

Interactive lectures with Moodle and students' devices: BYOD at Paris Descartes University

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1. ABSTRACT

ICT for Education has the potential to enhance and support learning. It is now possible to create engaging environments for learning and teaching and especially supporting interactive lectures.

To achieve this goal one strategy is to implement BYOD (Bring Your Own Device) programs into the learning process. The acronym BYOD refers to “[...] *technology models where students bring a personally owned device to [university] for the purpose of learning.*” (Alberta Education, 2012).

This definition confirms that using BYOD can indeed be an innovative way to create and animate interactive lectures.

This paper will present the learning activities based on the Moodle LMS (<http://moodle2.parisdescartes.fr/>) that were carried out in different lectures on a BYOD mode. It will also show how this model can improve and enhance learning and impact students' motivation.

2. INTRODUCTION

This paper investigates five experiences of BYOD that have been set up at Paris Descartes University. Paris Descartes University aims high to promote and integrate ICT in learning and teaching. After having implemented a Learning Management System (Moodle) and an academic social network (Carnets², <http://carnets.parisdescartes.fr/>), the instructional design engineers of Paris Descartes University in collaboration with faculties, has tested the integration of BYOD practices in various colleges of the University (Colleges of Biomedical Sciences, Law, Pharmacy, Medicine and Mathematical engineering).

We notice that the number of students' personal mobile devices increases in higher education context: this assumption makes us think that these devices can be used to complement learning activities.

We are convinced that the use of BYOD with other traditional learning methods helps to motivate the students and increase their learning performances.

To begin with, we need to clearly define what BYOD means. So, according to Alberta Education (2012), BYOD refers to “[...] technology models where students bring a personally owned device to [university] for the purpose of learning.”

So, the basic idea behind a BYOD model is that students will use their personal devices to support their learning in an interactive way.

Alberta Education (2012) goes further and adds that “a personally owned device is any technology device brought into the school and owned by a student (or student’s family), staff or guests”. The guide also identifies six categories of devices:

- Laptop computers;
- Smartphones;
- Tablets;
- E-book readers;
- Audio MP3 Players.

In our experiments, the students were mostly equipped with laptop computers, smartphones and tablets.

3. WHY EXPERIENCING AND IMPLEMENTING BYOD?

These experimentations find themselves in a favourable context. As Fang (2009) says: “It is much likelier that [the] number of [students’ personal mobile devices] will increase, with some universities even adopting campus-wide mobile learning programs. Mobile phones and laptops have increasingly become commodity products and easily available. Students are increasingly comfortable using wireless devices to organize their academic work, personal lives, and eventually their professional activities once they graduate into the workforce. We have actually reached the point of no return in usage of such technology”.

Moreover, Paris Descartes University works on the basis that if a student has a personal device and a preferred technology to work with, it is worth for him to bring it to school, rather than adapt to a new device issued or mandated by the [university] (Mac Gibbon, 2012).

So, allowing students to bring and to work with « ready-to-use » technologies with which they are already comfortable and familiar can have a positive impact and enhance learning (Horizon Project, 2013).

Several publications insist on the importance of considering the 21st Century skills, which are often cited as a justification for the BYOD, because they would be interwoven.

These new skills have emerged with the development and integration of ICT in education. Indeed, technologies and personal devices contributed the development of 21st Century skills as digital literacy, creativity and innovation skills, critical thinking and problem solving skills, communication and collaboration, and self-directed learning (Argueta, Huff, Tingen and Corn, 2011).

4. SETTING UP PROCESS

We will present here the Moodle based BYOD process used for the implementations of the different experiments. We identified five milestones such as Analysis, Design, Production, Implementation and Evaluation. These milestones are presented in the following figure:

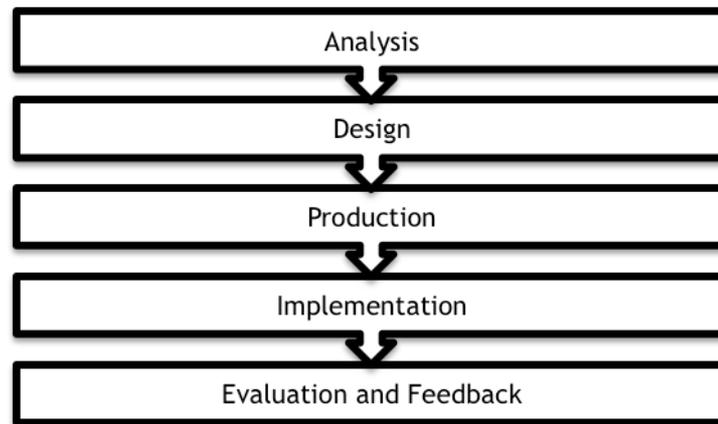


Figure 1. Moodle-based BYOD process

Analysis:

- Analysis of the existing pedagogical content: we verified if the content was suitable for a Moodle-based BYOD session;
- Analysis of students' equipment: before each session, we set up an online survey on Moodle to ask them of the kind of equipment they own and if they could bring it into the classroom;
- Analysis of the Wi-Fi connexions: a common work with the IT team allowed us to counter the number of connexions that can be supported during the different sessions.

Design:

- Instructional design of the lessons;
- Choice of activities (questions, exercises).

Production:

- Production of pedagogical materials in and with Moodle.

Implementation:

- Experiments in real teaching conditions;
- Animation of the session;
- Assistance and help if necessary.

Evaluation and Feedback:

- Online survey post-experiment;
- Live oral opinion poll just after the experiment.

We need to highlight the importance of the collaboration between teachers and Instructional Designers. These experiments would not have been possible without a common thought. In fact, it is essential to guide teachers, because as DeWitt (2012) precises “[..] They do not always understand how to handle the concept”.

The Paris Descartes University BYOD experiment program used Moodle LMS as a pedagogical platform but also as an eLearning authoring tool to propose adapted instructional material during the different courses. Indeed, Moodle offers a lot of activities for interactive learning and teaching as forum, test, and lesson. In our case, we decided to create question banks and activities, so that students use their personal devices to answer different kinds of questions during the lecture, allowing teachers to collect results and active feedback within minutes and students to compare their results with others.

Teachers and Instructional Designers are thus able to design interactive and engaging lessons and projects, in a sole place and with the same tool.

We are convinced that the devices that students embed in their daily life may change education: this experiment shows us that linking BYOD use in an instructional situation can improve students' comprehension, learning and motivation.

Indeed, as Vanwelsenaers (2012) says, "Teachers who utilize this type of technology in their classrooms may have a better chance of improving student learning in their classrooms, and may also gain access to resources not available to teachers who don't use this type of teaching strategy".

5. REVIEW OF EXPERIMENTS

Five experiments were made, which can be spread across two main categories:

- *BYOD for increasing Motivation and Attention;*
- *BYOD for Consolidating and Revising pedagogical notions.*

Manipulations during BYOD experiments were simplified because the students used their own devices. That allowed them to gain time and confidence because as Lundin, et al. (2010) say : "the students [...] will choose their own devices to connect to Internet and to other communication services and media applications".

For each experiment we will describe :

- the public;
- the course;
- the pedagogical objectives of the BYOD session;
- the session proceeding.

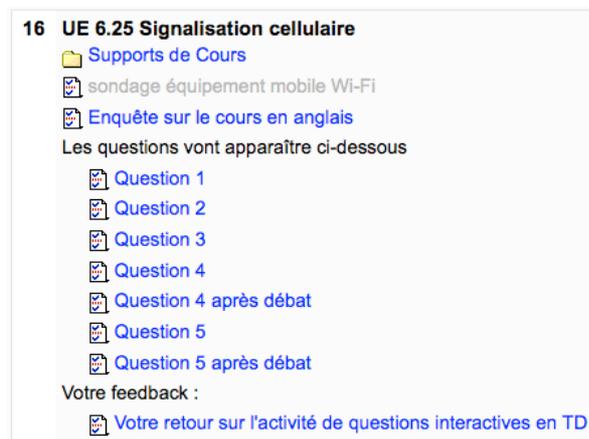


Figure 2. Example of Moodle based BYOD interface in Biomedical Sciences

Question 1

*1 Sélectionner la ou les réponses vraies (pour la condition NT)

A. L'oxystérol augmente l'activité du promoteur tandis que la Dex n'a pas d'effet

B. L'oxystérol et la Dex modifient l'activité du promoteur

C. La Dex n'a pas d'effet sur l'activité du promoteur stimulée par l'oxystérol

D. La Dex a un effet synergique sur l'activité du promoteur stimulée par l'oxystérol

Envoyer le questionnaire

Figure 3. Example of a displayed question on a student's mobile device

1. Sélectionner la ou les réponses vraies (pour la condition NT)

| Réponse | Moyenne | Total |
|--|--|-------|
| A. L'oxystérol augmente l'activité du promoteur tandis que la Dex n'a pas d'effet |  20% | 13 |
| B. L'oxystérol et la Dex modifient l'activité du promoteur |  56% | 37 |
| C. La Dex n'a pas d'effet sur l'activité du promoteur stimulée par l'oxystérol |  14% | 9 |
| D. La Dex a un effet synergique sur l'activité du promoteur stimulée par l'oxystérol |  11% | 7 |

Figure 4. Example of students' answers displayed during the class

5.1. BYOD for increasing Motivation and Attention

Theses BYOD experiments were made in the Colleges of Biomedical Sciences and Medicine.

- Experiment in the College of Biomedical Sciences:

Public: L3 students - 53 students + L2 students - 150 students

Course: Signalisation Cellulaire

Pedagogical objectives of the BYOD session:

- to revive students' attention;
- to enhance students' motivation;
- to introduce a debate in the traditional lecture;
- to compare his point of view with his peers ("questions after debate");
- to give an immediate feedback to the students.

Session proceeding:

This experiment was the first one in Paris Descartes University and is considered as a pilot.

The students were invited to answer five questions (Multiple Choice and/or Single Choice questions) available on Moodle. These questions were gradually posted at different time slots of the lecture (every 20 minutes in average).

We notice that this experiment was the opportunity to apply a pedagogical method called "Think-Pair-Share": After individually thinking about a question, students compared their answers with the others and could correct themselves.

- Experiment in the College of Medicine:

Public: L1 students - 180 students

Course: Apport de la Biologie Cellulaire et Moléculaire aux innovations médicales

Pedagogical objectives of the BYOD session:

- to revive students' attention;
- to enhance students' motivation;
- to test their knowledge in real-time on notions addressed during the live course.

Session proceeding:

The students were invited to answer several series of questions (Multiple Choice and/or Single Choice questions) available on Moodle. These questions were gradually posted at different moments of the lecture. The teacher, depending on his course proceeding, chose the pace.

Thanks to the BYOD program, the teacher was able to give an immediate feedback to his students, to insist on problematical points, and to adjust his teaching.

5.2. BYOD for consolidating and revising pedagogical notions

These BYOD experiments were made in the Colleges of Law, Pharmacy and Mathematical engineering.

- Experiment in the College of Law:

Public: L1 students - 120 students

Course: Grands Problèmes économiques et sociaux contemporains

Pedagogical objectives of the BYOD session:

- to enhance students' motivation;
- to revise some key Game Theory notions covered during the previous lessons in order to prepare them for the exam;
- to test their knowledge of these notions.

Session proceeding:

Two subjects assignments with two different case studies (based on solving problems) were given to the students. For each assignment, students were asked to:

- fill out a payoff matrix;
- find a Nash equilibrium;
- calculate probabilities.

They previously did this work in a traditional way, on paper. This time, we asked students to share their results by entering their data in the Moodle LMS.

The teacher was able to adapt his feedback and to provide a personalized correction, depending on the students' answers. He had the opportunity to go back to the notions which needed to be mastered, and to deal with them in depth.

- Experiment in the College of Pharmacy:

Public: L2 students - 70 students

Course: Chimie inorganique

Pedagogical objectives of the BYOD session:

- to revise some key notions covered during the previous lessons in order to prepare them for the exam.

Session proceeding:

The students were invited to answer several series of questions (Multiple Choice and/or Single Choice questions) available on Moodle.

The teachers used a slideshow as a remediation: this document allowed them to adapt their feedback and to provide a personalized correction, depending on students' answers.

This underlines one of the positive aspects of BYOD: teachers can get results and feedback within minutes.

- Experiment in College of Mathematical engineering:

Public: L3 students - 28 students

Course: Analyse de données

Pedagogical objectives of the BYOD session:

- to enhance students' motivation;
- to revise some key notions covered during the previous lessons to prepare them for the exam.

Session proceeding:

The students used a paper document with several wordings. They were then invited to submit their solutions by answering several questions (Multiple Choice and/or Single Choice questions) available on Moodle.

The teacher, after having seen students' answers, guided his feedback to deliver an adjusted correction to each of the questions.

6. CONCLUSION

The Paris Descartes University BYOD program has been set up since Feb 2012 from an original idea of Prof. Xavier Coumoul. A dozen of teachers is now regularly using it in the College of Sciences and this number will increase during the next months. The instructional designers are dedicated to widespread the BYOD uses in every colleges.

We can say that these experiments were successful thanks to the feedback evaluations that we obtained from the students. We could observe that using implementing a BYOD and Moodle in-class program brings excitement into the classroom and helps to motivate students.

Moreover, these different experiments allowed teachers to have instantaneous feedback on students' participation, actions and knowledge. This was an opportunity for teachers to have a feedback on their own teaching and to adapt it if necessary.

Using BYOD in the classroom is a way of improving interactivity not only between teachers and students but also between students too. In some experiments, we could observe a collaborative work between students, for example before submitting their answers to the LMS.

We are convinced, as Menkhoff and Bengtsson (2012) that using these technologies can greatly enrich the learners' experience and produce positive learning outcomes when blended with traditional instruction.

Moreover, the software development team is working on a project, which aims to integrate a Moodle triggering button into the teacher's slideshow. This functionality will allow the teacher to control Moodle's interface without leaving his slideshow and will simplify the use of the Moodle LMS in a BYOD model.

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Xavier Coumoul is professor at Paris Descartes University. He has completed his PhD in molecular toxicology in 2002 at INSERM unit U490 (head Pr Philippe Beaune). After a post-graduate year in Bethesda, MD he get a position at INSERM unit UMR-S 747 ('Toxicologie, pharmacologie et signalisation cellulaire' du Pr Robert Barouki). He is in charge of a Bachelor and Master degrees in pharmaco toxicology.

He is innovative in his ways of teaching (live and online), being the first professor at Paris Descartes University to propose and use interactive Moodle quizzes in BYOD mode during a lecture.

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