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Interaction between designer and trainer: an investigation on a French blended training program

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Abstract

This research aims to analyze the indirect and asynchronous interaction between a designer of online resources managed in a training scenario and the teacher who implements them in the context of teacher training. From theoretical considerations about the instrumental genesis of the artifact and the appropriation of resources, we try to characterize appropriation processes through a threshold which means that appropriation is done without misappropriate the design goal of resources and scenario. This study focuses on a French national blended learning program (Pairform@nce) based on a collaborative training. More specifically, we tend to highlight modifications, additions and suppressions of resources as well as modifications of scenario and use of supports as indicators of appropriation. These indicators are proposed from the analysis of four interviews with trainers and then verified by reading logbook of other trainers. Results from the analysis lead us to propose a collaborative tool for improving asynchronous interaction between designer and teacher.

Keywords: Teacher Training, blended learning, technology, collaboration, appropriation, resources.

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1. INTRODUCTION

Integration of Information and Communication Technologies (ICT) in classroom is becoming increasing common. In France, a national decree (2006) declares that new digital culture involves a

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new perception of teaching activity. Meanwhile, this new perception involves a new organisation of teacher's training in order to support teachers in this change of practices. Especially, the technology's complexity modifies the traditional training's organisation and tends to integrate a new actor in the process: the designer. Moreover, this new training's organization might be thought according the constructivism learning theory (Piaget, 1963) based on the premise that humans construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. Therefore, the trainees as well as the trainers are seen as actors in the training.

This study focuses on a French national blended learning program (Pairform@nce) based on a collaborative training whose basic premise is that teachers training must be organized differently; the goal is not only to describe and explain the use of new technologies but it is also built and implemented through the use of ICT. The teacher gets a training which allows to: 1) discover new tools and use them during the training 2) understand a pedagogical use of these tools 3) implement a ICT course and have a reflexive of his/her own activity.

First of all, the terminology used by the program and adopted in this paper is specific. We mean by training scenario, a training hybrid method combined to online resources about a subject or in a discipline. We mean by designer, the person committed in the production of the training scenario and design pedagogical and technical resources. It happens that designers are themselves trainers and pool training scenario they design. By trainers, we refer to the ones who implement the training scenario by forming teams of teachers. They animate the training in a blended way. And by teachers (or intern), we point out the persons committed to produce with their team a teaching sequence based on the scenario and experiments it in their classroom. They compare their experimentation with the team and described their own practice in a reflexive way.

The program is blended for each actor and the training scenario is stored on a platform whose access is reserved to participants. The interface differs depending on the user but the design of the training is conducted according precise specifications and each participant get access to the same organization proposed by the program: each course follow seven stages: (1) entry into the training, (2) selection of content, (3) self and co-learning, (4) design of a teaching sequence, (5) implementation of the sequence in the classroom, (7) reflexive thinking, (8) evaluation of training. Moreover, the course must incorporate a collaborative dimension: teachers have to work together on the design of a sequence for a class and the analysis of the implementation of the sequence, supported by the use of a collaborative online platform.

The program Pairform@nce is national: mutualization can be done within whole France and between trainers and designers between different regions. Both are not supposed to know each other.

As trainers are actors of the training, we are concerned by their training scenarios' pooling since the use of ICT allows it. In this purpose, we try to characterize appropriation processes through a threshold which means that appropriation is done without misappropriate the design goal of resources and scenario. We are concerned by trainers' point of view and more particularly, by the

indicators of their appropriation of the pedagogical scenario proposed by the designer. (Duthoit, Mailles-Viard Metz, Soury-Lavergne, 2011). At the end, we propose an online tool, the trainer's logbook, as an assistant for appropriation.

2. THEORETICAL FRAMEWORK AND HYPOTHESIS

2.1. An instrumental genesis: a theoretical framework to analyze the trainer's activity

In order to describe trainer's activity and training scenario's appropriation, we focused our research on analysis of the relationship between design and usage and beyond that, on the fact that design continues in the tool use (Folcher, 2003). It seems to us that the theoretical frame of instrumental genesis (Rabardel & Béguin, 2005) clarifies this process. We adapted it to the specific context we want to describe (Figure 1):

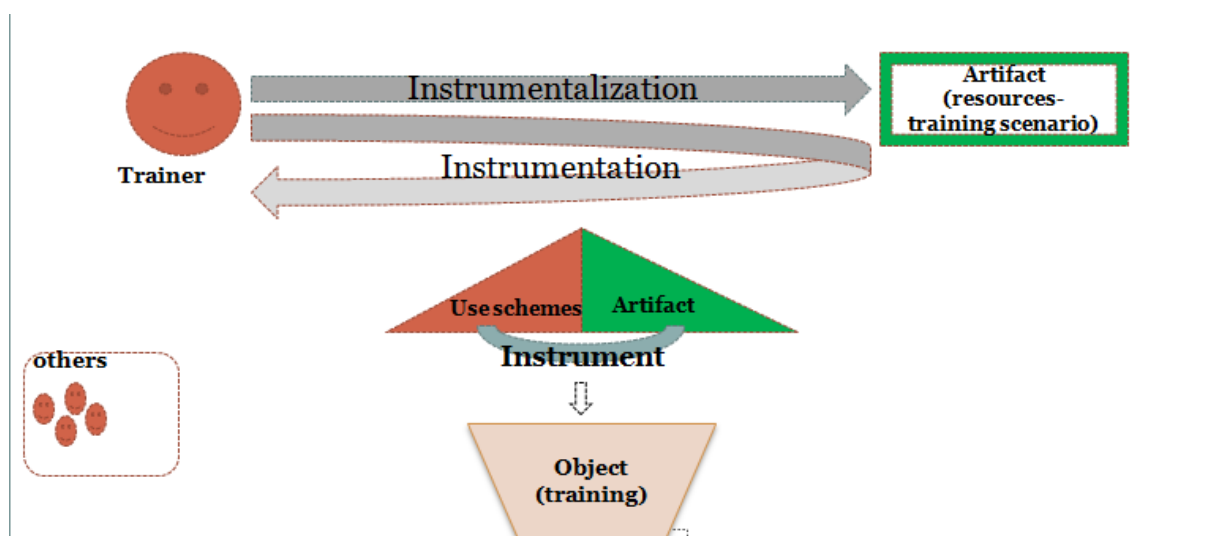


Figure 1: Instrumental genesis according to Rabardel (1995)

The “instrument mediated activity” is related to Wertsch’s propositions (1998) who consider that activity is a “mediated action”, which means that an action is done by a subject in order to inscribe a social object in himself, which induce a tension between his own schemes and the object properties. Trainers (or subjects) appropriate the artifact (resources, training scenario mutualized by the designer) in order to conduct a training, therefore they adapt their activity to others (teachers), to their own context of implementation and instruments’ use. The theory is, indeed, based on these “instruments” which Rabardel (1995) considers as composite entities of schemes’ use: which come from trainers’ experience and a fraction of the artifacts. Moreover, trainers appropriate the instruments by giving them functions which go beyond their constitutive functions, through activities of instrumental genesis, proposed through two process: instrumentation and instrumentalization: “Instrumentation concerns the emergence and development of utilization and instrumented action schemes: their construction, development through adaptation, the assimilation

of new artifacts in already constituted schemes, etc. Instrumental geneses may also lead to modifications of the artifact or instrumentalization. Instrumentalization concerns the emergence and development of the instrument artifact components: selection, regrouping, production of functions, catachreses, assignment of properties, transformation of the artifact, which continue the artifact's design in usage" (Rabardel & Beguin, 2005, p16).

2.2. Appropriation and mediations

Desanctis and Poole (1994) use the term "appropriation" to describe the adaptation of ICT by its users to their contexts. The term is also used in French by experts to describe the same process. Proulx (2001) would describe three levels within the appropriation process: 1) A minimum level where the object would be mastered by the users occasionally 2) An intermediate level where the use of technology becomes significant in everyday life 3) A third level where the technology brings something new in the user's life; the technology is totally integrated.

In their Adaptive Structuration Theory (AST) based on Giddens' structuration theory (1979), DeSanctis and Poole's characterize the deep structures that exist within both the technological artifacts and the work environments within which these artifacts are applied. The appropriation describes usually the "making something someone's own" process and is inscribed in lifetime's activities. Stai and Taddei (2009) define the appropriation as a process of diversion of the object that is accompanied by a double movement of diversification and stabilization of usage over time. The appropriation process is recognized from the gap between a prescribed use and a made use. However, it seems, that if the difference between prescribed use and made use is too important, appropriation is hindered and hardly processed, which does not promote the understanding of the activity's design. Basically, the appropriation process is inscribed in mediations between the subject and the object. Mediations to the object concern the subject's action on the object, with himself/herself and on relationship to the others and may take four main forms (Rabardel, 1995):

- Epistemic mediations, oriented towards getting acquainted with the object and its properties.
- Pragmatic mediations, oriented towards the action on the object: its transformation and handling.
- Reflexive mediations concern the relations the subjects weave with themselves via the instrument
- Inter-personal mediations concern mediated relationships to others.

Moreover, in the training context using ICT, the appropriation process incorporates the productive and the constructive dimensions of activities (Rabardel & Samurçay, 2001).The productive dimension of activity highlights the subject's aims to reach the goal while, simultaneously, the constructive dimension of the activity shows up resources and instruments developed by the subject destined to the productive activity. The two dimensions interrelate: "They

relate dialectically in that the difficulties or failures encountered in the productive activity lead to new developments in the constructive activity that will, in turn, modify productive activities and their conditions » (Folcher, 2003, p 3) .

In the field of our specific context, the trainer has to appropriate a training scenario he/she didn't design as a productive activity (as this is his/her purpose at this point of the training) but also as a constructive activity (as he/she designs instruments to do it.)

2.3 Describing appropriation process in order to facilitate it.

From this theoretical framework and the specific situation of Pairform@nce, two questions are asked:

- The process of appropriation is usually defined by a difference between the prescribed use and the maid use (Stai and Taddei, 2009). We aim to define it more accurately with the help of mediations between the subject (trainer) and the object using the instrument (Rabardel, 1995). In this purpose, we focus, more specifically our research on trainer's activities in order to highlight appropriation's indicators of training scenario.
- The training scenario's appropriation by the trainer should be improved. Therefore, the designer has to explicit the training scenario to the trainer. Then, he/she needs feedbacks from the scenario's appropriation. Our hypothesis is that a tracking tool would help an indirect interaction between trainer and designer: we suggest designing an online logbook in this purpose.

3. METHODS

A qualitative study was conducted in order to collect data. Initially, four interviews were recorded know more the situation from the trainer's point of view and define indicators of appropriation. Then, we analyzed two logbooks of other trainers who exchanges training scenario they designed and implemented in their training. They filled a diary by recording every action they did during their appropriation of the other's training scenario. This analysis was conducted in order to validate the appropriation's indicators and also to observe more finely the appropriation of a training scenario.

3.1 Collecting data: semi- structured interviews

Indeed, interviewed trainers have been selected according to the fact that they had implemented a training scenario they didn't design. However, the contexts in which they implemented the training scenario* and their training experience differ:

* Pairform@nce is a French national program. Trainers come from different regions.

- The first trainer (F1) is also a designer and is involved in the program Pairform@nce from the beginning. He previously designed and implemented a scenario on his own. He is concerned by the mutualisation of his own scenarios.
- The second trainer (F2) is also involved in the program Pairform@nce through a research project associated to the innovative program*. He has also participated in a trainers' training about Pairform@nce.
- The third trainer (F3) never designed a training scenario and never participated in a trainer's training but he is used to usual training session and interested with training practices integrating ICT.
- The fourth trainer (F4) never designed a training scenario and is a designer-trainer's substitute. He appropriated the training scenario at the last moment due to his colleague's absence.

This panel data, destined to a qualitative study, has been gathered on the hypothesis that different attitudes, professional skills and expertise in front of the technology could show appropriation's indicators.

We used a semi-structured interview. A framework of themes has been prepared before the interview. This framework was flexible during the progress of the interview.

We are concerned about trainers' activities during the appropriation of a training scenario (F2-F3-F4). More specifically, we asked the trainers if appropriating the training scenario was easy, if they encounter difficulties, if they used assistants (human or technologic), if they used resources from training scenario, if they added others from another experience etc. Framework of themes has been more modified during the F1 interview; we focused the interview on the design process of a training scenario that intended another trainer's appropriation.

Interviews were conducted using Flashmeeting[†], a webconference tool. First of all, using this tool helped us reaching trainers from whole France, as Pairform@nce is a national program. Moreover, the tool was appropriate to semi-structured interviews: the "start broadcasting" and the "stop broadcasting" allows the trainers to express themselves freely (figure 2) :

* By the French Institute of Education (IFé-INRP)- <http://eductice.inrp.fr/EducTice/projets/en-cours/pairformance> Research program from 2007 to 2011.

† <http://fm-openlearn.open.ac.uk/>



Figure 2: « Start broadcasting » and « stop broadcasting » options on flashmeeting.

In brief, this method helps us figuring out appropriation of the training scenario.

3.2. Analysis: paper logbooks

Another two trainers in mathematics were asked to complete a paper logbook during the implementation of a training scenario they didn't design. Indeed, both of these trainers have an expert knowledge of the device Pairform@nce. Actually, they exchanged a training scenario they designed.

This paper logbook consists of two parts;

- The first part had to be filled chronologically by the trainers. They could describe freely each activity they did related to a date (example: "28/12/2008:i read the slideshow about geometry but I could not understand the first figure" or "15/01/2009: I prepared the meeting and sent an email to Dominique in order to fix a date")
- The second part was focused on the resources (calendar, bibliography, slideshows, example of evaluation etc.). For each resource, the trainer could say if kept the resources in his own training; if he modified it or if he removed it

Logbooks have been collected after the trainings have been implemented and analyzed according to the indicators highlighted by the interviews' analysis.

4. FINDINGS: INDICATORS OF APPROPRIATION

4.1 Interviews' analysis

The discourse analysis of interviews helped us highlighting linguistic markers (personal pronouns, adverbs, syntactic construction) that allow us to emerge indicators of appropriation. The four subjects interviewed highlighted external constraints which make difficult the appropriation (or the design for use as far as F1 is concerned). For instance, the actors described explicitly external invariants with verbs of obligation: "*we had to reduce the face to face meeting because of budget*" (F3). In the same way, the use of gerund and prepositions shows us the importance of organization and context in the appropriation: "*So actually uh regarding the planning, uh, I adapted the training scenario's calendar hum ... by **adapting it** to our training's planning. I completed it in*

order to help the interns: from this new calendar, they could get an accurate view of the deadline” (F2) and “I changed the calendar **according to** the teachers’ availability as it’s a long training period’ (F3). From these sentences extracted from the interviews, the systematic calendar’s adaptation by the trainers shows us that the time factor is considerable. Indeed, the time factor appears as an external constraint to appropriation. In the same way, the constant intern’s consideration by the trainers shows a human factor to appropriation.

From this analysis, we may highlight common external factors that modify this appropriation process:

Time factor- for instance, the training scenario was modified because of time available for the training.

Organization and context factor- for instance, the training scenario was modified because of institutional decisions about the training.

Human factor- for example, the training scenario was modified because of interns’ difficulties.

ICT factor- the training was modified because of technology’s problems and others difficulties.

Nevertheless, the appropriation process differs also because of trainers’ experience: “The resources I used which are not in the training scenario are personal resources. Actually, I worked in special education field so I know some theory which I injected in the slideshow and my knowledge helped me to understand the diagram which was proposed in the resource and to explain it to the interns ”(F2). This trainer emphasizes his professional skills which helped him to understand the training scenario and so, to implement it.

Therefore, we think that, this experience and the professional skills modify the mediations between the trainers and the training. An experimented trainer will evaluate, in a more efficient way, the mediations between him/her and the training using a training scenario he/she didn’t design than a less experimented trainer. The mediations described by Rabardel (1995) are interesting in order to describe the trainer’s actions on the training scenario:

- Epistemic mediations (oriented towards getting acquainted with the object and its properties): the trainer knows the program’s premises; he/she uses correctly the terminology and knows the platform’s tool.
- Pragmatic mediations (oriented towards the action on the object: its transformation and handling): the trainer knows how to use and modify prescribed resources.
- Reflexive mediations concern the relations the subject weaves with himself via the training scenario he/she is appropriating.
- Inter-personal mediations concern mediated relationships to interns.

First of all, interviews’ analysis shows that the constraints of organizational and human management affect the activity of appropriation of the training scenario. Secondly, the changes

related to a personal evaluation of the course, due to experience and a personal implication is a factor of training scenario's modifications, including suppressions or additions of new resources.

These results seem to integrate instrumentation and instrumentalization's dimensions (Figure 2). Indeed, it seems that appropriation can be defined according to:

- Resources' instrumentation: trainer adapts them to the context of his own implementation. The training scenario is modified.
- Training scenario's instrumentation: trainer adapts the scenario according to his experience.

This figure synthesizes these indicators (figure 3):

Indicators of appropriation							
Externals constraints				Personal evaluation			
Time	Organization and context	Human management	ICT	Epistemic mediations	Pragmatic mediations	Reflexive mediations	Interpersonal mediations.
Instrumentation				Instrumentalization			

Figure 3: Indicators of appropriation related to instrumentation and instrumentalization dimension.

As well as instrumentation and instrumentalization processes are correlated in Rabardel's theoretical framework (1995), both are also working together in a training scenario's appropriation and cannot be dissociate in the trainer's activity.

4.2 Validation of the indicators with paper logbooks.

The paper logbook' analysis was used in order to check out these indicators. We applied the indicators to the logbook completed by the two trainers, and more specifically, to the second part of the logbook focused on the resources' modification. The figure 3 shows an extract from this analysis:

INSTRUMENTATION	INTRUMENTALISATION			
Organizational And / or Technical, legal constraints	Epistemic mediations, oriented towards getting acquainted with the object and its properties.	Pragmatic mediations, oriented towards the action on the object: its transformation and handling	Reflexive mediations concern the relations the subject weaves with himself via the instrument	Inter-personal mediations concern mediated relationships to others.
2 prescribed Days Only 2 days of training because of	The scenario prescribed a tool which I	Calendar prescribed unused. We	I think slideshows prescribed are not highlighting enough	Modification of PowerPoint for the teachers. Wish to send

financial restrictions	never used before: 'Geogebra'*. I used the software with my son in order to know his properties.	got 3 days for our training.	"individualization" aspect of the activity. So I integrated others slides I designed in a previous training. Added examples.	it by mail.
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Figure 3: Examples of appropriation indicators 'analysis from logbook.

We could find the appropriation indicators we defined within the logbook and we can confirm the appropriation indicators framework we proposed in the hypothesis section.

4.3. Another indicator of appropriation; the usage temporality

With the help of the paper logbook's first part which has been completed chronologically by the trainers, we highlighted another external factor of appropriation which is the **usage temporality**.

We observed that, inside the appropriation process, the activities are modified. For instance, the paper logbook shows the training scenario's appropriation from September 2008 to mars 2009 as far as the first trainer is concerned and from December 2008 to April 2009 as far as the second trainer is concerned. We brought out few invariants. At first, during the first months, the two trainers dedicate themselves to reading and discovery of the training scenario. At the same time, they both made contact by exchanging emails with the interns. Finally, they modified the training scenario in order to adapt it to the context of their own training.

4.4. Recommendation : an online logbook.

The first purpose of this study is to facilitate trainer's appropriation of a scenario he didn't design himself. As far as the Pairform@nce program is concerned, a direct interaction between the designer and the trainer isn't requested by the program's organization itself: trainers come from whole France. Moreover, the different users perform different activities.

Therefore, we propose an indirect interaction with the use of an online logbook. Each user could be informed of the actions of others.

Specifically, the online logbook is intended to be used by three actors:

- **The trainer:** 1) for a better comprehension of the prescribed scenario 2) for a reflexive approach of his/her own activity.
- **The designer:** he/she can get feedback from the trainers' appropriation process in order to facilitate next one.

* Software for mathematics, algebras and geometry.

- **The researcher:** he/she may analyze appropriation process.

The online logbook could be available online, on the collaborative platform used by the program, and aims to reach two goals:

- Determine, as far as the researcher and the designer are concerned, invariants of appropriation and validate the indicators we highlighted above. The designer may improve the requirements and assistants joined to the training scenario and the researcher may observe more accurately our hypothesis of indirect interaction as facilitators of the appropriation process.
- Support, as far as the trainer is concerned, a reflective approach to his/her own activity to evaluate his/her own approach to a prescribed use of a resource and improve his/her

More specifically, the online logbook would consists of three modules (Mailles-Viard Metz, S., Soury Lavergne, S., Daubias, P. ,2009); one input module where the trainer could fill his activity according to different dates; one display module where the trainer’s activity can be visualized as a chart. The use of chart could help a reflexive approach to one’s activity. These two modules are intended primarily for the trainers but the designer could also fill them on order to compare his own use of the training scenario he is going to mutualize to the other trainer’s appropriation (Figure 4). On the other hand, the third module would give information extracted from the two modules and would be intended to the designer and the researcher.

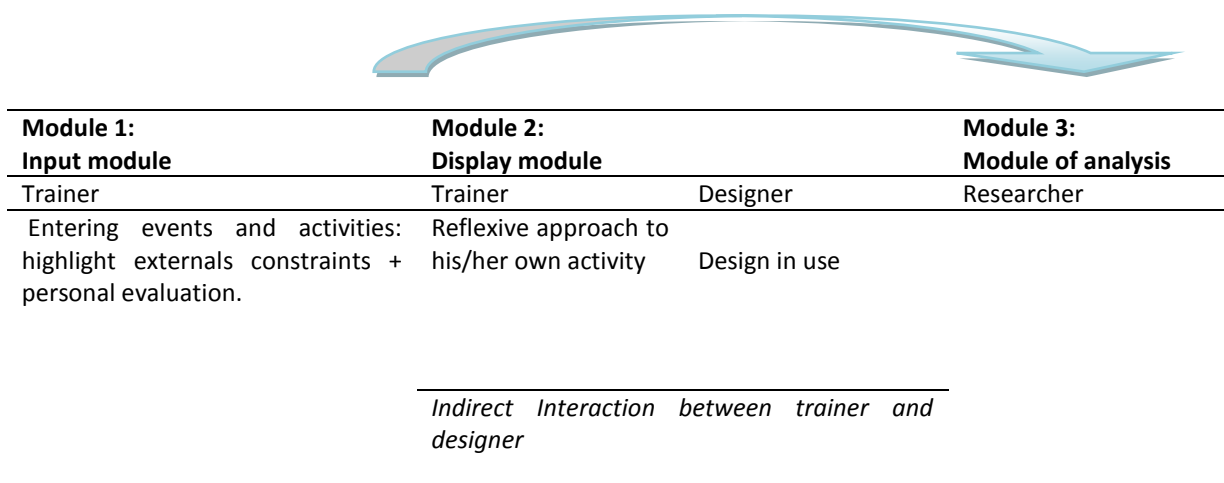


Figure 4: the online logbook

The input module (module 1) is fundamental in this logbook- Using it; the trainer fills his activity as the advanced training

Actually, the forms in the module 1 could already integrate the appropriation's indicators we highlighted in this study as external constraints (time, context, human management, ICT) and personal evaluation. In the same way, the use of these indicators could be highlighted in the display module (module 2) through charts; the trainer could have a reflexive approach to his/her own activity and the designer could see a feedback in order to improve his/her training scenario. Moreover, The designer could fill himself this logbook by designing the training scenario and give few more accurate recommendations with it.

5. CONCLUSION AND DISCUSSION

This study has identified a number of indicators of "appropriating" a training scenario by a trainer. We could determinate, on one hand, indicators observed from trainer's activity which is modified according to external constraints: contexts, ICT, organization, and mediations to others (interns, others trainers) and on the other hand, indicators linked to trainer's mediations to the artifact due to experience and a personal implication.

The appropriation of resources proposed in the prescribed training scenario involves a gap between the prescribed uses of the use actually made by the trainer. Even if this "gap" or difference shows diversity and an enrichment of the artifact, the appropriation has to be characterized through a threshold which means that appropriation is done without misappropriating the design goal of resources and scenario. To this purpose, these indicators can be reinvested to provide recommendations for the design of a tracking tool: the online logbook which is intended to record trainer's activity in order to give a feedback about the pedagogical scenario. This is a proposition as the online logbook still has to be developed.

However, this study has been applied to a French hybrid program which allows us to determinate and validates indicators of appropriation. The limitation of the research is that it is context-specific, and the findings apply to trainers and teachers in the context of the study only.

Further studies would be required on the appropriation of training scenario first, in another program, secondly, in another training context.

Moreover, the choice of a qualitative study, which was also imposed by the specific context of Pairform@nce, as the program is new, could be extended to another quantitative study in order to validate more systematically the indicators. The interns (or teachers) point of view could also be integrated in the study as the training is intended to them.

Whatever are the limitations of this study, the mutualization of resources is nowadays a reality with the recent developments of web 2.0 technologies and the use of collaborative platform. Teachers are more and more confronted to the use of resources they didn't design.

In this context, we would like to explore and check more specifically the online logbook as an hypothesis to allow an indirect interaction between the designer and the trainer in order to improve the appropriation's process. This online logbook could have another benefit for researchers 'point of

view: to define more accurately an appropriation threshold which means the spirit of the artifact designed by someone else is respected

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