
Atlantis University: a new pedagogical approach beyond e-learning

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Abstract

Atlantis University is an ambitious international project in the area of learning and is currently being developed by a group of universities and companies. It combines three different types of learning and teaching to form a single package offered to Students and people in the workplace alike: face-to-face learning, e-learning and project-based learning. The paper gives an overview of the advantages and disadvantages of the different learning methodologies, and describes the new Atlantis approach. The first practical solutions Atlantis University has developed, namely the Virtual Classroom, ELAT learning environment and Project Service Center, are likewise briefly introduced.

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1. Introduction

Education is increasingly decisive for our societies. Consequently, many people are looking for new ideas in the area of learning and teaching. Atlantis University is one such ambitious project; it combines three different types of learning and teaching to form a single package for offer to all customers (Figure 1), be they are full-time students or people in the workplace.

The three pillars of this university form a new paradigm for higher education development, delivery, support and assessment using Advanced Technology for Learning in a Net based Information Society (Atlantis).

Atlantis University is an international partnership involving nine universities and companies from the European Union (EU) and USA, and is committed to developing an innovative high-quality institution with common branding. The idea evolved from long-term experience in face-to-face (f2f) and project-based teaching as well as several e-learning (e-L) research projects (Furnell *et al.*, 1998, 1999; Stengel *et al.*, 2003). First practical solutions have already been developed within the last two years (see section 5).

2. Learning process hierarchy

The well-known knowledge pyramid can be used as a basis for clarifying the learning process hierarchy (Barnett, 1994). This hierarchy begins with data gathering/processing (Figure 2). Data in a context with a meaning are called information. Knowledge is defined as information in the context of humans. Applying knowledge to solve problems leads to capability.

Capability goes beyond both knowledge and skills/competence in that it represents “an integration of knowledge, skills, personal qualities and understanding used *appropriately and effectively*” (Stephenson and Yorke, 1998). By contrast, competence has to do primarily with the ability to perform effectively in the here and now, in a known or familiar setting; capability goes beyond this, having to do with the realization of capacity in an unknown or unfamiliar future context as well as good performance in the known present. Therefore we have placed the term capability rather than competence at the apex of the pyramid of learning.

The learning process in higher education usually starts from the bottom up and moves very slowly to the top of the pyramid. Against this background, many scientists and teachers are looking for a more efficient path to capability.



Figure 1 Atlantis University portal: one face to the customer

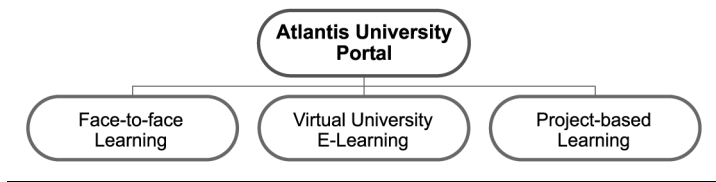
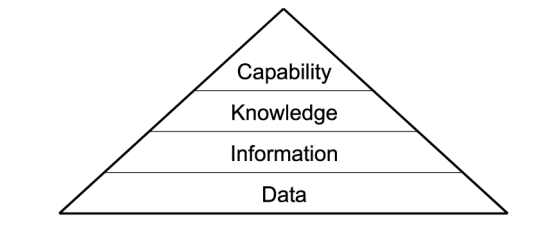


Figure 2 Learning process hierarchy



3. Existing learning methodologies

In this section we describe the three main learning methodologies with their respective advantages and disadvantages, and subsequently classify them in terms of the learning process hierarchy.

3.1 f2f learning

f2f or classroom learning is the classical learning approach, which has always been popular and will continue to be so. The reason for this is that humans learn from humans, that we are modeled on human archetypes. Table I shows principal advantages and disadvantages.

All professionals in higher education have a great deal of experience with groups in classrooms and know it takes a long time to get students to the top of the learning hierarchy.

3.2 e-L

The hype about e-L started in the middle of the 1990s. Why was that? The technology (especially the Web) was available, and many people thought self-directed individual learning at home was the future – independent of everything and everybody. The whole e-L community had to learn a lot: For

Table I

	Advantages	Disadvantages
f2f	Direct communication Feedback/questions possible Very flexible Not very dependent on technology	Uniform pace for all learners Variable teaching quality Same location, same time No repeat (no archives) Not immediately applicable No immediate answers Learners might be (and often are) passive

instance, it is very hard to motivate an isolated student watching a tutorial video for a longer time. The production costs of e-L content are very high – a good estimate is 100 times the cost of content for a f2f lecture.

Blended learning emerged as an approach that overcomes some of the disadvantages (see Table II) by combining e-L and f2f, and is now state-of-the-art for a virtual university.

The latest innovation in this area is mobile learning (Nyiri, 2002; Seppälä and Alamäki, 2002), which might be taken to mean a version of e-L using a mobile device. But this underestimates the potential of mobile learning, which could take place at the relevant location, e.g. learning how to build bridges in front of a bridge or information on buildings while walking through a city. Several research projects are addressing this point, especially for museum applications (Igd, 2003).

Regarding the learning process hierarchy, like classroom learning, e-L starts from the bottom and does not address capability.

3.3 Project-based learning (proL)

Solving real-world problems involves complex tasks – most of which are executed as projects. As such, in many cases, practical learning means proL (see Table III).

It is obvious from many research studies and our own experience that proL strongly addresses both knowledge and capability (Bruffee, 1999; Boud and Solomon, 2001; Batatia *et al.*, 2002). The group members not only learn the relevant subjects/contents, but also skills for teamwork, communication and project management. This makes proL the ideal learning methodology.

Table II

	Advantages	Disadvantages
e-L	Learning any time, any location Active learning at own speed Easier quality control Easy distribution	Resource-intensive (time, budget, tutoring) Content mistakes are more serious Technology problems Costs for students Not immediately applicable No immediate answers Isolation (no social contacts)

Table III

	Advantages	Disadvantages
ProL	Very intensive direct communication Very flexible Immediate response Feedback/questions possible Can be at the right location	Time-consuming Highly resource-intensive Unpredictable outcome How to choose group members Assessing group members

4. The integrated pedagogic approach of Atlantis University

Bearing in mind the various advantages and disadvantages of the different learning methodologies we propose an extended blended learning approach: Atlantis University.

Atlantis University is characterized by:

- The teaching methods are a carefully engineered mix of project-based learning, e-L and f2f learning – depending on the learner's situation (life long learning).
- International cooperative/collaborative and interdisciplinary learning and teaching leading to internationally accredited and recognized qualifications (global education for the global market).
- Knowledge and technology transfer between participating universities and companies and the workplace – private public partnership (not only academics).
- Projects incorporate real-world problems – resulting in qualifications (students) and solutions (workplace) – and eliminating the “practice shock”.

The Atlantis approach addresses knowledge or even capability rather than simple gathering and evaluation of information, and is delivered at an early stage of the educational life-cycle. It results in student-centered, integrated and more efficient learning.

Atlantis University seeks a standardized approach, curriculum and an interchangeable body of knowledge. Course contents and organizational issues are set up in a standardized way, among other things using ECTS, which makes the mutual recognition and portability of credits much easier. Implementing the principle “Write/develop once, use many times and locations” courses are developed in cooperation but made the responsibility of the strongest partners in each case. These courses could be used by all partners.

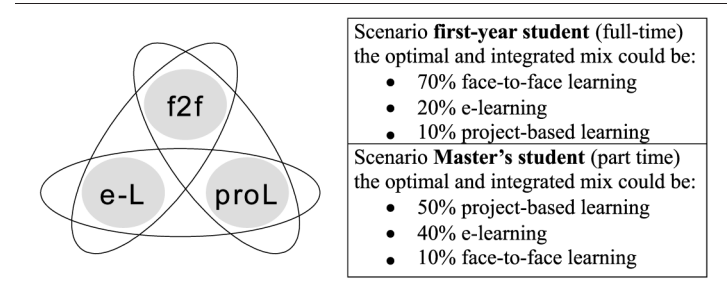
Thanks to our innovative approach and the subject of the course itself, we address students of different cultures, languages and of different regions, seeking to bridge significant differences and thus achieve an enduring impact.

Two example scenarios and Figure 3 show the possible combination and interaction between the three pillars of Atlantis University.

In developing learner capability across a range of fields, Atlantis will look to find the optimal mix of:

- f2f and e-L environments;
- individual study and project-based group work; and
- teacher- and student-directed learning.

Figure 3 Interaction between the three pillars



A learning path through a typical Atlantis course could be represented in a simplified form as in Figure 4.

5. Towards a practical solution

The theoretical approach used is complemented by three practical projects, with the aim of creating a combined, integrated infrastructure for the three pillars of our concept. The e-L project has been in place for over seven years, while the other projects started in 2003.

5.1 Virtual classroom as part of the learning infrastructure

To support our international Atlantis partnership we installed a virtual classroom infrastructure. This enables “remote” students to participate in lectures held in a specially equipped classroom elsewhere. The remote students sit in a classroom that has the necessary technology. This is still f2f learning and teaching, even though the student only sees the teacher via video and vice versa.

The technical infrastructure in the main classroom consists of an interactive whiteboard and two projectors – one for the video input from the remote classroom (Figure 5, see monitor on the left) and one focused on that board with the option to annotate any computer presentations

Figure 4 Typical Atlantis learning path

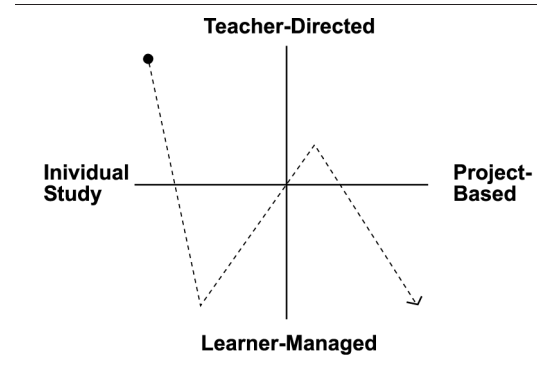
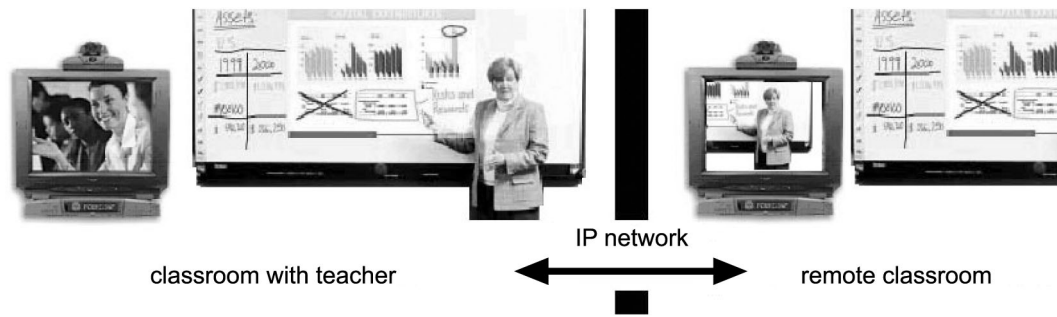


Figure 5 One lecture in two remote classrooms



using a special pen (see teacher in front of the interactive whiteboard). Two projectors (or big monitors) also have to be installed in the remote classroom – one for the video input (camera focused on teacher), and one for the input from the whiteboard.

5.2 The e-L Project ELAT

The Environment for Learning and Teaching (ELAT) has been developed in the project “Modules for multimedia net-based higher education (2MN)” with several partners and coordination in Darmstadt.

ELAT is a learning platform with the following functions: composition of course content, distribution of teaching materials, web-based communication, cooperative net-based learning, support in completing tutorial exercises, management of e-L courses and administration. ELAT enables self-managed learning using multimedia teaching materials, like audio-, video-clips and different XML-documents, which comply with the Learning Object Metadata Standard (LOM). The main principle of ELAT is to keep the handling as simple as possible (Figure 6). For example the authoring tool supports an easy way to produce courses by adding different objects, called knowledge units, to timelines, as shown in Figure 7.

At the moment ELAT integrates the following software packages:

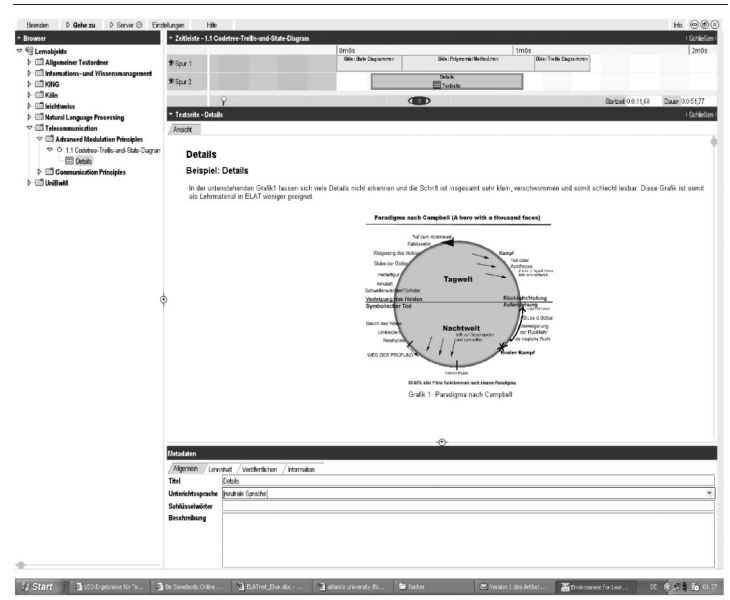
- The “Digital Communications Simulation System (DCSS)” which supports simulations in telecommunication, including fibre-optic transmission systems and components.
- NetSim, a virtual lab environment that simulates TCP/IP networks.
- Hydrotrainer and TWL-Trainer, training software for civil engineering and architecture.

Under development is a user modelling module for tailoring a course program which meets the users’ needs in an optimal way and a QTI compliant module for online tests. The 2MN project developed lots of e-L courses for teaching in

Figure 6 ELAT student user interface



Figure 7 ELAT authoring tool



engineering and IT. The first lectures were given with success in 2002/2003 at universities in Darmstadt, Cologne and Munich.

5.3 The Project Service Center supporting ProL

For projects in industry you usually need ample resources and a sophisticated infrastructure. To support student projects and their special needs we have developed a Project Service Center (PSC) as part of the Atlantis University concept. The PSC offers students communications and technological support for the duration of an entire project. Since students only participate in projects for a relatively short period of time (typically five months), the system must be quick and simple if it is to gain acceptance. Consequently, it is essential that the PSC has a high level of usability and permits decentralized administration of the student projects.

The PSC provides support for project management, collaboration management as well as document and content management. Since project management assists students in defining tasks and milestones it also generate project plans. The other two areas address communication between project members and document management.

Consequently, the PSC covers the three most crucial areas involved in project execution.

The PSC is integrating all three areas into a single, user-friendly platform by April 2004. It is possible to access all PSC functions via the web, in order to ensure maximum accessibility, but also to promote virtual teams. All that users require is a standard browser.

6. Conclusion and outlook

Atlantis University seeks to address many disadvantages of well-known pedagogical concepts for higher education. The proposed extended blended learning with its three pillars f2f, e-L and proL is an integrated student-centered approach with great potential, which differs significantly from traditional approaches.

The project is ongoing with further technical and organizational developments on a fairly large scale. To demonstrate the basic idea we will examine in detail a project management module used for different courses within a wide variety of subjects in all partner locations. This module will be delivered to different user groups the "Atlantis way" and traditionally, allowing us to conduct a comparison of learning results.

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