

# A Blended Learning Concept for Guided Self-Instruction

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## **Abstract:**

*Learning models are evolving from instructor centred, over learner centred to learning team-centred approach. learning is evolving to guide individual and collaborative self-paced web-based learning. In this paper, a supervised and guided individual self-paced web-based learning concept including collaborative learning in a virtual class is adapted. Blended learning is set forward as the solution. We focus on the requirements of the blended learning concept to be a good solution for this learning model.*

## **1 Introduction**

Often self-instruction is limited to the delivery of some basic theory of the learning topics. Usually, the teacher would structure that basic course content in a number of topics and delivers it as electronic content, composed of text, graphics, sound, images or video fragments. Afterwards the student will either individually or as a member of a team, assimilates the subject of the course. It has however become a challenge recently for all occupied with the organization of education and training to re-engineer the learning process and to implement advanced ICT in order to enhance learning through technology. Learning objectives are evolving from information transfer over skill acquisition to the creation of mental change. The supporting learning models are evolving from instructor centred, over learner centred to learning team-centred approach. It partly consists of classroom activities and partly as guided self-instruction where the teacher is planning the learning process. In particular, learning is evolving to guide individual and collaborative self-paced web-based learning.

In this paper, a supervised and guided individual self-paced web-based learning concept including collaborative learning in a virtual class is adapted. The proposed learning concept envisaged is a centred around a “supervised and guided self-instruction” model and with a very strong focus on the learning team centred approach. In addition, blended learning is set forward as the solution for a supervised and guided self-instruction learning concept.

## **2 Advanced Learning Model: Supervised and Guided Self-Instruction**

Recent advances on education technology has shifted the emphasis form traditional instructor centred approach learning, which can be categorized as an information delivery activity, to a learner centred approach focusing on skill acquisition. Accordingly, learning objectives are evolving from information transfer over skill acquisition to the creation of mental change,

while the supporting learning models are evolving from instructor centred, over learner centred to learning team-centred approach.

Blended learning is a solution which may take full advantage of ICT based learning combined with some traditional classroom activities. Types of learning activities used in traditional classes are lectures, exercises organised in the classroom and as homework, discussion session, and individual reading of some courses text, team assignment and tests. In the context of e-learning, the typical learning activities are self-paced learning using online documents and databases, online tests, online exercises, participation in an asynchronous discussion forum, individual search for learning materials, sharing online knowledge with other students, synchronous live-session, video-conferencing, online interactive discussion and chatting, and application sharing.

A new approach, based on a learning-team centred, is proposed where the students are learning in co-operative groups and have demonstrated an ability to generate higher-level reasoning strategies, greater diversity of ideas, more critical thinking and increased creative responses. An important second order benefit is the fact that it fosters the growth of effective teamwork, the development of interpersonal communication and listening skills.

In this learning concept of supervised and guided self-instruction, the learning process of a course is planned by the teacher. Some of the teacher-central activities are organised as classroom activities under supervision of the teacher, while other activities are organised by the teacher as self-paced activities. The learners can organise the completion of it independently. But specific dates to start and to end assignments are fixed. Books and tools are selected in advance by the teacher.

The self-instruction can be organised as an e-learning activity. In most cases, this type of self-instruction is limited to the learning of the basic theory of the learning topics. The teacher structures that basic course content in a number of topics and delivers it as electronic content, composed of text, graphics, sound, images or video fragments. The student will, either individually or as a member of a team, assimilate the subject of the course.

The information about the organization of the learning process can be found in the learning path. Besides the practical information about the course, the learning equipment and the evaluation methods, it also contains information about the contents such as summaries, case studies, slides, internet links, and links to the course content documents themselves. The learning process, therefore, consists of a mix of different learning activities, which limits the number of lectures. However, their role is to introduce the learning topic and to explain some complex issues. Practical sessions are organised and scheduled by the teacher too.

The total of these contact hours are limited to less than 30% of the students learning time. As self-instruction the student will afterwards assimilate the learning content individually in the study rooms or at home. Instructed assignments, which may also take the form of real projects in which enterprises are co-operating, will be solved in teams. Students can ask for help and for advice.

In this new concept of guided self-instruction, blended learning is set forward as an e-learning concept. The challenge is to find the right blend. It is dependent on the type of content, the type of student and the availability of the ICT solution. In case of informational content, self-learning is the optimal solution. Procedural content will be assimilated by making exercises and by repeating it again and again. The learning of behavioral content has to be organised as a team discussion or a role-playing session. From a conceptual content viewpoint, the most effective way is to confront the students with business case studies and to participate in business projects. If the student is only reviewing a course, or if the student is following only partly the course, or if students have different learning background it is advisable to organize asynchronous and self-learning.

E-learning courses may be implemented in this new approach. Such courses may include integrated links to other more detailed multimedia documents and hypertext links to

interesting websites, or to other courses on the internet. Well-chosen illustrations are resulting in attractive reading. In addition, self tests are integrated in the text and interactivity is built in by Question and Answer facility about the content of the course.

It is believed that the proposed approach encourages the student to find additional information, to share with other students and to expand own knowledge. At the end of the course an overview self assessment is supplemented. Students have to deliver assignments in the virtual classroom, reporting of their personal homework by papers, solved exercises, and so on. Discussions are organised as a classroom session or can be induced by the instructor, during the course. The student can be partly responsible for the course content too. The students co-operate with the teacher in creating some parts of the course text based on an individual study of books and periodicals in the course domain. Students can add some personal information documents to the course to share with colleagues.

### **3 System Special Requirements**

#### ***3.1 Online Delivery of Additional and Actual Information and the Access to Applications in the Learning Domain of the Course.***

A first characteristic of the proposed approach is the online delivery of additional and actual information and the access to applications in the course of the learning process. A high degree of practical relevance in the learning process and the provision of up to date information on point of theory and best practices have become a high priority. In addition, advanced and Actual Learning Content has to make accessible in the course of the Learning Process. Additional dynamic information can be collected by web-search agents and will also be integrated into each learning module. Web-search agents will gather information on the relevant know-how topics and other areas of interest specified by individual users. Intelligent agents implemented in the e-learning solution will provide the information retrieval from several (internet) sources, information filtering according to the personal characteristics of and delivered by the user and coaching of the students throughout their learning process.

The system supporting the fundamental theory-example-exercise triangle is further enhanced by the opportunity of access to commercial computer application programs and, to various databases and to up to date information on the Internet.

In case of learning of business applications, the integration of benchmarking models will also be a key element of the learning/teaching modules, in the sense that, on the one hand, an "ideal" virtual enterprise is created and, on the other hand, "real" business processes are provided to enable students in their role of business managers, to derive solutions for the problem.

Simulation and problem solving via benchmarking cases has to be implemented in a simulation tool and must be linked with the learning-portal. In case of learning in the technology domain the integration of laboratory based sessions can be key element in the learning module. Virtual labs allow experiments to be executed within web-interfaces and are integrated in the learning of the underlying theory. The learner can login through the internet onto the distance website and connect to the server and will be able to access and operate various virtual instruments and electronic apparatus or direct a robot.

#### ***3.2 Guiding the Learner***

A second characteristic is the special care to be taken in the guidance of the learner or the tutoring of the course. The learner enjoys excellent support by having the opportunity to become tutoring in the form of valuable advice and solving out any issues or problems. In tutor-led e-learning, learners enjoy higher levels of tutoring and classroom interaction. Tutoring can also be embedded in the e-learning course. In that case a computer tutor guides the students throughout the solution of an exercise providing explanations, hints and help.

In self-directed e-learning most of the information the learner needs will be available online, and he/she can start the course and work through at one own pace. But the learner will still enjoy excellent support by having the opportunity to become tutoring in the form of valuable advice and solving out any issues or problems. The tutor can help to select modules to study and can provide support during the course. The tutor is the subject specialist and guides the learner in learning the subject. The teacher is monitoring the students input and makes small corrections to it. Also a student regularly asks for advice. A Question and Answer facility is available in an “e-contact” application linked with the course

Tutor-led e-learning implies that learners take interactive courses which are of a classroom style but are attended virtually. Specific dates to start and to end assignments are fixed. Books and tools are needed that would normally need to take into classroom. This type of e-learning is less flexible but is nevertheless a very convenient and effective way of learning if the learner needs extra motivation and a little more structure in order to stick to the course. Learners enjoy higher levels of tutor and classroom interaction and can expect excellent support facilities.

The future of the emerging e-learning technology however consists of integrating instructional material (lectures, learning activities, ect) with real intelligent tutoring features, such as functionalities which can track user’s learning processes and react to his/her actions as a human tutor would. A computer tutor guides the students throughout the solution of an exercise providing explanations, hints and help. Tutoring can therefore be embedded in the e-learning course and the presentation of the learning content can be setup including opportunities for the learner to support in learning.

### **3.3 Presentation of the Learning Content**

A third characteristic is the need to present the learning content in a way to take care of the learning styles of the learner. Just as every person is unique, so is every learner. But how much this uniqueness matters is a great debate among educators, trainers, and psychologists. The VAK (visual, auditory, kinaesthetic) style is a style that is especially applicable in the presentation of e-learning content for the organisation of a self-paced e-learning course. Learners use all three types of styles to receive information. However, one or more of these is normally dominant. This dominant style defines the best way for a person to learn new information by filtering what is to be learned.

Trainers/authors need to present information fitting aspects of all three styles. This allows all learners, no matter what their preferred style is, the opportunity to become involved. In the e-MINDMAP concept, the e-learning content has been presented in a way that it is fitting aspects of all three popular VAK styles [x].

### **3.4 Collaborative Learning**

A fourth characteristic of the proposed approach is collaborative learning. On a first level, computer mediated communication has to be facilitated and its use must be integrated within the learning materials. Collaboration of a team of students is being viewed as co-operating on an assignment and/or joining discussions about relevant or current topics. On a second level the learners will deliver additional content him/herself and share it with other learners in their team. Synchronous communication could be conducted via the chat facility and conference systems, and asynchronous communication may be facilitated through the discussion groups and via email. It is now widely recognised that many e-learners benefit from these kinds of peer relationships and online communications.

Learners should however be encouraged to use the discussion group facilities. That is why the instructor/author has to embed some discussion in a learning activity. The authors can create some activities which involves learners posting a viewpoint or a response to a discussion board, for which authors had prepared an example to get the discussion underway. Content

delivery by students and sharing with other students of the team is an essential characteristic of collaboration and must be a built-in facility.

Learning the delivered content by the instructor must be a starting point in the learning process of the learners. They must expand their received knowledge by adding some other viewpoints, examples, applications, on the topic learnt. All learners of the team will bring their new knowledge in a knowledge pool of the e-learning course. They share their knowledge with the other learners

### **3.5. The Need for a Learner e-Learning Portal**

A last characteristic is that blended learning learners need a student e-learning portal. A number of facilities and tools are available and have to be used in the blended learning process. A learning portal can function to integrate the delivery of those facilities in one central access point. Teaching facilities, including tools for creating and storing electronic documents, follow-up of student performance, solution of student questions, and interactive communication with students. General course information facilities, including possibility of storing relevant information related to the course content, relevant dates, registration details, answers sections, ect. A number of facilities and tools are available in a student intranet. Administration facilities for registration of students, general description of courses, follow-up of student curricula, input of new lectures and new courses, course management tools, ... Library facilities, including storing, visualizing, publishing and downloading electronic documents on and from the Internet

## **4. Case 1: Virtual and Remote Labs at PSUT**

Through its highly interactive approach, online labs contribute to modern pedagogy for university teaching which aims at creative thinking and high level learning, encouraging students to become active learners challenged by complex problems and situations, seeking collaboratively a variety of solutions. Remote online users from around the world, who are logged through the internet, onto the distance website and connected to the server, will be able to access and operate various virtual instruments and electronic apparatus or direct a robot, for example, to perform different experimental setups. The system could be made fully interactive by mounting cameras on the setup and hence provide real-time video feedback and visual monitoring of the control parameters.

The objective of online labs is to implement a flexible learning concept for modern education at universities, focusing on enhanced access to a broad variety of experiments. Within a blended learning concept, online labs, remote and virtual, allow experiments to be executed within web-interfaces. The experiments can be implemented and accessed regardless of the location of the laboratory and the experimenter. Additionally, experiments can be performed which otherwise would not be accessible for reasons of expense, security, or availability. Students work individually or in small groups, designing and executing different types and realisations of experiments including the investigation of the underlying theoretical models. The Integration computer of numerical software packages and visualisation tools enable students to analyse their experimental data and treat their results further. Thus, students gain the opportunity to get acquainted with modern scientific software at an early stage of their academic education, enhancing their motivation and improving their scientific skills.

The design of a remote laboratory experiment is usually run locally on a LabVIEW platform but with the ability to be monitored and controlled over the Internet from within a Web browser. The remote laboratory server can be as simple as an experiment connected to a computer through a standard interface (DAQ, GPIB, serial, parallel, etc.) and with the host computer connected to the Internet as shown in Fig. (1). The client can be any computer

connected to the Internet running a simple browser. Once connected, the client will see the same front panel as the local host and also have the same program functionality.

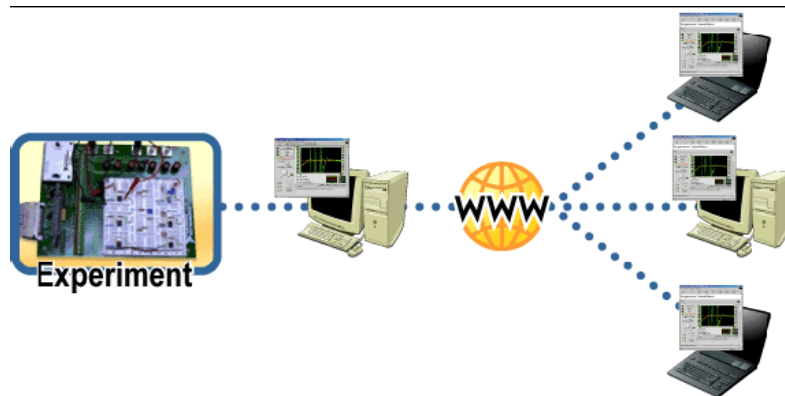


Fig. (1). Internet Control of a Remote Laboratory.

Additional tools to provide Internet-based measurement and automation solutions can be developed, to create innovative remote laboratories successfully.

## 5. Case 2: Business simulation in University of Hasselt

The course “Financial management” is organised as a blended learning process for business people. The basis principles of a balance and a profit and loss account and some financial instruments are delivered as e-learning modules. The learners can active experiment with the financial instruments. Afterwards during a workshop they can simulate their own financial situation in the tool and learn about the automatic delivered advices corresponding to their situation.

Contact
Research
Projects
Questionnaire

	Course	e-learning proces	study info	textbook	Documents		Forum
					Upload	Search	
0111KMOIS	KMO Informatiesystemen						Forum
0086STRATIM	Strategie- en informatiemanagement						
0088CIMICT	CIM en IT management						Forum
0077STRATIS	Strategische informatiesystemen						
0514BIN	Beleidsinformatica-BEDR.						
0432EBUS	E-business-MBA.E						
1549BEDRIS	Bedrijfsinformatiesystemen						
0001FM	Financial management						Forum
							<b>Tutorials</b>

**Learning**

**LOMS**

**Presta** BSC

**Ren** Vlaanderen

Fig. (2). Course portal

**Introduction**  
 Money is an important issue for all companies , being starters as well as in business decision making about continuation and growth. Financial management is built upon precise and complete business information. You can find it partly in the annual account review. To become a good overview is not evidently in case of a one-man business.

**The Balance and the Profit and Loss Account**  
 The balance is delivering a detailed instantaneous view of the financial situation. You can find the belongings on the assets, and the own properties and debts as liabilities.

**E-learning module : financial analysis instruments**  
**Application pharmacy**

**Financial analysis: instruments**  
 The profit and loss account will be presented yearly. You will find an overview all income and cost figures. The credit or debit balance corresponds with profit or loss. A qualitative financial management is based on the availability of complete set of accurate business information. The information can be found in the annual account review (balance, profit and loss account, en explanation. Our conclusions will made using some index numbers and ratio's.

**E-learning module : financial analysis instruments**  
**Application pharmacy**

**Financial needs and financing sources or credit facilities**  
 Which credit facilities (liabilities) will cover which financial needs (assets)?

**E-learning module : financial needs and solutions**

**Financial analysis of Your company**  
 Create the balance and profit and loss account of your company.

**Application pharmacy**

**Ratio's of Your company**  
 The liquidity, solvability and rentability of Your company

**Application pharmacy**

**Positioning of Your company**  
 By positioning the company's ratio's in a liquidity vs rentability diagramme, You can conclude about the soundness of the company.

**Application pharmacy**

Fig. (3). Blended learning course financial management

Voorbeeld resultatenrekening - Microsoft Internet Explorer provided by BIS

Address: http://server.luc.ac.be/apotheek/voorbeeld\$W.php

**HORIZONTALE ANALYSE**

ACTIEF	2001	2002	2003	
<b>Vaste activa</b>				
Oprichtingskosten				
Immateriele vaste activa				
Materiele vaste activa	100	87.33	80.48	Deze post groeit minder snel dan de globale onderneming.
Financiële vaste activa				
<b>Viottende activa</b>				
Vorderingen op meer dan één jaar				
Voorraden en bestellingen in uitvoering	100	146.31	218.23	Opgelet deze post groeit sneller dan uw globale verkopen.
Vorderingen op ten hoogste één jaar	100	97.8	128.63	Deze post groeit trager dan uw globale verkopen, doe zo voort.
<b>Liquide middelen</b>				
Opbelastingen & liquide middelen	100	120	140	Opgelet deze post groeit sneller dan uw globale verkopen.
Overlopende rekeningen				
<b>Totaal</b>	100	107.38	134.43	
<b>PASSIEF</b>				
<b>Eigen vermogen</b>				
Kapitaal	100	103.81	110.17	Deze post groeit minder snel dan de globale onderneming.
Uitgiftpremies				
Herwaarderingsmeerwaarden				
Reserves				
Overgedragen winst (overgedragen verlies)				
Kapitaalsubsidies				
<b>Voorzieningen voor risico's en kosten</b>				
Voorzieningen voor risico's en kosten				
<b>Schulden</b>				
Schulden op meer dan één jaar	100	82.91	72.15	Deze post groeit minder snel dan de globale onderneming.
<b>Schulden op ten hoogste één jaar</b>	100	121.3	180.47	
a. Kredietinstellingen	100	127.98	209.52	Opgelet deze post groeit sneller dan uw globale verkopen.
b. Leveranciers	100	114.71	151.76	Opgelet deze post groeit sneller dan uw globale verkopen.

Fig. (4) Interactive application of financial management

The e-learning modules include the facility of sharing additional texts with the team members by adding them to the course content.

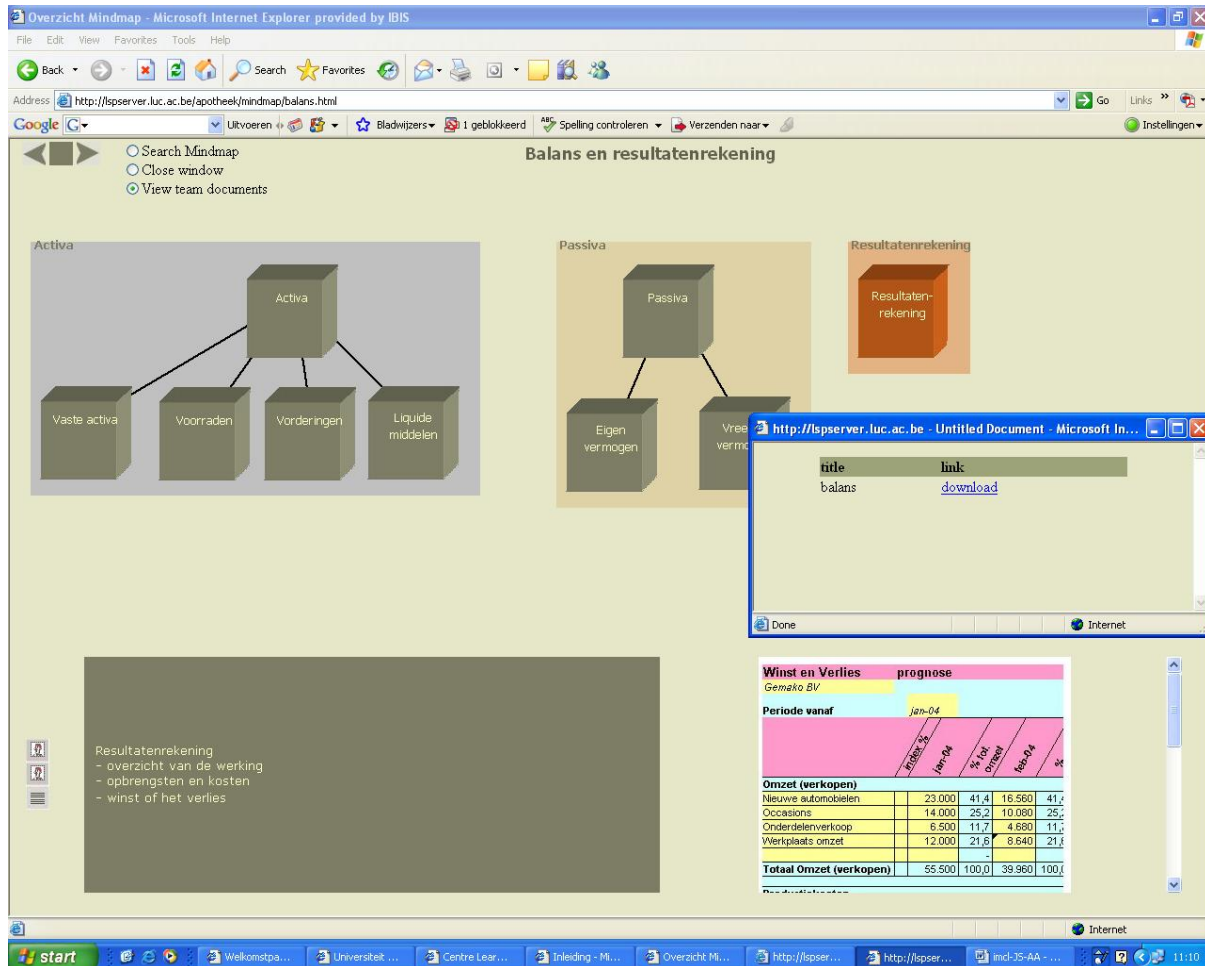


Fig. (4) presentation of learning content as a mindmap

## 6. Conclusion

In this paper, a supervised and guided individual self-paced web-based learning concept including collaborative learning in a virtual class is adapted. Blended learning is set forward as the solution. We have focused on the requirements of the blended learning concept to be a good solution for this learning model. Tutoring is required. Special care for the learners personal learning styles is important. It is an opportunity of extending the learning content in the course of the learning process. And at last even if the learner a distance learner, collaboration can be realised.

The case “Virtual and remote Labs at PSUT” is an example of the integration of laboratory based sessions. In the copurse financial management of U Hasselt a business simulation is included.



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