

# A Case Study of Work-Integrated E-Learning

PhD Kerstin Grundén  
Department of Informatics and Mathematics,  
University of Trollhättan/Uddevalla  
Uddevalla, Sweden

## ABSTRACT

An evaluation study of work-integrated e-learning in the county administration of Sweden is reported and discussed. A web-based prototype (Diabas) for in-house education dealing with the official registers, was developed and tested. The MOA-L model was used as a frame of reference for the evaluation study. In the model especially the consequences for the work situation, the work process and the quality of the service to the client was focussed. The present situation as well as the situation after the learners had passed the course was studied and compared. The initial analysis of the present situation regarding these aspects was seen as very important for the development process of the course. Similarities between the development of work-integrated learning courses and traditional system development work was analysed and discussed. Cultural aspects and management policies were seen as very important in order to motivate the learners to attend the course. The learners were on the whole satisfied with the pilot course. The flexible forms for the course was seen as important. The work situation and the work flow need to be adapted in order to facilitate the use of the new knowledge after the course.

**Key words:** Evaluation study, Work-integrated, E-learning, MOA-L model

## 1. INTRODUCTION

In this paper an evaluation study of work-integrated e-learning in the county administration (CA) of Western Gotaland (WG) in Sweden, is presented and discussed. A web-based prototype named Diabas, for in-house education in dealing with the official registers, was developed and tested. An organisation was specified (the County Academy (CAC) (SW. Länsstyrelseakademien) that should be responsible for the development, implementation and integration of similar education courses, for the personnel, on a national level. The prototype course was the first course developed by the CA in a pilot project. The researcher was responsible for the evaluation of the pilot project. The project organisation consisted of staff both from the CA and the University of Trollhättan/Uddevalla (HTU). The MOA-L<sup>1</sup> model [10] was used as a frame of reference for the evaluation work. In this model especially the work situation, the work process and the quality of the service is focussed. The present situation as well as the situation after the learners had passed the course was studied and compared.

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<sup>1</sup> MOA is an acronym for SW. Människa – Organisation – ADB-system, (in english: Human Being, Organisation, EDP-system). L is an acronym for “learning”.

In Sweden we have an old tradition regulated in law regarding public access to official records. It is therefore important to have relevant and proper administrative routines regulating the dealing with official records in the public organisations. The national CA of Sweden is divided into twenty-one separate county administrations located in different regions of Sweden. The CA of Western Gotaland is one of the largest administrations, with about 650 employees dealing with about 150.000 matters. The organisation is divided into sixteen different departments, each responsible for different specialised areas such as environmental issues, social issues, veterinarian issues etc. The employees dealing with matters in these areas mainly have an academic background. The organisation was characterised as a knowledge organisation by the personnel manager of CA at WG. The competence needs of the organisation was analysed regularly in order eg. to specify the actual education demands. External education courses often were considered as too expensive. Therefore the development of in-house courses was seen as an alternative.

The aim of the pilot project was to develop and test a web-based prototype for education in dealing with the official registers at the CA of WG and to specify an internal organisation for the administration and development of internal education courses (CAC). The pilot project was initiated by the end of the year 2001 and lasted until autumn next year. Personnel from HTU participated in the project group together with a project leader from CA, and the managing team together with personnel from the CA. The evaluation group consisted of personnel from HTU. There were also a reference group and special groups for the producers, the learners and the instructors. The author participated in most of the meetings with all of the groups within the project organisation.

## 2. WORK-INTEGRATED E-LEARNING

Work-integrated e-learning (WIEL) is a new research field, focussing on learning processes concerning both employees and organisations, using e-learning as a way of gaining new knowledge relevant for the work process. Most research in the field of e-learning is focussed on different e-learning systems in school teaching or at universities. Learning at work is more multidimension learning compared to educational institutions [3].

A common overall goal for in-house courses in organisations is that they should contribute to new knowledge for the learners in order to improve both their work situation and the work process. The development process of e-learning courses for organisations could be seen as very similar to traditional system development and implementation. The present work situation and the work process should be described and analysed in order to find proper solutions to specific problems. Checkland [4]

differs between “hard “systems thinking and “soft” systems thinking. According to Checkland an important aim for the analysis of a problem situation is to identify “the root problem” and to determine whether the problem mainly is of a technical or a social character, in order to find a proper solution to the problem. It is not unusual to propose a technical solution for a problem that mainly has a social character.

In the same way a problem situation should be analysed if the problem is supposed to be an educational need within an organisation. Lack of relevant knowledge could then be identified among the employees. Corporate e-learning courses are usually developed by large organisations that can afford the costs for the production and administration of such courses. There are different alternatives to in-house education, e.g. to send the personnel to external education or to buy externally developed courses, and offer them in-house.

Learning situations in an organisation can be defined and treated as change situations, and then all our experience of dealing with change situations in organisations also could be used. A new system or a new course is not implemented and used “by itself”. The personnel must be motivated, e.g. to participate in the course. The content of the courses must be seen as meaningful and relevant for the employees. The form of the courses must be relevant for the learners. There must be enough time at work enabling participation in courses. Work routines must also be adapted, in order to facilitate the application of new knowledge.

WEIL-courses could be designed and used in more flexible ways than traditional courses, in order to adapt to different work situations. Different learners can work with courses at different times, and at different geographical locations. Learners can also work in groups or individually. The courses could be self-directed or led by teachers or instructors. The challenge of the design of e-learning is that it should be considered relevant for the learners, both in content and in its form.

### 3. THE EVALUATION MODEL MOA-L

The theoretical frame of reference for the evaluation was the MOA-model [10] based on the authors PhD work [7]. The model has so far mainly been used for evaluation of CSCW (Computer Supported Co-operative Work) systems, such as the implementation of electronic dealing with public insurance matters within the National Social Insurance Board of Sweden [8] and the use of videoconferences for planning meetings between a hospital and the county administration [9]. In this study the model is slightly modified in order to be relevant also for evaluation of WEIL systems. This updated version of the model is named MOA-L.

The model gives an overall theoretical frame of reference that was used in order to identify and evaluate some important aspects of WIEL. Such aspects are the work situation of the staff, the change of the work process, and the quality of the service provided to the client<sup>2</sup>. Interrelated relationships between design of the technology, the organisation and the education is stressed in the model. Different consequences for the work process, the work situation, and the quality of the service provided to the client, could arise depending on different design of the organisation, the technology and the education.

<sup>2</sup> The service to the client could be replaced with “produced goods to the customer”.

Ideas about co-ordination, control and learning could influence the choice and design of technology, organisation and education and imply many important decisions. Every such choice could lead to different quality and efficiency consequences for the work process, the work situation for the staff or the service provided to the client. The MOA-L model could be used in order to compare different combinations of technology, organisation and education, and to examine the different outcomes.

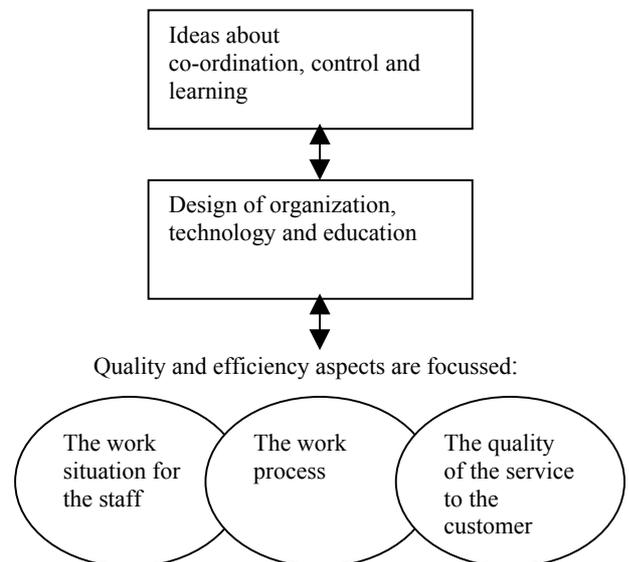


Figure 1. The MOA-L model

There are complex interdependencies between the work process, the work situation for the staff and the service provided to the customer. An unsatisfying work situation for the employees could affect quality and efficiency aspects negatively of the provided service. A satisfying work situation could have the opposite effects. Such important quality and efficiency aspects could be for example learning possibilities of work, communication aspects, information and documentation, and decision making. It is the way in which different system components relate to each other that determines the potential for the system to produce positive results.

Design of the organisation, technology<sup>3</sup> and also education should be in accordance with each other, in order to support the work process. There is also a need for adequate work routines, when using technology or applying new knowledge which the employees have acquired from an educational course. There could e.g. be very different quality and efficiency consequences depending on the design of the manual routines. If they not are adjusted to facilitate the application of new knowledge the learners have acquired from an educational course, the quality and efficiency consequences of the work could be effected.

There is a lack of comprehensive and unifying evaluation models. Much of the research hitherto has focused on one or another factors, with no integrated framework [1, 2]. A multi-method approach could be relevant for system evaluation, based on an understanding of the complex social and behavioural processes influencing learning processes of individuals in an organisation.

<sup>3</sup> Compare with the theories of Mintzberg [15].

An evaluation study can focus on different parts of the MOA-L model. Requirement analysis and evaluation traditionally are seen as discrete activities in design. Instead they can be understood as interleaved processes. The recognition of the interleaved nature of the design process means that evaluation usefully can take place at several points [21]. The evaluation of IT systems is often treated as process-orientated activities [5, 6]. The MOA-L model can be used in a process-oriented study.

The work process can be studied both before and after the implementation and use of a new course in order to examine changes in quality and efficiency aspects of the changed work process and the work situation. The MOA-L model could be used at different points of time in order to gain a deeper understanding of the process. Different types of consequences could be examined depending on the point of time for the evaluation [12] of an information system: Problems observed within the first half year of use mainly are of a technical character. Problems observed after the first half year of use until 1,5 years of use mainly have a psychosocial character e.g. ergonomic problems. Consequences could also be examined after a longer period (about 4 – 5 years) regarding changes of knowledge and competence. Different consequences can accordingly be examined when the outcome of a new course is studied. The ways the work has been effected due to new knowledge, which the staff has acquired from a course, should preferably be studied at different point of times, in order to detect different types of consequences.

A dialogue model for the evaluation work in organisations is recommended when the MOA-L model is used. To create learning arenas for such discussions can promote learning possibilities for the staff of the organisation [18]. A continuous feedback of results from the evaluation work to the participants has different purposes. It can lead to greater participant engagement in the evaluation work and increase interest in the project and motivation. Discussions can also lead to increased validation of the study, as the employee's perspectives are added to the analysis.

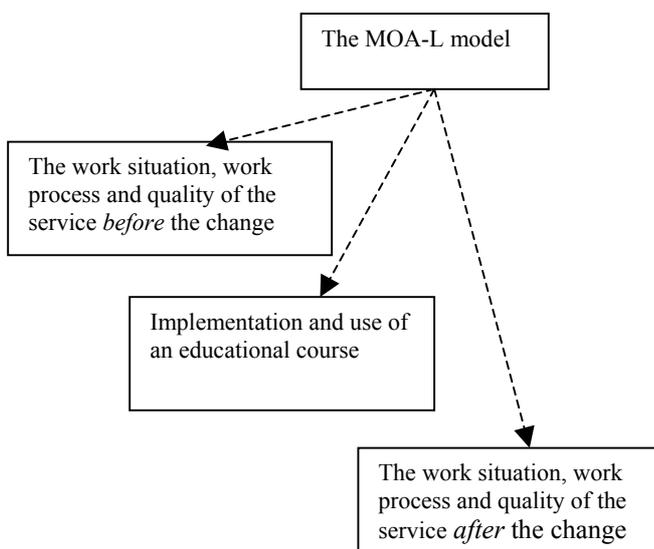


Figure 2. The use of MOA-L in a process-oriented study

Grundén & Ranerup [11] define some aspects that can affect the course of the implementation and usage process of an information system. Such aspects are the user participation in the process, technological problems, and expected and real

outcomes from the usage regarding efficiency and quality. As there are similarities between the development and implementation of educational courses in an organisation, compared with traditional systems development and implementation of information systems, these aspects could probably be relevant also for educational courses.

#### 4. DESIGN OF THE EVALUATION STUDY

The MOA model was used as a theoretical frame of reference for the evaluation work. In this study the model has been used both for the analysis of the contents of different aspects specified in the model as well as for the analysis of the process. The results of the evaluation study was reported and discussed at most of the project meetings.

Five registrars and eight handling officers with the official registers in three different CA's of WG were interviewed about their current work situation. The interview questions focussed especially on the three different aspects of the MOA-model; the work situation, the workflow and the quality of the service to the clients. The interviews lasted for about an hour and were tape-recorded.

A questionnaire was distributed to the learners after they had finished the course. Seven learners passed the course and answered the questionnaire. Questions were asked about evaluation aspects of the course. There were also special questions regarding the pilot project. All of the learners made entries in a diary during their studies. An evaluation seminar was held at the end of the course. The group discussions at the seminar were tape-recorded and analysed. About two months after the learners had finished the course telephone interviews were made with the participants in order to examine whether they had changed their work routines due to new knowledge achieved from the course.

#### 5. A PILOT COURSE ON DIABAS

The aim of the new course was to achieve better quality of the official registers according to the course specification. The learners should achieve knowledge about the rules regarding dealing with the official registers. They should also be skilled in searching and register documents and measurements in the Diabas system. The producer of the course was very experienced in dealing with the official registers. She had educated the personnel for many years in this field, and she had also published a book about rules and routines for dealing with official registers [13].

A web platform for distance education (Disco) developed by HTU was used for the Diabas course. Disco contains functions such as the administration of course documents, hand in function and a debate board. In the Diabas course a matter could be initiated, dealt with and terminated. There were also search functions and statistical functions in the system.

The Diabas pilot course was divided into four separate sections. The first section was dealing with the laws and decree regulating the registers. The advantages with relevant routines for dealing with registers were illustrated in a video. In the second section an introduction was made to the information in the Diabas system about a matter. Searching information of a matter was the focus of the third section. The fourth section was dealing with the registration of documents and measures in different matters. There were also separate links to electronic documents such as administrative manuals.

## 6. RESULTS OF THE STUDY

### **The survey of the present situation of the routines for dealing with the official registers**

According to the staff manager more handling officers of a matter should make their own registrations of the measures regarding the matters, instead of leaving those tasks to the registrars. According to the interviews most handling officers do not make such registrations themselves. The registrars initiate and terminate each matter and most often they also make the registration of the measures of the matter. Some of the registrars thought that there is a risk that quality of the information would be deteriorated and messy if more handling officers started to make their own registrations of the measures. A few of the registrars had a more positive attitude and would appreciate to get more time for other tasks if the handling officers made more registrations. The registrars emphasise that existing work division of labour has a long tradition in the organisation.

In general, the handling officers have 10 – 20 on-going matters. Some of the handling officers did not quite seem to understand the importance of making proper registrations. Half of the handling officers thought there was a risk for quality deterioration of the registers, if more handling officers started to register themselves. Most handling officers were satisfied with the existing division of labour. They referred to increased workload, their special competence and to the fact that more and more administrative tasks were transferred from the administrative staff to the specialists, when they argued for no change in the existing division of labour.

### **The questionnaire to the students about the course**

Most of the learners were satisfied with the course, both form and contents. Some minor comments regarding the form and contents of the course were however made. A majority of the learners had problems getting enough time for the course, due to a heavy workload. Most of the learners appreciated the flexible form of the course, but some of the learners also asked for more traditional forms. Some participants wanted a more group-oriented traditional course, with learners and tutors placed in the same room. Some learners asked for a common kick-off for the course, with all the learners and the tutors together. The discussion board of Diabas was not frequently used to a great extent by the learners, however.

Some of the learners thought that navigation in the different parts of the course could be made clearer. Some learners asked for information about the expected time duration for each section. All of the learners were satisfied with the technology used. Most of the learners thought the course would be useful for their daily work, and that they had acquired knowledge to search for information themselves. A few of the learner's thought that they also should start to register their own measures in their daily work.

### **The diary**

In the diary the learners made notes about their experiences during the course. The number of times the learners worked with the course varied between five and ten times. The number of hours used for studying the course varied between two and eighteen. Most of the comments had to do with design aspects regarding the contents of the course. Four learners had problems to get a relevant password in time. Some of the learners commented that they had found it easier to search and make registrations in the system, than they thought before they started the course. One learner asked for information about the expected time duration for each section of the course. Another learner wanted more of social contact during the course.

### **The evaluation seminar**

Most of the learners, tutors and the project group participated in the evaluation seminar. The seminar started with a presentation of the evaluation model for the participants. Then the learners were asked to report spontaneously about their impressions from the course. Most of the aspects reported from the learners had already been mentioned in the questionnaire and in the diaries. All of the learners seemed to have a positive attitude to the course. The learners seemed to have been motivated during the course, according to the tutors. One of the learners had started to make registrations in the ordinary work, due to the course. Most of the learners appreciated the flexible form of the course, although a few of the learners asked for more social contacts during the course. A common kick-off for the course was seen as important. The discussion board was not used very much. One learner did not use the discussion board to ask other learners because the tutor had answered all questions. The learners asked for information about the time duration for each section in the course. Several of the learners asked for better feedback of their results e.g. a key manual. They also asked for better navigation facilities in the programs.

Participants of the seminar had group discussions about arisen themes. Each group consisted of both learners and tutors. The first group started to discuss how their work should be planned in the best way in order to finish the course. They wanted a time limit for the course. The other two groups started to discuss division of labour between the registrars and the handling officers with the matters. A new system for dealing with matters will put more pressure on the handling officers to make registrations. In the future all handling officers were expected to make registrations. The resistance among the personnel towards making their registrations was also identified.

### **The interviews after the course**

According to the phone interviews after the course all of the learners had started to use their new knowledge about search possibilities in the system, in their daily work. A few had started to make registrations. One of the learners had troubles with the manual routines. He had to go to the reception to fetch a stamp each time he was making his registrations. None of the participants had transmitted their new knowledge to their work mates. Half of the learners did not think that the personnel should apply for the course if they not were enough motivated, e.g. demanded by the management.

### **Summary of the results of the evaluation after the course**

The main results from the evaluation after the course (the questionnaire, the diaries, the evaluation seminar and the phone interviews) are summarised below:

#### **The contents of the course**

- The students were satisfied with the main contents of the course
- Better navigation facilities was requested
- Estimated time for each section in the course was asked for
- The video was appreciated
- The debate board was not used very much

#### **The form of the course**

- Flexible forms for the course was seen as very important. Different students had different needs. Some were very satisfied with a pure self-study course. Other students wanted more social contacts during the course.

#### **The work situation and work flow**

- The time pressure of the ordinary work should be reduced in order to facilitate the participation of the course

- Taking time for studying the course should be legitimated in a visible way in the office. A sign on the door could e.g. legitimate taking time for studying the course.
- The administrative routines must be adjusted in order to facilitate the studies of the course and to facilitate the use of the new knowledge after the course.
- If the work division between the registrars and the handling officers with matters should be changed, there must be a pronounced policy from the management.
- It is difficult for one of a few persons to change the work culture on a work place. It is easier to change if many persons on a work place participate in a course at the same time.

## 7. DISCUSSION

### The analysis of the consequences of the course

The use of the MOA-L model contributed to an understanding of important aspects that influence WEIL. Consequences for work situation, work process and quality of service to the client have to be considered when WEIL courses are evaluated. The dialogue model used in the evaluation work also contributed to a mutual learning process around evaluation issues, both for the researchers from HTU and for the staff from the CA.

The MOA-model was used also for studying the process of the implementation and use of the WEIL courses. Different types of consequences of the use of new technology can be examined depending on the time elapsed from the implementation. The test group of learners made an evaluation of the course when terminating of the course. Then mainly consequences of a technical character could be studied. The test group and tutors were also specially selected and asked by the project management to take part in the test. When the course is used as a traditional course, the learners are supposed to voluntarily apply for the course. The tutors are also supposed to integrate their tutoring in their ordinary work. Much attention has been paid to the participants of the pilot project, a fact that could have influenced their motivation and judgements about the course. According to the telephone interviews two months after the course the participants still were applying their new knowledge to their ordinary work, which indicates that the course has been successful. The good results from the evaluation of the pilot project are however, no guarantee for a further success for the CAC, due to the test character of the pilot project. Further evaluation work is needed, when the course is used as an ordinary course, in order to examine the consequences for the work situation, the workflow and the quality of the service produced to the clients. Then the consequences of the ordinary course can be compared with the analysis of the present situation, reported in this article. Further evaluation work also could examine the effects of the individual learning on the organisational learning and the work culture [17]. Learning is always effected by its context [14]. It is important for the individual learning to be supported by a relevant education organization [20]. Further development of organization of the CAC could contribute to a common learning context for the learners in the organization.

### The development of work-integrated e-learning courses compared with system development work

The registrars administrated most of the dealing with the official registers, and most of the personnel did not want to change the division of labour between the registrars and the handling officers, according to the evaluation analysis of the present situation. The project management did not seem to be quite aware of the attitudes towards dealing with official

registers among their employees and the culture in the different parts of the organisation. There was no analysis made by the project group concerning these issues. Instead the evaluation group made such an analysis, which was reported to the different groups in the project organisation and discussed. Analysis contributed to a deeper understanding of the work situation, the work process and quality aspects of dealing with official registers.

There are similarities with the process of development and use of a web-based course compared with traditional change work and systems development work. There is a need for a cautious problem analysis before the production of a system as well as a course, in order to find the most appropriate solution to the real problem. A common mistake is to suggest a technical solution to a problem, even if the root problem is of a social character [4]. If we are not thorough, we can easily be seduced by powerful software and computer technologies at the expense of issues of culture, leadership, access, change, and so on as Rosenberg [16] points out. To offer a new course to the personnel is probably not enough in order to change the work routines and the work division of the personnel. Administrative routines in the ordinary work must be adjusted in order to allow for the application of new knowledge. Learners must be motivated to take part in a course, e.g. encouraged by management, the organisational culture manifested in verbalised policies. Workplace learning is a cultural practice [19]. The cultural practice of the workplace could affect the motivation to attend a course, and to apply new knowledge to the work routines. If there are big discrepancies between the cultural practices of the workplace and the contents of an educational course, the consequences could be that the workers are not interested in taking part of the course, or are not motivated to use their new knowledge to change the work practice.

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The case study approach is one way in which such active learning strategies can be performed in technical universities. There exist a number of definitions for the term "case study". 7) encourage collaborative learning and team-working skills in the language learner; 8) get you thinking and brainstorming; 9) connect theory and practice 8) provides an integrated view of management. Managerial decision-making involves integration of theories and concepts learnt in different functional areas such as marketing and finance. The case method exposes students to this reality of management [1, 4, 5, 6, 7, 8, 16, 17].