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# OPDES

Nº12

## Pedagogia no Ensino Superior

### **Pedagogy Embedding in a Learning Management System - The ADAPT Project**

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### **University Students, Emergent Adulthood and Professional Choices: implications for research and intervention**

Cláudia Andrade - ESEC, Centre of Differential Psychology, University of Porto

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### Brochura nº7

- *The University's role in developing rights and social equity.*

Alistair Ross (Jean Monnet ad personam Professor; Emeritus Professor, London Metropolitan University, London, United Kingdom)

- *'In theory, yes; in practice, no': Is this the reality of Education for Citizenship in*

*Higher Education.*

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#### **Nº 8 – Julho 2010**

*- Uma Proposta para a promoção da competência de síntese a partir de várias fontes em contexto académico*

Leila C.S. Rodrigues, Investigadora do CERNAS e docente na Escola Superior Agrária de Coimbra; e Luísa A: Pereira, Coordenadora Regional do PNEP, investigadora e docente no Departamento de Didáctica e Tecnologia Educativa da Universidade de Aveiro

*- A pedagogia no ensino superior: indagar para transformar*

Flávia Vieira, José Luís Silva, e Maria Judite Almeida, Universidade do Minho, Braga

#### **Nº 9 – Julho 2010**

*- Democratização do ensino superior e exigência científica*

João Boavida & Helena Damião (Faculdade de Psicologia e Ciências da Educação, Universidade de Coimbra)

*- O Programa Nacional de Ensino do Português na ESEC: cooperação, renovação e produção de conhecimento no 1º Ciclo do Ensino Básico*

Pedro Balaus Custódio (Escola Superior de Educação de Coimbra)

#### **Nº 10 – Julho 2010**

*- Desenvolvimento psicossocial do estudante do ensino superior: O contributo de Arthur Chickering*

Sofia de Lurdes Rosas da Silva (Escola Superior de Educação de Coimbra) e Joaquim Armando Gomes Ferreira ( Faculdade de Psicologia e de Ciências da Educação da Universidade de Coimbra)

*- PBL – Problem Based Learning (Aprendizagem por resolução de problemas)*

Adelino M. Moreira dos Santos (Instituto Politécnico de Coimbra – Escola Superior de Tecnologias da Saúde)

#### **Nº 11 - Julho de 2010**

*- Academic fraud in higher education: how to solve the problem and ensure integrity*

Ryunosuke Kikuchi (Departamento de Ciências Exactas e do Ambiente, ESAC – Instituto Politécnico de Coimbra, Coimbra, Portugal)

*- The integration of Incoming Erasmus students at ESE Porto: The use of cultural extension and educational activities*

Maria Inês Ribeiro Basílio de Pinho (Escola Superior de Educação do Instituto Politécnico do Porto - ESE/IPP)

# PEDAGOGY EMBEDDING IN A LEARNING MANAGEMENT SYSTEM - THE ADAPT PROJECT

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## ABSTRACT

The current Learning Management Systems (LMS) lack pedagogy and interactivity, giving rise to e-learning models that strongly reside on student's own motivation. This paper presents the ADAPT Project, a LMS that, making use of some Artificial Intelligence (AI) models and techniques, tries to overcome these limitations. The followed approaches include Case-Based Reasoning (CBR), Educational Adaptive Systems (EAS), Intelligent Tutoring Systems (ITS), Link-Mining (LM) and Evolutionary Computation (EC). The ADAPT project was approved for funding by Fundação para a Ciência e Tecnologia (FCT). The involved researchers belong to the following Research Centres and Institutions: Knowledge Engineering and Decision Support Research Center (GECAD - Research Center, proposing Institution); Centre for the Research and Technology of Agro-Environmental and Biological Sciences (CITAB – Research Center); Centre for Informatics and Systems of the University of Coimbra (CISUC - Research Centre); Instituto Superior de Engenharia de Coimbra (ISEC); Instituto Superior de Engenharia do Porto (ISEP); Universidade de Trás-os-Montes e Alto Douro (UTAD). The project clearly fits some of the goals of the recently signed confidence agreement between Ministério da Ciência Tecnologia e do Ensino Superior (MCTES / Portuguese Government) and the Presidents of the Portuguese Polytechnic Institutes, namely in what concerns to the distance learning commitment in the Community of Portuguese Language Countries (CPLP). The primary goal of ADAPT is the development of a full functional adaptive intelligent LMS. Susceptible of spin-offs creation, ADAPT may have a considerable impact in CPLP once Brazil and Angola seem really committed in e-learning implementation.

**Keywords:** Case-Based Reasoning, Educational Adaptive Hypermedia, Evolutionary Computation, Intelligent Tutoring Systems, Learning Management Systems, Link-Mining.

## 1. INTRODUCTION

E-learning systems present some major limitations such as the lack of pedagogy and interactivity. The ADAPT Project tries to overcome these limitations by making use of AI models and techniques embedded into an (almost) standard Learning Management System (LMS). The paper is organized as follows: section 2 refers some LMS handicaps; section 3 presents a brief review on Educational Adaptive Hypermedia Systems (EAHS) and learning styles (LS); section 4 describes the AI models and approaches to be embedded in ADAPT; section 5 describes the project goals and their general implementation; section 6 contextualizes the project and refers its expected impact; section 7 concludes the paper.

## 2. LEARNING MANAGEMENT SYSTEMS HANDICAPS

Technical teaching is traditionally composed of lectures, knowledge application exercises and laboratory classes. The teacher maintains a direct contact with the students thus allowing the evaluation of their performance and psychological profile, answer doubts and questions, fit examples and give general orientations to each one. In this context, e-learning systems pose some problems: LMS's allow little more than creating e-learning course contents accessible by an Internet site, offering some additional services such as chat and on-line sessions, all in a single system of comfortable usage by means of Internet access. Contents development makes use of learning-objects; their reutilization is the goal of specifications such as SCORM, AICC and IMS (SAF, 2003).

However, pedagogy is supposed to be included in the contents, not embedded in the LMS. Contents and example adaptation to student's questions is difficult or absent; the role of such LMS's is essentially passive: the initiative belongs to the student. Nevertheless, learning styles, pedagogy, interactivity, autonomy and creativity must integrate such systems. In this context it is of major importance to provide the LMS's with the following features:

1. Catch the performance and learning style of students as well as success and failure stories;
2. Adapt the (shown) contents to each student cognitive level and preferential learning profile;
3. Provide high interactivity, including a query answering system;
4. Be able to learn “how to teach each student” based on previous cases of success and failure described by (previously used) course scripts.

### 3. A BRIEF REVIEW ON (E-) LEARNING RESEARCH

#### 3.1 EDUCATIONAL ADAPTIVE HYPERMEDIA SYSTEMS

Adaptive Hypermedia (AH) is generally referred as a crossroad in the research of Hypermedia and User Modeling (UM) (Brusilovsky, 1996, 2001; De Bra et al., 2004; Wu et al., 1999). An Educational Adaptive Hypermedia System (EAHS) builds a model of the objectives, preferences and knowledge of each student and uses it, dynamically, through the Domain Model and the Interaction Model, to adapt its contents, navigation and interface to the learner objectives (or needs) (Martins et al., 2002; Martins et al., 2008).

De Bra et al. (2004) indicate that these systems must present the functionality to change content presentation, link structures or link annotations with the following objectives:

1. Guiding the user to relevant information and keep him away from the irrelevant one. This objective is known as Link Adaptation;
2. Supplying, in the content, additional information to certify that the most relevant information is shown. It is known as Content Adaptation.

The global architecture, proposed by Benyon (1993) and De Bra et al. (2004), indicates that EAHS must have three essential parts: the User Model, the Domain Model and the Interaction Model.



In EAHS, the emphasis is placed on student's knowledge in the domain application and learning style, in order to allow them to reach the learning objectives proposed in their training (Martins et al., 2007). The learning process is more efficient when it is built in a base of a knowledge previously learnt and it will be still more useful if the student will be actively implicated into the process (Martins et al., 2005, 2007).

The beginning of User Modeling (UM) is dated from 1978/1979 with the first work by Allen, Cohen, Perrault and Rich (Kobsa, 1993). In the following 10 years, numerous applications or systems were developed. Morik, Kobsa, Wahlster and McTear present an extensive survey of these systems (Kobsa, 1993). In these initial systems, user modeling was embedded and there was not a clear distinction from other components of the system (Kobsa, 1993). In 1990, Kobsa was the first author to use the term "User Modeling Shell System". Since then, different systems have been developed with the ability to reuse User Models (Kobsa, 1993; Chepegin et al., 2004; Martins et al., 2005).

In Educational AHS, the UM (or Student Model) has increased relevance: when the student reaches the objectives of the course, the system must be able to re-adapt, for example, to his knowledge (Brusilovsky, 2001; Martins et al., 2005). A Student Model (SM) includes information referring to the specific knowledge that the system judges that the user possesses on the domain, known as the Domain Dependent Data (DDD). The components of the DDD correspond to the Domain Model with three-level functionality (Benyon, 1993; Martins et al., 2005): Task level, Logical Level and Physical Level. The Domain Independent Data (DID) is composed of two elements: the Psychological Model and the Generic Model of the Student Profile, with an explicit representation (Kobsa, 1993). The psychological data is related with the cognitive and affective aspects of the student. This data allows the system to know beforehand which are the characteristics that it must adapt to (Benyon, 1993; Vassileva, 1998). The following list addresses the most common aspects that support adaptation (Martins et al., 2005):

- Domain Independent Data:
  - Generic profile: Personal information (name, email, etc); demographic data; academic background;

qualifications; etc.

- Psychological profile: Learning style (taxonomy); cognitive capacities; personality; inheritance of characteristics.

- Domain Dependent Data:

- Objectives; plan; complete description of the navigation; knowledge acquired; results of evaluations;

Some examples of different approaches that implement UM in some Adaptive Hypermedia Systems (AHS), follow:

- User Knowledge represented by a semantic net (Overlay Model):

- INTERBOOK, KBS HYPERBOOK, INSPIRE, HYPADAPTER, AHA, ISIS-TUTOR, KN-AHS, ELM-ARTII, METADOC and others;

- Stereotypes of two classification dimensions:

- METADOC, AVANTI, C-BOOK5 and others;

- User Objectives:

- INSPIRE, HYPLAN and others;

Some AHS that use the overlay model for UM are (Brusilovsky, 1996) AHM and XAHM, the ISIS-TUTOR and the HYPERFLEX. But many times one method alone does not allow the modeling needs of the system and the combination of diverse methods has to be chosen (Kavcic, 2000). Here are some examples: ANATOM-TUTOR, ELM-ART, INTERBOOK and AVANTI.

## 3.2 LEARNING STYLES

The key of constructivism theory is that the student must be actively involved in the learning process. It is important that teachers understand that knowledge acquisition differs from student to student. Some case studies have been proposed that teachers should assess the learning styles of their students and adapt their classroom and methods to best fit each student's learning style (Kolb and Kolb, 2005; Stash et al., 2005; Merrill, 2009).

There are different learning styles models such as, for example (Ritu

and Sugata, 1999):

- Models based on personality (Witkin's and Myers-Briggs Type Indicator) (Myers and McCaulley, 1985);
- Models based on information processing approach (Schmeck's and Kolb's);
- Models based on Social Interaction (Reichmann and Grasha);
- Models based on multidimensional factors (Keefe and Dun & Dun).

VARK Strategies consist of a questionnaire that provides users with a profile of their learning preferences. These models/Strategies describe three basic learning styles: Visual learning (learn by seeing); Auditory learning (learn by hearing) and Kinesthetic learning or practical (learn by doing).

The model proposed by Kolb is one of the most commonly used inventory and is based on Piaget's model on cognitive and learning development (Ritu and Sugata, 1999). Kolb Learning Styles Model (as behavioral model, is a guide not a strict set of rules) is based on the four stages of the learning cycle: Concrete Experience - (CE), Reflective Observation - (RO), Abstract Conceptualization - (AC) and Active Experimentation - (AE) (Kolb and Kolb, 2005; Stash et al., 2005).

The Felder-Silverman (Felder, 1998; Felder and Brent, 2005) model is another model that we consider particularly useful, especially because its author has an engineering background and the model development was focused in that field (Gomes, 2007). According to this model a learner is classified in five categories, Sensing/Intuitive, Visual/Verbal, Active/Reflective, Sequential/Global, Inductive/ Deductive. The categories Sensing/Intuitive and Visual/Verbal refer to the mechanisms of perceiving information. The categories Active/Reflective and Sequential/Global are about how the information is processed and transformed in understanding. Although the Felder Model describes the categories Inductive/Deductive, they are not measured in its instrument, the ILS, because the author believes that the best method of teaching is induction, whether it is called problem-based learning, discovery learning and inquiry learning.

The Learning process must take into consideration the individual cognitive and emotional parts of the student. In summary each Student is unique. Student personal progress must be adapted and not

generalize and repetitive (Jonassen, 1991; Martins et al., 2007).

## 4. ADAPT - FOUNDATIONS

The above described LMS's limitations and research on EAHS, are the basic reasons for the ADAPT Project - Adaptive Learning Management System - whose goal is the development of an innovative platform characterized by embedded pedagogy built on the following AI paradigms:

- Intelligent Tutoring Systems (ITS);
- Case-Based Reasoning (CBR);
- Link-mining (LM);
- Evolutionary Computation (EC).

### 4.1 INTELLIGENT TUTORING SYSTEMS

ITS are computer applications based on AI techniques that try to capture the profile and knowledge of the student and identify the causes of his errors. ITS try to select adequate contents, examples and problems whose presentation can include multimedia and simulation techniques. They try to replace the human teacher and create an action sequence that simulates an educational attitude. For example, a study from Carnegie Mellon University revealed that, in a test of computer programming, the students that learned using ITS obtained higher classifications than the other ones, also solving complex problems in a shorter time. A comparative study and some prototypes can be found in Bolzan e Giraffa (2002). Figure 1 shows the basic architecture of an ITS.

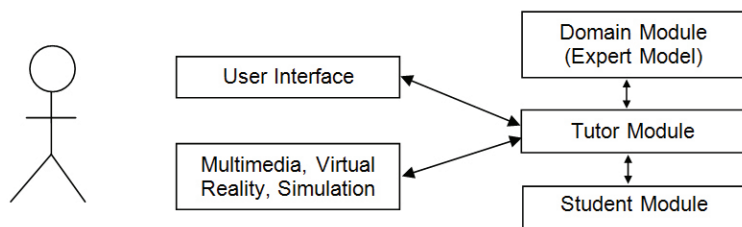


Figure 1 - Basic architecture of an Intelligent Tutoring System

The Domain Module stores the course contents and data, as well as problem solving strategies represented, for instance, by rules, scripts or templates that contain correct sequence actions. This module stores the domain knowledge.

The Student Module tries to evaluate the student acquired knowledge, his difficulties and reasoning capacities. It compares his actions and options with those described by the Domain Module. An ITS is capable of identifying simple problems such as the carry ignorance in an addition operation, or complex ones such as a procedure error in an action sequence for the setup of cruiser guns (Shai, 2003).

The Tutor Module decides, according to the competences shown by the student, what approach should be followed in order to present a given subject. For example, for a beginner it may choose to show some solved problems before presenting an unsolved one; next questions could be of increasing complexity; or it may choose to let the student freely explore a given subject. This module stores the pedagogy.

The User Interface can range from simple dialog boxes to voice recognition. Simulation and virtual reality techniques can provide an approximate real environment.

## 4.2 CASE-BASED REASONING (CBR)

CBR is a paradigm that resides on the invocation of past occurrences to solve new ones classified as similar to them (Marques et al., 2007). The CBR paradigm was created at the Yale University (U.S.A.) in 1982/83 with Schank's pioneer work and the CYRUS system (Schank, 1982; Kolodner, 1983). At Europe it arrived about 1991 with PATDEX (Richter and Wess, 1991), a fault diagnosis system developed at the Kaiserslautern University (Germany).

In the CBR paradigm historical data becomes implicitly available along the system lifetime and knowledge tends to adapt itself to the day-to-day experiences. The CBR operation cycle comprises four basic phases, as shown in figure 2:

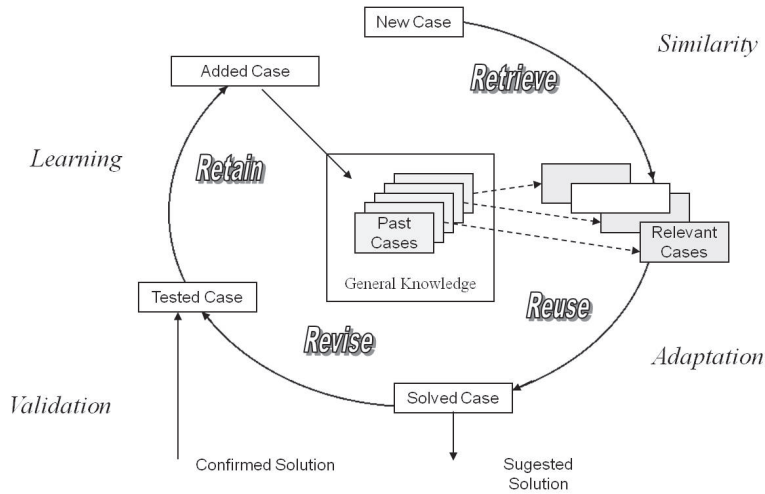


Figure 2: The CBR operation cycle (Aamodt and Plaza, 1994)

- **Retrieve:** Select, from the Case Library, the past cases that seem to be relevant to solve the present one;
- **Reuse** the selected cases to derive a solution;
- **Revise** the solution(s): this phase implies the intervention of an external agent or a simulation tool capable of testing each proposed solution;
- **Retain** in the Case Library all or part of the new case (including its solution) if it seems it may help to solve future cases, contains something new or teaches a lesson.

A general description and some particular aspects of the CBR paradigm can be found in Aamodt and Plaza (1994).

## 4.3 LINK-MINING

*"In this paper, we present Google, a prototype of*

*a large-scale search engine which makes heavy use of the structure present in hypertext. Google is designed to crawl and index the Web efficiently and produce much more satisfying search results than existing systems” - so begins the paper by Sergey Brin and Lawrence Page that presented Google to the world (Brin and Page, 1998, p.1). Google makes use of the link Web Structure in order to rank its search results. This algorithm is called PageRank (PR).*

Link Mining (LM) is a more general research area that includes link analysis (Jensen and Goldberg, 1998), hypertext, relational learning and inductive logic. One of the topics in LM is link-based object ranking, exactly the type of task that PageRank carries out. The intuitive idea behind PR is that a page that has many links to it is probably an important page, especially if these links have a high PR too. This approach gives rise to *“recursively propagating weights through the link structure of the Web”* (Brin and Page, 1998, p.4).

Basically, in the ADAPT context a content is ranked as important if many students used it, especially if, for a given learning style and cognitive level, those students obtained good outcomes.

## 4.4 EVOLUTIONARY COMPUTATION

EC is a subfield of AI that involves combinatorial optimization problems. EC uses iterative progress, such as growth or development in a population (Reis and Machado, 2007).

Genetic Algorithms (GAs) (Goldberg, 1989), a subfield of EC, are adaptive heuristic search algorithms based on the evolutionary ideas of natural selection and genetics. The basic concept of GA follows the principles - first laid down by Charles Darwin - of survival of the fittest. In 1859 Darwin published *“The Origin of Species”*, where he proposed that humans, and in fact all creatures, were not born as they are, but rather evolved from ancestors. Over time, creatures change to adapt to the environment and survive.

GA's were created by John Holland in the sixties at the University of Michigan. Holland's GA is a method for moving from one population of *“chromosomes”* to a new population by using a kind of *“natural*

selection” together with the genetics–inspired operators of crossover, mutation, and inversion. Over time, the number of above-average individuals’ increases and highly-fit building blocks are combined from several fit individuals to find better and better solutions to the problem at hand. This evaluation is generally carried out by a fitness function although, in some applications, it may be executed by a human actor, giving rise to the so called Interactive Evolutionary Computation (IEC). Figure 3 shows the general form of a GA.

1. Initialize the population
2. Calculate the fitness of each individual in the population
3. Reproduce selected individuals to form a new population
4. Perform evolutionary operations such as crossover and mutation on the population
5. Loop to step 2 until some condition is met

Figure 3. Evolutionary computation algorithm.

Swarm Intelligence (SI) is another subfield of EC based on the collective behaviour of decentralized, self-organized systems. The expression was introduced by Gerardo Beni and Jing Wang in 1989, in the context of cellular robotic systems (Beni and Wang, 1989). SI systems are typically made up of a population of simple agents locally interacting with one another and with their environment. The agents follow very simple rules, and although there is no centralized control structure dictating how individual agents should behave, local interactions between such agents lead to the emergence of a complex global behaviour. Natural examples of SI include ant colonies, bird flocking, animal herding, bacterial growth and fish schooling.

## 5. ADAPT - PROJECT GOALS

As previously stated, the ADAPT project intends to overcome the



handicaps described in section 2 by achieving the goals listed in the same section (numbered 1 to 4), according to the above described AI models, in the following way:

1. Goals 1 and 4: Initially load the ADAPT LMS with course scripts, according to the course contents and previously defined student's learning styles and cognitive level. These scripts act as the Case Library of a CBR based ITS (Sun-Gwan Hana, 2005). Some freedom of choice, link-mining and link-tracking, student's evaluation, final result and learning profile will constitute new examples of success and failure to be used (or not) in future course scripts. In this approach each case is described by the paths followed by each past student, his learning profile and his history. This way ADAPT can guide a new student following a previously known success direction and avoid unsuccessful behavior, while capturing data that reveal his cognitive level and learning style;

2. Goal 2: Contents selection and adaptation to student queries uses, among other possible ones, local searches based on link-mining / PageRank techniques. In fact, and adapting reference (Brin and Page, 2000, p.4), *another intuitive justification is that an example will have a high rank if many students have examined it or if it was frequently used by successful students. This approach may include Internet search and Web-mining;*

3. Goal 3: ADAPT includes online synthesis capabilities for solving What-if problems posed by students in an interactive way. This creative capability resides on EC. The results evaluation (fitness) can be carried out automatically or in an interactive way, this way resulting in an IEC model. The EC module needs a specific implementation for each course contents. However, each module is encapsulated as a learning object, susceptible of use in other LMS platforms or other applications.

As concept proof and first application domain, a course on Digital Systems has been selected, for the following reasons: a) Consolidated knowledge domain, well delimited; b) Well defined synthesis techniques;

c) Previous team experience on teaching this subject. The tests will be carried out at ISEP and/or ISEC.

ADAPT could reside on a pre-existent open-source platform such as Moodle, for example. However, code complexity related with services not relevant in the context of this project and predefined structures that difficult the adaptation to the project goals, determined that a new LMS be designed and developed from scratch, offering the basic traditional functionalities. The project target is, briefly, a completely functional LMS system, intelligent, providing pedagogy, interactive, fulfilling the requisites of a really attracting environment for student usage and self-learning, in the ideal one teacher to one student teaching / learning ratio.

## 6. ADAPT - CONTEXT AND ESTIMATED IMPACT

ADAPT is a project approved for funding by FCT - Fundação para a Ciência e Tecnologia. The involved Institutions are GECAD, IPC (Instituto Politécnico de Coimbra), ISEP and UTAD. The project provides some scholarships and Academic Degrees. The research team is composed of researchers from the following domains: Education, AHS, Computational Intelligence (Fuzzy Systems (Zadeh, 1996), Artificial Neural Networks and EC) and CBR. The team includes recognised leadership competences and experience in prestigious Portuguese teaching institutions, as well as in the professional domain.

Portugal is a member of CPLP, a community that includes Brazil, Angola, Mozambique, Guinea-Bissau, Cabo Verde, S. Tomé e Príncipe and East-Timor. All these countries have a long way to go in what respects to education and training. Brazil and Angola are already making a strong investment in e-learning, due to their geographical dimensions too. In this context and given some historical reasons, Portugal is a privileged member: ADAPT can be an interesting knowledge divulgation support to the CPLP community.

Besides this, ADAPT clearly fits some of the goals of the recently signed confidence agreement between MCTES and the Presidents of

the Portuguese Polytechnic Institutes, namely in what concerns to the distance learning implementation commitment in CPLP (CCISP, 2010).

## 7. CONCLUSION

Learning is an important issue as recognized by the Lisbon Strategy: *"The Lisbon Strategy is the EU's response to facing the challenges of globalisation, demographic change and the knowledge society. [...] There are three overall objectives: improving the quality and effectiveness of education and training systems; facilitating access to education and training systems; and opening up EU education and training systems to the wider world"* (European Commission, 2009).

E-learning clearly fits the 2<sup>nd</sup> and the 3<sup>rd</sup> goals; ADAPT clearly fits the former. As far as we know, until this moment no LMS has fulfilled the user expectations in terms of usability, adaptability and effectiveness: people still prefer live classes.

Can we change this?

Yes, we can.

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# UNIVERSITY STUDENTS, EMERGENT ADULthood AND PROFESSIONAL CHOICES: IMPLICATIONS FOR RESEARCH AND INTERVENTION

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## ABSTRACT

In this paper, we will address how emerging adulthood developmental period impacts university student's representations of adulthood and professional role. If classically, adult roles were essentially defined by the exercise of a professional activity today, social changes provide a new outline both to transition to adulthood, as well as to adult roles' anticipation namely for university students. If, on the one hand, the extension of the learning period emerges, on the other, a visible professional instability makes it difficult for youngsters to enter the labour market. These social shifts place new challenges to the way youngsters live their transition to adulthood, and anticipate their future roles as adults.

This work begins with the idea that the lengthen of the "moratorium" period that constitutes the transition to adulthood (being economically dependent from family, difficulties in entering the labour market, and postponement of the family projects on the youngsters' part) makes it less normative to assume adult roles. Thus, a new adult figure arises "in transition", also named the emergent adult. The developmental tasks of the beginning of adult age, considered indispensable to assume adulthood, may also involve different contours where identity construction and the acquisition of autonomy will guide the youngsters' attitudes towards university and labour market.

Finally we will discuss the implications of this life stage focusing on typical problems that emerging adults while they attend university and their representations of adulthood and future professional choices.

## INTRODUCTION

In an attempt to specify the phase of the vital cycle, that is placed between the final part of adolescence and the beginning of adulthood, there is, with some frequency, in the psychological literature, the designation of late adolescence. However, to speak about adolescence implies to refer to a developmental period, where there are changes both at a physical, as well at a psychological level. From the point of view of the social status, the adolescents, in the major part, are attending the secondary school system and living with their parent,



of whom they are dependent on from an instrumental (economic and social dependency) and affective (keeping relationships of great intimacy with their parents).

Allying the developmental features to the social features, it is, according to Arnett (2000), not very suitable to name late adolescents to university students, or even to those who already exercise a professional activity, for example, in the sense that these are in a stage clearly distinct from adolescence. If we refer to physical development, the differences are clear between the adolescents and these youngsters, since these are at a physical maturity stage not yet reached by the first ones.

At a psychological level, the task of construction of identity is now made or, if not, tends to be built away from the perspective of reproduction or indecision that characterise adolescence (Arnett, 2000; Arnett, 2006). On the other hand, in most cases these youngsters are responsible for their options and decisions, both in the area of affective relations, as in the area of education and professional choices. Still from the autonomy viewpoint and seeing that these are studies are referring to the North American context, many of these youngsters are no longer living with their family of origin (for example, because they are studying or working far from their parents' house), when they are, they maintain an independent lifestyle.

Finally, from the social point of view, there are visible differences between the adolescents and these youngsters, such as, for instance, the possibility of taking the driver's license, or even to vote, to refer just a few of the socially constructed tasks as adults.

## UNIVERSITY STUDENTS AS EMERGENT ADULTS

Based on the previous arguments, it seems inadequate to treat these youngsters as late adolescents, since they are, in terms of the psychological development and the social status, in a clearly distinct stage (Arnett, 2000). It is also common in the psychological literature to name this phase as transition to adulthood. In Arnett's (2000) perspective, it is necessary to specify what is understood as transition to

adulthood, seeing that this designation presumes these youngsters are still in transit into adulthood, and are not real adults, until they reach some of the steps that, in a more or less normative way, are markers of the entrance in that stage of life.

Despite the general acceptance of this designation, on the part of the sociological and the psychological studies, it still remains to be explained, according to Arnett (2000), which are indeed the changes and how to characterize the developmental process that culminates in the acquisition of the adult social status. In fact, it is being assumed that it is a stage of transition, and not a life stage with its own characteristics. The same way, the label "youth" to characterize this stage of the life cycle, encloses, in the same category, a multitude too large of individuals, with so many different characteristics, at the level of age, as of psychological development and social status, being consequently, hard to analyse (Arnett, 2000; Arnett, 2001). This designation goes back to a period in history when the youth movements broke out, more or less institutionalized, which, according to Arnett (2000), will be more appropriate from the sociological point of view, since it allows to establish a frontier between childhood and adult age, but inadequate from the psychological point of view.

More recently, in the 90's, this period became popular as the "Generation X", the inspiration for this label was drawn from David Coupland's 1991 book, which was entitled as such. However, it does not seem to correspond to a temporary phenomenon. This stage was here to stay in the lives of the youngsters, especially in some cultures, and in Arnett's opinion (2000), deserves its own designation, since it also presents characteristics of its own.

To characterize this period in development, Arnett (2000) proposed the name "emergent adulthood", which we shall analyse in more detail later, identifying the associated features and highlighting their implications for representations of adulthood, education and professional domains. The emergent adulthood is the proposed label for the youngsters between 18 and 24 years old (although this age criteria may vary, which would correspond to a developmental period with characteristics of its own from the psychosocial point of view) (Arnett, 2000). Hence, the designation includes features of a social nature, which cause direct effects in the psychological development.

The first characteristic of the emergent adulthood concerns the fact that this is an exploration phase of the identity, where options are rehearsed, namely relatively to education and professional domains. In the professional domain, the growing needs of the labour world imply not only a deeper necessity of investing in the education, but also come with periods of part-time work (work and study), usually in diverse areas. Even though these features may present different shapes, depending on the country/culture to each one is referred to, Arnett (2000) enhances the exploratory character of these labour activities, mainly serving for the identification of areas and activities where the youngsters feel they would not fulfil their vocation.

These experiences in the professional domain are characterized both by failure and frustration, although oriented by the absence of social pressure to reach the stability that characterizes adult age. Hence, this period of life was named by Arnet (2000) “age of instability”, for the explorations in emergent adulthood make this period to be dedicated to the construction of an adult life project. In fact, if this project is finally defined, in most cases is still subjected to multiple revisions, which are transformed into changes in the study domains, or temporary abandon of the studies, and also the entrance in the labour market, with alterations to the professional activities, or even the return to the educational system.

Also in the field of emotional relations there might somewhat enduring compromises, with periods of residential emancipation concerning the family of origin, which are not always stable, a comeback to the parents’ house might happen, or the beginning of a new co-habitation period with a new partner may occur. In either of the cases here presented, we face a clear exploration stage, concerning emotional relations, educational and professional roles, and how Arnet (2000) emphasizes, exploration and instability are two features intimately associated.

Emergent adulthood is also classified as an age of “self-focused”. Even if both childhood and adolescence also present that characteristic, the truth is that in these periods there is always the spectrum of parental, family or even institutional vigilance, as happens with the school, for instance. In emergent adulthood, this control fades away, and the options are more dependent on an individual decision, with consequences for the individual her/himself, such as, for instance,

“should I work and study?” or “should I leave my parents’ house and live with my mates?” or “will I work to make money for vacations?”

These and other questions that occur in emergent adulthood make the youngster to become more self-centred. This self-focus should not be understood only as a period of insecurity and uncertainty to the extent that, although this might happen in some cases, most times it means that the youngster has to go through deep reflections about the different life options (Andrade, 2010; Arnett, 1999; Arnett, Ramos & Jensen, 2001). This reflection is indeed a base for the development of the autonomy that characterizes adulthood.

It is also highlighted, in emergent adulthood, the feeling of being partially in adolescence and partially in adult age, reported by 60% of the emergent adults in Arnett’s (2000) study, that indicate, as main criteria for considering themselves as adults, to be responsible for their actions, to be able to take their own decisions, autonomously, and being economically independent. Within these criteria, the last one is that which is signalled as the main responsible for not feeling completely adults.

Arnett (2000) refers a national inquiry in the U.S. context, where 96% of the young people aged between 18 and 24 years old stated that they expected to, one day “obtain what they dreamt for in their lives”. Obviously, this is a period when life expectations are high and positive. This can be explained by the fact that these youngsters have not been confronted yet, in most cases, with responsibilities and difficulties that may restrict the possible wishes and a less optimistic vision of the future. It is an age characterized by an idealized image of the future where it is believed that several possibilities of success are at their disposal.

Yet, according to Tanner (2006), developmental stages may be identified within emergent adulthood. So, there is a stage where emerging adults are investing in their academic training where there are frequent explorations at the affective and professional domains. In this phase, they question themselves whether to make any decisions, according to their parents’ indications, since that, in this stage, their financial and residential support is needed, which might propel the tendency to respect parental guidance.

In this period, the choices and compromises they make have two kinds of effects: the first steps to future, more lasting compromises that characterize adult age are taken, and, on the other hand, clearer, more definite frontiers are being created with their parents. In the next stage, the approaching to the adult status becomes clearer: the compromises appear, especially at the professional level. The effects of entering one of the adult roles are felt at the level of a constructed identity that will progressively substitute the moratorium identity of the previous stage of emergent adulthood. Progressively, the involvement with the choices and the compromises grows, leaving room to adult roles practice, as well as to the construction of the emotional and residential independency towards parents.

However, as some authors claim, this period of living without major commitments is regarded by youngsters in both genders as a transitory period, followed by a certain stability in more conventional life patterns (Brannen & Smitson, 1998; Read, Adams & Dobson, 1984). Other youngsters, on the other hand, are characterized by a long post-adolescent period, that is often connected with the years they attend university. It is destined to life in a relaxed way, exciting and without many cares. Their priority is to meet new places and countries, spending time with friends, search for new experiences, learn and enjoy themselves, before settling down and assuming new responsibilities and long-lasting compromises. These youngsters may present long school trajectories that include the attendance to degrees and post-graduation training with precarious and/or temporary insertions in the labour market. These transitions are marked by the leisure and hedonistic character of life.

Despite the fact that these characteristics may be found in any youngster that stand in the context of transition to adulthood, the concept of "emergent adulthood" refers, in most cases, to a "class" of urban youngsters, from the middle class and attending university (Arnett, 2000). Besides, this conception should be analysed from the viewpoint of each culture's specificity; being culturally constructed, it is not, therefore, universal. In the author's opinion, this stage, with the characteristics attributed is more visible in industrialized countries, namely U.S., Canada, Australia, European and some Asian countries, like Japan and South Korea and in family contexts of middle and urban class (Arnett, 1998; Arnett, 2000).

In sum, the advantage of introducing the concept of emergent adulthood, in particular for the university students, is the fact that it is a period of options exploration, both in the affective and occupational domains, experienced far from the eyes of the social norms concerning the adult life. This transition period, as we have seen, involves feelings of insecurity and self-centring, manifested in sceneries of opportunities and challenges towards the future. They are what Arnet (2000) designates as “volatile years”, in the sense that they are experienced with some instability. Yet, some features of cultural nature influence the limitation or the prolongation of the emergent adulthood, or of the some of its characteristics, for the next stage. Even if some developmental tasks have been achieved, marking the beginning of adulthood, we have observed how cultural factors make a lot of these youngsters remain in a situation that does not outline, completely, the adult status. In fact, as Cavalli (1997) questions, why anticipate the passage to adulthood, with all the effort attached, if it is something that can be delayed in favour of a daily well-being? This perspective is corroborated by messages of the kind: “enjoy youth while you can”, which is very frequent in our culture and express a clear reinforcement of the idea that adult life will not be as satisfactory in as life in youth, a perspective that projects an extreme valorisation of this stage of the life cycle, the emergent adulthood.

## “VOLATILE YEARS”: CAN UNIVERSITY STUDENTS FORESEE THEMSELVES IN THE LABOUR MARKET?

Moving into adulthood involves the resolution of some developmental tasks, in order to allow a progressive construction of a personal project in a context of social and psychological autonomy. One of the most outstanding aspects in the literature about the new configurations of transition to adult life is related with the extended investments in academic achievement. Generally speaking, the universalized improvement in living conditions and the progressive change of cultural standards associated with the integration in the European Union, lead to an increase of educational levels, as well as to the enlargement of the expectations in professional achievement. So, the youth are encouraged to put their efforts on education and to invest in their vocational projects, aiming the future acquisition of a profession which enables them to fulfil their professional and economic independence.

This implies, in most of the cases, that the entrance in the labour market is delayed. Besides this, changes in the labour market have also altered the traditional continuity of the process from studies to professional insertion. The former predictable sequence of getting an academic degree and entering the labour market is now disturbed by maladjustments and fractures caused by the labour market instability and high unemployment rates among youth (Elejabeitia, 1997). These changes tend to affect youths in general and particularly those with university academic degrees, for whom the expectations associated to the investment in education frequently do not have a correspondence in a labour market position (Elejabeitia, 1997). Despite of these difficulties, there is a growing number of youth willing to invest in university studies.

In most of the Southern European countries (Portugal included) the youth follow educational careers during which they are away from the labour market, which adds to extension of a “non-productive status”, where they assume a “full-time student status”, often supported by their parents (Andrade & Fontaine, 2005; Andrade, 2010; Cavalli, 1997; Cordon, 1997). Once more, this is a culturally shaped reality. In contrast, in the U.S., most of youth attending the university work in part-time. This allows them to benefit from economic resources often invested in leisure activities. It is also stated that, in most of the cases, this professional activities have only this particular aim of improving their economic conditions and they do not imply the development of capacities connected with their future professions and careers (Andrade, 2010; Greenberger & Steinberg, 1986). Nevertheless it is also true that young americans involve themselves more than the Europeans, in voluntary service or activities, where they can experience some professional training and also open their views and perspectives towards the labour market (Arnett, 2000).

At the European level, Cavalli (1997) refers that, in most of the cases university students prefer schools nearby their parents’ residence to avoid high living costs that would force them to get a part-time job. In this way, they are not only supported and encouraged to proceed in education, but they can also benefit from the “full-time student status”. However, the lack of part-time job activities and training programs for youth can also discourages those willing to invest in professional activities during the university years (Cavalli, 1997). Another aspect

documented by Cavalli (1997) concerns the fact that most of the youth in the so called Southern European countries enter the labour market after a relatively long period of precarious jobs and unemployment, after finishing their education. The stability in the labour market is progressive and slow (Cavalli, 1997; Arnett, 2004). This framework also raises the question of personal fulfilment through work. According to Arnett (2004), work is regarded today by the youth not only as a task that should be done to provide economic independence, but also as a personal goal to achieve life satisfaction. This image of work also contributes to longer periods of "adjustment" to the labour market, with frequent changes in the kind of activities or even in the professions (Arnett, 2004).

In short, some consensus can be found on the studies, both in the U.S. and European contexts about the fact that the transition from education to the labour market is marked by individual trajectories that are no longer predictable (Arnett, 2004; Cavalli, 1997; Elejabeitia, 1997).

## IMPLICATIONS FOR RESEARCH AND INTERVENTION IN UNIVERSITIES

Overall, from the psychological development standpoint, emergent adulthood during the university attendance years allows them to lengthen "post-adolescence", moratorium and is a crucial phase towards the next decision-making, concerning the options of adult life. As it has been stated by literature from the psychological point of view university students devote their attention to their academic performance, their investments in social networks and leisure time offered by their student social status. One of the questions raised by literature is related with the fact that the growing support from parents to their adult children during the transition to adulthood can promote on them the raise of an "ideal life representation", preventing them from having personal judgments and actively engaging themselves with their life goals. As Côté (1996) argues, even if we can think the university context should accelerate the identity development, it appears that the way university life is structured, centred on academic goals and relationship exploitation, barely contribute to the establishment of an "in-between" phase, which does not promote self-inquiring and



deeper thoughts about the future. According to Arnett (2000), it is not during adolescence that most explorations for the sake of attaining a stable sense of identity are made, but during emerging adulthood and several societal changes contribute to these developments. In the first place, more young people continue their education after university, and thus postpone their working career. Also, students have to make many changes during education, like making choices among several courses or deciding to engage into an European internship (Erasmus Program) only to mention a few. Additionally, almost every year a new choice for specializations should be made and more and more students start a new study (Master Program) after finishing their first studies. Finally, most studies do not lead automatically to a specific type of career, because they have a broad range of choices available. These developments suggest that identity development in the form of a career choice may often be postponed, as compared to some decades ago.

In a circumstance where values and labour market experience dramatic changes, it is reasonable to admit that youth attitudes and expectations towards these domains must be reshaped. Consequently, it seems that the economic and the social development can change both the values and the attitudes towards work and career of the younger generations – this can be labelled as “new individualism”. In this backdrop, when youth confront themselves with structures of opportunities which do not accomplish their expectations, they can develop contradictory perspectives about themselves. As a result, they simultaneously hold idealized images and positive expectations towards work, but they also question themselves and hold some personal doubts that can lead to some identity readjustments (Côté, 1996).

Finally, we would like to add that emergent adults, especially incidence in the younger ones, are more concerned with their “present” and they seem not to care much about their future. We argue that it might be important to recall them about their future so they can plan their life options within deeper reflexive scenarios. In addition, developing supportive structures for the transition to adulthood (eg, part-time jobs, less expensive renting, etc...) can ease some of the difficulties that these youth face during the transition to adulthood, improving their self-confidence to engage in a adult life style. University intervention programs designed to promote the entrance in the labour market, in our opinion, should take into account individual specificities (eg, stage

of the life styles, living preferences, etc). It should also consider that professional and career choices can be made in many different options and not only the ones that are “socially prescribed” as successful.

We think that, if we take advantage of this moratorium period during the transition to adulthood in the university to promote actions in order to engage young people with their personal choices concerning adult life styles we are, in a certain way, encouraging a well succeeded transition to adulthood. This can benefit their personal development and active engagement with social matters.

If, in one hand, hedonism seems to be a value widespread among youth and in the society in general, on the other hand the absence of commitment with personal choices can jeopardize the transition to adulthood. So, most of these young adults seems to be somehow “lost” which also impacts their academic achievement. This, in itself, is a reflection of shifting age norms regarding the timing of life transitions, and in the midst of such normative “turbulence”. However, there could be also an additional cost of this since some youth are now facing patterns of precarious life that can be observed at the psychological level: they are unconfident about themselves and in the relations with others. Thus, programs and intervention at the university level that promote youth psychological development and career orientation can give an important contribution for a more active transition for the adulthood.

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Publicam-se artigos gerais sobre pedagogia e artigos sobre aplicações a domínios e temas específicos. O foco deve ser o ensino superior e o binómio ensino e aprendizagem. São do interesse estudos de caso, exemplos de projectos de sucesso, caracterização de métodos pedagógicos, planos de aulas e orientações práticas. Não serão aceites trabalhos previamente publicados.

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## ***Colecção Temática: Manuais Pedagógicos de Educação***

### ***Pedagógica***

Os Manuais pedagógicos, de natureza monográfica, focam e aprofundam um tema específico, tendo como intenção cobrir a globalidade do tema numa perspectiva aplicada à actividade educativa no ensino superior. Pese embora o rigor conceptual e a fundamentação empírica, estes guias centram-se em práticas facilmente replicadas e adaptadas.

» Manuais pedagógicos: periodicidade irregular; um único manuscrito em cada manual, de dimensão entre 12.000 e 18.000 palavras; estilo APA recomendado

### ***Exemplos de temas***

- Aprendizagem e Motivação
- Gestão do comportamento na aula
- Aprendizagem activa
- Ensino e dimensão do grupo
- Promover competências
- Métodos de ensino
- Recursos de ensino e aprendizagem
- Recursos multimédia
- E-learning e blended-learning
- Desenvolvimento curricular
- Avaliação e classificação
- Tutoria e ensino individualizado
- Competências de comunicação
- Ensinar o estudante atípico (internacional, com necessidades especiais, estudantes mais velhos, ensinar à distância,...)
- ...

### ***É bom saber***

- Quatro línguas aceites para publicação: Português, Inglês, Francês e Espanhol;
- Dimensão e visibilidade internacional
- Revisão por pares
- Edição online em [www.esec.pt/opdes](http://www.esec.pt/opdes)
- A versão em papel das publicações depende da obtenção de fundos e não pode ser garantido que a mesma aconteça na mesma altura que a versão digital.

## ***Série de Cadernos de Pedagogia no Ensino Superior***

***Colecção Temática: Manuais Pedagógicos de***

Educação Pedagógica

***Coordenação:*** Susana Gonçalves

***Equipa Editorial:*** Susana Gonçalves, Dina Soeiro e Sofia Silva

***Edição de:*** Escola Superior de Educação de Coimbra (ESEC)

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# PEDAGOGY IN HIGHER EDUCATION - CALL FOR PAPERS

The major concerns of this two series (the booklets and the Educational Guides) revolve around the processes of teaching and learning in post secondary education. Methods, activities, strategies and processes that foster the learning process and promote the efficacy of teaching are the core issue in this publication.

## ***Booklet series***

Both domain specific and general articles are welcome. Case studies, examples of succeeded projects, the explanation of specific teaching methods, study plans and teaching tips are all interesting examples to include in the articles. These could be original contributions or unpublished congress papers.

- Booklets: up to 4 booklets published twice a year; two manuscripts per booklet, 4000- 5000 words each; APA style recommended

## ***Monographic Series***

The Educational Guides, of a monographic nature, focus specific topics and aim to provide faculty with specific guidelines for educational activity.

The contributions must be practice-oriented and although rigorous and informed by scientific evidence, they should include orientations for teaching staff, teaching tips, and strategies or methods easily replicated or adapted.

- Educational Guides: irregular periodicity; one single manuscript of 12.000 to 18.000 words; APA style recommended

## ***Example of topics being covered***

- Learning and motivation
- Classroom behavior management
- Active learning
- Teaching and group dimension
- Promoting competencies
- Teaching methods
- Teaching and learning resources
- Multimedia resources
- E-learning and blended-learning
- Curriculum development
- Evaluation and grading
- Tutoring and Individualized teaching
- Communication skills
- Teaching atypical students  
(international students, special needs,  
older students, distance teaching...)
- ...
- International scope and visibility
- Peer reviewed
- The Booklets and Educational Guides  
are all edited online at [www.esec.pt/opdes](http://www.esec.pt/opdes)
- Paper versions (already distributed  
for some numbers) are dependent on  
funds and cannot be guaranteed to be  
published at the same time as the online  
version

## ***Good to know***

- Four languages accepted:  
Portuguese, English, French and  
Spanish

## ***Collection of booklets Pedagogy in Higher Education***

Series of Educational Guides

**Coordination and editor-in-chief:** Susana Gonçalves

**Editorial Board:** Susana Gonçalves, Dina Soeiro & Sofia Silva

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