LEARNING OBJECTS AND BLENDED LEARNING: AN EXAMPLE OF A CONTINUING EDUCATION COURSE

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Faced with a new generation of students who are used to exploiting the possibilities of the computer, we need a new type of education that will reflect a rethinking of content, form and duration. In the future, education will be in the form of 'voucher systems.' You get a set of vouchers and use them to attend the specific chunk of a study programme you need whenever and wherever it suits you. If the providers are to meet these requirements, the task of developing new courses and tailoring these to new students must be manageable. We therefore propose a new type of research-based courses. These are structured around 'Learning Objects,' short complete education sessions, which may be combined in various ways according to the student's interests and levels. We combine the Learning Objects with 'blended learning' and the ideas are tried out in research-based continuing education in applied statistics.

INTRODUCTION: LEARNING OBJECTS

'Learning Objects' represent a relatively new method of subdividing courses into smaller modules to give courses a flexible and reusable structure. According to Kovalchick and Dawson (2002), a Learning Object is defined as follows:

> Any digital resource that can be reused to support learning. The term 'Learning Objects' generally applies to educational materials designed and created in small chunks for the purpose if maximizing the number of learning situations in which the resource can be utilized.

Working with Learning Objects gives a wide range of flexibility for both the course providers and the users. For example, the structure makes it easier to suit different learning styles and the reuseability makes it easier to make new courses tailored for new customers. Below we will discuss the use of Learning Objects in research-based continuing education in applied statistics.

HOW TO BUILD FLEXIBLE COURSES

In continuing education learning should be fun as well as inspiring and innovative. What you learn should be directly applicable to your daily work and should help you see things in a new perspective, and your studies should fit into a busy life. Who of us has not experienced returning home from a course, putting the briefcase away and shelving the hand-outs, only to forget the knowledge acquired during the excellent course because it was not really applicable to your daily work, and because there is not time during an ordinary working day to put the theories one has learnt into practice?

If continuing education is to be attractive to employees as well as companies, study programmes must meet the following requirements:

- It should be possible to follow a programme in parallel with an ordinary job.
- It should be possible to work on study projects at your leisure.
- Knowledge gained from a study programme should be directly applicable to your daily work.

If the providers are to meet these requirements, the task of developing new study courses and tailor these to new students must be manageable.

We have therefore proposed a new type of research-based continuing education courses. These courses are structured around Learning Objects, i.e., short complete education sessions, which may be combined in various ways according to the student's interests and levels. We combine them with blended learning, i.e., a combination of e-learning, web-based learning

and face-to-face learning in order to take the best from two worlds and to ensure effective learning.

The new opportunities inherent in e-learning can ensure a differentiated working method adaptable to each specific learner in terms of relevance and level. There are other evident advantages to be derived from a net-based working form, especially by people who are active on the labour market and want to enhance their competencies. The form allows a high degree of flexibility, which may be a decisive factor for prospective students who are trying to fit in the studies into their working and family life. Some advantages are:

- With Internet access, you may take a course from anywhere in the world.
- You can take a course part-time and still keep your job.
- You can study at your leisure and at your own pace.

In order for e-learning to become a success, it is important that we either combine it with face-to-face education to achieve the personal contact that is often an important motivating factor or offer a very active moderator facility (Salmon, 2002). In this connection, group work via the Internet has proved a further advantage. It is also important to continue the development of e-learning methods; it will not do merely to transfer traditional educational material and methods to the Internet.

The Internet should be used for what it is best suited for, i.e., interactive quizzes, hypertext, animation, video clips etc. The form lends itself very well to studying data analysis and applied statistics because these are subjects in which you have to make analyses, interpret results, present the results, and so on in order to understand what is going on.

An important part of our efforts is to create sufficient computer support for cost-effective course development. This is done in three ways: Development of a dedicated repository system using metadata (http://ltsc.ieee.org/wgl2/index.html), for easy storage and retrieval of Learning Objects, creation of a course-making tool which combines learning objects into courses, and construction of a tool for making Learning Objects.

AN EXAMPLE: A COURSE IN DATA ANALYSIS AND APPLIED STATISTICS FOR A MEDICAL COMPANY

The world around us changes so fast that life-long learning is a prerequisite for possessing the competencies demanded by the business sector. Today, data analysis is used in practically all areas of society and plays an important role in almost any company. Many employees find it important to be familiar with data analysis and able to apply statistical methods – competencies that will increase the quality of their company and save it considerable expense. This is the situation for a Danish medical company who would like to educate all their engineers to a common level in applied statistics.

We have developed a course based on Learning Objects and blended education to suit their needs. Most of the Learning Objects are general ones which can be reused in any other basic statistical course – while a small part is specially designed and centred around practical problems of immediate importance to the company. The problems are described in full detail and form the basis for project work during the course. This is an essential part of the course which ensure that the learning can be useful in the future. The course has a very practical aim and is intended as basis for subsequent courses in statistical process control.

SPIN OFF – UNIVERSITY COURSES IN A NEW WAY

To develop new courses requires substantial investments of time and other resources. It is important that these investments can be used also for other purposes than continuing education. We believe that there are a number of reasons that the learning objects also are suitable for use students who take courses at the university. Students nowadays are much more inhomogeneous now than before – some are very good and some have substantial difficulties even with very basic concepts – Learning Objects may be used to ensure that there are suitable course material for very different students. Further students have very different learning styles – some learn best by first

getting exposed to theory and afterwards seeing examples, while others prefer the opposite order of presentation. Similarly some prefer visual and graphical teaching, some like to see theory written down in formulas, while others get the most out of listening to oral presentations – Leaning Objects make it possible for each student to use what suits her best.

REFERENCES

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