Education and Development Conference in Valencia, Spain. Over a hundred papers were presented by participants from a great variety of countries. Summarising, this book provides a kaleidoscopic view of work that is done, all over the world in (higher) education, characterised by the key words 'Education" and 'Development'. I wish the reader an enlightening experience.

**How to reference**

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