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E-voting : Enhance Digital native student interactions with a new voting activity in Moodle

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Abstract: This paper presents a new Moodle activity called "e-voting". This activity brings wider interaction inside large face-to-face classes. The paper presents how interactions can be supported and enhanced by engaging students, and also by enabling professors to work on initial concepts in a flipped-class or distance learning contexts. This paper describes the three different pedagogical models, proposes scenarios to be used. It presents the e-voting activity on Moodle, its advantages, its functioning and availability for the Moodle community.

Context

More than 20,000 (27% of all Swiss UAS students) learners enrol every year in the different curricula proposed by the University of Applied Sciences Western Switzerland1. This university offers students strong references to the real professional world, either by linking the teaching laboratories with real experiments or by developing projects with professionals in action. Since 2004, the e-learning Center Cyberlearn has been in charge of developing and conducting research in blended learning, along with the pedagogical use of new innovative and disruptive technologies.

The average student age at the HES-SO is 25, and most students attending a Bachelor curriculum belong to the "digital natives" generation. The distinguishing features of their learning process is strongly influenced by technology. Such students show short attention spans, are zappers, and need a variety of short activities, preferably in a visual form, to maintain their attention. The students of this generation tend to show a natural capacity for using technology and they especially appreciate being considered as co-experts in their courses. (Prensky, 2005) The "digital natives" appreciate horizontal hierarchical interactions and stop considering the professor as the only source of knowledge, and see him as a more experienced person with whom to cooperate (Prensky, 2012).

To behold whether theories dealing with Digital Natives, empirical observations reported by professors in numerous universities, and the current situation in the field actually converge, Cyberlearn conducted a quantitative study in May 2013, profiling students attending a cursus at the HES-SO (Cyberlearn, 2013).

The study shows that students' habits outside the classroom affect the ways they behave in class. 85% of them access the Internet during the course, for learning or other purposes. They massively use smartphones in addition to their laptops: 75 % use their smartphone during lectures, 29 % frequently, 46 % sometimes. Several reasons can explain this attitude: 46% access the Internet because their professor uses the Internet during the course, 29 % check on data showed by the professor, 49% seek data to supplement data provided by the professor, 68% read their e-mails, 47% browse the Internet, 32% admit being bored by the course and 28 % like doing several things at the same time. Some students seem to consider the Internet as a kind of addiction ("*I cannot stop myself…*", "*The Internet prevents me from…*", " *it makes me less attentive*..", or use it to sanction a course which fails to meet their expectations ("*course is too simple or boring, I do another job*" "*when the*

[1] Quoted in this document as HES-SO

course is particularly uninteresting I quickly digress").

Others researches reveal that students are constantly connected, day and night, without interruption even during class periods. Sleep seems to be the only moment without connection. This ceaseless use of the smartphone comes as an automatic response against boredom (Collectif, 2015).

Besides, students indicate that they wish a more frequent use of quizzes before the course, during the course (either at the beginning or at the end) or even at home, showing thereby how much they appreciate this activity (Cyberlearn, 2013). Indeed interactivity is encouraged while providing a fun approach much appreciated by this public, used to such types of applications, where friends can be challenged on general topics.

Voting systems in the classroom

When a professor needs feedback from his students on a specific issue, he generally asks a question and counts the raised hands. This rudimentary system proves limited. It can deal only with yes/no answers. Moreover, voting in front of the professor and the fellow students may dodge the answers. Some might not express their true opinion, might vote as another classmate, while others may fear the professor's look on their vote. This may establish a kind of self-censorship and harm the veracity of the provided answers. The clicker voting systems enhances this issue by providing immediate and confidential answers, while enabling the professor to address each student in particular in an efficient and courteous manner.

Scenarios for use

In order to embed this type of activity in the teaching process, we will describe three models for its application, coupled with a pedagogical scenario.

1. *Pedagogical approach : the role of initial concepts*

   This approach (Piaget, 1988, Giordan, 2010).) relies on the concepts the students build up during their life. Students need no previous teaching on a topic to have a pre-conceived idea about it. These underlying ideas are called **concepts**. The learners unconsciously build them up by crystallising their vision of the world and the knowledge presented to them. Then, they will express these in the form of more or less complex and more or less accurate models in relation with the scientific reality. Such initial concepts resist the learning process and often cause recurrent models which can be observed among learners, even among those having completed upper educational levels. Bachelard particularly mentions an « epistemic hurdle » : a ready-made answer, a ready-made idea becomes obvious and blocks the assimilation/adaptation process (Piaget, 1988). « We must think against the brain », as Gaston Bachelard (Bachelard, 1938) claimed. Knowing this, the professor can start working on these concepts during his teaching. After having identified these initials representations, the professor can work on the erroneous concepts and deconstruct them.
   The voting tools used in the classroom can therefore contribute to help the students become aware of their shortfalls and help the professor detect them. Then, the professor can set up learning activities to help the students modify and integrate the presented knowledge satisfactorily.

   Scenario 1 : the voting systems in the classroom can help identify these hurdles. The professor can ask questions affirming a scientific truth linked to the taught topic and observe how the students validate it.

2. *Sociological approach : habits linked to social networks.*
   According to the survey conducted by the HES-SO Cyberlearn center among students, regarding social media, 86% have a profile on Facebook, 25% on Twitter, 22% on Instagram and 3% on Tumbler. 13% of them have no profile on line. Additional social media are quoted, such as Google+, Pinterest, Spotify, Parlingo, Viadeo, Skype, Youtube, Xing and Linkedin. The students are uninterruptedly connected to these networks, which they use to express their opinion and interact with their community. ((Cyberlearn, 2013).
   Such behaviours tend to break the barriers and level out the relations between students and professors.

They also reinforce a pseudo-expert-consumer position. By constantly linking fan pages, reacting and commenting, posting videos, photos on these products, the students expect their opinion and judgement to be considered as pertinent and authorised.

Scenario 2 : the voting systems in the classroom can make use of these behaviours to outline the class condition in real time (satisfaction, comprehension level, expectations, etc.)

3. *Flipped classroom*
   This pedagogical method consists in shifting theoretical learnings out of the classroom time, which can then be dedicated to achieving added value activities (practical exercises, solving problems, workshops, experiments, debates, collaborative tasks etc.). The activities performed in class encourage interaction and break up a passive attitude often resulting from teaching methods relying purely on transmitting knowledge.

   Scenario 3 : These systems enable to check on students in order to discover what interests them and make connections between the provided knowledge and their centers of interest, to make them ponder on the presented topics. Therefore, to complete a quiz at the beginning of a course, in order to revise some notions covered in the previous lesson, either in or outside the classroom, can bring some dynamism to the course, as well as become an efficient revising tool. In flipped class sessions, it is also common to propose questions after a brief presentation of a particular topic, by allowing students to vote individually, followed by period of discussion in pairs, before relaunching the quiz and commenting on the progression of the results.

Type of systems

The convergence of technological habits, intolerance towards boredom and the preference shown by students for interactivity via activities such as quizzes, has encouraged the development of voting tools for use in the classroom. Ranging from physical solutions (clicker) to applications to be downloaded on the mobile phones, a professor can choose among a number of possibilities to embed this type of activity in the classroom. Some drawbacks of the physical systems encompass the purchasing costs, the physical storage and availability issues. Moreover, the hardware can become damaged and at times the buttons become unreliable for counting votes. As for the on-line systems, these often require a computer. Driven by such shortfalls, designers have developed applications for smartphones, sometimes for free. However, most of them require a dedicated application to be downloaded on the student's smartphone. The Cyberlearn survey reveals that only 37% of the students wish to use their smartphones for learning purposes.

Concerning the professor, the voting activity is designed on a computer, whatever the selected option. At the end of the voting, a graph displays (sometimes dynamically, in real time) the results in a presentation tool (such as Powerpoint) or any other selected system.

E-voting

One of the activity at the HES-SO Cyberlearn e-learning center consists in developing products useful to its community or more widely for the global academic community. We decided to embed the voting activity into the LMS Moodle in the form of an activity like any other (quiz, homework, etc.) for various reasons. Firstly, we selected Moodle as it is the LMS used in our university (4,000 courses online, 18,000 users) and it is one the most used open-source in tertiary education. Secondly, when designing his course, a professor may encounter difficulties to embed the voting activity in his global pedagogical concept, while having to implement and monitor it in another system. E-voting for Moodle enables the professor to stay in his course space when creating and monitoring the voting questions, as well as displaying the results. Therefore, the student faces a system coherent with the Moodle space he is accustomed to.

e-voting for Moodle displays voting results on a graph dynamically. A latency time span can be defined before the results are displayed, therefore avoiding students to be influenced by the results of other participants. After the course, e-voting for Moodle enables the professor to access the recorded data by quiz or by use, in order to evaluate how the class participants have integrated his questions. The answers remain anonymous.

Technical aspects

E-voting is a Moodle plugin will be made available for free to the community via Github.com on October 2015. Once downloaded, the administrators of the local Moodle platform can deploy the plugin in their own system, following the installation documentation available.
For the time being, e-voting is available in French, German and English and the plugin can support any other langagues. Cyberlearn will maintain e-voting for Moodle and make it evolve to meet the needs of the community.

E-voting functions as follows:

1. In the corresponding course, the professor creates an e-voting activity
2. He creates the questions and the type of replies, just like in a traditional quiz activity
3. When the activity is launched in the classroom, a qrcode and a web link are generated
4. Using an application for scanning the qrcode (for instance i-nigma, whose advantage is that it can scan qrcodes without having to be placed directly in front of the barcode), which must be install first on the smartphone, the students scan the code which transforms their mobile into a clicker. According to the number of possible answers for the question displayed on the beamer, the mobile screen (smartphone, phablet, tablet) is divided into the same number of voting options.
5. The professor defines a latency time span before displaying results on the chart (immediately, after 10 secondes etc.),
6. The students vote,
7. The professor stops the activity,
8. The results are dynamically displayed on a graph,
9. The professor can close the activity, discuss about it or/and launch it again,
10. Later, the professor can consult the voting records for each quiz to improve the questions e.g.

If the students have no mobile peripherals available, they can type the link displayed under the qrcode in their browser of their laptop.
Another advantage of this system is that no Facebook connection is needed, no specific user account has to be created, nor any personal data is recorded.

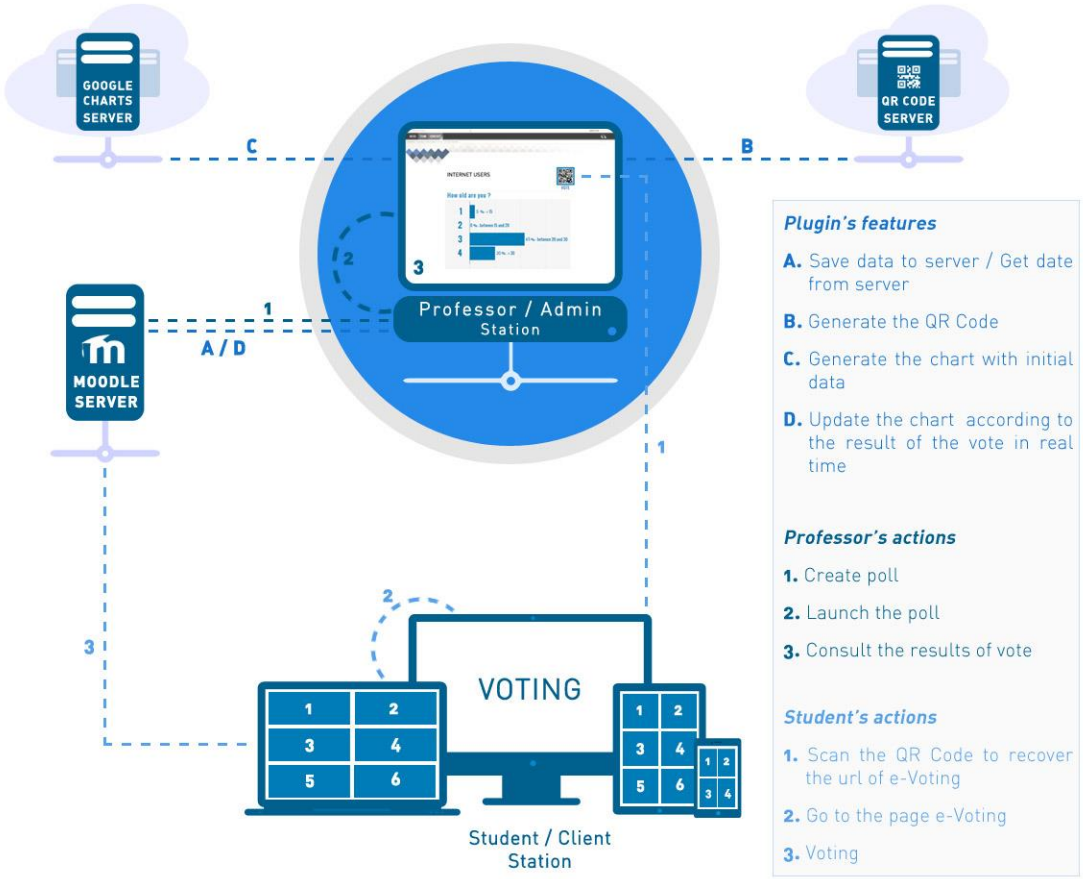

Figure 1 : Overall functioning of e-voting

e-voting and e-learning

It is interesting to point out that e-voting can also be used for distance learning courses, in an asynchronous use or inside MOOCs.
Indeed, quite simply, when a e-voting activity is launched at a specific moment, it generates the qr code and the link which the participants attending the distance learning course can to scan in order to vote. In an asynchronous use, it is also possible to launch a question and to leave it open for a week or more and see the results change as long as the votes fall.
Other example, in MOOCs, the activity can be monitored via Moodle to collect data on the course, to start a new week for a course, to gather feedbacks on course resources, etc.

Conclusion

The voting systems in the classroom or distance learning represent an asset when animating large classes, increasing interactivity, decreasing the participants' disengagement or help the professor to transform the students' initial concepts on the course content. The potential of voting in the classroom, as fun, pedagogic and didactic, constitutes one of the tools, which can transform the teaching process in order to meet Digital Native requests and habits, while at the same time engaging them in the presented topics. If a number of voting systems are available on the market, the e-voting activity in Moodle, open source and free, enables an non-intrusive, simple and pleasant way to embed this type of activity in the teaching process.
The technical evolution used to collect the answers to the questions in the classroom, serves a fundamental pedagogic aim: engaging students to become the actors of their own learning transformation. Xenophon, a Greek

author born in 430 BC, already claimed at the time: « Asking a question is teaching ». An activity such as e-voting for Moodle modernises the process while maintaining its usefulness and its pedagogical wealth.

Contacts
To find out more about e-voting on Moodle, test or download the plugin, please contact the author or Cyberlearn@hes-so.ch.

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