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Embedded Lifelong Learning: Demands on the Integration of Learning into the Daily Routine

Abstract

The Research Studio eLearning Environments has developed the “Learning Pulse”. The “Learning Pulse” makes use of a PUSH technology and supports repetitive learning activities by utilizing ICT. The PUSH technology is based on external initiation of a learning activity. This terminology is derived from web-application programming. This article reflects on the background and the relationship between the “Learning Pulse” and lifelong learning, focusing on aspects of motivation, flexibility, and learner dropouts. In the second part the idea behind the “Learning Pulse” is compared with the settings in which “conventional” self directed learning takes place. Based on these assumptions it is described how the PUSH approach can be used for embedding learning activities into the daily routine of a learner.

Key words: *Lifelong learning, learner’s motivation, flexibility of learning, information and communication technologies, micro activities.*

Introduction

The Research Studio eLearning Environments has developed the “Learning Pulse”. The “Learning Pulse” is a technology which enables learners to embed learning activities into a person’s daily schedule. The objective of this technology is to trigger off learning activities to regular patterns by linking learning activities to the daily use of ICT. The invention assures that a learner will be aware of the learning situation; the learning context does not interrupt another running activ-

ity; and makes use of ICT as a promoter of extrinsic motivation for learning activities. The “Learning Pulse” uses a PUSH approach to provide highly compact and interactive learning objects – so-called micro activities (Gassler, Hug and Glahn 2004). These micro activities can be embedded into various learning designs, strategies and concepts (cf. Heitkämper 2000) and thus enrich and enhance the learning process.

In this article we reflect on the relationship between the “Learning Pulse” and lifelong learning. In the first section we focus on the background of lifelong learning and the related concepts of motivation and flexible learning concentrating on reasons for learner dropouts in flexible adult-learning scenarios. In the second section we compare the PUSH approach of the “Learning Pulse” with the PULL approach of concepts of self directed learning. Finally, we describe how the PUSH approach can be used to embed learning activities into the learner’s daily routine.

Lifelong Learning

Lifelong learning is an important issue for social and economic development (OECD 1995, p. 7; Chisholm 2004, p. 7; Fretwell 2003, p. 54, Slide 8). The idea of lifelong learning “*goes beyond providing a second and third chance for adults and proposes that everyone should be able, motivated and actively encouraged to learn throughout life*” (OECD 1996, p. 15). In particular, lifelong learning focuses on learning processes beyond initial and higher education which the institutionalized education systems take care of (Kallen 2002, p. 33).

Due to technological and social development everybody has to improve their knowledge and skills continuously (Fretwell 2003, p. 267). On a large scale, however, adult learning and vocational training face different problems from the educational system. Although the learning strategies of adults do not strictly differ from those of children, they have different objectives over their individual learning processes (Illeris 2003a) and demand more control of the curriculum, the learning material used, the time schedule and the location (Illeris 2003b; OECD 1995, p. 16; Chisholm 2004, p. 19). By controlling curricula, learning materials, timetables and rooms, schools and universities are able to construct “protected environments” for learning. In adult learning, people have problems in creating such environments uniquely for learning. For the most part, learning activities share the available time with other activities such as work, travel, recreation and housework (Aggeli and Vassala 2003; Krieger 2003, p. 188; McCall, Lombardo, and Morrisson 1988; Mungania 2003; O’Connor et al 2003, pp. iv-v).

ICT can serve the purpose of making high-quality education and training accessible to learners outside of the educational system. The key question in the use of ICT in education is “*how can we assure that the new generation of learning technologies do not just benefit the better-educated and the better-motivated?*” (OECD 1995, p. 18) Until now, though, this point has never been addressed in a critical way (cf. Chisholm 2004, p. 20). ICT and media have predominantly been mentioned as a means to convey learning material or learning scenarios within the framework of the higher educational system (cf. Chisholm 2004, p. 23). These scenarios have been developed from seminar room environments and hence they have been commonly used by more educated and motivated learners.

Motivation

The learner’s motivation is a key factor for skill development and lifelong learning (cf. Sloboda 2001, p. 107; Dörnyei and Ottó 1998; Chisholm 2004, p. 29). Especially in vocational training and adult learning, motivation replaces the instrumental constraints of the educational system as present in classroom scenarios (Chisholm 2004, p. 10, p. 19). In order to attract learners to start and continue a learning process it is important to know what motivation is and how it prompts activity.

Edelmann (2000) defines motivation as the process that energizes or maintains a person’s behaviour. It describes how much an individual wants to initiate a certain action (Edelmann 2000). If motivation is to trigger off a learning activity, it is the combination of personal and situational factors which determine an individual’s behaviour or non-behaviour. Both factors are crucial once a certain activity has been initiated. Together, these factors give the ratio of an individual’s motivation to process a task. Thus, to induce an individual to process learning activities both personal and situational factors must be taken into account.

The personal factors are also called *intrinsic motivation*. This term describes all kinds of motivation which have their origin in the individual itself (Edelmann 2000). Beside basic needs, intrinsic motivation can result from emotional stimulation, curiosity or anticipation of success (Edelmann 2000, p. 258). Situational factors – or *extrinsic motivation* – sum up all conditions that influence the individual from the outside. Extrinsic motivation may result from social or economic demands, coercion, rewards, or instantaneous necessities. These situational factors usually provide additional goals for the individual’s behaviour. “*Goals may be proximal or distal. Proximal goals are those that can be achieved in a reasonably short time, whereas distal goals are those that will be met far into the future.*”

Typically, proximal goals are associated with maintaining motivation." (Hodges 2004, p. 2)

By definition, educational and didactic considerations on motivation can only deal with external factors. Utilising external factors for motivation may affect the learner's motivational potential either positively or negatively. If negative factors dominate, the initiation of learning activities becomes less likely. Examples of negative factors are tight schedules, conflicts, stress or a heavy workload.

Flexibility

Derived from the vision of lifelong learning to "*facilitate learning in different places according to the needs of the learner [...]*" (OECD 1995, p.21) e-learning has been developed from ideas of flexible and distance learning (Mason 2002). The slogan "learning – any time, anywhere" is linked to this idea. It also links flexibility to the learner's location and the time of learning. The dominance of this slogan in the discourse about adult learning and flexible learning, the scope of the term "flexible learning" has been narrowed to the flexibility of the learner's location and the decision about when learning activities should take place. In the context of lifelong learning, a broader view on flexibility was barely stressed in the past. Referring to adult learning, flexible learning focuses on organizational factors. Vavoula and Sharples (2001) define three operational levels for the organisation of learning:

"[...] At the lowest level, the learner performs learning activities such as reading, discussing, observing and taking notes. These activities are then grouped at the middle level into distinct learning experiences based on (learner's) criteria such as the topic of learning, the time, and the context in which the activities are performed.

At the top level, the learner organises learning experiences into learning projects based largely on purposes and outcomes: experiences which add to the achievement of a certain aim are likely to be grouped under a single project." (Vavoula and Sharples 2001).

At the lowest level flexibility can be achieved on four sublevels (cf. Doherty 1998):

- (a) *environmental level* such as the learner's location and the situational context;
- (b) *temporal level* such as time of learning, duration of a learning activity or the frequency of learning activities;
- (c) *didactic level* like learning material or methodology; and
- (d) *technological level* which involves distribution channels, technical devices, or data formats .

The requirements for learning approaches and didactic settings depend on the types of flexibility that should be achieved.

Flexible learning to date

Many flexible and distance learning approaches offer learners the choice of when and where to learn within a predefined curriculum. This concept is still widely used in distance learning; it was adopted to computer based training (CBT) and later transferred to Web based technologies. The use of technology helps to make teaching and learning activities independent of a specific location. Even if one no longer has to be physically present, flexible learning still requires spending a couple of hours in the evening dealing with learning material provided via the internet. The potential of flexible e-learning which goes beyond traditional learning scenarios used in educational institutions has not been fully exploited yet.

A special problem of adult learning is that attempts at learning are often abandoned even before the learning process has actually been fully initiated (cf. Dörnyei and Ottó 1998, p. 56). In distance learning, the group of so-called “non-starters” is usually the largest group of dropout students (Fox 2002, p. 8; Fritsch 2003; Fritsch 2004, p. 1). As an explanation Aggeli and Vassala (2003) as well as Mungania (2003) mention several conflicts of required time and available time for processing particular learning material in distance learning. Mungania’s (2003) empirical study on “barriers in e-learning” shows that time conflicts are major barriers to successful learning processes (Mungania 2003, pp. 21–23). O’Connor *et al.* (2003) indicate “time conflicts with work and family commitment” as one of the key factors influencing dropout rates in adult learning” (O’Connor *et al.* 2003, pp. 8–9).

From a more “technological” view these findings can be described as follows – “the space of lifelong learning interferes with other institutionalised social spaces, such as the family or the workplace” (Faßler 1996, p. 45). Learning during working hours could conflict with economic interests and necessities while learning during recreation time often lacks motivation and concentration. These frictions are difficult to unravel by the learners on their own. (Aggeli and Vassala 2003).

The current concepts of flexible learning release the individual from the constraints of location and time schedule prominent in classroom training. It gives learners more control over the learning process, but there is no gain without loss: control brings about the responsibility to create new constraints when it comes to embedding learning processes into daily routines.

Push or Pull?

Learning requires recurring learning activities in order to improve knowledge and skills. Thus, flexible learning approaches do not only require concepts and models of the learning process as such (Mason 2002), but also a clear notion of the organisation of learning (cf. Vavoula and Sharples 2002). Focusing on the organisational aspects with regard to learning activities, these concepts must answer how learning activities are initiated and which frequency of learning activities is required to keep up the learning process. With reference to web-applications two core models can be distinguished: (Client) PULL and (server) PUSH are the two core technologies to initiate and maintain data-streams between client and servers in web-application development (cf. Gundavaram 1996).

As far as the PULL technology is concerned, a user activity causes a client application (usually the WWW-browser) to generate a request and send this request to a server system, the server system handles the request and the data related to the request is sent back to the client. This approach is called PULL, because the server remains inactive unless some client request is received – a client pulls information from a server.

The PUSH technology is different. The client only initiates a connection to a server system. Once this connection has been established, the server sends data to the client until either the server or the client breaks the connection. Instead of waiting for client requests the server actively *pushes* data to the connected clients.

Using the classical communication definition of sender and receiver as a metaphor, in flexible learning the learner is the client and a teacher, a library, a school or another training facility is the server. PULL and PUSH describe who initiates a learning activity.

In our metaphor the PULL approach is related to the concept of self directed learning, because the learning activities result from *intrinsic* motivation and commitment of a learner. In case of ideal environmental conditions each learner can actively pull “learning objects” in order to go ahead with the learning process. Implicitly this approach requires a learner to perform a rather complex set of activities *before* learning takes place. In e-learning these activities include the decision to learn, the decision about the subject, to log into a learning environment, choosing the content and so forth. In short, learners pull everything required for learning to their environment. The learner’s deliberate decision and reflection regarding the intended learning activities are prerequisites of the PULL approach. Hence, the context in a PULL approach is always equivalent to that of a learning environment.

The problem of the PULL approach is that it relies on the learners’ ability to find appropriate learning environments and to motivate the learners to initiate

learning activities. Depending on the environment and the individual motivation long phases of inactivity might take place. If specially structured learning material is used, the learner's efforts to pick up the learning thread are increased by the duration of the intervals of inactivity. In the special case of formalised distance education, a learner is falling behind schedule and unable to satisfy the formal conditions of a curriculum, often drops out silently. (cf. Fritsch 2003; Mungania 2003).

In a PUSH approach learners do not "get away that easy". Since they are pushed into learning situations, *extrinsic* motivation affects any learning activity. This approach does not require any preparatory activities on the part of the learners: they are presented some learning objects and asked to perform some learning activities using these "objects". Even if this approach does not require any preceding activities, the framing context is important as it provides learning opportunities that stimulate learning in different contexts.

In adult learning the challenge the PUSH-approach poses is to find the best moment to instigate a learning activity, since pushing a learner into a learning situation in the middle of another process is usually equated with interruption and does conjure up a whole set of negative side-effects. When applying the PUSH approach, a fundamental requirement on the learning context is that educational settings do not cause conflicts with other processes and activities.

The use of ICT and the daily routine

ICT is an opportunity to embed learning activities into daily routines. As ICT has become a part of daily life, ICT devices, services and applications play an important role in communication as well as in compilation, storage, and access of data. In the EU about two thirds of the consumers have access to ICT devices and use them daily (EUROSTAT 2004). Voice calls or SMS on the telephone, e-mails or instant messages on the computer, and programmes like word processors or computer games structure the daily schedule of an individual. Often short communicative activities are the footprints of our daily agenda. As ICT was becoming more and more ubiquitous, the technology was acquiring a more personal touch. Today, personal computers (PC), mobile devices such as mobile phones and personal digital assistants (PDA) are usually considered private tools. Through these tools it is possible to contact individual learners almost everywhere by just knowing their telephone number or e-mail address.

To assure privacy many devices and services combine communication services with authentication mechanisms, which restrict the use of a service or a device to

authorised users. Authentication itself is a short activity preceding the intended communication. Entering the PIN code on a mobile phone or the password of one's Internet banking account are examples for such authentication procedures.

Other common activities preceding the use of ICT are switching off the screen saver of a PC or disabling the key lock of a mobile phone. Unlike the means of authentication the latter actions do not restrict usage, but delay access to a service. Commonly such "access delays" are seen neither as disturbing nor time consuming by the learners. Apart from that the procedures of authentication and access delay are not yet part of the communicative process.

A side effect of using ICT is that it focuses a user's attention on a device. This is particularly true if one starts a programme interactively, dials a friend's telephone number, switches off a screen saver, or starts writing an e-mail.

The ideal moment to "push" a learner into a learning situation is just after authentication and before the initiation of the communication activity. At these moments the learners' attention is focussed on the device, so they are susceptible to the learning situation. Additionally, the communication activity has been prepared, but not started yet. The learning context thus promoted does not interfere with any other activity. As ICT is frequently used during the day, there are plenty of opportunities to present learning situations to a learner.

Motivating Learners to Learn

Learning requires activity and commitment from a learner. One has to construct operations actively, in order to represent the terms and concepts. "*Personal learning starts with a learner in a social, cultural and technological environment. The act of learning involves the artful deployment of the environment, including its tools and resources, to solve problems and acquire new knowledge.*" (Sharples 2000, p. 180). However, a "learning environment" itself is not sufficient for a learner to initiate learning activities. Pushing learners will put them into a learning situation which hopefully stimulates them to start some learning activities. In case of triggering PUSH by employing ICT, a learner's primary intention is to use the requested service rather than learning. It is less likely that a learner will handle the learning situation on their own, since personal factors must be considered reasonably low. Hence, other situational factors have to be applied to motivation.

Extrinsic motivation can be heightened by *rewards* or *enforcement* (Edelmann 2000, p. 258). Both reward and enforcement are not necessarily related to the learning topics. The use of extrinsic motivation should be flexible in order to avoid learning resistance or incidental learning of the external factors.

Enforcement of learning describes a situation when no alternative choice other than learning is available to the learner. Although enforcement is often associated with *punishment*, the latter does not cover the entire concept of enforcement. As opposed to punishment, enforcement can also be interpreted as *necessity*. In adult learning such necessities are common starting points for learning. For instance, if a company buys new financial software replacing an old one, employees are required to learn how to use this new software to guarantee efficient application.

Rewards can be prizes you win, but also proximal goals such as feedback, certificates, and grades (especially if they are combined with some kind of ranking). The use of rewards as a form of extrinsic motivation for learning is ambivalent. On one hand rewarding can stimulate a learner to participate in a learning process, on the other rewards may lead to situations where the actual learning process is shadowed by learning the behaviour to collect the rewards.

In the PUSH approach a learner will not process a learning situation in order to learn, but to gain access to the originally requested service. In this case the aspect of enforcement is applied because learners have to pass a learning situation before they can access the desired communication service, which is the “reward” for the learning activity. The concept of access delay is important for *motivation by rewards* and it influences the design of a learning situation. First of all, the success of the learning activity in terms of correct and incorrect must be irrelevant for passing a learning situation. The learners must not be restrained from using the requested service, even if they are pushed into learning situations. External enforcement is thus restricted to the limitation of alternatives. In the event of access delays limitation means that the learners have to pass the learning activity, before they can access the requested service. Secondly, the learning situation has to be compact, i.e. a learner must be able to pass a learning situation rapidly and achieve access to the communication service as soon as possible. This reduces the pressure which may be exerted on the learners, because they are conscious of the fact that the access to the service does not depend on the success of their previous learning activity. As communication is important, the proximal goal to use a device can be considered as good motivation to start learning activities.

Taking into account the previous thoughts about motivation, the possible duration of learning activities is limited to a few moments. A learning activity is of similar duration as the time required to remember and enter the PIN code on a mobile phone.

Conclusions

Lifelong learning demands new approaches to concepts of teaching and training. In particular, in the area of adult learning embedding learning activities into one's daily routine becomes increasingly important. The PUSH approach is one solution for embedded flexible learning. We described it as an alternative to the PULL approach, which is widely used in distance and adult education. By pushing a learner into learning situations one is released from the organizational overhead of planning the learning schedule. However, the PUSH approach does not make this overhead disappear, but moves it back to the learning management system. Hence, the learning management system needs to be able (1) to detect appropriate contexts for pushing learning activities; (2) to send these learning tasks to a learner; (3) to draw the learner's attention to the learning situation; and (4) to detect if the pushed learning activity is in conflict with other activities. The "Learning Pulse" technology utilizes the social function of ICT and according to the given requirements it identifies moments to push learning opportunities. Integrated into ICT devices the "Learning Pulse" makes use of ICT as extrinsic motivation for learning activities.

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