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Effects of Using Online Tools in Improving Regulation of the Teaching-Learning Process: TLPA™ & Pleyade™

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Abstract

Introduction. The current panorama of Higher Education reveals a need to improve teaching and learning processes taking place there. The rise of the information society transforms how we organize learning and transmit knowledge. On this account, teaching-learning processes must be enhanced, the role of teachers and students must be evaluated, and new ICT methodologies must be tried out. The DEDEPRO® model makes significant methodological and technological contributions toward this end.

Method. A total of 728 male and female students and their teachers, from the Universities of Almería, Granada (Spain) and UWIC, Cardiff (UK) participated in this educational experience. A quasi-experimental type design was used, with a non-equivalent control group. The ETL Questionnaire (Housell, Entwistle & colls, 2001) and IATLP Scales (De la Fuente & Martínez, 2004) were used for evaluation. The intervention made use of the DEDEPRO methodology and web utilities TLPA (De la Fuente & Trujillo, 2005) and Pleyade (De la Fuente & Martínez, 2004), both derived from this model.

Results. Multivariate analyses showed in both questionnaires a significant interaction effect towards improvement of *Group x Time*, both with respect to regulated teaching (professor) and self-regulated learning (students).

Discussion. Usefulness of the methodology and web tools drawn from the DEDEPRO™ Model is discussed, as well as possibilities for generalization.

Keywords: Intervention, Improvement of regulated teaching, Improvement of self-regulated learning, ICT, DEDEPRO™ Model.

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Introduction

The current panorama of higher education reveals a need, confirmed both phenomenologically and empirically, to improve teaching and learning processes that are produced therein. Recent legislation has recognized this, establishing the imponderable need to contribute toward this end. At the European level, the proposal for creation of a European Space for Higher Education (ESHE) is in itself both a challenge and a need. Within this conception of educational quality, it makes sense to improve teaching-learning processes, to evaluate the role of teachers in that process, and to carry out experimentation processes using new methodologies and technologies, all as goals within higher education.

Self-regulated learning is increasingly under study, not only in face-to-face education, but also in virtual learning. Most research has focused on classroom instruction situations, and reveals the importance of metacognition in general and of self-regulated learning in particular (Bembenutty & Karabenick, 2004; Boekaerts, Pintrich, Zeidner, 2000).

Research devoted to the study of self-regulated learning online is still quite limited; however, these studies show that such regulation is a necessary, important characteristic for students receiving instruction through virtual learning environments (McMahon & Ron, 2001; Williams & Hellman, 2004). We also need interventions aimed at improving the teaching-learning process through possibilities afforded by new information technologies. One example is the study by Rogers and Swan (2004), which demonstrates that self-regulated learning can be effectively applied to Internet searching behaviors, and indicates some of the strategies used.

In our country, online interventions for improving the regulated teaching-learning process are nearly non existent. The lack of research in this field led a group of experts in the study of learning strategies to develop a virtual intervention within the framework of a Project for Research, Development and Innovation (De la Fuente & colls. 2003-2006), resulting in a virtual platform as an aid to face-to-face teaching for improvement of self-regulated learning. Universities from Almeria, Granada (Spain) and Cardiff (UK) participate in this Project.

Self-Regulated learning and Regulated teaching

Self-regulation is defined as the process by which a person generates thoughts, feelings and actions which are systematically oriented toward the achievement of defined goals (Schunk & Zimmerman, 1994). According to Pintrich (2000), self-regulated learning refers to application of general regulation and self-regulation models to areas of learning, in particular, academic learning which takes place in schools or in classrooms, such that students are able to learn in a context where they can create their own learning episodes to match their own goals. After reviewing the models and different studies on self-regulated learning,

Self-regulated learning

From the world of research in Educational Psychology, the currently dominant cognitive paradigm has contributed very useful and complementary theoretical models for delimiting functioning and intervention in the improvement of cognitive processes and academic learning. One line of current research is focused on the study of learning processes from the perspective of learning strategies, with relevant scientific contributions in our country (Beltrán, 1993; Bernad & Escanero, 1992; Mayor, Suengas, González-Marqués, 1993; Monereo, 1990, 1993,1997; Pérez Cabaní, 1997, 1999; Pozo y Monereo, 1999) and elsewhere (Barak & Rafaeli, 2004; Hill, 1999; Lee, 2002; Li, 2000; Zimmerman, 2002; Zimmerman & Schunk, 2001).

Regulated teaching

From a complementary perspective, there is a current trend of work which postulates improvement in learning processes and in self-regulated learning through implicit activities in the teaching process, using different devices for continuous regulation of the process (Jorba & Cassellas, 1997; Jorba & Sanmartí, 1996; Luo, 2000; Rodríguez & Jorba, 1998; Valls, 1998, Xin, Shen & Lin, 2000). Toward this end the model of Regulated Teaching postulates diverse teaching strategies: 1. evaluation (diagnostic and process-related); 2. information given to the students about the teaching process and structuring of learning activities; 3. setting the stage for self-regulation in the students. The teaching process is understood to be regulated when activities of teaching, learning and evaluating are intrinsically interrelated toward achieving autonomous, constructive, cooperative and diversified learning.

Regulation of teaching for the self-regulation of learning

There are currently several studies (Biggs, 1999, 2001; De Corte, Verschaffel, Entwistle & Van Merriënboer, 2003; Entwistle & Tait, 1990; Prosser & Triguell, 1999) and European Projects, such as the *ETL Project* (Hounsell, Entwistle & colls., 2001-2003) which aim in the direction of analyzing, in an integrated, interactive fashion, the reality of teaching-learning processes being produced in university classrooms. From our perspective, we add one more essential element, defined as a vote for regulation mechanisms implicit in teaching-learning processes.

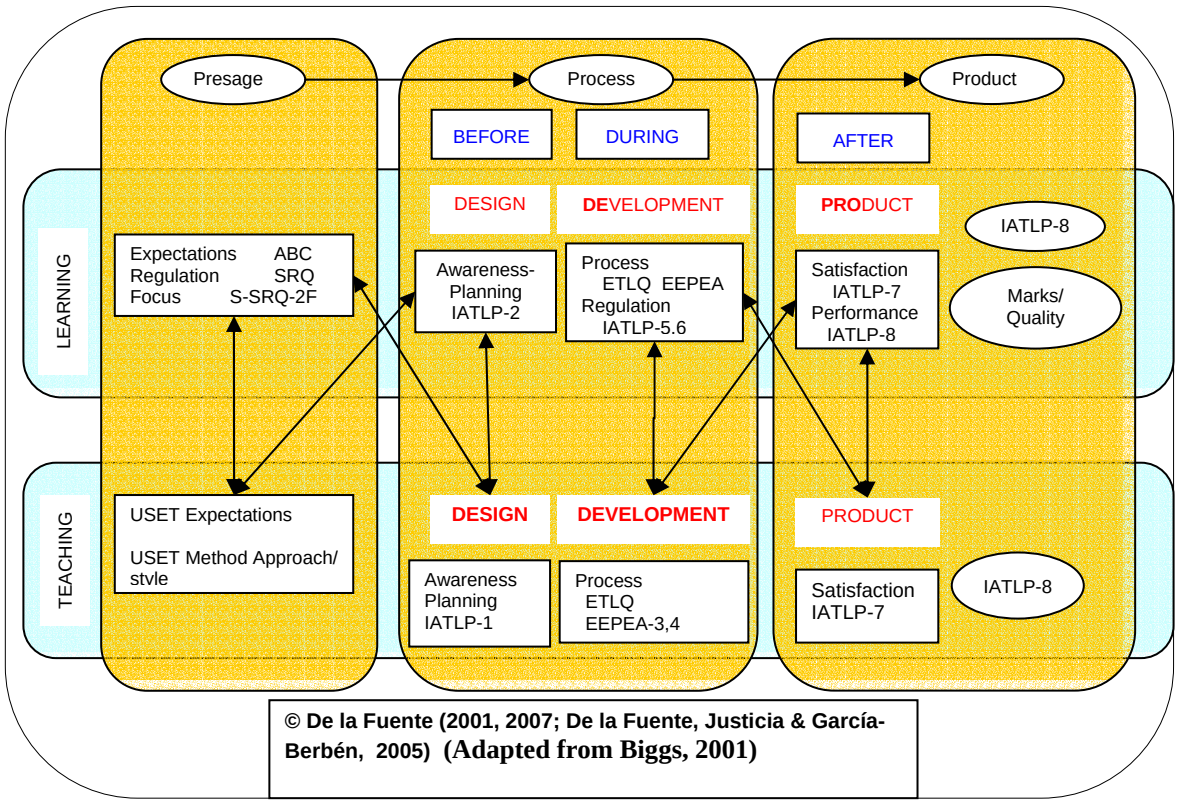


Figure.1.- Intereactive Model of Teaching-Learning, DEDEPRO

This takes shape in the *hypothesis that lack of regulated teaching and self-regulated learning* are an explanatory variable in university students' deficient academic performance, associated with inadequate processes of learning and teaching. The essential characteristic of this integrating model is that it seeks to incorporate fundamental elements of what is involved in a "teaching process which regulates learning" and a "self-regulated learning process". We

have fleshed out this approach in a conceptual model called DEDEPRO™ Model (De la Fuente, 2007; De la Fuente & Justicia, 2001, 2004; De la Fuente, Justicia & Berben, 2005; Justicia, De la Fuente, y Berbén, 2007). In summary, this conceptual model assumes that different deficits are produced in the design and development of the learning process, on the teacher's part, and similarly, in the design and development of the learning process, on the student's part; furthermore, both effects are produced interactively and multiplicatively. This model has been defended already in research at non-university levels (García, De la Fuente & colls., 2002) and university levels (De la Fuente & colls., 2003-2006; 2007-2010).

Regulated teaching and learning through information technologies: Web and Internet

A recent, more novel line of work tries to improve processes of teaching and learning through possibilities afforded by information technologies: Web and Internet. In our country, some limited attempts exist at university level (Mir, Repáraz & Sobrino, 2003; Moreno & Santiago, 2003; Sanz & Prieto, 2001). Nonetheless, more and more studies are focused on optimizing teaching and students' learning at university level, whether on a theoretical basis (Issroff & Scanlon, 2002; Vandervert, Shavinina & Cornell, 2001), or in learning through websites (Barba & Clark, 2002; Davies & Carbonaro, 2002; Fernández, 2001; Wang & Beasley, 2002 Willians, 2002; Gadner, Sheridan & White, 2002), online evaluation (Lara, 2000, 2001, 2003; Moskal & Dziuban, 2001) or the creation of online learning communities (Sax, 2002).

Objetive of this research

The DEDEPRO™ Model proposed by De la Fuente and collaborators (De la Fuente & Justicia, 2001, 2004, 2007; De la Fuente, Justicia y Berbén, 2005; De la Fuente & Martínez, 2004), and adapted from Biggs (2001), is framed within this new conception of regulated teaching. The model has undergone several changes as a result of adjustments made from the study and review of different variables and educational theories. The DEDEPRO™ Model (Design, Development and Product of teaching-learning process), arises from detecting limitations in teachers' planning and information on important elements of the teaching situation, as well as students' lack of planning out the design and development of their own learning over a prolonged period of time.

The objective of this research was to confirm whether teaching-learning methodology based on the DEDEPRO model (De la Fuente & colls., 2001, 2004, 2005), and applied using two online tools for regulating the teaching-learning process --TLPA (De la Fuente & Trujillo, 2005) and PLEYADE (De la Fuente & Martínez, 2003) -- produced improvements in these processes, that is, in the manner of teaching and learning.

Method

Participants and Design

A total of 728 male and female university students from the University of Wales Institute, Cardiff (UK), University of Granada and University of Almeria (Spain) participated in the above R&D&I Project (2003-2006). Of these, 206 students belonged to the control group and 522 to the experimental group. A quasi-experimental design was used with control group non equal and two independent variables: 1. Group of Treatment (control and experimental) and 2. Teaching-Learning Process Academic Type in the year (2003 and 2004). Evaluation of the dependent variables was performed at the end of each school university year.

Evaluation instruments

Two complementary scales were used for evaluating regulation of the teaching-learning process:

1. The *Cuestionario sobre Experiencias de Enseñanza y Aprendizaje*, CEEA (De la Fuente & Martínez, 2003) is the Spanish version of the *Experiences of Teaching & Learning Questionnaire* (Entwistle, 2002). The original scale was used in the ETL Project, UK (Hounsell, Entwistle & colls., 2001-2003) and provides a valid, reliable means to evaluate experiences of the Teaching and Learning Process. For more information, please, see: www.ed.ac.uk/etl/project.html

2. The Escalas *EIPEA, Escalas para la Evaluación Interactiva del Proceso de Enseñanza-Aprendizaje* (De la Fuente & Martínez, 2004), or *IATLP Scales, Scales for Interactive Evaluation of the Teaching-Learning Process,* (De la Fuente & Martínez, 2007a, 2007b). These provide a precise evaluation of behaviors typical of the three defining phases of Regulated Teaching (before-during-after) and of Self-Regulated

Learning (before-during-after). Reliability and validity indices of this scale are quite acceptable.

Intervention instruments and procedure

The hypothesis of the lack of regulated teaching and learning sustains: one cause of the phenomenon is that the teacher does not make important informational elements about the design and development of his or her teaching explicit, at different points in the teaching-learning process, such that students might make decisions about the way they should be learning (De la Fuente & Justicia, 2001, 2007; García, De la Fuente, Justicia & colls., 2002). Similarly, in the case of students, lack of correct decisions about design and development of the learning process leads them to learning without self-regulation, and therefore, to a lower performance than what could potentially be achieved, based in the DEDEPRO™ Model (De la Fuente, Justicia & Sander, in edition). In this situation, Information and Communication Technology (ICT) takes on special strength as a powerful resource for improving teacher-pupil communication in the teaching-learning situation. Such is the case of two tools called *TLPA* and *PLEYADE*.

1. *TLPA™*. The *Teaching-Learning Process Application* (De la Fuente & Trujillo, 2005), is an online tool designed to regulate the process of teaching-learning. It is intended for teachers and students of any educational level, although it is especially applicable in Secondary Education and University. The purpose of this online utility is to make possible and to encourage optimal design and development of the teaching-learning process, optimal macro- and micro-regulation of both teaching and learning. In addition, the utility seeks to improve teacher-pupil communication at all points in the teaching-learning process. It is designed for education professionals and students at any educational level. Additionally, this utility seeks to improve teacher-student communication at any moment during the teaching-learning process.

This utility, which is offered both in English and in Spanish, is constructed so as to be a support to face-to-face teaching. It is structured for ease of use, especially so that users unfamiliar with such network-based tools would find it relatively simple. In essence, it is made up of several different sub-utilities. The first is directed at the teacher, and allows him or her

to select and administer who will have access to the tool, as well as to plan out which aspects the students would use for learning. The second is directed at the pupil, allowing him or her to access relevant information regarding the subject or aspects of learning, as well as to interact with the teacher online, to ask questions, and to access an online instructional module for improving specific learning strategies.

Both the teacher and student sub-utilities follow the same internal structure expressed in the above DEDEPRO model, specifically its process and product phases, within which three points of time are differentiated: design, process, and product. The platform is accessed via a username and password provided by the teacher; these are stored by an administrator using a management utility included in the Pléyade tool. Once the student enters in the webpage via Internet, he or she must select the language to be used when working with the tool, and enter a valid username and password for accessing both TLPA and PLEYADE. Since this paper focuses specifically on TLPA as a tool for improving self-regulated learning and regulated teaching, we now proceed to describe the parts that make up this utility and its usage.

Teacher utilities

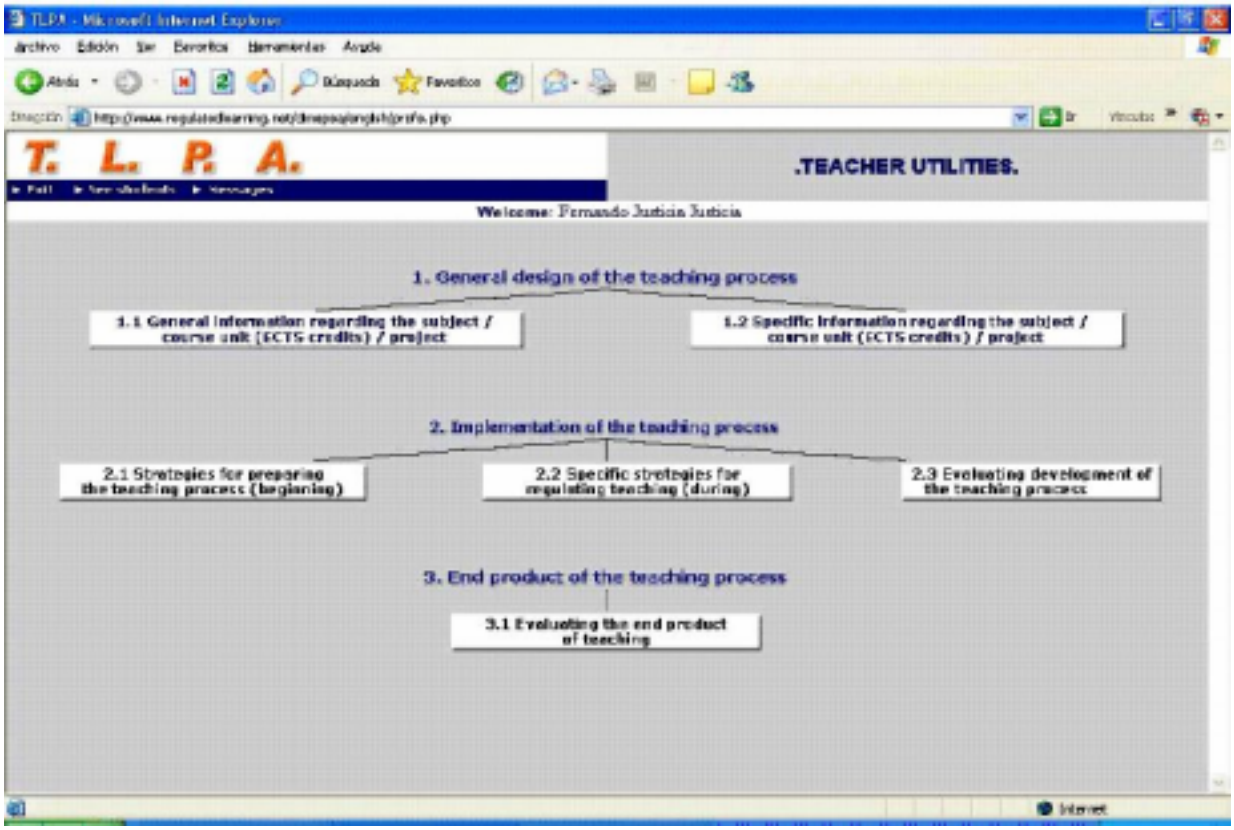
Teachers who use the platform in the teaching-learning process must fill out the class subject information in detail. As shown in Figure 2, use of the teacher's tool will present the student with the three phases in which instruction is divided.

a. General design of the teaching process, where teaching is planned out. This includes general subject information with identification data such as course name, credits, etc. Furthermore, it responds to the questions of what, how, and when does one teach/learn, and what, how, when and who is to be evaluated.
b. Development of the teaching process. At this point the before, during and after of the process itself is addressed; what has been planned in the design is now implemented. Here the teacher provides information about preparation strategies that can be used at the beginning, during and at the end of the course, for the purpose of helping students plan macro-regulation of learning. Additionally, activities to be performed using the utility are laid out in detail, at the same time recommending strategies that the student can use for each activity before, during and after its execution; this type of regulation corresponds to micro-regulation of teaching. Finally, the teaching process is evaluated through student

comments and assessments, and teachers are evaluated using certain online scales which students fill in.

c. The final phase refers to evaluating the end product of teaching, handled similarly through student opinions and online scales.

Figure 2: Teacher Utilities screen

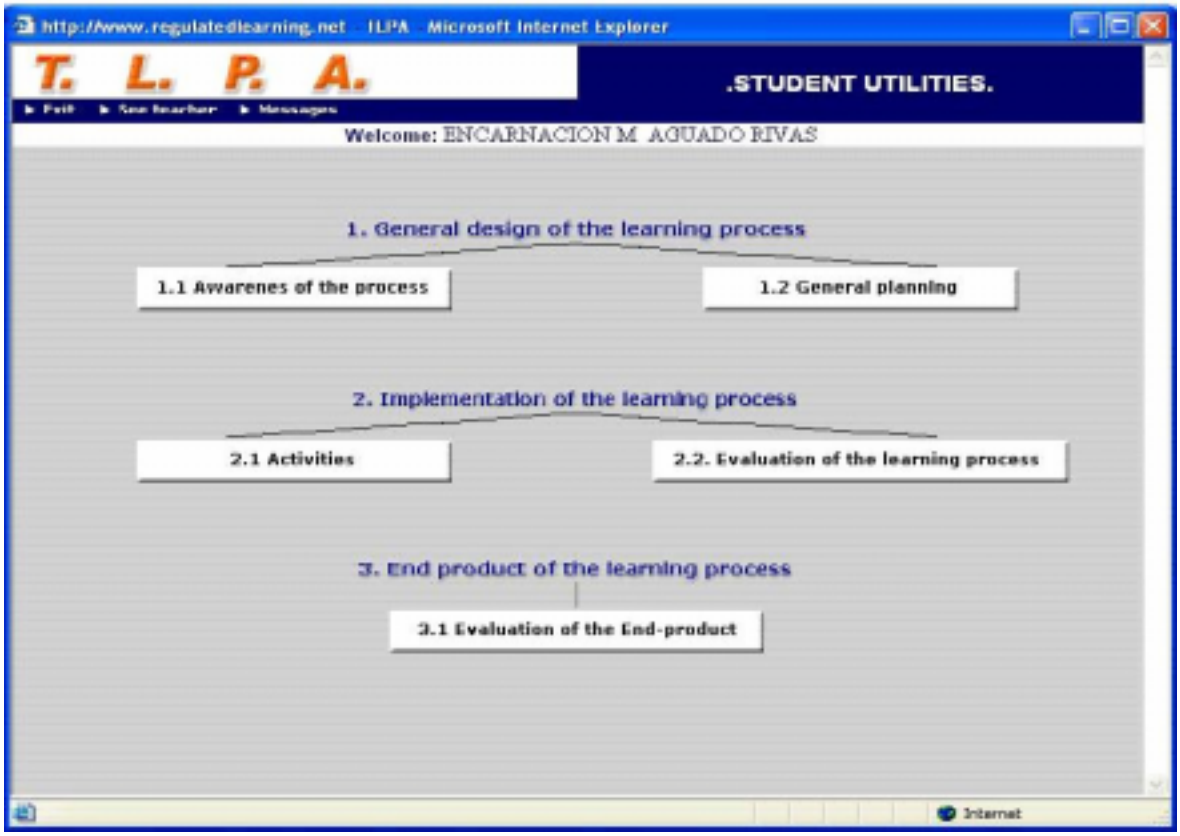


Student utilities

The student, aided by the information which the teacher has provided through the teacher utilities, must now prepare the three phases of his or her own learning (Figure 3):

a. General design of the learning process. At this initial stage the student expresses in detail the conception of and plan for learning.
b. In development of the learning process, strategies used for performing activities are specified, as well as an evaluation of one's own learning process.
c. At the end of the course an evaluation of the end product of the learning process is carried out.

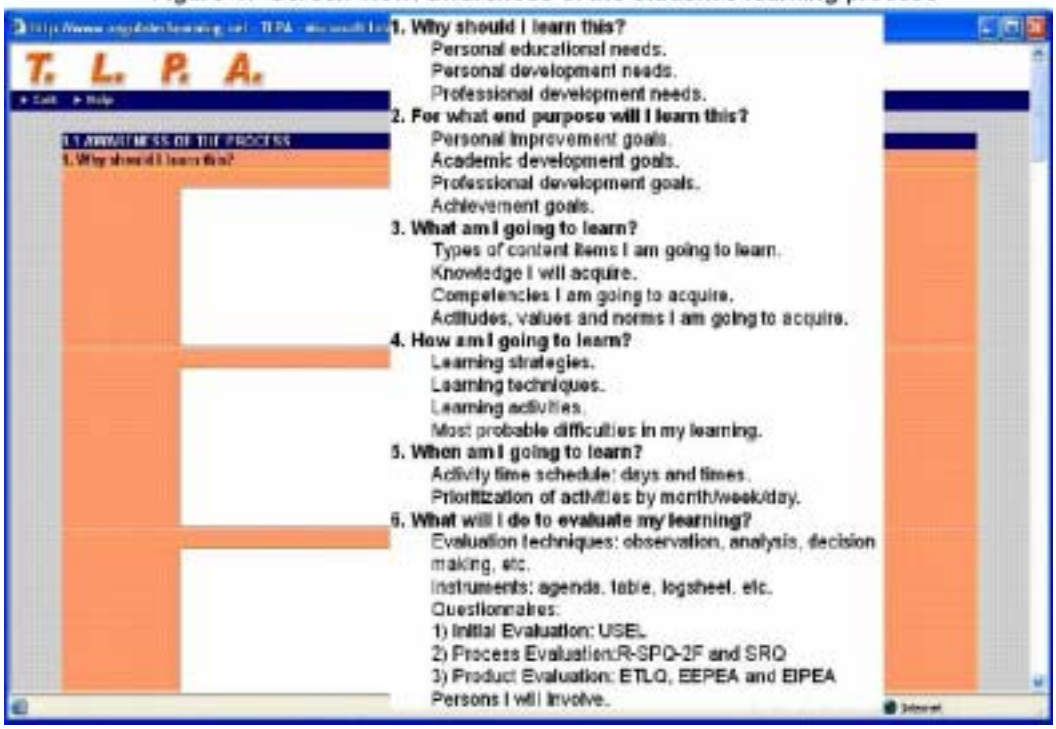
Figure 3. Student utilities screen



Awareness of the student's process and general planning

The student, based on the teacher's plan of the teaching process, must plan out the learning process. Becoming aware of the learning process requires that he or she answer questions similar to those spelled out by the teacher in the specific subject information. Such questions are shown in Figure 4 and refer to the why, what for, what, how and when of learning, in addition to what is to be evaluated in learning. Each question has been broken down in order for the pupil or student to more easily specify his or her own program. Another screen corresponds to scheduling for this subject (term, semester or annual basis), from the first day of class until its final exam, enabling the student to become aware of the teaching-learning process and encourage macro-regulation of learning.

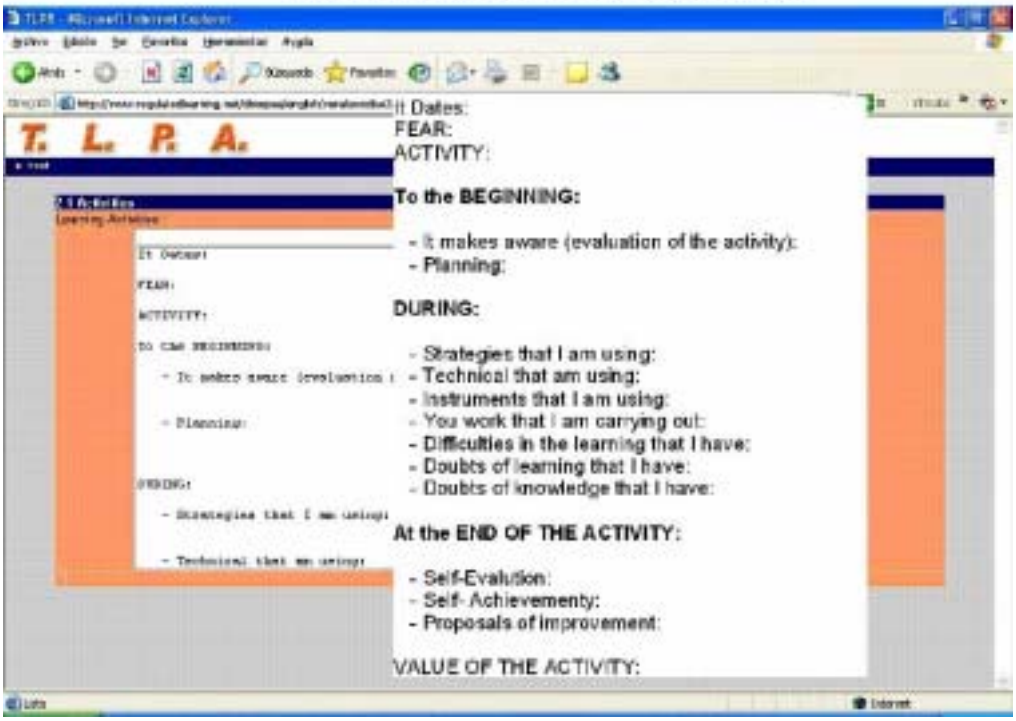
Figure 4. Screen view: awareness of the student's learning process



Activities

In the teacher's tool, a series of activities are proposed which also can be explained in the classroom. These activities are accompanied by strategies which the teacher recommends to the pupil at three points of the learning process: at the beginning, during, and at the end of the task. Figure 5 shows the window where the student must spell out the information; to the right are specified the sections which each activity is divided into; thus the student can make an exhaustive analysis of the micro-regulation of his or her learning, making him or her conscious of learning and helping to correct possible errors.

Figure 5. Activity screen of the student's utility



Evaluation of the learning process and end product

The final phase of the teaching-learning process is evaluation; here we distinguish between evaluating the process of learning and evaluating the end product of learning. Evaluation of the learning process is similar to what was done for the teaching process, and consists of filling out some scales that address this aspect. Students are also given the opportunity to explain their assessment, as well as other aspects which they may wish to make known with regard to the evaluation.

On the other hand, in evaluating the end product of the learning process, students must specify both their level of satisfaction with learning which was acquired in this subject or period during which the tool was in use, as well as their level of satisfaction with their academic performance, indicating a number between 1 (not satisfied at all) and 10 (very satisfied). Scales are also completed in this evaluation for the purpose of measuring the students' degree of satisfaction.

Help

Help which is made available in virtual tools is sometimes insufficient, and represents one of users' principal sources of complaint (Aleven & colls., 2003). For this reason we considered it worthwhile to devote a section specifically to this characteristic of the online tools. In TLPA we have taken pains to assure that help and information is offered for all those sections and aspects which may be more confusing. For example, help is made available in the student's utility at different points in the learning process. Similarly, the teacher's utility also gives help at each of these points.

2. *PLEYADE*™. The *PLEYADE* application (De la Fuente & Martínez, 2003) is an online utility which consists of a data management engine which can be adapted to any private access website or intranet. In the example case, this is the website of the RD&I Project on Self-Regulated Learning. Several access profiles are defined: general webmaster, teacher, student, etc. The purpose and function of *PLEYADE* are established in each case, according to the intent of the website where it is being incorporated. Screen views shown in Figure 6 belong to this particular RD&I Project (De la Fuente & colls., 2003-2006), where it has been applied.

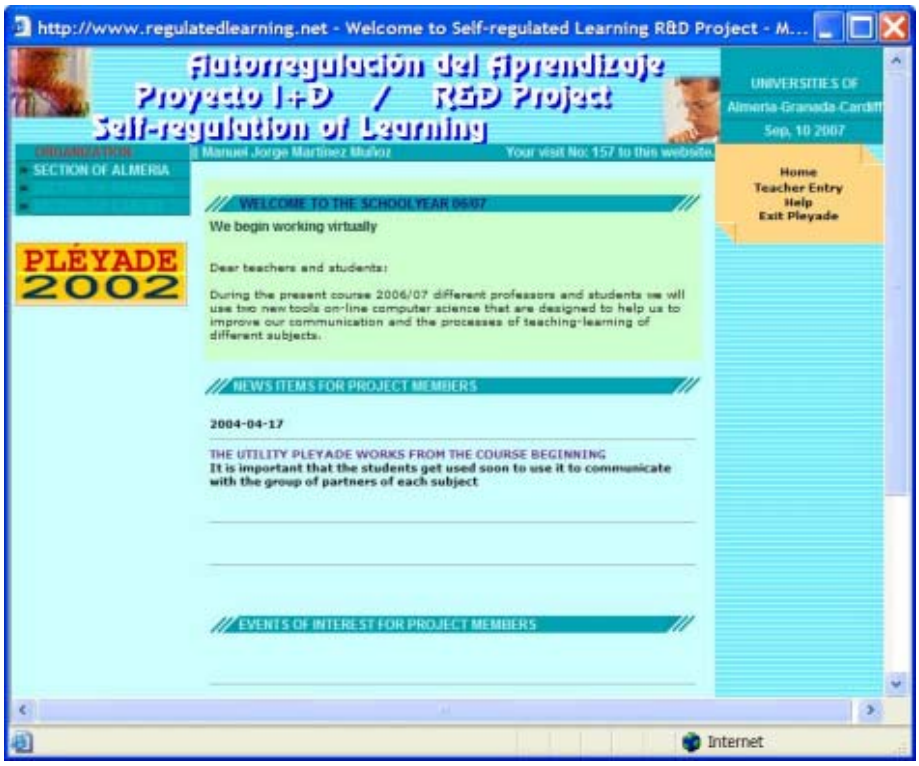


Figure 6.- PLÉYADE, online utility

PLEYADE, with certain small adaptations, can be personalized for use in any area of online work, such as research projects, journals, corporate group websites, associations, etc. Profitability gained from the tool is enormous, and can be expressed in terms of time, volume of data, precision of data and its accessibility. One could say that it is a great resource in carrying on communications between teacher and team, teacher and student, student and student, etc. Most notable are ease of use, guarantee of privacy, and transparency of certain functions, which are hidden to the user and do not distort the user's interventions. The tool can manage an unlimited number of independent groups, each with its students and teachers. The *PLEYADE* tool is also quite easy to use at the Teacher level, nearly all the work being handled through use of fill-in forms.

Statistical analyses

Statistical analyses through multivariate analyses of variance (MANOVAs): Treatment (Group) x Academic Year (Moment).

Results

Statistical analyses through multivariate analyses of variance (MANOVAs) have shown very important interaction effects (Group x Moment), with a general, significant improvement in teaching and learning experiences (Hounsell, Entwistle & colls., 2001-2003). Several general behaviors in the *learning experience, teaching experience, demands and the contents* improved (see you the Table 1). Specific aspects of improvement as evaluated by Entwistle's Scale (op. cit.) are shown in Table 2. Several specific behaviors in the *learning process* improved: careful organization of time (ETL11), concentration (ETL15), freedom in manner of learning (ETL20), relationships between learning units (ETL22), speaking with students on how to learn better (ETL28), encouraging them to think about how to approach required assignments (ETL30), learning how to work with other students (ETL64), to communicate knowledge effectively (ETL74), and computer skills (ETL78). And in the *teaching process* improved: explaining how to develop knowledge of the topic (ETL30), examples and analogies for helping grasp things(ETL33), manner of teaching corresponding to what was to be learned (ETL36), helping students understand how to think and to reach conclusions

(ETL39), opportunities to discuss important ideas (ETL48), demands for collaboration among students (ETL47) or teaching support for completing required assignments (ETL55).

Table 1. Multivariate contrasts for the effects of the online intervention on dimension of teaching and learning behavior (ETL Questionnaire, Hounsell, Entwistle et.al, 2001).

Variables			Dates		Effect
Group					F(4,721)= 5,83****
Moment					F(4,721)= 2,216*
Group x Moment					F(4,721)= 8,750 ****
Dimensions	Control Group n=95 Pre	Group n=111 Post	Experimental Group n=194 Pre	Group n=328 Post	Cross effect F (4,721)= 8,750****
D1. Experience's Learning.	55.55 (11.07)	52.77 (11.46)	59,45 (6,33)	61,15 (6,85)	F (1,724)= 10,62****
D2. Experience's Teaching	119,12 (39,98)	102,36 (31,91)	136,73 (19,71)	143,66 (23,52)	F (1,724)= 28,50***
D.3. Demand	27,45 (6,81)	25,80 (5,83)	29,49 (4,73)	29,75 (6,13)	F (1,724)= 3,99*
D4. Contents	23,41 (8,04)	20,56 (6.78)	27,24 (4,62)	29,06 (5,46)	F (1,724)= 22,77****

p<,05; p<,01**;p<,001***; p<,0001*****

Table 2.- Multivariate contrasts for the effects of the online intervention on specific teaching and learning behavior (ETL Q, op. cit.). Behaviors with a significant increase in interaction are highlighted.

Variables			Dates		Effect
Teacher group					F(77.551)= 8,413***
Year					F(77.551)= 1,750***
Group x Year					F(77.551)= 1,496***
Behaviors	Control Group n=95 Pre	Group n=111 Post	Experimental Group n=194 Pre	Group n=328 Post	Cross effect
ETL-Item 11	3,19 (1,27)	2,87 (1,13)	3,31 (0.89)	3,49 (0.95)	F(1,630)= 7,096**
ETL Item 15	3,11 (1,40)	2,87 (1,15)	3,41 (1,03)	3,64 (0,97)	F(1,630)= 5,520**
ETL Item 22	2,69 (1,32)	2,49 (0,98)	3,23 (0,90)	3,47 (0,96)	F(1,630)= 5,909**
ETL Item 25	2,72 (1,31)	2,53 (1,18)	3,55 (0,89)	3,52 (1,34)	F(1,630)= 8,230**
ETL Item 30	2,61 (1,15)	2,51 (1,03)	3,48 (0,78)	3,73 (0,92)	F(1,630)= 3,630*
ETL Item 33	2,72 (1,33)	2,48 (1,08)	3,44 (0,89)	3,75 (0,89)	F(1,630)= 9,117**
ETL Item 36	2,66 (1,27)	2,51 (0,98)	3,41 (0,87)	3,70 (0,82)	F(1,630)= 6,396**
ETL Item 38	2,42 (1,24)	2,35 (1,02)	2,37 (1,01)	3,07 (1,10)	F(1,630)= 14,781***
ETL Item 39	2,58 (1,13)	2,72 (1,31)	3,12 (1,21)	3,78 (0,92)	F(1,630)=6,439**

ETL Item 40	3,00 (1,43)	2,73 (1,25)	3,60 (0,88)	3,72 (0,93)	F(1,630)=4,085*
ETL Item 41	2,72 (1,57)	2,39 (1,11)	3,86 (0,85)	4,08 (0,86)	F(1,630)= 8,756**
ETL Item 42	2,88 (1,51)	2,81 (1,32)	3,42 (1,03)	3,88 (0,84)	F(1,630)= 7,147**
ETL Item 43	2,78 (1,53)	2,57 (1,18)	3,69 (0,84)	3,99 (0,89)	F(1,630)= 7,474**
ETL Item 44	2,83 (1,48)	2,49 (1,11)	3,35 (0,29)	3,43(1,06)	F(1,630)= 4,329*
ETL Item 45	2,59 (1,34)	2,15 (0,99)	3,36 (0,93)	3,53 (1,00)	F(1,630)= 10,383***
ETL Item 46	2,66 (1,30)	2,17 (0,95)	3,62 (0,86)	3,83 (0,92)	F(1,630)= 15,106***
ETL Item 47	2,81 (1,50)	2,64 (1,27)	3,69 (0,92)	3,89 (0,90)	F(1,630)= 3,648*
ETL Item 48	2,72 (1,20)	2,46 (1,01)	3,22 (0,87)	3,42 (0,96)	F(1,630)= 6,365**
ETL Item 50	2,70 (1,30)	2,52 (1,12)	3,27 (0,88)	3,57 (0,91)	F(1,630)= 6,653**
ETL Item 55	2,72 (1,22)	2,54 (1,15)	3,15 (1,00)	3,55 (1,06)	F(1,630)= 9,378***
ETL Item 59	2,73 (1,08)	2,50 (0,99)	2,79 (0,79)	2,92 (0,87)	F(1,630)= 4,745*
ETL Item 64	2,14 (0,88)	2,25 (0,98)	2,71 (1,02)	2,45 (1,02)	F(1,630)= 3,790*
ETL Item 72	2,92 (1,40)	2,67 (1,21)	3,53 (0,99)	3,78 (1,04)	F(1,630)= 6,120**
ETL Item 74	2,78 (1,16)	2,61 (1,12)	3,28 (0,85)	3,57 (0,95)	F(1,630)= 6,388**
ETL Item 76	2,31 (1,33)	2,36 (1,05)	2,72 (1,20)	3,46 (1,19)	F(1,630)= 9.809***

p<,05; p<,01**;p<,001***; p<,0001*****

In complementary fashion, results show general, significant improvements in self-regulated learning (better planning of learning, better self-regulation strategies and behaviors, and satisfaction with the process), as well as in regulation of the teaching process (better regulatory behavior, better specific regulation strategies, and satisfaction with the learning process). Results as evaluated by the IATLP (op.cit.) are shown in Table 3.

Table 3. Multivariate contrasts for the effects of the online intervention on specific learning and teaching behavior (IATLP Scales, De la Fuente & Martínez, 2004).

Variables	Dates				Effect
Group					F(9,811)= 27,327****
Moment					F(9,811)= 3,102***
Group x Moment					F(9,811)= 8,083********
Dimensions of E	Control group n=95 Pre	n=111 Post	Experimental group n=194 Pre	n=328 Post	Cross effect
IATLP-2B. Planning of	**13,69**	**12,81**	**13,86**	**14,62**	F(1,819)= 15,611****
Learning process.	(8,36)	(6,40)	(2,63)	(2,57)	
IATLP-6A. Self-	**42,77**	**40,34**	**41,63**	**44,71**	F(1,819)= 24,328****

regulating Behaviour.	(8,14)	(6,86)	(7,14)	(7,33)	
IATLP-6B. Self-	**166,00**	**154,58**	**162,86**	**168,85**	F(1,819)= 35,428****
regulating Strategies.	(19,33)	(19,11)	(19,78)	(18,69)	
IATLP-4A. Regulatory	**66,94**	**58,65**	**65,17**	**68,75**	F(1,819)= 46,330****
Teaching behaviour.	(12,88)	(10,55)	(9,70)	(12,24)	
IATLP-4B. Regulatory	**34,44**	**31,29**	**31,29**	**31,11**	F(1,819)= 9,026**
Evaluation.	(7,55)	(5,49)	(5,45)	(6,18)	
IATLP-4C. Regulatory	**40,32**	**35,59**	**40,98**	**43,91**	F(1,819)= 27,682***
Teaching strategies.	(9,65)	(9,57)	(8,86)	(9,80)	
IATLP-8B. Satisfation o	**49,24**	**46,01**	**44,38**	**46,80**	F(1,819)= 13,30***
Learning.	(8,09)	(6,98)	(6,69)	(8,78)	

p<,05; p<,01**;p<,001***; p<,0001*****

Discussion and Conclusion

Results allow us to affirm that the proposed treatment, using a regulatory teaching methodology, encourages self-regulated learning, especially when online technologies described above are used. In this sense, results imply that use of online technology for the students' self-regulation encourages such important learning skills as: time organization, concentration, relationships between learning units, speaking with students on how to learn better. Similarly, it also encourages certain teaching processes that enable significant learning, opportunities to discuss ideas and helping students understand how to think and to reach conclusions.

Nonetheless, this study has limitations such as the small number of participantes in the study, and the lack of an equivalent control group, such that we cannot yet conclude whether the methodology in use or the online tools are causing this effect. In any case, the beneficial effect of the methodology derived from the DEDEPRO^{TM} model (De la Fuente et al., op. cit.), using online tools as a support, is a fact. Future research should demonstrate generalization of these results with a broader sample of subjects and academic profiles at university. This would in turn become important empirical evidence for adapting ourselves to the European Space for Higher Education (De la Fuente, Justicia & cols, 2007-2010; De la Fuente, Justicia & Sander, in edition).

The tools in use have proven to be very useful for regulating and improving the teaching-learning process. They allow teachers and students to improve the design and development of processes managed by each side respectively. Thus, they are applicable both to the European Credit Transfer System at university, as well as to lower levels of teaching. Besides producing an applied, practical use in ICT schools, these tools represent optimization of virtual communication between teacher and pupil, as well as between the pupils in the class group.

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