# Making Flexible Learning More Flexible

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## Abstract

*As a response to the changing environment in which the educational sector operates today and, in particular, the increasingly diverse student population, many universities opt for flexible delivery of their courses. However, there is a tendency to focus too much on technology per se and not on the learning process. At the same time educational technology itself which still is lingering behind current developments in the information technology (IT) industry. We argue that educational technologies are still task-oriented rather than process-oriented and as such not capable of effectively supporting an integrated study process. In this paper, we present a concept of Flex-eL – a flexible, fully integrated, workflow enabled, learning environment. We argue that flexible learning should be even more flexible and based on that premise, we critically evaluate the existing technologies for flexible delivery. Furthermore, we describe the main features of Flex-eL and discuss some important issues that we have come across during its pilot implementation.*

## 1. Introduction

In the last couple of years, the area of flexible learning and flexible delivery is becoming increasingly popular. However, confusion remains about what "flexible learning" and "flexible delivery" really mean and whether and how they differ. In this paper, we adopt the following vision of flexible learning as a student-centered form of education: "..flexible teaching and learning is that mixture of educational philosophy, pedagogical strategies, delivery modalities and administrative structures which allows maximum choice for differences in student learning needs, styles and circumstances" [1].

We also assume that flexible delivery is a way of implementing flexible learning. "...flexible delivery is defined as the provision of learning and assessment opportunities in a way that does not require the student to be present at a particular place or at set times. The materials may be presented in a variety of modes, increasing the degree of student control over when, where, how and at what pace they learn" [2].

For many educators, flexible learning is seen as a direct consequence of the ways that information technologies are changing education [3]. For them, flexible learning is perceived to be a form of learning carried out by information technologies where students expectations and their approach to learning are driven by information technologies. Thus, in this context, educational technologies continue to be used as information delivery machines replacing the teacher. This usually results in a narrowly defined educational model that focuses too much on delivering instructions and not enough on intellectual engagement, participation or progress of individual students [4]. At the same time, the adoption of technology for flexible delivery has been curiously uncritical. There is an assumption that technology must be good for learning and will result in learning just because educators are adopting it.

The main objective of this paper is to present a concept of *Flex-eL* (Flexible e-Learning) – an innovative workflow-supported learning environment and to explain how this environment can be used to provide more flexible learning.

## 2. Related Work

In the last couple of years, a number of web-based educational packages have been developed and deployed by many universities all around the world. The most popular ones include: Lotus LearningSpace, WebCT, TopClass, etc. Their main features can be summarised under several very broad categories:

- *authoring and presentation tools* such as text and graphics editing environments, automatic glossary and index generation, generation of course meta-data etc.
- *assessment and feedback tools* such as automatic quiz generation including a variety of types of questions



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- *student management tools* including grading and reporting
- *administrative tools* including managing user accounts, updating software and security management
- *collaborative tools* including synchronous and asynchronous collaborative tools such as bulletin-boards, news groups, chat rooms, audio/video teleconfencing, electronic whiteboards etc.

For more detailed comparison of various web-based educational environments see examples [5] and [6].

Although several leading packages provide a wide range of very powerful tools for various aspects of course management, one could observe that the increasing popularity of these technologies often results in *technology-centered* rather than *student-centered* learning. The learning methodology has been often left behind. The challenge is not to re-create the face to face teaching situation with all its inherent problems with new technologies, but rather create new learning environments providing unique communication patterns, changed limitations to the types of learning activities that are possible and provide a new high-quality learning experience. Currently, more and more researchers are highlighting the importance of learning methodology (see for example [7], [8] and [9]) as it is becoming clear that technology itself is far from sufficient for effective flexible learning.

## 3. Is Flexible Learning really flexible?

Many students are choosing flexible learning courses because they are unable to fit in with a conventional study regime with its rigid scheduling and inflexible business hours. But the question still remains: Is "flexible" really flexible, especially in terms of time?

In the majority of cases that one may find in the literature and observe in practice, "flexible" usually means accessible at any time, usually on the web. However, what remains unchanged are various time constraints such as deadlines for enrolment, assessments and final exams. A semester is still organised as a block of 14 or so consecutive weeks, with one fixed starting date and one finishing date. Curriculum is almost always organised in a strict linear mode (i.e. "production line") where learning resources and time allocated for each topic are predetermined by the lecturer at the beginning of the semester. There is no provision for the alternative learning paths that will suit the needs and learning styles of individual students

Obviously having "flexible" access to study material at any time is only a part of the solution. Therefore, even if we succeed in creating interactive learning activities never possible before but keep the linear mode of study restricted by various time constraints, do we really have flexible learning? We believe that in order to make flexible learning more flexible, we need to use the time in new and more productive ways.

As reported in [10], time should be a factor supporting the learning process rather than a boundary marking its limits. The idea that time should be used as a flexible resource, opens profoundly different opportunities for the new approach to learning and major educational change. In Section 5, we will illustrate this point by the example of the Flex-eL learning environment.

## 4. Current limitation of educational technologies for flexible delivery

In addition to the rather limited way of how technology is used, another problem of flexible delivery is in the information technology itself. Educational technology is still lingering behind current developments in the IT industry. In spite of Web-based multimedia applications, the emphasis is still on support of individual learning tasks and activities, very often in isolation from other tasks. Hence, the most popular educational packages for flexible delivery are still "task-oriented" rather than "process-oriented". For example, there is no effective integration of technologies that support various

aspects of the study process e.g. student administration and enrolment (handled by the university administration), course and subject management (handled by a department) and learning tasks as designed by an individual lecturer. This causes even more inflexibility in the present educational system as various deadlines have to be introduced to enable effective processing of student enrolments, organising of final exams, assignments etc.

Furthermore, tools offered by educational packages are content-free resources and their adoption and integration into the study program relies on (often very limited) experience of the course designer. That approach easily results in technology-centered learning tasks. Furthermore, every educational package provides a limited set of tools. Inclusion of any new tool possibly from "other packages" as they become available could be very difficult.

We argue that to effectively support the integrated study process and therefore provide more flexibility, we require different IT support i.e. educational technology that is process-oriented rather than task-oriented.

One of the latest process-oriented information technologies is workflow technology. In the IT industry, workflows are considered to be one of the currently most influential information technologies, second only to the Internet. They are process oriented business information systems that offer the right tasks at the right point of time

to the right person along with resources needed to perform these tasks.

So far, workflow technology has been exclusively used to support modeling, reengineering and execution of various business processes. However, to the best of our knowledge it has not been used in education to support integrated study processes, thus enabling more flexibility.

## 5. Supporting more flexible learning with Flex-eL

The Flex-eL (Flexible e-learning) project was initiated in March 2000 as a joint effort of the Department of Computer Science and Electrical Engineering and the Distributed Technology Centre at the University of Queensland, Australia. The aim of this project is to provide a state-of-the art multimedia learning environment that will realise the full potential of flexible learning by combining workflow technology and innovative learning strategies based on a concept of the integrated study process. The most important objectives of the Flex-eL project can be summarised as follows:

* to provide individual time management by relaxing enrolment and assessment time constraints and removing the concept of an academic semester; thus enabling students to enrol at any time and complete their program at any time. At the technology level, web-based workflow is used to support generation of individual instances of the study process for each student, planning and scheduling, as well as monitoring and tracking of individual students and their study and assignment progress.
* to provide broad access to information and instructional resources better suited for individual learning styles. Thus, students are able to choose a combination of learning resources that suit their individual style rather than have them chosen by their lecturer at the beginning of the semester. The role of workflow technology here is to enable effective integration of various learning resources by providing the right task i.e. learning activity at the right point of time to the student along with all the learning resources needed to perform the task.
* to support flexible, individually tailored learning pathways, enabling students to have more choice as to which module to study, when, for how long and in which order. Technology is used to manage individual instances of the study process.
* to integrate individual components of study such as enrolment, learning and assessment into the so called *the integrated study process.* At the technical level, the integration is achieved by workflow technology.
* to provide better access to, and more effective interaction with teaching staff (including better feedback and guidance) in a form of personalised learning assistance offered every working day.
* to provide more flexible assessment (including fully supervised quizzes, take home assignments and final exams) that students may attempt at any time they choose, rather than when they are told to. To support such flexibility, Flex-eL provides an electronic booking system as well as electronic pools of questions that will be used for just-in-time random generation of assignments. Note that for this purpose we don't use multiple choice questions.
* to enable better interaction between students necessary for effective active learning at the level of individual learning activity, module or subject and in this way to prevent student isolation, often associated with flexible delivery. Students can use Flex-eL to find out, who else is doing the same module at the same time and willing to work in a group.
* to develop students' feeling of "belonging" to the program not only as a client but rather as a member of a learning community [8] with his/her own responsibilities associated with the learning process. It is obvious, that this way of learning, requires a lot of responsibility and self-discipline on the student side as well as a lot of timely support from all other participants in the study process.

We hope that this way of flexible learning is at least one step closer to the vision of the flexible learning (as defined in [1]) as we are adjusting time to meet individual needs of the learners. However, though the Flex-eL environment is scalable i.e. capable of supporting both small and large groups of students, we believe that this mode of learning may not be suitable for all subjects and all groups of students (e.g. subjects that rely on the use of highly specialised labs).

## 6. Flex-eL Pilot Phase

Flex-eL is currently in its pilot phase. Starting from July 2000, we have offered only one postgraduate subject in the Flex-eL study mode: "Information Systems" (offered through the Masters of Information Technology program). Even though we are still in the initial phase of its implementation we have come across a number of issues that could be of interest to other educators who plan to implement similar projects:

* Instructional design for Flex-eL is really challenging as it is necessary to design interactive learning activities that will make students benefit from the alternative individualised learning paths. Thus when designing learning activities, we need to take into account not only communication and collaboration aspects of the study process but also the coordination aspect as well. For example, group work makes sense only for the students

who are at the same point of the study process i.e. doing the same module at the same time. Furthermore, it is necessary to prepare large pools of questions from which the assessment tasks will be automatically generated, different for every individual student. This is very time consuming as we are not using simple multiple choice but problem-based questions that test, for example, critical thinking and problem-solving skills.

* Induction of flexible learning as supported by Flex-eL is another great challenge. As we currently offer only one subject in this mode, students need to complete the subject by a certain date to be able to enrol in subsequent subjects. Therefore, "true flexibility" is going to be possible only when we are able to offer a full set of subjects in this flexible mode.
* In addition to preparation of high quality learning materials, student preparation is crucial. As we expect students to take full responsibility for their learning and study time, proper student preparation and support have to be carefully planned and implemented. On-going support should encourage learning though constant reflection and sharing that experience with other participants both students and teaching staff.
* Finally, another equally important challenge is evaluation of the Flex-eL learning environment and most importantly student learning. For this purpose we use a variety of evaluation techniques (surveys, reflective journals, focus groups and reports generated by workflow technology). As we learn from the experience, we expect to further refine the Flex-eL learning environment.

## 7. Conclusions

In this paper, we described the Flex-eL - an innovative, flexible learning environment supported by a process-oriented technology called workflows. We argue that what is currently known as "flexible learning" should be even more flexible and that is only possible if we create learning strategies that deal with time in a completely different way. Rather than restricting learning, time should be used to enable new, individualised ways of learning that better suit the needs and learning styles of our students. We also argue that educational technologies should follow, if not lead, current innovations in the IT industry rather than linger behind. In this paper, we also identified a number of challenges that we are facing during the pilot phase of the Flex_eL project.

As life-long learning is becoming increasingly important, we believe that the main objective of flexible learning should be to integrate learning into the lives of learners rather than to force them to organise their lives around learning to meet various deadlines imposed by educational institutions. Only if we rethink time and start using it in a more flexible way we can make flexible learning more flexible than what is currently the case.

## 8. References


[1] Lundin, R. "Flexible Delivery: An International perspective", *UQ Teaching and Educational Development Institute In-House Conference, Initiatives in Flexible Delivery*, September, 1997, http://www.tedi.uq.edu.au/tei/flex_delivery/Lundin.html

[2] University of Queensland, *Report of the Working Party on Flexible Delivery*, September 1997.

[3] Nunnan, T, "Flexible Delivery - What is it and Why is it a part of the current educational debate?", *HERDSA Annual Conference Different approaches: Theory and Practice in Higher Education*, Perth, WA, 8-12, July 1996.

[4] Marjanovic, O., Cecez-Kecmanovic, D. "Collaborative Distance Learning", *Proc. of 1996 IEEE International Conference on Multimedia Engineering Education*, 3-5 July, Melbourne, Australia, IEEE press, 1996.

[5] *Comparison of Online Course Delivery Software Products*, Centre for Instructional Technology, Marshall University, http://multimedia.marshall.edu/cit/webct/compare/comparison.html

[6] *Review of leading asynchronous, web based course delivery tools*, University of Tennessee, http://www.outreach.utk.edu/weblearning/reviewasych.htm

[7] Brown, A, "Design for learning: What are the essential features of an effective online course" *Australian Journal of Educational Technology*, 13(2), 115-126. (1997)

[8] Freeman, M.A. Capper, J.M. *"Educational Innovations: Hype, Heresies and Hopes"*, ALN Magazine, Vol. 3, Issue 2 – December 1999.

[9] Lefoe, G. "Creating Constructivists Learning Environments on the Web: The Challenges in Higher education", *Proc. of the ASCILITE98 Conference*, Australia , 1998.

[10] *Prisoners of Time*, Report of the National Education Comission on Time and Learning, April 1994.