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Les métiers innovants de la formation. Le champ de la formation professionnelle et l'ingénierie de formation à distance

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Conférence en Sorbonne

du mardi 3 décembre, 18h15-19h45 devant les étudiants du

Doctorat professionnel de l'Université Paris 5 René Descartes

sur le thème :

Les métiers innovants de la formation

Le champ de la formation professionnelle et l'ingénierie de formation à distance

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Support de la conférence

Introduction (10 min)

Cette conférence en Sorbonne d'une heure trente, conçue pour les étudiants du doctorat professionnel en sciences sociales de l'Université Paris 5 René Descartes, vise à décrire les métiers innovants de la formation (formateur, responsable de formation, chef de projet en formation, activités d'ingénierie de formation dans l'enseignement à distance,...) des secteurs privés et publics tels que je les ai étudiés et parfois pratiqués, durant les cinq dernières années (2008-2013). L'essentiel du matériel de lecture se trouve dans les annexes : ces documents rédigés en anglais présentent les résultats de mes recherches en sciences de l'éducation sur ce sujet.

Ce support de conférence se divise en deux parties : dans un premier temps le champ de la formation professionnelle continue du secteur privé, avec la configuration des métiers actuelle qu'a générée la loi française de 1971 (formateurs indépendants, chefs de produits d'organismes de formation, responsables de formation des entreprises clientes), dans un deuxième temps les activités d'ingénierie de formation dans un établissement public d'enseignement à distance.

La présentation se verra relativement interactive et des moments pour les questions seront ménagés dans les entretiens.

Présentation du conférencier

Je suis ancien élève de la formation doctorale en sciences sociales de l'École normale supérieure et l'École des hautes études en sciences sociales, où j'ai mené des recherches de sociologie des entreprises (les organisations innovantes des Start Up, à l'orée des années 2000) et des recherches d'ethnographie (la structuration d'un groupe de travail collaborant à la construction d'une pirogue, dans l'ethnie Djuka du Nord de la Guyane française). J'ai ensuite effectué le programme grande école de l'École des hautes études commerciales, soutenu une thèse de doctorat des universités en philosophie (éthique) et suis, depuis 2011, chercheur en sciences de l'éducation au Conservatoire national des arts et métiers. Plus précisément, je suis chercheur dans le Centre de recherche sur la formation, dans l'axe « gestion et organisation de la formation ». Mes travaux se servent de mes activités rémunérées que je traite comme matériel d'observation-participante pour les analyser.

Ces activités rémunérées sont plurielles, j'en retiendrai deux qui concernent directement les métiers innovants de la formation : j'ai d'abord été chef de projet en formation professionnelle lors de ma thèse de philosophie et je suis aujourd'hui responsable de formation chargé de l'ingénierie des formations alors que je suis chercheur. Je veux ainsi vous transmettre un regard d'expert de terrain sur les métiers innovants de la formation, à la fois de praticien et de chercheur.

Utilité de cette conférence pour l'auditoire

Cette présentation vous sera doublement utile : d'abord si vous souhaitez valoriser votre doctorat pour travailler dans l'économie de la connaissance – ou vous professionnaliser dans la profession de professeur, vous connaîtrez alors mieux les métiers de la formation et comment y accéder ; ensuite si vous souhaitez poursuivre dans la recherche, vous pourrez alors prendre exemple sur une méthode et une

épistémologie que je présente dans la dernière annexe : il s'agit de prendre de la distance vis-à-vis de ses pratiques éducatives pour mieux les décrire et les analyser philosophiquement.

Définitions premières

Je traiterai des métiers, c'est-à-dire des outils, techniques, machines et dispositifs qui sont propres à une activité. Ce sont des métiers innovants car pratiqués par de nouveaux acteurs (dans la formation professionnelle continue) ou parce qu'ils utilisent des outils récents (les nouvelles technologies de l'enseignement à distance). Ces métiers innovants concernent la formation, c'est-à-dire l'intervention sur autrui pour lui donner une forme : que ce soient des idées pour mieux voir la réalité professionnelle, des habiletés pour mieux exercer un emploi, ou des compétences pour mieux communiquer avec ses collègues.

Je ne me limiterai toutefois pas aux métiers innovants de la formation ainsi définis mais chercherai aussi à comprendre les arts qui les soutiennent : quelles sont les compétences, savoir-faire, savoir-être qui caractérisent ceux qui exercent ces métiers ? Quels sont, parmi ces arts, ceux qui se conservent lors des innovations modernes ? Comment votre formation doctorale peut être valorisée pour exercer ces métiers innovants ? Ces questions sont esquissées dans les descriptions ci-dessous, elles feront l'objet des échanges avec l'auditoire lors de la conférence.

Les métiers du champ de la formation professionnelle privée (30 min)

Il vous faut à présent consulter la première annexe scientifique en fin de document, page 8 : « un réseau de prestataire de formation et la certification croisée dans le champ professionnel ». Dans ce projet d'article sociologique, j'ai tenté de montrer comment le champ de la formation professionnelle était marqué par plusieurs métiers qui déterminaient la carrière du formateur.

Prenons le cas d'un formateur-type : tel employé expérimenté d'une cinquantaine d'année décide de se retirer progressivement de son entreprise tout en faisant fructifier son expérience : après avoir été formateur expert au sein de son entreprise, il monte son propre statut juridique et vend ses compétences tantôt comme consultant, tantôt comme formateur pour le compte d'un organisme de formation – ce qui lui permet aussi d'intéresser des clients potentiels à consulter. Après plusieurs missions pour l'organisme, il crée une formation régulière qui a lieu trois fois dans l'année et qu'il reproduit dans un organisme de formation concurrente. Une autre filiale du groupe lui propose bientôt d'éditer un livre professionnel où il explique ses enseignements, ce qui lui permet d'asseoir sa notoriété. Il est aussi interviewé par une tierce filiale qui assure ainsi sa publicité dans un hebdomadaire lu par les responsables de formation des entreprises clientes – et fini par lui remettre un prix pour son ouvrage. Peu à peu le formateur fait carrière grâce aux différentes sociétés, aux capitaux croisés, qui forment le champ dans lequel il intervient. Il peut alors s'associer avec une autre formateur aux compétences complémentaires et peut être plus jeune, qui prendra alors la dimension commerciale de la prospection.

Autour du formateur nous voyons ainsi qu'il existe d'autres acteurs : le chef de projet en organisme de formation professionnelle qui suit l'actualité, propose des programmes de formation au formateur, contractualise avec lui, vend la formation à des entreprises clientes avec son catalogue et coordonne une équipe-projet pour la bonne réalisation de chacune de ces formations. Le chef de projet est tour à tour concepteur, commercial et coordinateur de la formation. Il évolue avec le temps pour devenir chef de produits, c'est-à-dire responsable d'un catalogue de formations qu'il doit animer (remplacement de

nouveaux produits, création d'événements de communication,...) et faire fructifier économiquement. Le chef de projet en formation est souvent un jeune titulaire d'un master d'école de commerce, il coordonne, au sein de l'organisme de formation, une équipe transversale issue de profils variés : logistique, communication,...

L'organisme de formation qui recrute le formateur vend les formations à des entreprises clientes, représentées par leur responsable de formation. Celui-ci ou celle-ci gère le catalogue interne de formations de l'entreprise. En plus des formateurs issus de l'entreprise-même (formateurs en bureautique ou en langues, formateurs issus du métier au cœur de l'activité de l'entreprise), le responsable de formation achète des formations aux organismes pour ses cadres dans le cadre du plan de formation – qui sont ainsi formés et récompensés pour leurs efforts. Le plan de formation s'inscrit dans la gestion prévisionnelle des emplois et compétences, pour adapter les employés à leur travail ou les aider à évoluer – en priorité vers les futurs besoins en compétences des employés, qui ne feront pas l'objet de recrutements spécifiques. Les responsables de formation travaillent ainsi, au sein de la direction des ressources humaines, au plus près des responsables de la gestion prévisionnelle des emplois et compétences et des recruteurs.

Enfin le formateur indépendant que je décrivais initialement peut obtenir des prix ou éditer des livres et articles dans des entreprises parentes (c'est-à-dire aux capitaux croisés et intérêts liés) de l'organisme de formation. Ainsi tel chef de produit peut lui recommander tel éditeur qui se trouve appartenir au même groupe financier, ou l'inviter à tel prix remis par une revue elle aussi éditée par une filiale du même groupe.

Je présente donc une vision tripartite du champ de la formation professionnelle :



En quoi ces métiers sont-ils innovants ? Ma thèse est que la mise en place, dans le secteur privé, d'organismes à des fonctions complémentaires (formation, édition, célébration) est nouvelle car elle reproduit, dans un environnement médiatisé par la monnaie, des pratiques qui ont cours dans le monde académique là où la rémunération est essentiellement symbolique. L'innovation tient dans la monétisation de l'activité – le reste des pratiques (expertise, renom, recommandation, transmission des apprentissages) est conservé.

En quoi votre formation doctorale peut vous être utile pour pratiquer les métiers innovants de champ de la formation professionnelle ? Je pense que vous pouvez aisément valoriser un doctorat universitaire en Sorbonne dans un département de formation d'une grande entreprise française en mettant en avant la marque Sorbonne et le prestige qui y est associé dans l'économie de la connaissance francophone. Votre spécialité en sciences sociales est un atout car ces métiers sont de nature sociale et relationnelle avant tout : il s'agit de mettre en relation et construire des collectifs d'apprentissage.

Le métier de l'ingénierie de formation dans l'enseignement à distance public (30 min)

Dans cette deuxième partie je vais présenter des activités dans le secteur public et un métier de la formation qui est innovant car il fait appel à des outils techniques récents : enseignements par vidéo ou cours diffusés sur Internet, utilisation des forums pour interagir avec les apprenants, gestion des va et vient de copies électroniques entre enseignants et étudiants via des logiciels... Il s'agit de l'ingénierie de formation à distance. Ce métier est parfois couplé à des responsabilités de dispositifs de formation existant, mais sa dimension la plus attractive à mes yeux concerne la conception de nouveaux dispositifs de formation. Plutôt que de simplement assurer le bon fonctionnement d'un dispositif, il faut imaginer et réaliser de nouvelles créations, des formations dépassant le plus souvent la centaine d'étudiants.

Pour mieux comprendre le quotidien de ce métier innovant de la formation, je vous invite à présent à lire les annexes 2, 3 et 4 situées respectivement en pages : **Erreur ! Signet non défini.**, **Erreur ! Signet non défini.**, **Erreur ! Signet non défini.**. Ces deux projets d'intervention orale (acceptés pour une conférence à Séville n'ayant pas encore eu lieu au moment de la rédaction de la présente note) et ce projet d'article décrivent par le menu les activités d'ingénierie de la formation au quotidien, en insistant sur les outils informatiques qui l'appuient et l'art de leur manipulation : campus électronique pour les deux premiers, logiciel didactique pour le troisième.

En complément de ces documents, je vais présenter rapidement la formation officielle que suivent les nouvelles recrues (« responsables de formation chargé de l'ingénierie de formation ») pour apprendre le métier. Les compétences demandées pour les professionnaliser sont la gestion de projet (comment servir les apprenants avec des formations de qualité, à moindre prix et tenant les délais ?), la stratégie et le pilotage éditorial (quelles relations entretenir avec les auteurs de cours, les éditeurs, les partenaires ?), l'ingénierie pédagogique (comment modulariser une formation et la découper en séquences horaires ?), la mesure comptable de la valeur d'une formation (comment maîtriser tous les coûts d'une formation et calculer la rentabilité d'un projet à lancer ? comment intégrer dans un seul document Excel le prix et le nombre d'inscrit prévu d'un côté ; les coûts d'auteur, de mise en ligne, d'impression, de diffusion, de correction des copies, d'inscription des apprenants, d'ingénierie de formation... de l'autre), les outils de la contractualisation (le cadre juridique des droits d'auteurs et d'emprunts, notamment concernant les images utilisées dans des supports de formation), la compréhension du cycle de vie d'une formation (les

étapes successives suivies par le responsable de formation dans son travail : création d'une formation, conception de la formation, déploiement, suivi et fermeture de la formation devenue surannée) et enfin les innovations techniques et les nouveaux dispositifs numériques (environnements numériques de travail tels que Blackboard et Moodle).

Les nouvelles industries de la connaissance qu'ouvre la possibilité de l'enseignement à distance concernent des centaines de milliers d'apprenants et non des dizaines de milliers comme c'est le cas de grandes facultés. Pour en savoir plus sur ces industries de la connaissance, je vous conseille les travaux initiés par Jacques Perriault et continués par Pierre Moeglin, notamment dans la revue *Distance et médiation des savoirs*. Ces métiers sont donc innovants dans le sens où ils appellent une gestion quantitative d'un grand nombre d'étudiants, ce sont les institutions qui ont préfiguré les Mooc (*Massive online open courses*) nord-américains de ces dernières années.

Votre formation doctorale en sciences sociales peut être valorisée là aussi du fait de la reconnaissance du diplôme dans les milieux académiques, mais aussi car vous avez pratiqué des stages de terrain et peut être déjà enseigné.

Conclusion (20 min)

Pour conclure ce support de conférence, je vais récapituler en quoi votre doctorat peut être utile à l'exercice de ces métiers innovants de la formation : c'est un diplôme académique valorisé dans l'économie de la connaissance, les sciences sociales incluent la sociologie et donc une sensibilité au travail collectif et aux métiers de la relation. A cela, j'ajouterai votre attrait probable pour l'histoire et la sensibilité aux échelles de temps (travailler dans une administration, avec des projets sur une à deux années n'est pas du même rythme qu'un organisme de formation qui inscrit certains de ses projets dans la semaine).

Enfin, je voudrais ouvrir la conférence sur une piste épistémologique que suivront peut être ceux qui continueront dans le domaine de la recherche. La cinquième annexe (page **Erreur ! Signet non défini.**) présente une méthode de praticien réflexif que je vous invite à lire attentivement. Elle vous donne des outils pour prendre de la distance avec vos futures activités professionnelles et continuer à produire des connaissances académiques.

Annexes scientifiques

Un réseau de prestataires de formation et la certification croisée dans le champ professionnel¹.

Entre 2008 et 2010, nous avons travaillé comme chef de projet dans deux organismes de formation de taille moyenne (80 employés) et appartenant chacun à un groupe plus large. Nous avons ainsi été amené à concevoir des formations servant le droit individuel à la formation ou les plans de formation et à contractualiser des formateurs professionnels avec qui nous avons eu des échanges aussi bien formels qu’informels. En parallèle de ce *terrain*, nous étions doctorant en philosophie, après avoir été formé à la sociologie qualitative à l’École normale supérieure et l’École de hautes études en sciences sociales (Centre Maurice Halbwachs).

Notre *problématique* consiste à questionner ce terrain à l’aide de concepts bourdieusien : comment fonctionne ce champ de la formation professionnelle ? Quels sont les capitaux déterminants la structure sociale invisible de cette économie particulière, avec ses violences symboliques, ses rapports de pouvoirs et de domination ?

Notre contribution consiste à montrer que le paysage de la formation professionnelle continue (FPC), créé en France en grande partie par la loi de 1971, est largement modelé par le réseau de groupes financiers donnant une certification invisible à des experts issus du monde professionnel – que la FPC vise et qui les produit.

Ainsi, un des deux organismes de formation étudié est filiale de deuxième niveau d’un grand groupe hollandais spécialisé dans la publication scientifique. En France, plusieurs filiales aux capitaux croisés et opérant au même endroit se complètent : les formateurs recrutés par l’organisme de formation sont édités dans une maison d’édition sœur et participent à des événements créés par un magazine professionnel, lui aussi membre du groupe. Ainsi les formateurs, simples experts issus de l’entreprise ou du conseil, sont amenés à construire leur capital social dans ce réseau et à accumuler les symboles de reconnaissance générés par les différentes sociétés du groupe : publications, remises de prix, formations d’entreprise prestigieuses sur ce marché...

Notre principal résultat est la description de la trajectoire type de ces formateurs, dans le champ décrit, menant à la constitution progressive de leur habitus professionnel. Ce métier particulier de la formation est ainsi formaté par des certifications croisées et une qualification endogène qui le fait fonctionner comme un monde autonome avec ses propres règles de mesure de la valeur².

¹ Projet de communication pour l’Association Française de Sociologie. Marty, O., 2012

² Éléments de bibliographie

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Oral presentation for a fifteen minute session

Learning on an online campus

Students team building through online interactions with a LMS³

Abstract

This oral intervention in Spain will present French distance education management : how LMS is supervised in order to train students. After a brief methodological introduction, I will show results consisting in the description of LMS management whose aim is to improve the learning activity of distance students. I will explain how interactions and “coopetition” are fundamental in students team building. I will end up with a discussion around three notions : effectiveness, efficiency and efficacy in learning. These three notions rely on group interactions in order to reach training objectives.

Keywords

Management – Education – Distance education – Team building – LMS

³ LMS : Learning Management System

Method

My activity in French public education is twofold : I am both a training manager in distance education and an education scientist. I split share my time between two parts : a day work on Learning System Management supervision ; 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, aesthetics 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 with the Google Scholars link: it is about the use of new technologies in small organizations (Start-ups of the years 2000-2004) – studying carefully publishers on personal digital assistant of those times.

As to what concerns this presentation about learning on an online campus 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 manager; responsible for a few websites designed as online campuses. As a manager, I hire teachers to moderate forums and to give online tips and tricks to students. I pay a special attention to students involved in an online learning process, the way they interact on the LMS and their group numeric dynamics. I will therefore describe students online team-building, using the point of view of what the indigenous within the organization call “management”. As an education sciences researcher at Conservatoire national des arts et métiers (Cnam, France), I use these data to analyze students team-building on the platform and compare them to literature about teambuilding and groupwork⁴ in online environment.

Results

Students interact with online course contents : they read material, complete sets of exercises given on the website, answer recorded questions from teachers to assess their understanding of the reading material, and so on. The LMS manager’s job, in this case, is to check that the website is correctly provided by the production department (all webpages work out), to guarantee the quality

⁴ I used Kurt Lewin’s analysis of group dynamics but also more recent articles such as Cheng C.Y. and al. “The effects of Team-based learning on learning behaviors in the maternal-child nursing course”, in *Nurse education today* (2013) and Yu-Ling Lin and al. “The values of college students in business simulation game: a means-end chain approach” in *Computers & Education* (2011)

of the reading material and the exercises available on it and provided by teachers (whether they belong to the organization or are commissioned), to be sure that the number of students enrolled by the registration department reaches an optimum (assessed by a financial analysis).

Students also interact with teachers on an online forum, where they can ask for pieces of advice about the exercises and also for general information about their training. This forum is moderated and an answer is by-rule provided within 72 hours. Therefore, teachers and forum moderators will visit the LMS platform to keep up with the rhythm of questions and answers on a daily basis. The LMS manager has to hire the proper number of teachers so that all questions are answered without any loss.

Finally, students interact with other students on the same platform, a place where they exchange tips and personal experience about the training. They can answer each other's questions and wonderings, even before the teacher provides his / her own official answer. Hence the forum has an almost autonomous life : many subjects are launched, questions, answers, suggestions, comments and tips fill each page. Teachers follow the conversations and check that forum's ethics, set by the manager, are respected. If not, they alert the manager who will exclude any troublemaker.

In case of lack of animation, or simply to launch the first debate, teachers are incited by managers to spontaneously propose an exercise. It can be asynchronous : a teacher asks his/her question and comes back on the forum the day after to see and assess the results. It can also be synchronous : an appointment is given at a precise hour and all learners can chat together on the forum as soon as the teacher has asked a question. This is a bit harder for the teacher to handle since it can be very lively, depending on the number of students online. This teaching technique is closer to *virtual classrooms* that I present in another speech here in Sevilla. The question of timing is essential: most of the students have a daily work, most teachers don't work during weekends and therefore synchronous sessions have to take place early in the evening (which, contrary to Spanish uses, is mostly between 6 and 8 pm in France).

It is through these interactions with humans (teachers, other students) and non-humans (website, files to read and exercises to do) that a learning group is built. The student acts by filling in a checkbox, the website software automatically answers and provides the right answer with an explanation. The student hands in an electronic file, a teacher reacts by a correction of it, and grades are posted on a specific software where every student can compare their results with basic statistics of the group's grades (average, maximum and minimum grades). Last but not least, a student acts on a forum, other students or a teacher react and an interaction chain is built up. Slowly, action, reaction, interactions, are building up the community of learners.

Throughout the training period, each individual learner is progressively included in a learning community. Beside, The head of the teachers acts as a community manager, giving rhythm and harmonizing the learning community. He/she is the keeper of the pace and peace of the forum, he directs the exchanges, orientating them on important topics related to the courses. He / she decides when the last hands-in can be sent back to teachers for correction and what is the ideal time for each correction. The students group lives like an organism, with its own rhythm of learning (which is the essential function of having such a group).

Each and everyone is included within this whole organism, individualities are melted in a collective dynamic that aims at a single direction. Students' individual goals may be somehow different, but learning is common to all and they get united in this common path. They follow a common method, that is to say they follow the same path to knowledge ; guided by a few pedagogues that lead the group on this one-track way. The website provides all the material necessary to step on and go forward and the LMS manager oversees the whole operation.

When listening to students after their training period, I found out that they the collective dimension of their learning process had been extremely important for them. It is thanks to the group that they had kept studying all along their training period (that could last eight months, sometimes even more) : they had been boosted by a collective dynamic which had enhanced their individual performance, through both competition and cooperation. On the one hand, they had competed to get the best grades of the group, on the other hand they had cooperated and helped each other to solve problems. This “coopetition”, as it is frequently referred to at Cnam, is a group dynamic since both cooperation and competition tie up the group and lead all members to the same destination of knowledge.

Students feel supported on their long-lasting effort : some of them said they hadn't given up in a moment of weakness because they had felt part of a learning team. Competition seems to help the best students, they compete to be even better and to surpass the others. Cooperation could also be an advantage for weaker students : they are supported in difficult moments and can catch up with the group thanks to their help. A few online teachers have set up complex “coopetition” : groups of students cooperate to compete with other groups. There is solidarity within the group, acceptable ferocity against other groups. And the result of the whole organization is a forward movement, to keep learning more and more on the LMS.

An example of this complex “coopetition” has been provided by a groupwork (4-6 students) on a specific topic during part of the training. After a presentation of each group's subject, they have worked in small teams cooperating together and competing against the other teams to get the

best collective assessment. This can be done on the LMS, thanks to virtual classrooms (see my other presentation here in Sevilla) or, on a basic version of it, thanks to forum dynamics.

Discussion

Therefore it appears that a workgroup can be established on the basis of the interactions between its members : the more learners, teachers and artifacts interact, the more effective and efficient the learning group becomes.

The workgroup is effective since more results are produced throughout interactions : a student alone, without any course material to interact with (and behind the course, the teacher who wrote it), won't learn much on his/her own. If he/she has a course material available on a virtual campus such as a LMS, he/she is more likely to meet his learning objectives. A connection with other students and teachers on a LMS makes it even more effective : he/she will understand better thanks to questions asked to the teachers and answers provided, he/she will find motivation to go further, competing with the best, cooperating with his/her learning team. He/she will benefit more for the learning process , the learning group will be more effective thanks to interactions.

The workgroup is also more efficient since interactions allow to reach the same number of learning gains in a shorter period of time and a less money. A workgroup interacting properly speeds up its learning rhythm and most students in the group get to know quicker what each of them would have learnt in a longer span of time if let alone. Learning is therefore more efficient when the group of students interact properly on the LMS : each student learns quicker.

What's more, a single teacher can moderate twenty students, or more, in their discussion on the forum – if each student abides by the online conversation rules. Costs are therefore cut and group learning is more efficient since it is less expensive than individual courses. Interactions with the teachers are also recorded on the forum, and any student who has missed a week's lesson can catch up with the group without any supplementary cost. Money saving is therefore both due to interactions among students and interactions with the LMS website.

A final dimension could be explored : the question of efficacy. When effectiveness was linked to production of learning results, efficiency linked to production of quick and non expensive learning results, one can define efficacy as an extra production of homogeneity among students' results. The objective of training managers is indeed that most students will reach the knowledge objectives defined in the learning contract they sign when they buy and enroll the training. It is important that groupwork should produce effectiveness and efficiency, but efficacy is also

fundamental. Since students interact with each other, their respective level of learning tends to be closer. One gets to know what the other knows thanks to their interactions. Interactions of the group with course material and teachers correct the gap between the weakest students (who are helped) and the best students (who are fostered to help the weak and pull the group forward). Therefore, an homogenous group of students is built up and dispersion around average level is reduced. A normal group⁵ with a strong interaction rate is better since most students reach the learning objectives of the training– effectiveness and efficiency are thereby completed with efficacy.

⁵ The adjective normal refers to a statistical approach of the distribution of student's grades, following a Gauss curve.

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Oral presentation for a 15 minutes session

Industrializing virtual classrooms in distance education

How to measure added value of a training ?

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 ?

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 knowledge⁶. 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

⁶ 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 students 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 were 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 real 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.

Distance education engineering⁷

Interactive method and virtual pedagogy for French learners

Keywords

training engineer – interaction paradigm – virtual method – experience – pedagogy

Abstract

A field description of training engineers' work in distance education allows us to test the interaction paradigm in current social realities. The training engineer's work is about tuning a software to provide undergraduate students with a virtual learning method. It therefore appears to confirm the interaction paradigm : learning is a dynamic of human actions and software reactions, similar to a serious game in a virtual world. But the course's final assessment through a case study reveals the limits of the interaction paradigm. This complex problem, based on real-life situations, is rather seen as a "mental experience" by the very professionals working in this educational institution. We therefore put aside the interaction paradigm to take into account cognitive realities stressed by the training engineers' pedagogical activity.

Introduction

Digital revolution reaches standard mass education. In France, the government has set up C2I ("Certificat Informatique et Internet") to meet the European policy aiming at a computer competencies universal pass. In order to prepare students for this certificate, the French national institution for distance education (Cned) has implemented a training device based on educational computing, on a large scale. Cned's undergraduate students learn how to use office software through a didactic software. This very didactic software proposes many exercises in a virtual simulation of the office software to be learned by the students. Our article presents the work of a

⁷ Marty, O., 2011, projet d'article.

training engineer 1/ tuning the didactic software to meet the requirements of the learners' profiles and goals and 2/ designing a final assessment procedure through a computer-based case study.

Literature review

There is an abundance of literature dedicated to educational computing and, more generally, the use of computers in education (collective work such as Cornu, 1994 ; handbooks such as Maddux, Johnson, Willis, 2001, 3rd edition ; the review *Computers & Education*). However, the pedagogical device we present is not about using a computer within a classroom, but turning a computer into an (almost) self-sufficient learning tool since it is about distance education (Moore, 2012). The students are non-computer specialists and they are able to navigate on the Internet in full autonomy. Our focus will be the teacher, in this case the training engineer in charge of tuning the software to prepare the students to work with it. As a trainer, his job is limited to the preparation of the course : he does not have to deliver it in presence of the students. He is neither the one who designed the software, nor a mere learner. He is the mediator, in charge of adapting the instructional device to the students in order to guide them in their learning process. He then completes the process by assessing the students, with the same software.

Field study method and hypothesis

We collected empirical material through a field study at Cned. Participating and observing the work of training engineers allowed us to gather raw data that we have analyzed within the *interaction* paradigm. Erwin Goffman's social sciences interactionism (Goffman, 1959) has helped us as an enquiry method. But it is the educational computing interaction analysis that we have used to understand the results of this enquiry. David Squire presented this interaction paradigm in 1994 (Squire, 1994) and our hypothesis is that this paradigm is still partially valid : the work of the training engineer can be described as the preparation of the interactions between the students and the software.

Furthermore, this *interaction* hypothesis relies on a sub-hypothesis : learning is an *action*, an activity of the learner (Barbier, 2011 ; Mucchielli, 2012). If we consider that the training engineer's work is to prepare the learner-software interactions, we infer that learning is an action (here an action on a software). We will now test these hypotheses, confronting them to the raw material and showing their limits.

1/ Learning process

In order to understand the training engineer's work, we have to fully describe the learning process. The didactic software is used by undergraduate students enrolled in the compulsory computer course for the French diploma *Brevet de Technicien Supérieur* (Bts). We will take the example of a Bts in tourism : it requires the students to acquire basic knowledge of databases management. This course is described in the national curriculum as a twenty hours course.

Cned provides the students with this twenty hours course, but it is not delivered by a teacher within a classroom : the students have to learn how to use a database software through a twenty hours course set on M+ (the didactic software). They have access to M+ on their personal computer, either at home or within the company where they are doing an internship. During approximately twenty hours, they will learn through M+ how to manage a database. The didactic software M+ gives them access to a virtual simulation of a database software where they have to solve almost a hundred problems in order to discover, understand and use all the functions of the simulated database software. Therefore, we can define M+ as an exerciser : it provides the students with exercises in a virtual environment.

How could the students' learning process be described in this exerciser ? When one uses M+, one watches the screen where the software to be learned is simulated and one navigates within these simulations by clicking on menus. One has to read the text of the exercise box (usually a simple question) and the text on the menus of the simulated database where he has to find the

answer of the question. The answer is very often a manipulation such as “open file named X”, “fill in table A” or “link table A to table B”. The student reads the questions and then answers them by using the simulated software as if he was using it in a real life situation. If he doesn’t know how to answer, he can launch a tutorial video about the question. This video is a recorded scene within the virtual software, where he sees exactly what he has to do and listens to a recorded voice commenting the actions taking place on the screen.

This learning process can be summed up with verbs referring to actions : to read, to click on, to navigate, to watch, to write down.... Therefore, our sub-hypothesis that learning is an action seems to be confirmed : the students are not passive in front of the computer, they are active. This activity requires their attention and implicates them for repeated one or two hours sessions, till all the exercises are completed.

However, these actions are not unilateral : the didactic software “answers” to them. To each student’s action there is a reaction from the computer. When the student clicks to open a file, the simulated software opens it and it is visible on the screen. Then the student clicks on “check your answer” icon and, if correct, a congratulations message appears on the computer screen – if not correct, the student has the opportunity to redo the exercise. Once done, the student clicks on the “next exercise” icon and the computer answers by another question box (appearing on the screen). This chain of actions and reactions can be described as an interactive process between the learner and the software. Our main hypothesis that Squire’s (1994) interaction paradigm is still valid is therefore confirmed. We will however study its limits in the next paragraphs to prove it is only partially true.

The interaction learning process can be more carefully studied by describing how the actions of the student are progressively shaped by the reactions of M+. At the beginning the actions are rather slow because the learner takes time to fully read all the menus, looking for the one he thinks

he has to click on. Then he gets to know all the menus and can quickly access to the function he wants to use. Therefore the frequency of the interactions increases with the learning process. Their very nature also changes gradually : at the beginning the questions are rather easy (“write down this text” / “find within the table this element”) and the student can answer directly. But then the difficulty increases (“edit the formula”, “print this part of the table”) and the students have to watch the videos giving the key elements for them to answer. The nature of the interaction is therefore modified. The material of the interactions, however, remains constant : they never have to find elements out of M+ (by surfing on the Internet or consulting a complementary book), all the interactions take place within the didactic software. The dynamic analysis of the interaction (variations of frequency, nature and materials) shows how the student progressively learns. His actions are shaped by the software, this process being comparable to an elaborated conditioning process.

All these interactions lead the students to learn the *logic* of the software : the *vocabulary* describing all the items (“file”, “table”, “folder”,...) and the *operations* they can command by clicking (“opening a file”, “clearing a table”,...). They discover all the items of the software to be learned and how to use them : they learn a virtual world and the competencies to act within it. Therefore, this kind of computer-learning can be compared to the current trend of serious games. Indeed, many serious games simulate a virtual world where the player has to play. In order to play, he has to understand all the other characters and the rules commanding them. He also has to acquire specific competencies to interact with them. It is the same idea of learning how to live in a virtual world, acquiring its logic (both vocabulary and operations). The main difference being the interest of the game : what motivates the player to play, the learner to learn ? In the case of a serious game, he acquires points and gets pleasure in it (self-achievement, competition with other players,...). In the case of our didactic software, he needs to get points since these are going to be his final mark

for the national diploma. This is precisely what the training engineer has to prepare: tuning M+ so that it fits the undergraduate students profiles and the requirements of the Bts national program.

2/ Training engineers' main work and discussion of the hypothesis

The training engineer's work is to study carefully the students' profiles (what do they already know about the database management software they have to learn ?) and the learning objectives (the level required by the diploma as described in national texts). Thus, he gets a precise idea of the competencies they have to learn (the difference between what they already know and what they are supposed to know) and tunes M+ to limit the exercises to what is strictly necessary. Then, to reach the legal compulsory 20 hours of training, he adds basic exercises that will strengthen the students' general knowledge of database management. The yearly group of two hundred students for a Bts is toursim, scattered all over France, is not homogeneous. Therefore, some of them will go very quickly over these basic competencies (that is to say without watching the explanatory video), while others will have to repeat some exercises many times before answering them right. Furthermore, when the training engineer collects all the marks tracked by the software, he/she finds out that some students only achieved 50% of the exercises, whereas others have it 100% right. A brief statistical study of the marks shows that a few students don't understand the exerciser and miss their learning goals, a few others do half the exercises, and most of them have great marks – regardless of the time they spend on the software. The 20 hours is frequently not respected : a majority of the students get good mark in about 15 hours. A very few other complete all the exercises in 40 or more hours. Once again, it all looks like a serious game that the student has to play (that is to say understand and enjoy) if he/she wants to learn efficiently (fully and briefly). The master of the serious game being an invisible engineering teacher, setting the rules and collecting the points.

The hundred or so exercises of M+ can be described as a virtual learning path. The Greek word for *path* (*hodos*) is the etymology of the word *method*. Therefore the idea of a step-by-step method can be fully understood. Each step being an action on the virtual path, the software's reaction is an opportunity for the student to take another step in the right direction. It is a virtual and interactive method. The work of the training engineer is to prepare this path for the learners and to put them on the right track. He has to determine what is going to be the first step (what is the lowest student's level), what are the majority of the steps going to be about (what are the main items most of the students still have to learn) and what is going to be the final step (as determined by national texts).

The training engineer finally collects the results without meeting the students : he extracts from M+ all the data representing the results of each student to every exercise. The training engineer's work is about training conception and software management much more than a live lecture in presence of students. As opposed to traditional teaching, distance learning through educational computer has nothing to do with theater. The trainer is no longer an actor placed on a stage, with a script to deliver to a more or less active audience. He is a training developer, focusing on the preparation of the course and its programming on a software. The students will learn by acting and interacting with the software on exercises he has prepared. The hypermedia software will answer potential questions with recorded videos delivering the lecture on demand. The training engineer will then collect the grades to hand them in to the diploma manager. As a teacher would do, he can analyze the difficulty of his training and assessment (by selecting a more or less difficult learning path). The training engineer's work is therefore to prepare the interaction between learners and software. But his work does not end here, he has further responsibilities.

In the following paragraphs we will highlight the limitations of the interaction paradigm.

3/A computer-based case study as complementary assessment : a shift of paradigm

Training engineers and directors working at Cned consider that the use of the software to teach and assess the students is not sufficient. They complete it by a case study that the learners have to take at the end of the course. This case study is compulsory and graded. Whereas the software M+ provides them with a set of brief exercises, helping them to solve these exercises with precise videos, Cned's training engineers have collectively decided to oblige the student to rethink the material they acquired throughout the year through a single complex case study. The knowledge and competencies developed by the hundred simple exercises is required to solve the unique complex problem they have to solve at the end of the year. It is still distance working since they do it at home and have no time limitation. They can be helped by someone and they can also search on the Internet or any other source of information. But all they need has been learnt through the interactive virtual learning method. They are presented with a case study taking place in an environment virtually identical to their internship or future work. For example, the description of a company dealing with clients and resources. Then, they are asked to manage a database provided with the case study (in a separate file) and to answer a few questions using this database. This complex problem experience contrasts with the simple exercises they had to go through with the exerciser : here they have to link many elements they have learnt separately, sometimes at very different moment of the course. This experience is both a tool for learning (digesting) and assessing the students (long-term memorization, critical-thinking), in a situation similar to what they will have to handle in the coming years of work situations. Can this experience be described as an interaction ? We will now defend that it can't : this problem is irregular and cannot be handled with the interaction paradigm.

The final case study is usually prepared and corrected by a teacher working for Cned. The training engineer provides the teacher with data about the student's targeted job, the national text of the diploma and a copy of the interactive and virtual method he has built in M+. The teacher hands in a two hours case study including all the files necessary (database, description of the test,

questions, correct version). The training engineers will send it by electronic mail to the students at the end of the course and they have a week to complete and send it back. Then the teacher (sometimes helped by correctors) will correct the case and give a grade. The training engineer, in this case, acts as a teacher manager, in charge of coordinating the assessment event. He no longer has to prepare an interaction between learners and a software. What he prepares is different : it is the specific learning and assessment experience of a case study.

How do Cned's workers present this final assessment ? Being a large national educational institution, counting 200 000 learners and trainings ranging from primary school to master degrees, Cned has been a source of intense didactic creativity. This creativity can be tracked through university books (for example : Cornu, 1994), but also by many broadcasted and recorded videos. We will now take one of these videos as raw material (Berbaum, 1997), in which the institution explains and legitimates its didactics. The video gathers selected learners testimonials and questions, teachers' answers and specialists' pieces of advice (intervention of a senior university professor in education sciences, a consultant from another national institution). During a few hours, all these people converse and define learning norms for a targeted audience of Cned's students. We assume that this kind of video has shaped the current conceptions of Cned's training engineers since their current discourse about the assessment is very similar to that of the video. The evaluation is never presented as an interaction, but rather as an activity described as mental experience.

The vocabulary used in the video deals with cognitive psychology applied to education sciences. An exercise similar to the case-study prepared by training engineers, is described as something mental since the students have to be cut off from reality : they are advised to work in an isolated room, far away from any noise or inconveniences (as if in a examination room), during a dedicated time and in relaxed mood. Thus, the video describes student activities in terms of mental processes and cognitive functions : self-questioning, memory (short term and long term), perception determined by learnt conceptions, links between the different dimensions of the exercise, mental

representation of the situation, stimulation of creative imagination to solve problems, attention span determined by motivation, ... All these formulae and cognitive explanations deal with a mental experience and the word interaction is only pronounced once (during the video, running from minute 20 to minute 45).

We can now come back to the case study set up by training engineers and describe it the way they talk about it (influenced by the institution's didactics such as presented in the video). The case study consists in dealing with a complex situation and crossing knowledge in order to answer it. There is no longer action nor reaction (there is no M+ to react dynamically to the students findings) : thus no interaction. Instead, the learner is led to a difficult situation that will require concentration and a lot of mental effort. It is a fruitful experience because the learner will have to reorganize what he/she already knows and therefore know it differently while strengthening it (the very term "reorganize" appears as a leitmotiv in the video). He has to make sense of scattered data and to produce a correct answer. In the video, the senior university teacher explains that what one sees in the current situation is determined by what has previously been learnt. As if the student would see reality through the glasses of what he has learnt. The student is assessed through the use of the database management software : he has to solve specific questions. The software is therefore a communication tool for the student.

As we've shown it, the complex problem solving is no longer an interaction. It is a three dimensional experience as recently described by Jean Marie Barbier (2011) : the case study represents 1/ a particular event, 2/ that the student has to feel and think and 3/ about which he/she will communicate. Therefore, the work of the training engineer is to prepare an experience. The training engineer stands as a distant guide who leads to a fruitful event (a complex problem), helps the student to make sense out of it (because it is a case study similar to work situation) and to express a valid meaning (the correct answer). As a distant guide, the training engineer leads the

student to the problem, obliges him/her to understand it the right way (the way learnt during the interactive path) and to come back with the proper answer. As a distant guide, the training engineer's work appears to be about pedagogy, since the word pedagogy includes in its etymology the Greek word meaning *to lead* (*gogein*).

Conclusion

M+ is an instructional device providing the students with a method, that is to say a learning path ; the computer case study is a better suited pedagogical tool : the possibility for the training engineer to guide the students through a rich and difficult experience. The work of Cned's training engineer is both about method and pedagogy, thus fully didactic. This social sciences field study in an educational institution requires a modification of the interaction paradigm in order to take into account the mental experience.

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An epistemology of distance

Ethnography of training activities : engineering and management in higher education organizations

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Abstract

To begin with, I will present a current fieldwork in distance education engineering and its results (2011-2013) and will compare them to previous more exotic studies (in an Amazonian tribe, 2001; in new economy start ups, 2000-2004 ; about bullfighting (2007-2011)).

I will then launch a discussion about the question of distance :

1. Cultural distance to the fieldwork. What is seen first (when one is a stranger)? What is seen after a few months (when one gets socialized)?
2. Distance to oneself in higher education: how to regularly take a “step back” to observe and describe? How to become an observer who is distant to one’s own world?
3. Distance to research community: what is the optimal distance in the researcher’s description, taking into account his potential readers and their closeness to the subject?

As a conclusion, I will present a model combining the measure of these three distances.

Key words

Distance – ethnography – education engineering – epistemology

A study in a higher education

Personal research background

I have been trained in field study methods at Ecole normale supérieure and Ecole des Hautes études en sciences sociales in Paris, France. I have completed short participatory observations : in north Guyana, in the Amazonian rainforest where I studied the construction of canoes by an indigenous tribe at the Maroni river bank (Marty, 2002a). My focus was the activity of the workers in different work situations : first chopping down the tree in the forest and then carving the trunk in the canoes harbor, next to the village. Later, I came back to France to study new economy and high tech Start Ups operating in the field of numeric edition (Marty, 2002b). I was closer to sociology of work, trying to describe the socialization of a freshly hired employee (I was working part time and had declared to the management that I was doing a social sciences enquiry) and writing down the story of the organization from inside (the company lasted for 9 months before going almost bankrupt).

After this masters degree in research, I enrolled in a master of business administration (French grande école) to acquire management skills. I dedicated my final year dissertation to the subject of ethnography within companies (Marty, 2004). It is a French dissertation available online, it frames this presentation since most of its epistemological considerations are still valid while studying higher education as an organization (Trowler, 2012 : *Doing Insider Research in Universities*). The question of distance to the field is raised in this dissertation; one of the notions that I will be developing later in this contribution.

In 2011, I defended a PhD in ethics about bullfighting. This might seem to be exotic but it is not, at least in my point of view. I grew up in South West of France (next to Spain), where I got involved in many amateur bullfighting activities. My research was mainly a compulsion of readings about bullfighting values and field data : participation to *corridas* and *fiestas*, and interviews.

I am now an employee of higher education public institution, occupying the position of a manager/engineer in distance education. But I'm also, as a leisure, a researcher within a research

center on adult training (CRF, belonging to Conservatoire national des arts et métiers, Paris), where I am preparing an “habilitation à diriger les recherches” (research direction habilitation) in education sciences.

A study on distance education engineering

Since 2011, I have written six papers about distance education among which two (Marty, 2012, a&b) are dedicated to education engineering and one is about distance education management (Marty, 2012c). The first and the third articles have been presented orally in a seminar at Conservatoire national des arts et métiers. The second article, written in English, is a working paper archived on the website of Centre national de recherche scientifique (Cnrs). In these documents, I have presented distance education engineering both as an activity and a project. It is about conceiving curricula in order to train students and adjusting an education software to meet national diploma requirements.

Among the results, I am presenting a three dimensional typology of scholars, elaborated using the analysis of criteria for the selection of French university teachers (the raw material was presented on the national website for the recruitment in 2012).

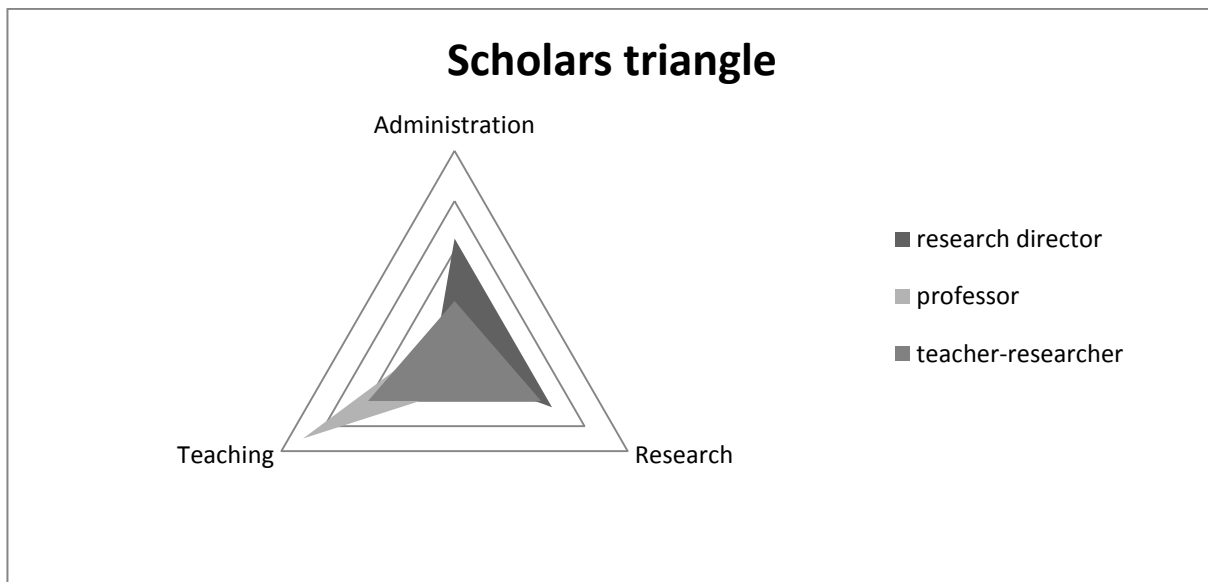
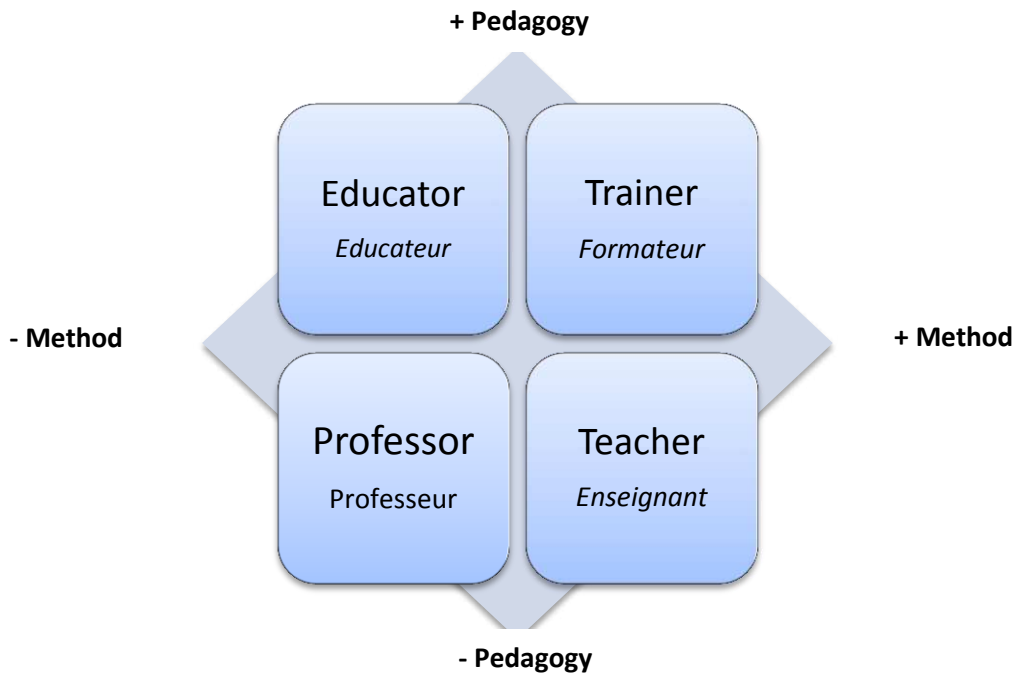


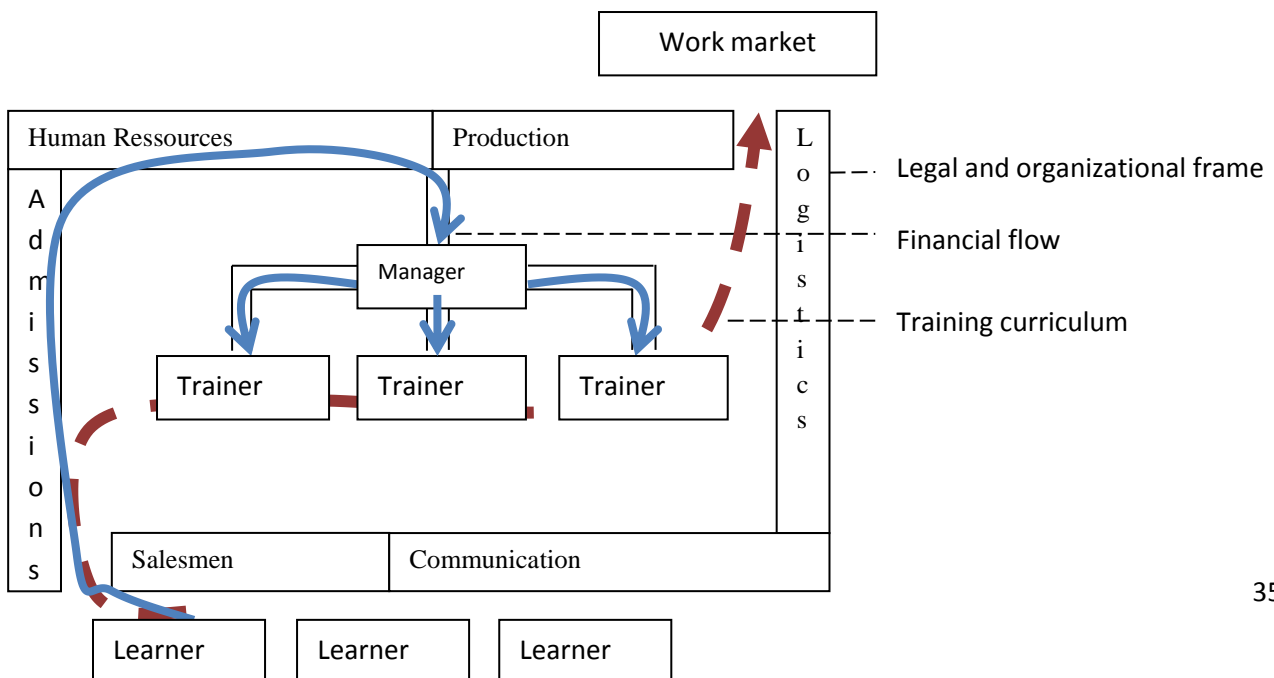
Figure 1

Another result is a typology of didactic figures : different actors in higher education are classified on two dimensions – method and pedagogy, justified by their very etymology and the name of the two French ministries involved in education :



Didactic types (Figure 2)

Last but not least, the comparison of my current higher education public institution with a private one (specialized in professional education) led to a diagram of the organization of the public institution (defined as a set of complementary organs) :



However the point here is not to present results but to develop epistemological considerations regarding the finding process. I will therefore stress the difficulties I encountered and the solutions I opted for.

I will attempt to summarize three kinds of epistemology considerations around the notion of distance : distance to the field, distance to oneself, distance to the research community. In all the cases, I will try to measure this distance, or at least to quantify it. I therefore take for granted the notion of continuity from insider to outsider as proposed by Justine Mercer in 2007 in *The challenges of insider research in educational institutions*.

Distance to the field

The first distance I want to stress is the cultural distance to the fieldwork. This is the reason why I started with my personal research background : in my enquiries, I went progressively from very exotic studies (a huge distance separated me from the Djuka indigenous) to more or less common distance in modern social sciences (new economy companies, south-west Europe bullfighters) to an endogenous study within a higher education institution (distance education engineering).

This decreasing distance entails a first methodological consideration : when the researcher is an apparent foreigner (the only European person with a notebook and a pen in a Djukas tribe speaking “talkie-talkie”), he/she naturally declares his enquiry. This enquiry is not necessarily understood but it is visible. However, if the researcher is among colleagues in higher education, with the same cultural background and conception of science, he/she is much less visible. One can therefore be tempted not to declare one’s enquiry. This might be done in order to keep the observed from changing their habits to appear what they would like to be. Furthermore, it prevents them from influencing the researcher’s study (because they might be interested in science and have their own point of view, because they want to use this study as a communication tool and so on...). The first bias of insiders is therefore methodological : since one is invisible, one is tempted not to declare himself/herself and collect different data.

Being an insider researcher, doing an endogenous study, has another consequence dealing with the notion of visibility. As French researchers of the previous generation have shown it (for example Bourdieu, 1984), when one is too close to his field, one may not see what is evident. A foreign ethnographer can see the “big picture”, the frame, since everything is strange to him. He will naturally spot the way people are dressed, their notion of time, of space,... since he is looking from far away, with a lot of distance. On the opposite, an insider is so used to his own world, he looks at it from such a short distance, that he or she is blind to many features. Being an insider makes many dimensions of the field natural and invisible.

However, distance is not necessarily set once and for all. Indeed, as the research process progresses, the researcher tends to get closer to his field. I approached the indigenous tribe, progressively understanding their language, their social codes, accepting their work rituals – thus getting closer and closer to them. On the other hand, if one studies his/her colleagues’ work, one will have to try and take a step back to be more distant to one’s habits. As a conclusion for this part, the research work is progressive and the distance variable : one doesn’t see the same things at the beginning and at the end of the field – this is why writing down regularly allows to keep track of this change of focus.

How can one measure this distance to the fieldwork ? It is a difficult task but there are a few criteria that allows to quantify this distance : what is the previous experience of the researcher (is one’s familial or personal background near from the field studied ? what were the previous field studies in his research career ?). Another criteria is the time spent on field : the longer it is, the closer the researcher gets to his field. Until the point the researcher belongs to the field and then arises another problem : how to be distant to oneself when oneself is closed to be an indigenous ?

Distance to oneself

As mentioned earlier, I am currently employed in higher education as a manager and in my leisure as a researcher belonging to a laboratory in education sciences. These parallel activities can be difficult since I sometimes wonder if I am an actor or a spectator in my daily activities. I sometimes hesitate on the point of view that I should adopt. To quote P. Trowler (2012, empl. 592), the exercise is to “render the normal strange”, and sometimes it feels strange to be the researcher who is trying to do an auto-ethnography. To overcome this I try and divide

the day in two parts : work time in my work space for work activities ; leisure and research at home. Thus, there is no confusion in my mind.

However, I notice that the more hierarchy there is between work and leisure the less confusion there is in one's mind. Distances effects are produced by inversion of the hierarchy or when there is an equal effort on both activities (when I spend as much time working as writing for my researches). Distance to oneself is therefore quantifiable as well as the distance to the field.

Usually I maintain the following hierarchy : first my job as a training engineer and second my leisure as a researcher. A consequence regarding epistemology (cf. Marty, 2004, last chapter), is that participating is at least as important as observing. It is about participating first, then observing (reflecting once back home) and finally writing down regularly not to forget. Instead of a participatory observation, it is rather an observatory participation. This is important since, the researcher will not see the same things : being part of the action, he sees the actors' interests and strategies, and can present his/her own strategy as an actor – as stressed by a researcher in organization sciences (Crozier, 1981). What would be invisible to a mere spectator is accessible to the actor. It is about objectification of one's subjectivity.

To sum up, participating actively and taking a step back daily, to reflect at home, can be seen in three ways

- as two parallel activities, as I try to maintain them in my current position
- as divergent activities: when it comes to financing one's research, a paid employee in education is a limitation due to legal constraints
- as convergent activities : a long term field study at work allows the outsider to see inner strategies and details that are too precise

In conclusion, there is a distance to oneself, a distance between the two parallel lines of activities. Let's now observe the distance to the research community.

Distance to the research community

Up till now, I mainly focused on the production of ethnographic material. Let's now consider the audience of this research.

The main audience is the scientific community. The production of field data is an answer to the demand of the laboratory of education sciences. This demand is embedded within international trends of research. Therefore, when I take my daily notes, when I present them orally in a seminar or in a conference, when I publish an article or a book, I expect to reach a scientific public. Being an amateur is not a difficulty since I went through elitist French institutions that give credit to the researches. They amplify and give authority to them. Moreover, belonging to an education institution (even though not as a researcher) strengthens the academic position.

Here lies a possibility to measure the distance to the audience. Indeed, answers to questions such as the following ones give a hint of the distance to the research community : has the institution studied a laboratory ? a research review (this is the case for the one I studied) and is it well known an established within the research community ? what are the disciplines taught by the institution studied and are education sciences included ?

The main difficulty lies on the distance I have to adopt when I present my work : I have to guess what the reader is supposed to know about the topic I am writing about. When I studied the Djuka tribe, I wrote a general chapter about the tribe (a review of literature). But when I write about an education institution, it is sometimes delicate to present it : is it publicity ? do I have to quote administrative science ? what is, in this case, the interest of a general description since the scientists are close to this institution and already know about it ? Thus, I have to adjust the distance; zooming in or out to have the proper focus relative to the reader.

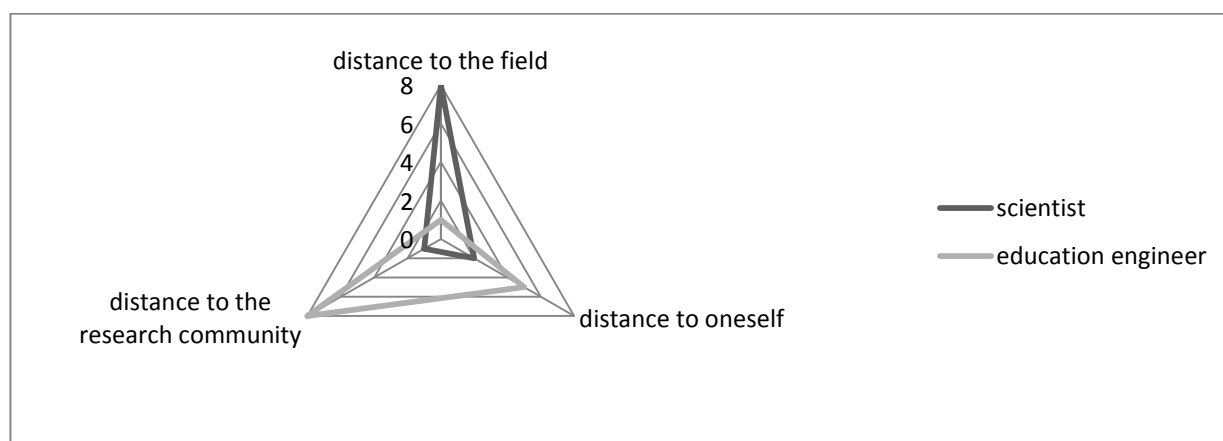
Another audience that I have presented in the beginning is the very institution being studied. Djukas never sent me a letter to complain about my work published on the Internet and concerning their habits. But distance education higher managers did. They wanted to control it. A similar experience occurred with a Start Up that I studied : even though I tried to have an anonymous case study, a high tech company manager recognized his company and complained about it. His argument was that it was not scientific : to his eyes, science involved physics, machines such as a microscope or, at least for social sciences, computers and quantitative data. In the case of the higher education institution, closer to social sciences qualitative method, my work has been judged mainly regarding its utility. But the question of being a scientific discovery or not has been raised, due to my main professional status. That is an epistemology question : is science made only by professional scientist or is there room for qualified amateurs ? The answer seems to be linked to the

distance between paid and leisure activities : the more separated they are, the less confusion of interest they involve, the more scientific the amateur is regarded.

Conclusion : measuring distances

The description of this field study in education engineering and management led me to three kinds of epistemology analysis : distance to the field, distance to oneself and distance to the scientific community. I showed power relationships and symbolic violence that were also developed by ethnographers of science (Latour, 1986).

I want to finish by combining the measure of these distances. I am presenting a three dimensions scale to determine two profiles of researchers – the ideal being at the intersection of the two triangles, that is to say reducing the distances.



Measuring the distances : two profiles (Figure 4)⁸

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⁸ We can measure of distance with the unique parameter of time :

D = distance to the field = it decreases when time on field increases.

d = distance to the research community = it decreases when time spent doing researches increases.

d/D = distance to oneself, a score near 1 is harder to maintain on the long run

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