Industrializing virtual classrooms in distance education. How to measure added value of a training ?

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Key words

Education – Technology – Distance learning – Training engineer – Virtual classroom

Abstract

This oral presentation in Spain is the opportunity to present French distance education engineering and management. After a brief methodological introduction, I will present the results of an enquiry about industrialization of virtual classrooms : who, when, what are the key questions framing the description of these results. Last but not least, I will discuss the question of value: what is measured through accounting ? what is the part due to innovation ?

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Method

My activity in French public education is twofold : I am both a training engineer in distance education and an education scientist. I share my time between two activities: a day work on curriculum conception and implementation ; an off-work university study about distance education. In my education sciences researches, I use normal social sciences participatory observations (stemming from ethnography field techniques) and doctoral philosophical analysis (chiefly ethics, esthetics and epistemology). The results of my latest researches can be found on this website : http://educations.voila.net ; written both in French and English. On the same website, an article in Spanish can be found through the Google Scholars link, about the use of new technologies in small organizations (Start-Up's of the years 2000-2004) – studying carefully publishers on personal digital assistant of these times.

As to what concerns this presentation about industrialization of virtual classrooms in distance education, I collected empirical data through a fieldwork study in a French distance education institution equivalent to Uned (Universidad nacional de educación a distancia), here in Spain. On the other side of the *Pireneos* mountains, in France, I was hired as a training engineer. I designed a one-year curriculum including intensive use of virtual classroom technology. Here I use past tenses since my presentation is about previous data : this curriculum is about to be implemented and I am not directly in charge of this task within the organization. I will therefore describe the conception phase only, what the indigenous staff within the organization studied call "engineering".

As an education sciences researcher at Conservatoire national des arts et métiers (Cnam, France), I will use this raw material to analyze large scale industrialization of an innovative teaching tool and compare it to an essay dedicated to industries of knowledge[1]. It is important to mention that this essay stems from the works of a laboratory that no longer exists which dealt with education industries within the organization described (a laboratory founded by Jacques Perriault, currently director of research at Cnrs). This major French book's author is currently one of the directors of the organization's scientific review – though not directly hired by the organization. I will finally launch a discussion about added value of a training and how to measure it – still taking as references practices within this distance education organization.

Results

The project I was involved in was to reengineer a one year curriculum for a hundred adult students who are preparing a national diploma to become teachers (what in France is called "agrégation" : a very selective diploma to facilitate careers at university and that opens a permanent position as a civil servant in secondary

[1] Moeglin P., 2012, *Les industries éducatives*, PUF, Que sais-je ?

education). Since students are scattered all over France, they opt for distance education so that they don't have to travel to attend classes in a university. Some of them are already secondary education teachers , others work in a private organization and some others are still students. So that there are also time issues for this preparation , which explains why student choose distance education : part of them can't be full time students and have to study at night, which they can do thanks to distance education. Within French distance education, this public organization, State granted, is a main center of preparation for this competitive examination. However it is a contender of universities, preparing the examination either with traditional classes or with virtual classes. Almost all French universities offer preparations for this examination and a few offer distance preparation. One is particularly a serious competitor for the course offered by the studied organization since it uses all the range of new technology devices and recruit students and teachers from all over France. The reengineering process I got involved in to was partly to counter this contender.

The previous curriculum was based on paper lectures and essays to be sent by traditional post. Oral examinations where prepared with paper-written essays. This former distance education system – also based on telephone pedagogy in some rare cases - was not yet supplemented with a website including forums where to exchange tips and tricks with other students and supervised by a teacher. It was therefore not using current technologies such as a website and virtual classrooms provided by many companies competing on the market.

My task was to reengineer this curriculum to update it with our contenders and technologies available today for distance learners. I designed a large set of services and a complex online application form. Here I will detail the use of virtual classrooms as a service to provide distance oral preparation.

The new web device tested and to be implemented on a large scale to replace the former paper one is based on virtual classrooms to prepare oral examinations. The test period included an oral preparation to a similar examination (an "agrégation" in history : this training had a website but no virtual classroom till the test during the year 2012-2013) ; it was a success since students required more virtual classroom activities. In the preparation for the management examination (Agrégation d'économie et de gestion) I designed a full year program of virtual classrooms. Each of the 140 students is to take three oral through a virtual classroom per year he/she is directly corrected by a teacher. Therefore he or she is to intervene orally in the three subjects tested during the real examination (management, law, economy). The written part of the examination is prepared with a written training (lectures, paper hand-in) and the oral part of the examination is prepared thanks to an oral training in a virtual classroom (same lectures, three oral exams once the students have passed the written part of the examination and will take the oral part). Each student can also attend silently to the oral mock exams of others, so that he/she can fully take advantage of the mistakes and their corrections of the other ones. The best exams are recorded so that all students can actually see and listen to good models, highly rated by the teachers. Each student can take part in another's evaluation, supervised by the teacher : the listeners can judge the lesson given by the student taking the mock exam (this should not be forgotten :

this examination is meant to become a teacher, so the oral part of the examination is a lesson given by the examinee) through a worksheet prepared by the supervisor, including criteria to evaluate the students. Therefore, virtual comrades can have a reasonable approach of each other's lessons and fully learn and train to adopt the final examination demands. Usually, our supervisors are part of the national jury. So they know very well what is required during this demanding examination to become a teacher. The group of students meeting up in virtual classrooms can therefore attend potentially four virtual classrooms a week. It is a maximum for students who have time to attend all classes. It is to give rhythm to the week of study and help them not to give up because of a lack of motivation / stimulation: the group has its own dynamic and incites students to study every day.

During the pre-test period done with volunteer students, it appeared that the use of a new teaching technology on a large scale triggers many changes in the institution's community of practices. The main issues were to train teachers to handle the tool : how to start a virtual classroom, interact orally with the student and keep an eye, at the same time, on the chat box ? Our virtual teachers have a previous experience with non virtual classes : they are mostly former teachers in traditional classrooms. So they know how to manage a group of learners, with group resonance for each word they pronounce and group dynamic. Thus they only have to learn the tool : turning in and off the software, clicking on the right button at the right time, completing oral pieces of information with written scripts appearing continuously on the screen. It is better to have a young teacher, or at least a teacher used to using softwares and easy going with all that concerns communication on the Internet. Having the supervisors training each others on how to handle a virtual classroom is also a possibility, but the organization is not yet at this level of industrialization with internal training curricula in order to become a virtual classroom supervisor.

It was also a matter of logistics to organize the applications for oral mock exams since the institution was not used to it. The organization is used to files distribution (paper or electronic works are sent by student and distributed to correctors, and lastly sent back to students with a grade), . Hybrid trainings would typically include a website and presence lectures, but not necessarily with virtual classrooms booking. An employee had to do this part of the logistics : scheduling with supervisors and students the shifts of oral mock exams and the sending of the test one day before the oral mock exam (so that the examinee could prepare for his exam for four hours in conditions similar to those of the realt national examination).

Last but not least, costs were estimated in order to validate the whole project : it could not be implemented if too expensive. As a training engineer I therefore had to fill in a financial matrix including all the costs and income of the designed training. This included fixed and variable costs. Among the fixed costs : conception time (number of days in the year per training engineers), administration time (number of days in the year per training managers), course and hand-in writing time (to be written by external authors, even though we hesitated for this training on a bibliography including a few key books), courses design (by a special

team in charge of designing all courses), website creation (by the same team), registration forms creation, marketing budget dedicated to the communication about the product (mainly through our website, paper catalogue and presence at national events). The variable costs were about the number of lectures to be printed and sent to students (work of a special unit working as a small delivery factory), number of software fees for virtual classrooms (we work with external providers), supervisors fees (some of them are "lent" by the Ministry of Education, others are paid by the organization), tutorial fees (website animation), registration fees (by a specific department in charge of completing the online registration and ensuring a good circulation of hands-in from students to teachers, and back). After completing the cost analysis, a first rank estimation of revenues was given : the number of years estimated for this project (a three-year life for this training product, before reengineering), number of students estimated by year (around 140) and the fees per student. This financial matrix was sent by email and checked by headquarters employees, in the *Futuroscope* campus, near Poitiers, France.

The whole operation of estimating costs and revenues, plus an extrapolation over the return on investment, margin and profitability, is to have French civil servants and employees of this organization used to money management. Indeed, French government (Ministry of Education) validates a national budget for this organization and has to be sure that the money given is well used. A national accounting body (called "Cours des comptes") is in charge of auditing the processes and producing a report about this distance education organization – this explains why the organization studied insists on budget control with this financial matrix that has to fill in all training engineers.

Discussion

The discussion is about how an organization in distance education implements a new technology to improve its performances on a large scale. The main idea is that it entails an estimation of a training's value. This value is partly accounted in an official document listing all the costs and comparing them to the number of students and how much they are going to pay for the course – which is the aim of the Excel document I 've just described.

But many dimensions are not listed in this accounting vision : the cost of changing routines within the institution (traditionally called processes in management) as much as perceived added value of using new technologies and therefore catching up with private contenders on training market.

The question of processes and routines are hard to take into account. Indeed, how to measure extra work done by civil servants when they are in charge of a new mission ? It is the training engineer and manager who is in charge of estimating costs for all people involved in the training. In the case of a new project, he or she has to fully anticipate all tasks which will be required (for virtualization of virtual classrooms, I showed that

the practicalities involved were a bit different than usual) and to estimate how much time each and everyone will dedicate to them. A very dynamic training engineer will trigger many changes in the organization and could be regarded as cost producer. But he/she it is also a way to catch up with all market innovations and to produce value through new revenues. Indeed, the reengineering of management "agrégation" is an opportunity for the organization to industrialize what has been tested and to fully use a value-producing innovation.

The question of the added value that can be observed when using new technologies can be summed up with the notion of innovation. A specific department of innovation has been recently set up nearby the organization's headquarters. It is in charge of evaluating and giving pieces of advice about the innovative dimension of all new engineering projects. The team in charge of an innovation analysis of this project of industrialization of virtual classrooms was positive about it. Indeed, the technologies of virtual classrooms are used by the innovation department and they encourage its use in all courses. They added on their report that a special stress could be put on the importance of such a device for the handicapped. Indeed, a national grant was given to the institution to use distance education with disabled students. Virtual classrooms enable the hard-of-hearing to turn on the volume of their computer, the partially-sighted to adjust their screen to their vision,… In a nutshell, industrialization of virtual classrooms has some added values which haven't been totally taken into account.