

# INNODOCT/16

“LEAN EDUCATION AND INNOVATION”

Editors:

Fernando Garrigós Simón

Sofía Estellés Miguel

Ismael Lengua Lengua

José Onofre Montesa

Carlos M. Dema Pérez

Juan Vicente Oltra Rodríguez

Yeamduan Narangajavana



UNIVERSITAT  
POLITÈCNICA  
DE VALÈNCIA

EDITORIAL  
UNIVERSITAT POLITÈCNICA DE VALÈNCIA

*Editores:*

Fernando J. Garrigós Simón  
Sofía Estellés Miguel  
Ismael Lengua Lengua  
José Onofre Montesa  
Carlos M. Dema Pérez  
Juan Vicente Oltra Rodríguez  
Yeamduan Narangajavana

**INNODOCT/16**  
**“LEAN EDUCATION AND INNOVATION”**

*EDITORIAL*

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

*Colección Congresos*

Los contenidos de esta publicación han sido evaluados por el Comité Científico que en ella se relaciona y según el procedimiento que se recoge en <http://www.innodoct.com>

© Editores: Fernando J. Garrigós Simón  
Sofía Estellés Miguel  
Ismael Lengua Lengua  
José Onofre Montesa  
Carlos M. Dema Pérez  
Juan Vicente Oltra Rodríguez  
Yeamduan Narangajavana

Diseño portada: Ismael Lengua Lengua

© 2016, Editorial Universitat Politècnica de València  
[www.lalibreria.upv.es](http://www.lalibreria.upv.es) / Ref: 6340\_01\_01\_01

ISBN: 978-84-9048-528-6 (verión impresa)

La Editorial UPV autoriza la reproducción, traducción y difusión parcial de la presente publicación con fines científicos, educativos y de investigación que no sean comerciales ni de lucro, siempre que se identifique y se reconozca debidamente a la Editorial UPV, la publicación y los autores. La autorización para reproducir, difundir o traducir el presente estudio, o compilar o crear obras derivadas del mismo en cualquier forma, con fines comerciales/lucrativos o sin ánimo de lucro, deberá solicitarse por escrito al correo [edicion@editorial.upv.es](mailto:edicion@editorial.upv.es)



LEAN EDUCATION AND INNOVATION  
INNODOCT/16



- 15. Using the Back Bay Battery simulation to teach about disruptive innovation**  
Authors: Antoni Olive-Tomas, Lucinio Gonzalez-Sabate, & Xavier Jolonch-Palau 187
- 16. eHealth Perceptions of Biomedical Engineering Students**  
Authors: A Martinez-Millana, C Fernandez-Llatas, MP Sala Soriano, V Travera & C Dema 199
- 17. Technology-based impairments for elderly students in higher education**  
Authors: Roberto Llorente & Maria Morant 209
- 18. Divulcation of Nobel Prize women awarded in Science between 1901 and 2015 using stamps**  
Authors: Beatriz Rivas-Murias 219
- 19. INTACT platform in professional courses: a case study**  
Authors: Gonçalves, Vitor & Martins Maria Luzia 231



Valencia, Spain, on 18-20 May  
INNODOCT/16

## INTACT platform in professional courses: a case study

Gonçalves, Vitor<sup>a</sup> & Martins, Maria Luzia<sup>b</sup>

<sup>a</sup> ([vg@ipb.pt](mailto:vg@ipb.pt)) <sup>b</sup> ([marialuziagomesmartins@gmail.com](mailto:marialuziagomesmartins@gmail.com)) Instituto Politécnico de Bragança, Portugal

---

### **Abstract**

*The development of Information and Communication Technologies and the paradigm of modern society require that training centres adapt to new realities resulting from the need to decode emerging literacies, based on multimodal texts. Besides, the continuous changes in the work market demand on continuous learning, so preparing trainees for it means prepare them to develop collaborative and Information Technology learning skills based on e-learning, b-learning and m-learning.*

*This paper aims to present the exploration and evaluation of the INTACT (Interactive Teaching Materials across Culture and Technology) platform, both in the trainees and trainer's perspectives, in a training course. To this purpose, the trainer created, developed and shared learning objects and contents in the platform in order to be used in training context, both in the classroom and in distance learning, promoting collaborative learning. The results were based on the single exploratory case study and in the analysis of the work done by the trainer, the learning outcomes evidenced by the trainees, mainly by direct observation and by conducting two inquiries.*

*These activities were made to answer the following investigation questions:*

- How can the use of didactic tools, which allow the introduction of multimodal texts, help students to develop literacy skills?*
- How can the platform help trainees to develop collaborative learning skills?*
- Which are the main difficulties perceived in its usage in training courses' context?*

*The data collected showed that:*

*- both the trainer and the trainees considered the usage of didactic tools, that allow the integration of multimodal texts, help students to develop multiliteracy skills;*

*- there is potential in the usage of collaborative learning and that trainees are receptive to this process of learning, but it is necessary to wait for more users in the platform to explore all its collaborative possibilities, mainly users from different countries to accomplish bilingual perspective.*

**Keywords:** *INTACT, training, collaborative learning, e-learning, multiliteracy.*

## **Introduction**

Nowadays, we live in an information based society. We communicate and get information on the world around us through various media, written texts, video, audio, etc., making it necessary to change the concept of literacy. Figueiredo (2004), citing Nadin states that *the concept of traditional literacy, read and write properly, it is no longer accurate*. Today, the concept of literacy has evolved to incorporate the features of electronic productions' multimodality. This new literacy called multiliteracy includes the ability to produce and decode messages using electronic tools and information technologies (IT).

As society changes, the world of work changes as well. Today, workers know they have to invest in lifelong, continuous learning and be flexible. So it is important to use the technological resources at disposal to boost knowledge and acquire new skills that may allow the worker to keep up to date as well as to share knowledge, with others. He/she can resort to learning strategies based in IT such as electronic-learning (e-learning), blended-learning (b-learning) and mobile learning (m-learning).

In this context, using the electronic tools available to communicate, get information and learn is more and more a widespread option and training centres need to resort to these tools in order to prepare trainees to face the challenges of the world of work.

In this paper, the researchers will present the findings on the use of the INTACT platform in training courses and in order to achieve the objectives, there are going to be presented some reflections on educational methods and on the evolution of educative technologies, as well as a description on the creation, development and exploration of Learning Objects (LO) in the INTACT platform, promoting collaborative learning, in order to evaluate if it is possible or desirable the usage of the INTACT platform, in mother tongue's classes, in training courses, both in the trainer and in the trainees' perspectives.

### **Investigation questions**

The present work intended to answer the following investigation question: “How can IN-TACT be used in training courses, in Portuguese classes?”

In order to answer it, three other questions were made. The first intended to explain how could the use of didactic tools, which allowed the introduction of multimodal features, help students to develop literacy skills. The second one intended to evaluate how it could help trainees to develop collaborative learning skills and the last one intended to find the main difficulties perceived in its usage, in this specific context.

### **Educative Theories**

For centuries, there have been debates on the best way to foster learning and in the context of this paper it seems to be relevant to point out behaviourism, constructivism, connectivism and collaborationist theories and link them to the evolution of educational technologies.

The behaviourist theory, according to Skinner and Pavlov, advocated the idea that the transmission of knowledge is directly related to the environment in which the subject is inserted. Skinner (1954) believed that learning should be divided into short sequences and this should be checked through questions covering the explored theme, giving positive reinforcement to the learner if the score is positive, so he/she would feel more motivated to continue the learning.

The Constructivist theory developed by theorists such as Jean Piaget, Freinet and Wallon, during the late nineteenth century and the twentieth century, argue that knowledge is a construction based on understanding and reasoning and learning is a construction of new knowledge from what is already known, arising from the interaction of sensory experiences and reason, which are considered inseparable aspects. This theory focused more on learners and on their critical understanding of the content.

In recent years, the connectivist theories emerged. These theories advocate that, at a time when circumstances change quickly, where everything is related to everything, the content to be learn has to be constantly updated, relevant and contextually appropriate. Siemens (2005) considers learning a networked process because it is built from the interaction between the subject and the environment that surrounds him/her, and that the act of learning is equivalent to the development of a certain neural configuration. To Downes (2005), learning materializes in communication between members of a community and today this communication is not only in words but also in images, in video, in short multimodal texts.

The term participatory learning or collaborative learning (Davidson & al, 2009), can be used to describe the learning centered on the learner and it results from the interaction between

different people with different ages and backgrounds, using new technologies to engage in collaborative learning environments, that allow author and reader to interact simultaneously.

### **IT evolution and its use in the learning process**

The theories presented had a huge impact on the way IT were and are still used in classrooms and in how its resources have been explored since its creation. At the time of web 1.0, the contents tended to be static, with almost no interaction between the producer of the information and the learner, they tended to approach the behaviourist and the constructivist theories.

Then the web 2.0 appeared offering the learner the possibility to interact with the content producer and becoming him/herself also a producer, making it an ideal space for learning and teaching, through the usage of LMS (Learning Management Systems). These systems allow the distribution of content in digital format and the usage of collaborative tools, both synchronous and asynchronously and by using all the possibilities teachers can adapt the connectivist and the collaborative theories that will allow their learners to be able to learn, even when they are not at their classrooms anymore.

McLuhan, quoted by Coutinho & Bottentuit Junior (2007), states that *men make tools. The tools recreate men ...* Therefore, we can say that if we consider the use of web 2.0 tools at our disposal, we are able ultimately to recreate the world around us and even ourselves.

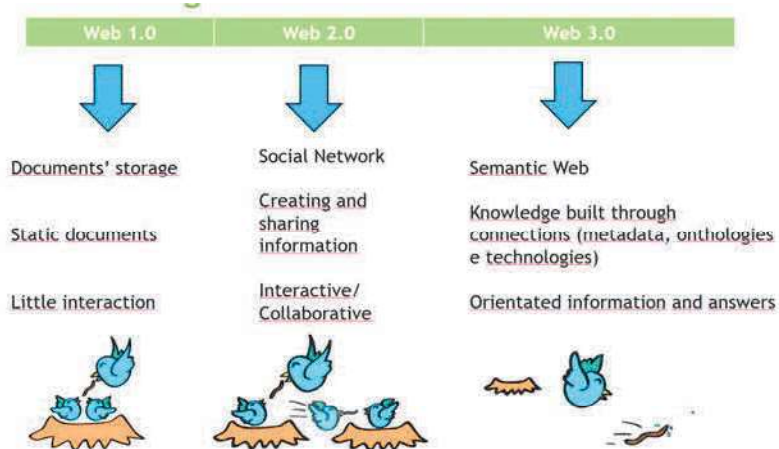
Given the increasing volume of content and information, the question that now arises is how to take advantage of them so that we can create knowledge. *The web has become a media library of documents, now constituting the largest repository of information that provides and offers services to virtually all sectors of society* (Gonçalves & Carrapatoso, 2009).

In recent years, there have been created the conditions and services that allow us to say that the next step is to move to web 3.0, a web in which besides linking people, the web will also link information. The web 3.0 makes use of software to search the World Wide Web (WWW) data that can answer to the question posed by the user and presents him/her with filtered results according to the requirements established.

The Web 3.0 or semantic web, a web of that constructs meaning, will emerge from the organization of the information through metadata, ontologies and semantic technologies, which will allow the user to find connections that until now were hidden or non-existent. *The semantic web is not separated from the current web, but its extension, in which information is given with a well-defined direction, enabling better cooperation between users and computers* (Berners Lee, Hendler, & Lassila, 2001).

To facilitate the discovery of new meanings, new realities, the semantic web can enable new approaches to learning and discovery. Learning, which had become more accessible synchronously and asynchronously with the web 2.0 , can now become even faster and focused on the learners objective, by using metalanguages and procedures to give concrete answers to learner’s questions “it allows knowledge to be expressed , distributed and formally shared to be interpreted and used ( ... ) to allow the generation of knowledge ( Gonçalves & Carrapato, 2009).

**Table 1.1. Web evolution and educational uses**



### The INTACT platform

The INTACT platform was developed under the Comenius Programme, by a consortium of six countries and educational institutions: University of Education, Ludwigsburg, Germany; Universidad Complutense de Madrid, Spain; College Kecskemét, Hungary; St. Patrick's College in Dublin, Republic of Ireland; Polytechnic Institute of Bragança, Portugal; Babes-Bolyai University in Cluj, Romania.

INTACT platform can be used on mobile devices, allowing to overcome the spatial boundaries and training room schedules (b-learning experience extended to m-learning scenarios). Most of the resources are implemented in Hyper Text Markup Language (HTML) 5, to ensure independence from specific technology or software and it is designed to allow the creation of collaborative learning environments, allowing interaction between students and teachers from different areas and different geographical locations. This feature will allow to increase cooperation and communication between schools and training centres and foster collaborative work using interactive materials at regional, national and international levels, ensuring

the strengthening of social and cultural skills of the trainees. The platform also enables the reutilization and adaptation of content to different contexts or courses, making it possible to reuse or improve the contents uploaded by other teachers, as long as there is consent of its creators. For this to happen it is necessary that the developer of the content fills up all the metadata fields, allowing other platforms users to find the materials that best fit their needs.

### **Case Study**

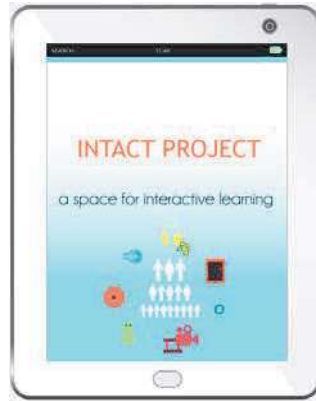
The investigation carried was a single exploratory case study, a descriptive study, where the exploration of the INTACT platform was evaluated both by the trainer and the trainees, of a Portuguese training centre.

When formulating the research questions, in case studies, the researcher aimed to study the phenomena and its complexity in natural context, by collecting, analysing and interpreting information. According to Dooley (2002), the advantage of the case study is its applicability to human situations, which suits the type of study to be developed in this dissertation. When choosing a case study of this kind, it was assumed that learning can be assessed not only by the results shown in a given evaluation time, but it can and must be observed and analysed in the light of the idea that learning is a continuous process that it is reflected in further learning, as understood by the constructivist and connectivist's educational paradigms.

The results of the study came out of the interpretation of both qualitative and quantitative data collected through the registration of the sample's reactions, opinions and attitudes towards the platform in observation grids and the evaluation of the samples' learning results and the results of the electronic inquiries.

The study was carried out in Portuguese Language classes, on the second year of a training course in Mechanics. The sample was constituted by the trainer, who created the contents and used it in classes using both b-learning and m-learning strategies, and the course's eighteen trainees, all male, with ages between 17 and 23 years old.

The content of the classes that took place during the investigation process intended to foster the trainee's understanding on issues related to the main differences between the current and past labour markets. This goal was meant to be achieved through the creation and uploading of learning objects using multimedia features, such as text, image, video and audio, and promoting collaborative learning through the usage of video conferences, forums and chat rooms.



**Picture 1- Intact Project**

The study was made during seven months and it was divided in three moments. On the first moment, that took place between October 2014 and December 2014, the researcher explored the INTACT platform, its resources and potential and began the creation and development of learning units, as well as the preparation of the initial inquiry distributed to students.

On the second moment, between January and March 2015, the INTACT platform was used in a b-learning way, and most of the activities took place in the training room, including online synchronous sessions, as a way to complement the learning and promote collaborative learning.

The third moment took place in late April 2015, when the final inquiry and all the data were collected and the results analysed.

When the study began, the INTACT platform was in the final stages of development, so some of its features have since then changed.

### **Development of the Learning Unit in the INTACT Platform**

The INTACT platform is based on an open source software, based on Drupal and Opigno distribution and allows the user/trainer to manage his/her training courses organized into learning units and lessons, allowing him/her to manage roles and access to information on the results of the apprenticeship. It also enhances interaction between trainers and trainees thanks to video conferences, forums and chat rooms. To facilitate synchronous interaction, the platform also offers the software open source Big Blue Button.

The access to the INTACT platform is made through the [www.intactschools.eu](http://www.intactschools.eu) domain. Logging on to the application and once the platform automatically assumes that the new user is a student, the trainer/teacher has to request permission to the platform's administrator to be able to assume the teacher's role.

After this, the trainer can start creating his/her Learning Unit (LU). At this point the trainer can choose to be receptive to collaboration from other users, who can be allowed to make changes, give opinions or use his/her contents. When a new LU is created, the trainer should fill in all the metadata requested, that will include information on the subjects addressed, the area of knowledge, the roles and permissions given to each kind of user, among other relevant information.

Inside each LU the trainer can create lessons and at each lesson he/she can create learning objects that can be chosen from a set established by the platform, like content or web pages, multiple choice questions, development questions and others that include the possibility of attaching files, embedding images, iframes and Big Blue Button videoconferencing.

As the use of multimodal texts and the development of multiliteracy were some of the main learning objectives established, many multimodal features were embedded or attached in the lessons created. In order to do that, the trainer developed content using the WIX platform, to create a web page, the open source eXe educational tool and the Microsoft PowerPoint program or similar.

There was also content integrated from pre-existing electronic content sites on the Internet, like Youtube, as well as links to external sites.

Collaborative learning was developed by establishing collaboration through meetings, forum topics and chats.

The trainer evaluated the learning process through the evaluation of the results from the trainer's activities in the platform and through inquiries and polls.

### **Results on the trainer's perspective**

The platform INTACT shows to be attractive and it has a user friendly interface. It presents diversified types of LO and gives the trainer the possibility of using multimodal texts, both through external links and embedded contented. It helps to promote collaborative learning, by establishing the possibility to make connections between different users. The trainer has easy access to the learning results, which can allow him/her to make adjustments and provide strategies to improve the results. In the formal evaluation that emerged from the trainees' exercises in the platform, fifty six percent of trainees got marks between 80 and 100%.

The trainer considered that the platform could be used to address different learning theories stated before.

The platform gives the possibility to divide the contents into short sequences and to provide positive feedback on the achievements accomplished, as considered to be effective by Behaviorists.

It allows the integration of multimodal texts, showing that communicating is not only made out of words, but also of images and sound, making it possible to learn by combining the information perceived by the senses, besides the platform allows open and flexible curricula, adaptable to the trainees' interests and needs, as considered to be effective by constructivists.

By allowing b-learning, it enhances continuous learning, both inside and outside the classroom and by allowing communication between all the users, it also makes it possible to create social spaces of interaction and learning, as considered to be effective by connectivists.



Picture 2- Videoconference

The platform gives the opportunity of assessing different learning units, giving the trainee the possibility to manage his/her learning process. It also makes possible the collaboration between trainers and even trainees, in special cases, in the development of the contents and learning objects as considered to be effective by collaborationists.

### Results on the trainees' perspective

Through the last inquiry made to the trainees, the researchers collected the following data:

- 78% of the individual considered the impact of the platform in their learning process positive and 44% considered that the platform had a positive impact in their commitment in classes;
- 22% of the trainees used the platform outside the classroom and they also highlighted as positive aspects the facts that they could access to it everywhere at any time;
- 72, 7% considered the use of multimodal tools relevant to their learning process;

- 34% of the individuals considered to be important the opportunity to participate in the learning process, through polls;
- 66% considered that the platform allowed them to interact in a positive way with the other students and 22, 7% considered forum topics to be the most useful didactic tool in the platform.

### **Final considerations**

The data collected showed that the usage of didactic tools, that allow the integration of multimodal texts, like the INTACT platform, help students to develop multiliteracy skills. The data suggest there is potential in the usage of resources that allow collaborative learning and that students are receptive to this learning scenario.

There were some difficulties perceived during the case study. On the one hand, there were the difficulties resulting from hardware and software malfunctions, that made it difficult to access the platform, on the other hand there were the difficulties arisen from the fact that there was a considerable gap of time between the training sessions. The last difficulty perceived was related to the inexistence of other groups working in the same subject, which restrained the possibility to explore the multilingual and intercultural potentials of the platform. It wasn't possible ask other group of students and teacher from another country to collaboration.

These difficulties made it clear that training centers need to have better and more efficient hardware and software and that it is necessary to wait for more users in the platform to explore all its possibilities.

### **Future work**

In order to continue the process that started with this study, the reasearchers intend to continue exploring the platform's functionality, by increasing the number of LU in the platform, including LU in English, to exploit their multilingual features and broaden the scope of cooperation to other regions and countries and by promoting the platform in training centers and schools.

## References

- Berners Lee, T., Hendler, J. & Lassila, O. (17 de maio de 2001). The semantic web. Obtido em 12 de abril de 2015, de Scientific American: <http://www.cs.umd.edu/~golbeck/LBSC690/SemanticWeb.html>.
- Coutinho, C. P. & Junior, J. B. (2007). Blog e wiki: os futuros professores e as ferramentas da web 2.0. SIIIE'2007 (pp. 199-203). Braga: Universidade do Minho.
- Davidson, C. N. & Goldberg, D. T. (2009). The future of learning. Cambridge, Massachusetts: MIT.
- Dooley, L. (2002). Case Study Research and theory building. *Advances in Developing Human Resources* (4).
- Downes, S. (10 de 2005). E-learning web 2.0. Obtido de Learn Magazine: <http://elearnmag.acm.org/featured.cfm?aid=1104968>
- Downes, S. (12 de 2005). An Introduction to Connective Knowledge. Obtido de Stephen Downes: <http://www.downes.ca/post/33034>
- Figueiredo, A. (2004). A língua portuguesa e o desafio das novas tecnologias: iliteracias e contexto. Em *A língua portuguesa: presente e futuro*. Lisboa: Fundação Calouste Goulbenkian.
- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.
- Gonçalves, V. B. & Carrapatoso, E. M. (vol.1 de 2009). Web semântica e cérebro global juntos por uma boa causa. *EDUSER*, revista da educação, pp. 70-87.
- Cruz González, M. (1990). Dinámica entre intereses y destrezas culturales y recreativas en Puerto Rico: Análisis por área geográfica con énfasis en el área oeste. Tesis de maestría no publicada, Universidad de Puerto Rico, Río Piedras.
- INTACT Project. (2014). Proposal for online platform for an interactive collaboration classroom. INTATC. Ley de protección de menores, Ley 75, 1980, 8 L.P.R.A., Sec. 401-437. (Supl. 1990).
- Martins, M. L. (2015). Plataforma INTACT- estudo de caso no ensino da língua portuguesa em cursos profissionais. Bragança: IPB.
- Project Comenius - A lifelong learning Program of the European Union. (2014). Proposal for online platform for an interactive collaboration classroom. INTATC.
- Crow, T. J. (2000). Did homo sapiens speciate on the y chromosome? *Psychology*, 11. Retrieved from <ftp://ftp.princeton.edu/harnad/Psychology/2000.volume.11/psyc.00.11.001.languagesexchromosomes.1.crow>
- Siemens, G. (2003). Learning Ecology, Communities, and Networks - Extending the classroom. Obtido em 14 de 03 de 2015, de Elearnspace, everything elearning: [http://www.elearnspace.org/Articles/learning\\_communities.htm](http://www.elearnspace.org/Articles/learning_communities.htm)
- Siemens, G. (2005). Connectivism: A Learning Theory for the Digital Age. Obtido em 14 de 03 de 2015, de Elearnspace, everything elearning: <http://www.elearnspace.org/Articles/connectivism.htm>
- Skinner, B. F. (1954). *The science of learning and the art of teaching*. Virginia: Universidade da Virgínia.