Regulation of training system for adults in educational technology

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Abstract This paper reports the characteristics of a post graduate diploma on educational technologies based on a combination of face-to-face and distance activities and assesses its quality. We first define the bases of the training program and present several tools (logbook, portfolio and questionnaires) which have been used to evaluate and regulate both training and individual learning process. Our observations indicate an increase and better regulation of the quality of the educational and learning processes. On the basis of the results we achieved, we propose that our original design could be extended to similar adult training programs. The way this innovative system is integrated in the universities shows an evolution due to its success that implies a certain kind of return on investment due to the demand of such kinds of device.

1. INTRODUCTION

Three years ago, two Belgian universities (ULG & FUNDP) put their resources together to start a new postgraduate program in educational and training technology combining face-to-face and distance activities. This program ("Diplôme d'Etudes Spécialisées en Technologie de l'Education et de la Formation" see http://www.ulg.ac.be/ ste/destef/-DES-TEF) targets graduates with professional experience in training. They are from various backgrounds (companies, primary and secondary schools, universities and public organisations). Depending on their initial profiles and personal projects, different profiles of competencies can be developed as, for example, pedagogical designer, training systems manager, on line tutor, or multimedia product designer. Everyone of these uses Information and Communication Technologies (ICT) as well as active learning methods

based on the teaching and learning paradigms defined by Denis & Leclercq (1994). All learners design their own personal project which leads them to choose specific courses to realise it.

Hereafter, we describe some criteria of a quality control of the training and learning system of the DES-TEF and some regulation tools we used to improve it. Quantitative and qualitative evaluations have been made, mainly at a micro level by collecting data from learners and teachers. Our analysis focused on the regulation of the individual learning process and of the training system. Some effects at the institutional level are also considered. Our observations suggest strongly that this methodology is efficient in a hybrid education system, combining distance and presence learning in a context of professional development. Therefore, we propose to apply this approach to similar systems.

2. WHAT ARE EVALUATION CRITERIA FOR ASSESSING AND IMPROVING THE QUALITY OF THE TRAINING SYSTEM ?

Quality deals with all the properties and characteristics of a product, a process or a service that permit to satisfy explicit or implicit needs. The concept of quality control is based on the idea that every product, production process or service should be checked and improved if necessary. As education is a part of the economy of services (Charlier, Bonamy & Saunders 2002), it should be looked at whether or not it fills explicit and/or implicit needs of its actors and of the institutions.

In our context, we are interested to test how we can regulate and optimise the training and learning system, and process when the main actors of this process are implicated in its own regulation. Indeed, the participants of the DES-TEF do not only consume the training service, they also produce a part of it. This co-production phenomena by the 'client' is what the economists would call *servuction* (self banking, self learning).

Now let's consider which characteristics we took into account in our quality assurance concerning the training system of the DES-TEF. We could have referred to many aspects of the system (see the model of the 'diamond' from Leclercq et al. 2000) or could have assessed the quality at each stage of the production or each use of the service, but we decided to focus on the following criteria:

the answer to the client's demand
a learner based approach
a pedagogical contract
the follow up of the learner

the adequacy and added value of the educational and technological resources
a co-evaluation and a regulation process
the return on the investment

2.1 The answer to the client's demand

These quality criteria mainly refer to the matching of the learner needs and the training proposal.

A survey we did previously indicated that there was a deficiency in the domain of training in the use of ICTE (Information and Communication Technologies for Education) at local and national level in Belgium. Therefore, two universities combined their efforts to develop such a common training curriculum.

In the DES-TEF, the demand- and/or need- of the client are mainly related to the improvement of his/her professional skills in the particular field of ICTE and to the development of a personal project. We noted that motivation is not generally linked to the certification (diploma) itself, even though it could often help the participants to redirect their career.

The system tries to match the learners' needs by providing a flexible curriculum with some activities at a distance and by enhancing their participation in defining their training program (Kremers & Piette, 1999). Five common modules introduce basic theories and principles concerning the following areas: training and learning, training systems, multimedia design and production, evaluation and management of ICTE resources. Then, the learners choose specialised courses in these modules depending on what they need for the materialization of their project. For instance, somebody who wants to produce an educational multimedia software will choose courses like 'evaluation of the quality of multimedia products', 'pedagogical specification of the product', 'legal and ethical framework for multimedia production', and so on. Another participant whose goal is to design a distance learning course will choose a module entitled 'analysis of distance learning environments'. To maximise the personal investment of the participants, we emphasise the link between the professional activities and the educational technologies.

Adjustments to new demands are also possible as the teachers team tries to regulate the curriculum as the training process (see hereafter).

2.2 A learner -based approach

E-learning and learning systems adapted to adults share common features: they both focus on the learners and their autonomy. Indeed, they

are responsible for defining their own learning needs, for the conception of their project, for the way to realise it and for the evaluation of the learning effects (Leclercq & Denis, 1996).

Knowles (1990) pointed out two elements for adults' training evaluation. On one hand, there is a necessity for self-diagnosis and on the other hand, a need for a shared evaluation of apprenticeship, program and course design between the learner and the trainer. Self-diagnosis could be defined by the identification and expression of a lack of competencies or through a personal project of apprenticeship – as it is the case in the DES-TEF program. Therefore, the personal implication of the students in the definition of their own learning project should improve their self-evaluation and the integration of the training (Kaufman, 1999). About apprenticeship evaluation, Meirieu (2000, p. 96) proposes to formulate indicators of results of the mental process, instead of objectives lists for assessment. To assess these indicators in the DES-TEF, we developed adapted tools such as logbooks, forums and regulation sessions.

2.3 A pedagogical contract

The pedagogical contract, described by Carré and Pearn (1992, p.50), as a basis for self-learning is also certainly a quality criterion in all kinds of training, but it is particularly the case in adult training combining distance and in attendance strategies.

The four goals we want to achieve by using this contract are: to formalise the individual project, to clarify the negotiation between the learner and other partners, to structure the self-learning process and to facilitate the evaluation. These four categories can then be tagged as objectives (described in observable facts as much as possible), resources (both material and human), logistics (place, budget, calendar) and evaluation (methods, criteria). This tagging is necessary to clarify the functions of the tools, which will be used during the training and to precisely define everyone's role.

In the case of the DES-TEF, this stage was done through/via the definition and the communication of its basic principles (see http://www.ulg.ac.be/ste/destef/principes.htm). In addition, the objectives of each course and activities are repeated frequently. Their meaning, their management (who will do what, with the help of which resources) and their evaluation criteria are fully explained and described by the majority of the instructors.

2.4 The learners' followup

Adults learning, self-learning and e-learning do not imply that the learner is alone (Denis, 1997). At each stage of their learning process, the learners can get help and advice from the educational staff, as, for example, to precise their needs, to reflect on their apprenticeship, etc. In the DES-TEF, we attach a resource person to each learner, a supervisor for the follow up of his/her project. Feedback on the activities are given by the instructors. We strongly encourage interaction and collaboration between the learners to solve problems or to realise prescribed activities.

2.5 The actors training and competencies

The development of an e-learning system requires the participation of many actors and the description of new jobs (Basque, 2000; Denis, 2003). These actors need specific competencies (le Préau, 2001) to produce service. Co-ordination is then necessary to collect and communicate useful information for regulation. In the DES-TEF, many actors are experts in technologies of education. A single person has often several roles: pedagogical designer, technical producer, tutor, teacher, evaluator. The system is quite dynamic, meaning that since its conception, it has evolved. Some people have specialised in a particular function. For instance, some tutors have been attributed to different courses. To achieve this, we organised training sessions for the tutors in order to clarify their roles in the program and to try to match them with the instructors' goals.

As we said previously, the main aim of the training program is to increase the competencies of the learners in different topics, related to ICTE. A portfolio is used to monitor the evolution of the work of the learners. As the program implies the use of technical tools, the learners need to be familiar with them. Therefore we defined some basic technical skills we estimated necessary to let them use efficiently the pedagogical supports and communication tools. We ask them to self-evaluate their competencies (see http://www.ulg.ac.be/ste /destef/competences.html) and decide if they need extra training.

2.6 The adequacy and added value of the educational and technological resources

To be efficient, we had to develop specific pedagogical resources and activities to match the objectives of the training program. Some questions emerge immediately. If the resources and activities are available on line, what is their real added value? Are they only electronic books or do they

offer an interactive way of learning, that will achieve a better understanding of the topic for the learner? Do the instructions about the activities enhance links with the concepts or tools developed in the courses? Are these activities adapted to reach the educational goals? Are the contents and the theoretical framework up to date? Do the user interface and the electronic supports respect basic ergonomic principles such as controllability, homogeneity, usability?

It goes without saying that the choice of the technological tools is also important. If we consider a distance training system, what is the quality of its platform (ORAVEP, 2000 ; Le Préau 1999 & 2000 ; Gram et al, 1998) ? Does it make it possible to develop all the requested activities? Are the tools used for certain activities such as the collaborative learning adequate not only for its realisation but also for its timing (cf. Lewis, 1996)?

2.7 A co-evaluation and regulation process

Each training system, whatever its educational environment, needs to be regulated at one time. Different variables could be used for this purpose: analysis of the needs (e.g. adaptation of the curriculum to new needs), learning objectives, methods, and evaluation criteria. In higher education (university level), commissions of experts and teams of instructors evaluate the training system in order to ameliorate its quality. An assessment of the teaching itself (but not of the instructors) has also been developed (Gilles et al, 1998).

Once again, the identification of the actors who contribute to the regulation is primordial. In the DES-TEF program, we established a specific structure, called the management committee, that deals with the problems of the admission of the participants, the attribution of a resource person to each participant, the modifications of the curriculum, the adaptation of the diary, the regulation of the courses and specific problems of some students. This committee is composed of training staff members who use information coming from different sources: learners' portfolios and logbooks, questionnaires, interviews and focus groups. The committee meets four times a year. As the information source comes from the learners themselves, they are also actors within the regulation process. During the meetings of the committee, an agreement about the need for evaluation and regulation of the revised system is reached between the committee members. At a second time, we organised regulation sessions between instructors and learners to exchange feelings and experiences about the original system and about the plans to adapt it to the new version.

2.8 The return on investment

It is not our purpose to analyse the costs of the design and the realisation of such a training system in this paper. We will consider only the number of people who get the diploma at the end of the program and the way this innovative system has been implemented.

3. THE EVALUATION TOOLS EXPERIMENTED WITH IN THE DES-TEF IN ORDER TO IMPROVE ITS QUALITY

From its start, a constant evaluation and regulation process of the DES-TEF has been performed. As said before, this is one of the fundamental principles of the program based on data coming from different sources and tools. We focus hereafter on the nature of the tools and support we used in the evaluation of the individual learning process and of the training strategy.

3.1 Logbooks to write down and - if needed - regulate mental processes of apprenticeship

3.1.1 Logbook design

To keep track of their own progress (by mainly self-assessment) during the learning, the learners keep notes in a **logbook.** The logbook contains information on the learning experiences of the learner. Each learner can express his/her personal experience of learning at cognitive and socio-affective levels. They write what has been learned in which context and tell their positive and negative experiences of learning. Our hypothesis is that the use of the logbook could help them to build a positive self-image because it shows the evolution of the learning (from the starting point to the achievement) and the possibilities to transfer this apprenticeship.

We conceive it as a tool that offers the possibility to develop a socio-constructivist pedagogy (Bruner, Piaget) and that, in addition, contributes to the data collection to evaluate if some of our quality criteria are encountered. Let's try to answer our questions by analysis of the use of the logbook: Is it really '*a learner-based approach'* ? What about the *'pedagogical contract'*, the *'learner's follow up*' and the *'answer to the client's demand'* with the help of the resource person? Does it provide huge information permitting the '*co-regulation*' of the training system and of the individual learning process?

The first version of the logbook in the first year of the DES-TEF showed rather poor interest by the students. This observation could be explained by four hypotheses.

1. The questions we asked were very general and therefore, not always adapted to the perceptions and feelings of the learners.
2. We realise that we did not emphasise enough the role of the logbook by providing a detailed and clear explanation to the learners. The consequence has been a misunderstanding of the aim of the analysis. As the follow-up of the courses provide them with help to build and think about the learning project of the learners, why do they need an extra analysis tool? What is the feedback from the concepts analysed in the logbook and the individual project? Does it concern understanding, tasks, etc? The learners found it extremely difficult to simultaneously evaluate the learning system and their own learning.
3. This tool required the students to havea good capacity for writing and meta-cognition. To analyse his/her own working is not an easy task, to write it down to be read and understood by someone else is even more difficult. The reactions were to organise some meetings to discuss it directly, or if we want to keep this tool to propose an alternative way of expressing feelings and perceptions?
4. The logbook has been perceived as an obligation, imposed by the instructors without taking into account the will of the learner to express feelings or not. The pace was imposed by the teachers, and sometimes you need to express something, sometimes not.

The following year, we adapted our logbook to address these remarks (Piette et al., 2001). First, the questions were more precise and dealt more obviously with the individual, relational and environmental variables as described by Charlier (1998). The idea being that the analysis of these variables during the learning process should allow a better regulation of the learning process (e.g. choices, expectations, learning methods, more or less implication in a type of activity) as well as the way of learning. We planned this regulation as dialog with a resource-person dedicated to each individual learner. Another role of this resource person is to help him/her to choose the specific courses that will best fit the needs expressed by the learner and observed by previous contacts. The best person to play this role will be somebody who has a deep knowledge and a good representation of the learning system. For this reason, it seems to us that an ideal profile will be the one of a student from a previous year. The dialog with his/her resource person relies on the logbook where the participant regularly writes about his/her analysis.

The observations we made of the use of this second generation of logbooks were different than expected. Indeed, regular face-to-face meetings

with the resource person resulted as a consequence in the learners not feeling the need to write too many details because of the possibility of giving them verbally. The balance of this setting is quite delicate because the relations between some students and their resource persons could be very rich and go beyond the initial role but, at the opposite end, some of the learners have just made a superficial analysis of their situation as we gave them freedom in their writing. Would it have been efficient to direct them closely? It is difficult to say. Perhaps, some of them will analyse their experience through other experiences that follow. The role of the resource-person is not an easy one to play because trainees have some demands, some questions about the whole strategy and it would be necessary to be fully involved (assistance of courses, reading of the learners projects and papers) to be able to support them efficiently.

3.1.2 Negotiations about the impact of the logbook

In similar experiences (Piette, 2001), logbooks were used as a tool of regulation and meta evaluation. This experience showed that the logbook can be a good indicator of the evolution of the mental process for both the learner and the instructor. It also pointed out the necessity to clarify the role of the instructor. Indeed, he/she produces the course contents and the lecturing but also helps the students in their work activities, evaluates their productions and reads their meta-evaluation. In this experience, a contract between the learners and the instructor was written down containing the following points:

- the criteria of evaluation were proposed and subjects to discussion (before the evaluation) ;
- tools and timing were organised to globally design the course ;
- the logbook was compulsory: it was considered as an activity (the time allocated to fill it was counted in credits time) but it was evaluated under different criteria than the other activities. A deeper analysis led to a more positive influence on the global score.
- If there was a possible positive influence of the logbook to the final score, it has been insured that it would not have any negative effect on the scores. This precaution was important because trainees were allowed to say what they think about the course that is the context of their apprenticeship.

This experience has demonstrated also the value of the logbooks in the regulation of the training system but also highlighted the enormous allocation of time dedicated by the instructors to manage them. This problem could be partially solved by the organisation of logbook debriefings in

groups of students. This solution combines the advantages of allowing discussions between learners about their different perceptions and saving the time of instructors.

3.2 A portfolio to evaluate improvement of the student and the training device

All the learner production linked to the activities of the different courses is gathered in a **portfolio,** which is also a tool for self-evaluation (St. James, 1998). The learners drag their work into a folio on a website, so that the instructors can access the student production easily, read the documents and react. This collection of data is important for the trainees themselves to keep track of their work but also, it allows a self-analysis through their successive productions. They can also use this folder as a storage item for all documents they consider relevant for completion of their project (tools, references, etc.).

Why is the portfolio a way of testing our quality criteria? Because it illustrates how far the *'pedagogical contract'* is respected as it contains the products of the learners' activities for which the evaluation steps have been described. By looking back to their own production, the learners can then measure the '*evolution of their competencies'* and contribute efficiently to develop the requested *'based learners' approach'*.

The instructors evaluate the learners' productions as a *'follow up'* to their work. At this step, the portfolio provides an opportunity to get some feedback on the learning device itself. Feedback is given to the trainees individually or through a collective debriefing. If too many students failed to achieve good quality work, one can wonder if the learning system does not present some weaknesses in the way the instructions have been provided or in the nature of the chosen activity. In this case, a complete review would have to be done to solve the problem.

In the DES-TEF (2000-2001), we observed a lack of resource persons for the follow up of the learners due to the fact that the instructors were very busy. At the first stages of the development of a training program, instructors design, lecture and regulate their new courses at the same time. But the students desired more personalised feedback on their work. The following year, the size of the training team increased and the regulation of the design of the courses and the update resulting from it were in progress. The results were a bigger and regular allocation of time dedicated by the instructors to the evaluation of the works and more individual feedback all through the year. To conclude this point, the students papers and the debriefing exchanges between each student and one person dedicated to him/her (called the resource person) gave good indicators of the level of understanding of

the concepts, on the competencies reached by students and on the efficiency of the learning device.

3.3 Questionnaires to regulate the learning system

During the first year, the students systematically answered a questionnaire at the end of each compulsory course. This data collection had multiple goals. For instance, it allow us to collect information on the added value of the distance training (providing web supports with hyperlinks in the courses notes, their effective use, activities to be made at a distance) but also on the different teaching and learning methods proposed (e.g. case studies, collaborative learning (Henri & Lundgren-Cayrol, 2002), PARM method (Jans & al. 1998), LQRT method (Leclercq, 1998)), on the use of ICT tools, etc.

The indicators of evolution (‘*the learners’ follow up’,* the development of the *‘learners’ competencies’, ‘the adequacy and added value of the educational and technological resources’* and it favours the *‘co-evaluation and regulation process)* we can point out from these questionnaires has helped us to reinforce the *‘learner’ based approach.* We will not detail all the results coming from the data we collected but we will describe the process of collecting the data and how we use them in a perspective of regulation.

3.3.1. Process from the data collection to the regulation of the courses and device

During the first year of the implementation of the DES-TEF, a student chose to focus her personal learning project on training devices for adults. She decided to evaluate each compulsory course through questionnaires and she compared her results with published ones. She played evaluator and trainee functions. In addition, she was involved in the design of some activities and resources of the program itself. The disadvantage of her position was the difficulty in avoiding bias in her analysis (as it would need an external expert). But the interesting point was that she could pretend to realise a multi-angle analysis by referring to what she experienced in addition to what she collected from the questionnaires.

The coordinators of the course were very demanding about evaluation because they were short of time to do it themselves and there was no external evaluation programmed. All the students and the instructors identified in the regulation meetings were informed of the results of their analysis concerning the added value of the e-learning and the training device. They took regulation decisions in order to improve the training system.

3.3.2. Some results

Some questions were specific to a given course (e.g. a typical method was used), others were more general (e.g. how the web supports with hyperlinks are used). The next paragraph will focus on some of the results obtained from the data collected.

a) The evolution of the technical use of the distance learning platform

At the beginning of the year (before starting the DES-TEF), most of the learners declared that they were familiar with software required for word processing, Internet use etc so we expected them to master the basic skills to surf on the web courses and to produce the documents requested by some activities. After a first use of the platform, some of them were feeling uncomfortable. So, we set up a hot line (phone) and a thematic forum about technical problems. After a few days, the learners who had difficulties in handling the platform felt reassured.

Some learners had their personal computer and connection to the Internet at home, some use it at work or at the university or at a cybercentre. So they have a lot of opportunities to connect to the platform and use the tools it contains.

The participants said that they were interested in the explanations given by the instructor and in the discovery of the tool, but some of them felt that they would have need an additional session or written guides. To adapt the system to learners' needs, another organisation of the activities was programmed the following year and additional support was provided to help the learners to autonomously answer some technical questions.

b) The use and the added value of the online support and tools

All the learners thought there was added value in the online course. In the first course, three out of ten said that they had consulted the hyperlinks, four that they did this occasionally and three reported that they did not use it at all. Comments were varying. Some students felt that the links reported too often to the glossary, others that there were too many links and that they were going too deeply in the subjects ! Maybe it took too long to explore all the contents and links. Nevertheless, they said they would consult them if needed in their project and/or professional life. We found out that many learners printed the notes - it is too difficult and expensive in connection costs to read them on the screen - and asked to have them on a CDROM. We later met this demand.

Concerning some distance activities, they said they had very rich relationships with the other participants and that they expressed themselves more than in a face-to-face meeting. The communication tools such as the forums and the electronic mail helped them to know each other better, to communicate about the different tasks (react to a particular case) and to have confrontations about their respective points of view on the use of theoretical models, to become more familiar with the use of the tools and to think how to avoid the difficulties due to the lack of analogic communication (e.g. after having interacted in a forum and with the e-mail, they built their own chart of use of these communication tools), etc.

c) Contents, methodology and planning of the activities

The answers to the questions pointed out some of the weakest link of our program, which we decided to improve by a face-to-face session. In the module "training and learning", the students proposed to design and discuss just one case instead of two to allow them to analyse the interactions more deeply. In general, they considered this activity as excessively time consuming and underestimated on the number of credits attributed to this activity. Some problems related to the timing and credits dedicated to the activities had to be adjusted in the diary. Some clarification was also asked for different activities, especially about when the learner should consider his/her task is well done and finished. To help the students, we implemented the instructions and the evaluation criteria.

Comments about the methods we used were often different from one student to another. There was no common agreement between the students on the adequacy of one course, activity or methodology. For example, some learners preferred collaborative activities, some prefers individual work ones, the same was observed concerning the distance or face-to-face courses, a structured presentation of the topic before a personal exploration or not, etc. These data highlighted differences in the perceptions of the learners and illustrated the need to discuss them in a collaborative way without individual criticism in the training team. The context of each student is unique, as are those of the instructors. Therefore, interpretation of the comments has to be done in the context where they have been expressed.

4. SOME EFFECTS AT THE INSTITUTIONAL LEVEL

Even though, distance learning projects had already been experienced in both universities (Charlier et Peraya, 2002), the DES-TEF is the first full post graduate diploma, combining distance and face-to-face learning in these

institutions (Charlier & Denis, 2002). This innovative program is intended to adapt training practices and to include ICT tools to design innovative activities linked to educational technologies. It has to be noted that no additional staff have been provided by the institutions to start the program. All the instructors were volunteers and had to add this charge to their already existing load.

After two years, an assistant has been appointed to improve the management of the distance learning platform and the tutorial for some activities. A tutors online training was designed (Denis, 2003) and applied in this context. We then have moved a step forward in the acknowledgement of our original concept as we received help from the authorities of the university. This is one fundamental step to an official recognition of the training program (we were before just authorised to organise the program). This is probably a consequence of a return on the investment made. Indeed, we are very close to the critical average number of certificated people per three year period, a pre-requisite for state subsidy.

5. CONCLUSION

The DES-TEF has been created to answer a real need in the development of competencies in the design and the use of ICTE in Belgium. So far, it has proved to be a great success. Furthermore, this training system is innovative and original as it emerges from the combination of innovative pedagogical methods and technological tools. In this new system, the teaching and learning processes are regularly regulated by using qualitative and quantitative methods and tools. Logbooks, portfolios, questionnaires and regulation meetings between students and instructors provide a huge amount of information and allow both parties to discuss several aspects of the training device. This has a dynamic impact on the device as together they think and conceive the future improvement for the following years. Many components of the system are adapted to fulfil the best learning needs of people interested in the use of ICTE and improve the quality of the system.

To assess the value of our program, we performed quality control and regulation at several levels. At an individual level, learners reflect and “take distance” about their own learning strategies, their personal development and about the proposed courses in order to regulate them. Instructors meet regularly to develop strategies for a better adaptation of the system. The role of the resource persons, as we designed it is to support the learners with help, information and feedback to the students about their understanding . The system implies that all actors share their experiences to develop a community of practice (Daele & Docq, 2002 ; Henri & Pudelko, 2002).

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