iCERi 2018

11TH INTERNATIONAL CONFERENCE OF EDUCATION, RESEARCH AND INNOVATION

CONFERENCE PROCEEDINGS

SEVILLE (SPAIN)
12-14 NOVEMBER 2018

iCERi 2018

11TH INTERNATIONAL CONFERENCE OF EDUCATION, RESEARCH AND INNOVATION

CONFERENCE PROCEEDINGS

SEVILLE (SPAIN)
12-14 NOVEMBER 2018

ICERI2018 Proceedings
11th International Conference of Education, Research and Innovation
November 12th-14th, 2018 — Seville, Spain

Edited by
L. Gómez Chova, A. López Martínez, I. Candel Torres
IATED Academy

Book cover designed by
J.L. Bernat

ICERI2018 COMMITTEE AND ADVISORY BOARD

Adriana Agnes Repellin-Moreno	MEXICO	*Jose F. Cabeza*	SPAIN
Agustín López	SPAIN	*Jose Luis Bernat*	SPAIN
Alan Fenn-Lavington	AUSTRALIA	*Juanan Herrero*	SPAIN
Amparo Girós	SPAIN	*Juliana Mahpol*	MALAYSIA
Ana Henriques	PORTUGAL	*Ken Brown*	IRELAND
Ana Paula Lopes	PORTUGAL	*Kenesha Wilson*	UNITED ARAB EMIRATES
Ana Tomás	SPAIN	*Laurie Henry*	UNITED STATES
Anna Romagnuolo	ITALY	*Lisa Zawilinski*	UNITED STATES
Antonio García	SPAIN	*Lorena López*	SPAIN
Berit Grønn	NORWAY	*Lori Severino*	UNITED STATES
Breno Deffanti	BRAZIL	*Luca Botturi*	SWITZERLAND
Brian Garibaldi	UNITED STATES	*Lucilia Falcao*	BRAZIL
Chelo González	SPAIN	*Luis Gómez Chova*	SPAIN
Cherry Poussa	UNITED KINGDOM	*Luis Roseiro*	PORTUGAL
Christian Grévisse	LUXEMBOURG	*Lynn Vona*	UNITED STATES
Christine Stanley	UNITED STATES	*Mª Jesús Suesta*	SPAIN
Christopher Evans	UNITED KINGDOM	*Maria Porcel*	SPAIN
Christopher Mattatall	CANADA	*Marta Alves*	PORTUGAL
Craig Loewen	CANADA	*Mary Jo Self*	UNITED STATES
Cristina Nicolau	ROMANIA	*Mayaugust Finkenberg*	UNITED STATES
Cynthia Rosas Magallanes	MEXICO	*Michal Gregus*	SLOVAKIA
Dale Carnegie	NEW ZEALAND	*Michalis Xenos*	GREECE
Daniela Buna	UNITED STATES	*Miguel Peiró*	SPAIN
David Jennings	IRELAND	*Miranda Lin*	UNITED STATES
David Martí	SPAIN	*Nicola Galloway*	UNITED KINGDOM
Diane Boothe	UNITED STATES	*Norma Barrachina*	SPAIN
Dragana Brzakovic	UNITED STATES	*Oronzo Parlangeli*	ITALY
Eduardo Figueira	PORTUGAL	*Paul Lane*	UNITED STATES
Eladio Duque	SPAIN	*Peter Haber*	AUSTRIA
Elmaziye Özgür	CYPRUS	*Peter Mazohl*	AUSTRIA
Fernando Enrique Ortiz Rodriguez	MEXICO	*Pia Palotie*	FINLAND
Francesco Galati	ITALY	*Pnina Shavit*	ISRAEL
Halvard Øysæd	NORWAY	*Priya Sharma*	UNITED STATES
Helmut Woellik	AUSTRIA	*Rong Huang*	UNITED KINGDOM
Hiroyuki Obari	JAPAN	*Rosa Cendros Araujo*	CANADA
Ignacio Ballester	SPAIN	*Sergio Pérez*	SPAIN
Ignacio Candel	SPAIN	*Shannon White*	UNITED KINGDOM
Iván Martínez	SPAIN	*Sylvia Dempsey*	IRELAND
Jan Moritz Anke	GERMANY	*Thomas Fischer*	GERMANY
Jan Perry Evenstad	UNITED STATES	*Valentina Donzella*	UNITED KINGDOM
Jaroslaw Kujawski	POLAND	*Victor Harari*	MEXICO
Javier Domenech	SPAIN	*Wendy Gorton*	UNITED STATES
Javier Martí	SPAIN	*Xavier Lefranc*	FRANCE
Joanna Lees	FRANCE	*Xema Pedrós*	SPAIN
John Craft	UNITED STATES	*Yukio Konishi*	JAPAN

CONFERENCE SESSIONS

ORAL SESSIONS, 12th November 2018

Mobile Learning
Tutoring & Mentoring
ICT and Digital Skills among Teachers (1)
Work-Integrated Learning: University-Industry Collaboration
Technology Enhanced Learning (1)
Barriers to Learning and Social Inclusion
Learning Space Design
Special and Inclusive Education (1)
Maths and Statistics in Higher Education

Social Media and Social Networks in Education
Assessment of Student Learning (1)
ICT and Digital Skills among Teachers (2)
University-Industry Collaboration
Advanced Educational Technologies
Student Support and Engagement (1)
Architecture and Design Education
Special and Inclusive Education (2)
STEM Education (1)

Massive Open Online Courses & Open Educational Resources
Assessment of Student Learning (2)
Soft Skills Development
New challenges for the Higher Education Area
Active Learning Experiences in Higher Education
Student Support and Engagement (2)
3D Technologies and BIM in Architecture and Engineering
Dyslexia & Speech Learning Disorders
Computer Science Education (1)

e-Learning Experiences
e-Assessment
Information and Digital Literacy
Internation-alization in Higher Education
Virtual Reality in Education
Quality Assurance in Higher Education
Business and Economics Education
Equity and Inclusive Education
Integrating Emerging Technologies and New Material with Design

POSTER SESSIONS, 12th November 2018

Pedagogical Methods and Innovations

Emerging Technologies in Education and Research

ORAL SESSIONS, 13th November 2018

Technology Enhanced Learning (2)
Serious Games & Game-Based Learning (1)
Community-Based Learning
Work-Integrated Learning, Research and Societal Impact
Project and Problem Based Learning (1)
Early Childhood Education
Pre-Service Teacher Education (1)
Pre-service Teacher Experiences in STEM
Language Learning Education

Learning Analytics
Serious Games & Game-Based Learning (2)
Community Engagement Education
Entrepreneur-ship Education
Technology for Active Learning
Curriculum Design Experiences
Pre-Service Teacher Education (2)
Maths in Primary and Secondary Education
Foreign Language Teaching and Learning (1)

Learning Management Systems (LMS)
Gamification
Sustainability Education
Work Employability
Experiential Learning
Management in Higher Education
Pedagogical Innovations & Educational Research
Computer Science Education (2)
Foreign Language Teaching and Learning (2)

Flipped Learning
Digital Skills and Student Support
Adult and Vocational Education
Workplace Learning
Collaborative and Peer-based Learning
Leadership and Management in Education
Teacher Training
Technology Enhanced Learning in STEM Education
Multicultural Education Challenges

Blended Learning
Creativity and Design Thinking in Education
Student Mental and Physical Well-being
Internships and Workplace Learning
Project and Problem Based Learning (2)
Experiences and Research in Education
Professional Development of Teachers
STEM Education (2)
Gender Issues in Education

POSTER SESSIONS, 13th November 2018

Global Issues in Education & Inclusive Learning

New Trends and Experiences in Education

VIRTUAL SESSIONS

21st Century Skills
Academic Research Projects
Accreditation and Quality in Education
Active and Experiential Learning
Adult Education
Advanced Classroom Applications and Technologies
Assessment of Student Learning
Assistive Technologies and Accessible Resources
Barriers to Learning
Blended Learning and Flipped Classroom
Bullying Prevention and Awareness
Collaborative and Problem-based Learning
Creativity and Design Thinking
Critical Thinking and Problem Solving
Curriculum Design
E-content Management and Development
e-Learning Experiences
Early Childhood Education
Educating Individuals with Intellectual Disabilities
Educating Individuals with Sensory and Motor Disabilities
Educating the Educators
Education for Sustainability
Education Practice Trends and Issues
Education, Research and Globalization
Emerging Technologies in Education
Emerging Technologies in Education and Research
Employability Issues and Trends
Flipped Learning
Game-based Learning and Gamification
Gender and Equality in Education
Global Issues in Education & Inclusive Learning
ICT and Digital Skills
In-service Teacher Training
Inclusive Learning, Cultural Diversity and Special Education
Informal Learning
International Projects
Language Learning Innovations
Leadership and Educational Management
Learning and Teaching Innovations
Learning Management Systems (LMS)
Life-long learning
Links between Education and Research
m-Learning: Mobile Applications and Technologies
Multicultural Inclusion and Indigenous Perspectives
New challenges for the Higher Education Area
New Challenges in Education and International Cooperation
New Trends and Experiences in Education
Online Assessment
Organizational, Legal and Financial Aspects
Pedagogical Innovations
Pedagogical Methods and Innovations
Post-graduate Education
Pre-service Teacher Experiences
Primary and Secondary Education
Professional Development of Teachers
Research Management
Research Methodologies
Research on Technology in Education
STEM Education Experiences
Student Support and Motivation
Technology in Teaching and Learning
Tutoring and Mentoring
Undergraduate Education
University Networks
University/Industry Experiences
Virtual Learning Environments (VLE)
Vocational Training
Work Employability
Workplace Learning

ABOUT ICERI2018 Proceedings

HTML Interface: Navigating with the Web browser

This USB Flash drive includes all presented papers at ICERI2018 conference. It has been formatted similarly to the conference Web site in order to keep a familiar environment and to provide access to the papers trough your default Web browser (open the file named "ICERI2018_Proceedings.html").

An Author Index, a Session Index, and the Technical Program are included in HTML format to aid you in finding conference papers. Using these HTML files as a starting point, you can access other useful information related to the conference.

The links in the Session List jump to the corresponding location in the Technical Program. The links in the Technical Program and the Author Index open the selected paper in a new window. These links are located on the titles of the papers and the Technical Program or Author Index window remains open.

Full Text Search: Searching ICERI2018 index file of cataloged PDFs

If you have Adobe Acrobat Reader version 6 or later (www.adobe.com), you can perform a full-text search for terms found in ICERI2018 proceedings papers.

Important: To search the PDF index, you must open Acrobat as a stand-alone application, not within your web browser, i.e. you should open directly the file "ICERI2018_FrontMatter.pdf" with your Adobe Acrobat or Acrobat Reader application.

This PDF file is attached to an Adobe PDF index that allows text search in all PDF papers by using the Acrobat search tool (not the same as the find tool). The full-text index is an alphabetized list of all the words used in the collection of conference papers. Searching an index is much faster than searching all the text in the documents.

To search the ICERI2018 Proceedings index:
1. Open the Search PDF pane through the menu "Edit > Advanced Search" or click in the PDF bookmark titled "SEARCH PAPERS CONTENT".
2. The " ICERI2018_index.pdx" should be the currently selected index in the Search window (if the index is not listed, click Add, locate the index file .pdx, and then click Open).
3. Type the search text, click Search button, and then proceed with your query.

For Acrobat 9 and later:
1. In the "Edit" menu, choose "Search". You may receive a message from Acrobat asking if it is safe to load the Catalog Index. Click "Load".
2. A new window will appear with search options. Enter your search terms and proceed with your search as usual.

For Acrobat 8:
1. Open the Search window, type the words you want to find, and then click Use Advanced Search Options (near the bottom of the window).
2. For Look In, choose Select Index.
3. In the Index Selection dialog box, select an index, if the one you want to search is available, or click Add and then locate and select the index to be searched, and click Open. Repeat as needed until all the indexes you want to search are selected.
4. Click OK to close the Index Selection dialog box, and then choose Currently Selected Indexes on the Look In pop-up menu.
5. Proceed with your search as usual, selecting other options you want to apply, and click Search.

For Acrobat 7 and earlier:
1. In the "Edit" menu, choose "Full Text Search".
2. A new window will appear with search options. Enter your search terms and proceed with your search as usual.

REINVENTING UNIVERSITY IN THE XXI CENTURY: NEW THEORIES AND NEW PSYCHO-PEDAGOGIC MODELS FOR TEACHING AND LEARNING IN THE INTERNET

M.A. Garito

International Telematic University UNINETTUNO / President/Rector / Professor Emeritus in Psychotechnologies (ITALY)

Abstract

The existence of an Internet network, external to man, including interconnected digital memories, has completely changed the processes and mechanisms of production and transmission of knowledge, of research and learning; it has been more and more affecting knowledge communication languages. By now, the Internet has evolved into a global platform, ever richer of contents and it is actually becoming the major infrastructure for knowledge exchange among people. Today every university should conform to the changes brought about by the Web, as it happened for many institutions that deal with contents production. All over the world a lot of discussions are going on about the role universities are playing and will be more than ever playing in the global network. The fast spreading of virtual campuses and the posting of videolessons of lectures belonging to different universities across the world in the Internet and the creation of global network for higher in which teachers and students from different places of the world participate in the collaborative construction of knowledge is not a utopia. By now a new "intra muros" and "extra muros" educational and training space is developing. New spaces of access to knowledge through the Internet can be everywhere: on PCs, on smartphones or on tablets and everybody can have access to knowledge with no limits of space and time. Creating an infrastructure for the higher education of the XXI Century involves adding to the university physical buildings a technological infrastructure: the Internet, which is an interactive and collective communication place, has its basis, as its peculiar richness, the direct involvement of its users in the creation as well as in the exploitation, of contents. Of course, in case you want to use a technology as Internet, to activate teaching and learning processes, it is necessary to apply theoretical models useful to allow for constructing methodologies and languages suitable to teach and learn through the technologies. Research work on this issue is constantly evolving along with technological evolution. This presentation will illustrate the research activities whose results allowed to design and realize the Didactic Cyberspace of the International Telematic University UNINETTUNO, which is based on a systemic approach and on a new psycho-pedagogic model.

Keywords: Online Learning Environments, Psycho-pedagogic Theories and Models, Innovation, Internationalization.

1 INTRODUCTION

The existence of an Internet network, outside man, including interconnected memories, deeply changed knowledge production and transmission. Today every university should adapt to the changes brought about by the Web, as it happened for many institutions that deal with contents production. All over the world a lot of discussions are going on about the role universities are playing and will be more than ever playing in the global network. The fast spreading of virtual campuses and the posting of videolessons in the Internet confirms that in the next years university students, teachers and lecturers will be ever more working within inter-university networks.

Today the transformation of the university is no longer only an option, but an imperative, an essential need in this new scenario. Traditional universities, that, since their origin, have been characterized themselves as centers of the knowledge production, are forced to revise their organizational and educational models, the role and functions of teachers and students, their physical structuring, their lecture-halls, their research laboratories, the spaces themselves shared by the students. By now, a generational clash of enormous scope is emerging within our academic institutions. The criticisms to the university advanced between the end of the '80s can be defined as "waiting ideas": waiting for the new Web and for a new generation of students, the digital natives, able to effectively put in question the old model of university. The convergence among the new Web, the new students' generation, the needs of the global knowledge economy and the shake-up of the economic crisis is starting a "perfect storm"

for the universities and everywhere there are signs of an imminent change. The creation of a global network for higher education in which teachers and students from different places of the world participate in the collaborative construction of knowledge is not a utopia; there are already several examples that brought a new vitality to the universities: very soon they became the protagonists of a networked global economy, such as the consortia among universities and companies that developed an "*intra muros*" and "*extra muros*" educational and training space. New spaces of access to knowledge through the Internet can be everywhere: on PCs, on smartphones or on tablets and everybody can have access to knowledge with no limits of space and time. Computer networks put an end to the one-way communication of knowledge by introducing a new communication paradigm and allowing the student to:

- Access the content of a dynamic knowledge that he himself can enrich and make available for others;

- Start, even at distance, new communication and interaction relationships between students and teachers.

Today the Internet allows for transmitting directly from the university to the student, lectures, multimedia products, databases, self-assessment systems, tutoring support, practice work, virtual laboratories and the organization of exams. The Internet has greatly enlarged the range of educational solutions bringing to the user's home not only information but even "learning" and "structured knowledge" promoting collaborative learning among users of different countries of the world within dynamic virtual spaces.

We have to recognize that nowadays it is no longer school classrooms or university lecture-halls the only places where teaching is delivered, but anybody, anywhere, if he has the technological equipments and appropriate materials, can build an environment of his own to carry on his own learning and self-learning process. Physical distances are overcome, people and cultures really come together within a global system of communication that changes even our way of living, of learning and of thinking and that allows to start a concrete trend of innovations and enhancement of the higher education system.

The problem, therefore, common to all the universities in the world, is no longer whether education reproduces social inequalities or not, but how to adapt better to this system and how to create systems within the context of a globalized economy that could develop open and integrated teaching and learning processes, by using the different languages for the communication of knowledge, as well as by operating without boundaries and limits of space and time.

Distance university, in the new context, is not an alternative to traditional universities, but it represents, even for them, a new opportunity and a new way to perform its own teaching and research functions. Today distance university can help traditional universities to develop products, process and system innovations.

In order to develop learning processes, we should use theoretical models useful to allow for constructing methodologies and languages suitable to teach and learn through the technologies. An example related to this are the activities and research work developed by the International Telematic University UNINETTUNO.

This research work allowed University UNINETTUNO's researchers for a continuous monitoring of the potentials of the various technologies to connect their development to new knowledge communication models in order to be able to rely on a consistent body of theoretical and operational knowledge granting a fair balance between the technological-engineering components and the cognitive, methodological, cultural and educational components specific of education.

This type of interdisciplinary research involves experts in many different fields: cognitive science, psychology, pedagogy, linguistics, computer science, software engineering, Big Data, sociology, anthropology. The research work conducted on in this field are constantly aimed at analyzing the way in which technologies affect our conscious and unconscious strategies of information processing. Research work is conducted on the impact of the screens of TVs, PCs, smartphones on our way of living, perceiving and thinking. The languages and methodologies used for implementing teaching and learning processes are analyzed from an historical perspective: from the Socratic method, linked to oral language, to the methodologies used in written texts where the organization of knowledge, structured according to chapters and paragraphs, corresponds to the logical and sequential development of the content to be transferred.

Within the research activity we keep on analyzing:

- Models of interaction between teachers and students, based on the Socratic method;
- Hypertextual, multimedia, cooperative and collaborative languages to be connected to the methodologies for designing and realizing distance courses;
- Languages to teach through videolessons in order to develop cognitive processes and long-term memory;
- Organizational models for Internet-based educational structures.

These research activities allowed to:

- Identify the complex interrelations existing among communication technologies, cognitive processes and educational models;
- Assess the soundness of the hypotheses applied to the teaching and learning models implemented in the cyberspace of the International Telematic University UNINETTUNO;
- Assess the efficiency and effectiveness of the organizational model of the educational structure.

The results of this research work allowed to design and realize the didactic cyberspace of the International Telematic University UNINETTUNO, based on a systemic approach relying on proved knowledge related to learning theories and on the potentials and development of the technologies leading to a constant evolution of the psycho-pedagogic model. The design and realization of the educational processes are focused on the students and on the learning communities.

The psycho-pedagogic theories being applied are mainly linked to socio-cognitive constructivism and allow to use the Internet to realize constructive and collaborative teaching and learning environments, essentially characterized by:

- Synchronic and asynchronic interactive and bidirectional communication;
- Student's active participation in the construction of knowledge.

In the didactic Cyberspace students are continuously stimulated by the professors-tutors to become active constructors of knowledge and to identify the most appropriate paths and tools to achieve their objectives. The acquisition of knowledge is dynamic rather that static, multimedia rather than linear and systemic rather that systematic. A new psycho-pedagogic model has been created, which is characterized by the shift:

- From teacher's central role to the student's central role;
- From knowledge transfer to knowledge creation;
- From integration between theory and practice;
- From a passive and competitive learning to an active and collaborative learning.

In the didactic Cyberspace several learning environments were included and in each of them a training session was realized based on a specific method meant to triggering teaching-learning processes:

- With the videolesson we use a symbolic-reconstructive learning model linked to the teaching classic mode and, thanks to the links to various kinds of training materials, it is possible to study in a multimedia and hypertextual way;
- With the virtual laboratories it is possible to check and enhance one's own knowledge and skills according to a "learning-by-doing" mode;
- With the chats, forums and virtual classrooms, 3D environments systems through web-based meetings, it is possible to promote collaborative learning and share the various steps of the learning process with other students belonging to different linguistic, cultural, political, religious and social backgrounds.

In each environment it is possible to simultaneously integrate each single learning mode with the other ones. The learning activity is structured in such a way as to promote the transfer of knowledge according to different modes:

- From simple to complex (videolesson and intelligent library);
- From theory to applicative projection (learning by doing in virtual laboratories);

- From guided exercises to searching the World Wide Web (webographies and bibliography);

- From individual study to interactive dialogue between teacher and students and among students (collaborative learning based on communication tools and synchronic and asynchronic sharing).

2   VIDEOLESSONS

In UNINETTUNO psycho-pedagogic model the videolessons play a major role; digitized and posted online in learning environment designed to allow their hypermedia use thanks to their indexing by issue, modularity and inclusion of bookmarks: timed hypertextual links to more-in-depth study materials related to what the professor speaks about in given section of the videolesson. Through an interface designed by UNINETTUNO the student can navigate through the videolessons, moving from one lesson to the other, within the same videolesson, using indexing allowing to select a specific sub-issue treated by the video professor and play the video to the second in which the professor starts to treat that specific issue or among the more-in-depth materials related to that specific video lesson, by means of the box at the right of it. In addition, in some specific moments, a bookmark, a lighting signal highlights one of the types of more-in-depth study materials listed in the box at the right of the video, indicates to the student that a specific more-in-depth study material associated to what the professor is speaking about in that specific moment of the videolessons. This way, the learning process becomes an hypermedia process: the student can access more-in-depth contents suggested in real time by hypermedia bookmarks structured by UNINETTUNO professors and researchers that allow him directly access to books and articles, that is to say texts, lecture notes, produced essays, selected and made available by professors and tutors, CD—Roms, multimedia materials, photo galleries, films associated to videolessons; bibliographical references and selected lists of websites, collections of references to external materials validated by professors and tutors experts of each single course in scientific terms.

3   COLLABORATIVE LEARNING

Great importance is attached to the collaborative learning activities that take place through the system of Interactive Classrooms as well as in the tridimensional worlds of the Virtual Classrooms on Second Life available on UNINETTUNO's platform. In the three-dimensional virtual classroom of UNINETTUNO's Island of Knowledge, students and teachers-avatars develop learning processes experimenting a new immersive-collaborative learning dimension. The students use interactive tools, they make practical exercises, mid-term assessment tests, dialogue and learn in a cooperative and collaborative way and become active constructors of knowledge.

The utilization of a virtual world and of avatars as representations of one's own virtual body enhance involvement and participation, an essential feature of both educational and social interaction. The three-dimensional virtual world is becoming a more and more interesting tool for uniting the two dimensions, the one which is more linked to education and the one that is more linked to socialization and entertainment. The aspect of social interaction, as a starting element for implementing UNINETTUNO's psycho-pedagogic model, finds a more appropriate environment for developing constructive and collaborative learning processes and socialization processes in three-dimensional virtual classrooms.

4   INTERACTIVE CLASSROOMS

In UNINETTUNO Interactive Classrooms teachers and students utilize interactive tools, they carry on practice work, mid-term assessment tests, exam simulations, they discuss and learn in a cooperative and collaborative way and become active constructors of knowledge. These collaborative learning environments allow to adopt the "*flipped classrooms*" pedagogic model: students are led to acquaint themselves on the issues related to the planned discussion; then they study the videolessons, the reference texts, the books, the lecture notes, articles, essays, thus preparing themselves to face the debate with teacher-tutor. UNINETTUNO Interactive Classrooms allow teachers and students to adopt various educational interaction modes.

4.1   Teaching Processes and Procedures

The teacher/tutor sets up a working environment that allows the participating students to work in practice on the documents and software packages prepared by the teacher; during the first phase of the

session, the teacher/tutor shows the students specific procedures and processes, using functionalities of applications and sharing integrated to the Interactive Classrooms systems; during the second phase, the teacher/tutor proposes to the students real-time exercises in which the students repeat the procedures they have just learnt with the teacher's help; the teacher/tutor intervenes only if the students move away from what is envisaged by the expert model.

4.2 Collaborative Project Works

The teacher/tutor prepares an exercise in which the students are asked to handle, in a practical and collaborative way, the theoretical knowledge they have just learnt; the teacher shares with the participating students the working environment that was created carrying on activities including creative and collaborative writing, preparation of technical documents (i.e. : business plans, marketing plans, analyses and reports), team work, cooperative work on specific technical software packages; at the beginning of the session the teacher/tutor presents the exercise and shares the working environment with the students; in addition, the teacher gives the control of the working environment, one by one, to the students who will physically work on the set-up software package following the suggestions resulting from the group discussion; the realized product can be re-used in the following sessions, whereas the final product as well as the single "revisions", collaboratively created in each session, can be evaluated through the tracing system.

4.3 Exam Tests Simulation

Using this digital environment the teacher/tutor organizes a simulated exam test; the teacher/tutor prepares a structured assignment like those that will be worked out for the exam papers; at the beginning of the session, the teacher/tutor submits the paper to all the students who are connected and fix its timing, as that of the actual exam tests. During the exam tests the students can ask for help on specific issues being treated and the teacher/tutor can explain in details how to appropriately deal with the issues or technical problems of the exam tests. At the end of the session, the students submit the completed exam papers through the platform; these will be corrected by the teacher/tutor, assessed by the assessment system and discussed during the following session of Interactive Classroom.

5   INTERACTIVE EXERCISES

In UNINETTUNO's Didactic Cyberspace Interactive Exercises are also available, through which the student can assess, in real time, and put in practice the theoretical principles learnt with the videolessons, by implementing a "learning-by-doing" process. Through virtual laboratories we develop new learning models that will tend to shift human cognitive working from the symbolic/re-constructional mode to that of the motor-perception one. The student can reflect on his own experiences, on the theoretical principles that are made operational and easily stored into memory thanks to his problem-solving activity. An interactive exercise can include different types of questions.

The running of interactive exercises is implemented automatically while displaying the videolesson at the end of each issue treated by the teacher in the videolesson itself. By means of database including all issues semantically related to the videolesson issues, the system generates sets of different questions for each session, making the self-assessment phase always relevant and effective for the student. Interaction is quick and user-friendly and students get a general assessment of the exercise in real time based on parameters that were previously set by the teacher who:

- Designs each questions and decides which is the correct solution;
- Sets the pass threshold for each exercise
- Supplies textual feedbacks and hints to review the issue if he passes as well as if he gives wrong answers.

If the exercise is successfully completed the student is led by the system to go on watching the videolesson starting from the following point. On the contrary, in case of wrong answers, the system suggests to the student to go back to the issues of the videolessons that are needed to give a correct solution to the exercise before going on studying more advanced study issues.

6 VIRTUAL LABORATORIES

In UNINETTUNO'S Cyberspace there are also virtual laboratories where the student can put into practice the theoretical principles learnt in the videolessons, starting up a "*learning-by-doing*" process. In interactions taking place in virtual laboratories, the student is guided, along his learning path, both by an expert teacher-tutor and by an intelligent system. We know that is more difficult to teach somebody to carry on complex assignments; in order to become truly skilled, a student is required to learn the abstract working principles as well as learning how to apply these principles into practice. Human mind works better on concrete and specific cases than on abstract data. The strongest learning is that one build by "doing", therefore making mistakes and correcting them, instead of learning in a mechanical way or passively watching the demonstration made by an expert. The apprenticeship method used in the old craftsman's workshop was an extremely efficient way of teaching complex arts such as painting, sculpture or woodcraft etc. Today, many teaching methods are relatively efficient in transmitting abstract principles, but less effective when it comes to teaching how these principles are applied. For this reason, knowledge and skills usually remain divorced from their use in the real world. As a consequence, motivation to learn is often low and much of what is learnt is quickly forgotten or remains "non-integrated or inert"(Kass 1996). In order to avoid these problems, the didactic cyberspace contains virtual laboratories and exercises, which are an integral part of the videolessons and allow the student to make a direct connection with the application of what the teacher explained at any time he wishes to do so. Through virtual laboratories we develop new learning models that will tend to shift human cognitive working from the symbolic/re-constructional mode to that of the motor-perception one. Re-constructional-symbolic learning is generally associated to learning processes: reading, understanding, reasoning, induction, deduction, conscious and self-conscious processing and this can normally happen by studying the texts. Motor-perceptive learning is associated with practical, hands-on activities: you watch, touch, modify your behavior; you analyze its results, you try and re-try; the response, the reaction of the object results into knowledge since it is automatically linked to the action that generated it: it is a "trial-and-error", a "learning-by-doing" process. The student can reflect on his own experiences, on the theoretical principles that are made operational and easily stored into memory thanks to his problem-solving activity. In virtual laboratories the learner is always guided by a system automatic intelligent agent or by an expert tutor who checks and controls whether the path he started allows him to build his own knowledge and competences. This environment invests the student with an absolutely active role but always with appropriate tutoring.

A working environment, if sufficiently fertile, can encourage students to explore and learn on their own; however, exploration and activities without guidance can only work in a few limited contexts. In most cases and, in particular, for those skills that require complex learning and involve assignments that are not easy to solve, a student without a guide may have problems in correctly interpreting what happens in a simulation and can test only hypotheses that fit into the categories of knowledge already acquired during past experience. An explicit point of reference is provided by the guide who can get round these difficulties and encourage students to explore theories and hypotheses that they would have otherwise not applied.

UNINETTUNO's virtual laboratories appear as true "learning-by-doing" environments where they teach how to avoid to acquire un-used knowledge, setting knowledge in the context in which it will have to be applied (see Lave, Wenger, 1991).

7 LEARNING ANALYTICS

At the end of every training intervention students and teachers/tutors, by means of UNINETTUNO's *learning analytics* system, can consult statistical data on the students' performances and on the activities carried out in the various environments available in the Didactic Cyberspace obtained in the interactive exercises of the lesson and of the whole course. The assessment reports, displayed as charts and data tables give the students a clear vision to self-assess their own learning progress and to the teachers/tutors the tools to re-orient and reformulated their own contributions in the Interactive Classroom or in the 3D Virtual Classrooms based on the problems met by the individual students and by the class.

8 CONCLUSIONS

UNINETTUNO's psycho-pedagogic model has soon become a global model acknowledged at international level; many are the agreements that UNINETTUNO reached with Ministries and Universities

of various countries of the North and of the South of the World with which we learnt to share curricula and to jointly create, with countries having different political and cultural backgrounds, new educational models meeting the needs produced by the globalized world. Thanks to the new technologies, jointly the interconnected intelligences of the teachers and students build new contents and develop competences and expertise, not based on the imposition of the cultural models of the one or of the other, but on intercultural and inter-linguistic cooperation. Students enrolled to the International Telematic University UNINETTUNO come from 164 different countries of the world and all of them can all can access University with no more space, time and place limits in order to acquire new competences, but also to consolidate a system of shared values. UNINETTUNO actually demonstrated that, in order to build and spread knowledge, thanks to the Internet, borders are uncertain, frontiers are places of continuity and not of conflicts. Thanks to UNINETTUNO's model, teachers and students across the world can give an appropriate answer to the needs of internationalization of the educational systems in order to be able to prepare the skills required by the labor global markets and help transforming the University into an open system, capable of modernizing itself and integrating all the knowledge available on the Web and achieve a worldwide exchange of knowledge.

REFERENCES

[1]   J.S. Brown, A. Collins, D. P. Dugui, Situated Cognition and the Culture of Learning, in "Educational Researcher", 18, 1: 32-34, 1989.

[2]   J. Dewey, Democracy and Education: An Introduction to the Philosophy of Education, Macmillan, New York, 1916.

[3]   R.M. Gagné, Educational Technology and the Learning Process, in "Educational Researcher", 3, 1: 3-8, 1974.

[4]   M.A. Garito, «Un Modèle d'Université à Distance réalisé dans les Universités Traditionnelles Italiennes: le Consorzio NET.T.UN.O. (NETwork Teledidattico per l'UNiversità Ovunque) », in Un accès au Savoir dans la Société de l'Information, CNED, Poitiers: 161-174, 1996.

[5]   M.A. Garito, Going the Distance with E-Learning, in "Public Service Review": European Union, Public Service Communication Agency Ltd: 146-151, 2003.

[6]   M.A. Garito, "Distance Learning: the New Era of the University", in Procedia - Social and Behavioral Sciences, 93, Proceedings of the Brussels, 3rd World Conference on Learning, Teaching and Educational Leadership: 1749-1754, 2013.

[7]   M.A. Garito, "Teaching and Learning on the Internet: A New Model of University, the International Telematic University UNINETTUNO", in CTA-Computer Technology and Application, 4, 9: 476-485, 2013.

[8]   M.A. Garito, L'Università nel XXI Secolo tra Tradizione e Innovazione, McGraw-Hill Education, Milano, 2015.

[9]   A. Kass, Simulazione Integrata, Presentazione di Casi e Tutoring Socratico: un'Architettura per Evitare il Fallimento dell'Apprendimento in Settori Complessi Teoricamente Deboli, in M.A. Garito (a c. di), La multimedialità nell'insegnamento a distanza, Garamond, Roma, 1996.

[10]   R.J. Spiro, P.J. Feltovich, M.J. Jacobson, R.L.Coulson, Cognitive Flexibility, Constructivism and Hypertext: Random Access Instruction for Advanced Knowledge Acquisition in Ill-Structured Domains, in Duffy TM, Jonassen DH (eds.), Constructivism and the Technology of Instruction: A Conversation, Lawrence Erlbaum, Hillsdale (NJ): 57-75, 1992.

[11]   J. Vygotski, L. Mind and Society, Harvard University Press, Cambridge (MA), 1978.

[12]   J. Vygotski, Il processo cognitivo, Bollati Boringhieri, Torino, 1987.

[13]   E. Wenger, Communities of Practice: Learning, Meaning, and Identity, Cambridge University Press, Cambridge, 1998.

[14]   W. Winn, A Constructivist Critique of the Assumptions of Instructional Design, in Duffy TM, Lowyck J, Jonassen DH (eds.), The design of Constructivist Learning Environments: Implications for Instructional Design and the Use of Technology, Springer, Berlin: 189-212, 1993.

[15]   W. Winn, Current Trend in Educational Technology Research: The Study of Learning Environments, in "Educational Psychology Review", 14, 3: 331-351, 2002.

[16]   W. Winn, Cognitive Perspectives in Psychology, in Jonassen DH, Handbook of Research on Educational Communication and Technology, Lawrence Erlbaum, Mahwah (NJ): 79-112, 2004