From Paper Work to a PC World -
Online Practice for a Large on-Campus Class

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Abstract

The use of electronic communication in the course teaching practice opens new opportunities, paradigms and debates. A classical and debatable issue is using of electronic communication whether can create paperless work and effectiveness of learning and teaching environment or not. This article is writing about the analysis of online courseware for on campus students, in learning and teaching of a university college course. Communication, Environment and Project based learning (CEP) is a standard 15 ECTS course for the first year engineering students at Østfold University College of Norway. The CEP course uses an online communication center combined with traditional teaching and advising. There are approximately 150 college engineering students participated in this CEP course, and the courseware (LearingSpace) was a basic communication tool for them. The students used online courseware to restore and transfer their messages, reports and documents, though the distance was not an issue, physically. “Learning-by-doing” is an important pedagogical principle for this online CEP practice. They also intended to practice their ICT applicable skills, not only through on campus ICT training, but also through their project coordinating and reporting. The analysis of this CEP online practice was based on a survey of their feedback and their online activities. The quantitative dimensions of the course and the large number of students seemed to be the crucial issue for this electronic application, and shall be aware for further implementing.

Keywords: On campus students, online courseware, survey and feedback analysis

Introduction

Østfold University College of Norway has emphasized particularly industry contacts and used relevant industrial tasks for their engineering students. The project work is a key method and basic skill for their engineering students through all the three years. The college has a partnership agreement with 50 companies, which are considered as learning laboratories for these students. The college’s 500 engineering students are using project work as a learning method as an important part of their ordinary course activities. The students have involved in with local business companies and institution to give realistic problems to work with. The local companies also appreciated this arrangement and they seem to realize the values and experience of these students’ projects.

The CEP course is linked to textbooks and practiced in cooperation with nearby companies where the students shall address company situations relevant to chapters in the textbook, de-
scribe, analyze, compare to theory and recommend for the company in small reports (3-5 pages). Second half of the course they shall make a project work on an environmental task for the company. For the project they are asked to act as consultants, make plans, budgets, accounting, and they shall report and present their work, result and recommendations. The students intended to learn their communication and cooperation skills, not only through their lecture books, syllabus and course materials, but also through their project teamwork and their analysis report writing (Westhagen, 1999).

For engineering students, working in groups with realistic problems gives training in defining and limiting a task, develops skills in communication and co-operation, and demands practicing of leadership and reporting. The company is treated as a customer. The students often suggest a company and a problem themselves. Plans concerning results, activities and milestones, economy and time consumption shall be documented. The project result is presented in a report, is presented verbally in a lecture and is also mostly presented in an exhibition stand or on a poster. The first year project is general for all engineering directions, an environmentally focused project.

There was a new practice for CEP course in 2002, and it was introduced an online communication center combined with traditional teaching and advising. There are approximately 150 college engineering students participated in this particular CEP course, and the courseware (Learning-Space) was a basic communication tool for them. The students used this online courseware to restore and transfer their messages, reports and documents. Though the courseware (Learning-Space) is primarily a distance learning tool, it was however not an issue for this CEP course, since the course was conducted on campus physically.

A Paperless PC World

There are few intentions to reason this new practice, and paperless work is the one. There is a need to eliminate the paper work for this CEP practice, especially for a large class with over 150 students where documents in papers become difficult to administrate (Allen, 1998).

Another need is process documentation. As the students are divided into 30 groups and the group process will be a part assessment for the final evaluations. The group process includes messages, questions, comments and debates throughout the course period, and there is a clear advantage to restore such information digitally.

A classical and debatable issue is how easy or difficult this practice will be for this online approach. There might not be a general or definite answer because the answer could be different by each case, though some research papers concluded no difference between learning under two conditions, online vs. face-to-face (Smith, Smith, & Boone, 2000). However, for this CEP course practice, it is our first try for such a dimension, in terms of class size, duration and total frequencies of online activities. It is an ultimate test for the capacity for the courseware, as well as course organizing and merging online (McCray, 2000) and a try for teachers’ course development online (Torrisi-Steele & Davis, 2000).

The key questions are therefore addressed as the follows:

1. How manageable and serviceable is organizing of such a large online class with 150 students and long course period in almost 10 months?

2. How easy and available for learning of the courseware, getting familiar with LearningSpace for the most of CEP students, especially for whose without ICT backgrounds?

3. How active and dynamic in online performance of each individual and group throughout the CEP course?
4. How will the target group and users, thus the CEP teachers and students appraise such an online approach?

5. How applicable and suitable for practicing of such an online approach into this CEP course, especially for on campus students?

Upon the closed date for this paper, the online CEP course was not finished yet. However, the current analysis has evaluated the online CEP process so far and explored few details of the mentioned questions above. A questionnaire-based survey was also conducted for gathering of quantitative data.

**Online Course Organizing**

The online organization of this CEP course was rather a hierarchy-based structure, though students are encouraged to work independently and self-organized within their own groups. This organization structure is very similar as the traditional CEP course for previous years, but assigned 2 technical assistants as a supportive function. Figure 1 displays the structure of this organization. There are several groups of actors involved into this CEP course and they are:

- 2 chief teachers, responsible for the overviewed progress of the course.
- 8 assistant teachers, responsible for the comments and detailed supervising for the course progress for students.
- 150 students divided into 32 student groups, each with own group leader and secretary.
- 2 Technical assistants, responsible for the courseware and troubleshooting for students’ online activities.

It was also assigned a 2-hours introduction course of LearningSpace for every student and assistant teacher. The intention was providing the basic knowledge and elementary skills for everyone so that CEP online conducting would be smoothly, though the necessary and applicable skills must be practiced more and more lately.

There were many discussions about the access authority issues for the online virtual classroom. The courseware (LearningSpace) is constructed in many levels and options for access and different authorities can be assigned for users. In principle, this is a question about freedom and options versus disciple and limits. The more access and authorities we have assigned for users, the more freedom and options they will acquire. However, this might also bring in a negative consequence of disorganizing and confusing, especially for these new beginners. Consequently, a principle of centralized access and authority has been applied for this CEP course.

Table I illustrated the sizes and online access authority for different groups for this CEP course. The terminology of “Access” defined as the option of having access and authority to read, create and modify any document in a definite category. Correspondingly, “Read” means a user has only the possibility to read any document, but not for creating and modifying. Only chief teachers and technical assistants have the access and authorities for all course categories. Students and assistant teachers have the same access and authorities during this online CEP course.
The LearningSpace application is comprised of interconnected categories, each with its own database. Students have access to read the Schedule (Course plan), MediaCenter, CourseRoom and Profiles (with task evaluate function) modules. Chief teachers have the access to create and modify the documents in these four modules plus the Assessment Manager (task evaluate) module.

The Schedule (Course plan) presents the instructional design and structure for the course as created by an instructor. From here students are presented with learning objectives and applicable deadlines as they navigate to course materials and exercises, take tests and quizzes, and participate in surveys. The Schedule may be designed for a self-paced course or structured around specific time frames (e.g., containing modules to be completed each week). For this CEP course, there are 12 modules.

An instructor or course designer creates the MediaCenter, the knowledge base that includes all course-related content as well as access to external sources. The current CEP course has placed approximately 11 documents in this category so this option was only modestly used.

The CourseRoom is an interactive environment in which students have discussions among themselves and with the instructor as well as collaborate on team tasks and assignments. The CourseRoom provides for public and private discussions and enables collaborative learning that is both participant-to-participant and instructor-to-participant. The CourseRoom supports asynchronous collaboration as well as other synchronous collaborations. However, the current CEP course has only assigned asynchronous collaboration for the class to simplify the communication process for new beginners.

The Profiles is a collection of student and instructor descriptions that includes contact information, photographs and information about education, experience, and interests. This application allows students to create a "home page" of information about them and to identify other students with similar interests and objectives. The other important function of Profiles is task evaluating, so the students are able to receive the comments and feedback for their assignments here.

The Assessment Manager (tasks evaluate) is an evaluation tool for instructors to privately test and give feedback on participant performance. Quizzes, exams and surveys are posted in the Schedule for students, and are e-mailed back into the Assessment Manager for private review by the chief teachers, whom can review, grade and provide feedback to participants privately. For the

<table>
<thead>
<tr>
<th>TABLE I: ONLINE ACTORS’ ACCESS AND AUTHORITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total document summaries (by February 24, 2003)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course activity types</th>
<th>Course plan</th>
<th>MediaCenter</th>
<th>Course room</th>
<th>Personal profiles</th>
<th>Task evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief teachers</td>
<td>Access</td>
<td>Access</td>
<td>Access</td>
<td>Access</td>
<td>Access</td>
</tr>
<tr>
<td>Ass. Teachers</td>
<td>Read</td>
<td>Read</td>
<td>Access</td>
<td>Access</td>
<td>Read</td>
</tr>
<tr>
<td>Student access</td>
<td>Read</td>
<td>Read</td>
<td>Access</td>
<td>Access</td>
<td>Read</td>
</tr>
<tr>
<td>Actor access</td>
<td>79</td>
<td>11</td>
<td>636</td>
<td>202</td>
<td>1548</td>
</tr>
</tbody>
</table>

[1] There were totally 190 registered students in our online database. However, 30 - 40 of them were pre-course students, whom gradually left the course due to other offers. They should however not count as the regular students of this CEP course, so the real total number was 150.

[2] There is a fixed function in the courseware to generate a group task evaluation into every group members, automatically. Hence, there are many duplex or multiplex documents in this category.
current CEP course, both quizzes and a questionnaire-based survey have been conducted throughout this option.

The total documents and actors are also summarized in this table. A document defines as one single writing message, with or without attachment that sent in the virtual classroom by an online user, either a teacher or a student. A document could be a part or section of syllabus, or an assignment, a question, a comment, an answer, or a message. Thus, the number of documents for an online course indicates, from a quantitative aspect, how extent and active the course has been.

There is a clear distinction of document distributions for this online CEP course, see table I. The distributions are 79 for schedule, 11 for media center, 636 for course room, 202 for profiles and 1548 for assessment. This indicates a fact that the most extent and active processes are taking place in course room and assessment (task evaluating), and the least active usage was media center.

**Online Activity Statistics**

The course room is indeed expected to be the most active arena for online users. The current analysis will therefore focus much on this arena. This online CEP course used asynchronous collaboration and writing based document was the basic communication elements. This provides an easy access for secondary data collection, thus good resources for online activity statistics.

The greatest advantage of such online activity statistics is easiness for data collection, since every writing document will be recorded automatically in the database. However, there is a disadvantage of this method, which the detailed content of each document is accounted in the analysis. It is therefore necessary to undertake a questionnaire-based survey to support the quantitative analysis.

It is also important to clarify the definitions of statistical results. A statistical analysis can only be a simple game of numbers, without these definitions.

An online activity statistic can therefore consist of the following elements:

1. An online activity or frequency is a document or message sent or transferred by a course user, a teacher, a student or a student group.
2. An active student is an online student whom, not only participate in and read an online course's documents or messages, but also has sent one or more document or message to his/her online classmates or teachers.
3. An active day is a day when document or message transferring has been recorded in an online classroom.

Table II has summarized online activity statistics for this CEP course, updated by February 24, 2003. The statistic of active actors indicates most of online users, thus teachers, assistant teachers, students and student groups have indeed been active in this online CEP course to some extent.

<table>
<thead>
<tr>
<th>Online actors</th>
<th>Chief Teacher</th>
<th>Assisted Teacher</th>
<th>Tech. assistant</th>
<th>Total students</th>
<th>Total groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>150</td>
<td>32</td>
</tr>
<tr>
<td>Active actors</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>110</td>
<td>32</td>
</tr>
<tr>
<td>Frequencies</td>
<td>74</td>
<td>86</td>
<td>2</td>
<td>474</td>
<td>381</td>
</tr>
<tr>
<td>Average total</td>
<td>37</td>
<td>10</td>
<td>1</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Most active</td>
<td>64</td>
<td>30</td>
<td>1</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Least active</td>
<td>10</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
It is however a clear distinction between these actors in their activity levels. The differences can be observed by the frequencies of their document online forwarding, both in average and in most active frequency account. A comparison of these statistical results can be summarized as the follows:

- A majority of registered online users were or had been active once throughout the CEP course. However, there was one assistant teacher and 40 students, whom were observed as inactive users. They never sent a document throughout the course, though they might have visited the course’s virtual classroom and read the content.
- The chief teachers are clearly the most engaged group in this CEP course (average 37, most active 64 and least active 10), followed by assistant teachers (average 10, most active 30 and least active 0).
- The students are the least active and engaged online individuals (average 4, most active 21 and least active 1). This distribution is expected, but not wished.
- However, the student activities in their group level were better performed than their individual level (average 11, most active 22 and least active 1).

It is also noticeable to observe a fact that online activity levels for assistant teachers and student groups are approximately the same, both in average (10 vs.11), most active (30 vs.22) and least active (0 vs.1). This was matched with the managing structure of CEP course, as the assistant teachers were supposed to be the main actors or supervisors for student groups. The most assigned communication events were processed between these two groups.

Another approach of online activity statistics is examining the activity details for the whole CEP class. Table III has listed a number of indicators and their statistical outcomes:

<table>
<thead>
<tr>
<th>Activities by weekday</th>
<th>Mon Day</th>
<th>Tues day</th>
<th>Wed day</th>
<th>Thu day</th>
<th>Fri day</th>
<th>Sat day</th>
<th>Sun day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>137</td>
<td>123</td>
<td>130</td>
<td>131</td>
<td>110</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Frequency</td>
<td>44</td>
<td>31</td>
<td>21</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>Activity types</td>
<td>Discussion</td>
<td>Comment</td>
<td>Assignment</td>
<td>Original</td>
<td>Modified</td>
<td>Locked</td>
<td>Attachment</td>
</tr>
<tr>
<td>Frequency</td>
<td>56</td>
<td>194</td>
<td>386</td>
<td>304</td>
<td>332</td>
<td>423</td>
<td>370</td>
</tr>
</tbody>
</table>

These frequency figures indicate the most active days when frequencies of documents reached the high level.
• **Assignment deadline:**

  This is a list over deadlines for assignments, used as references for analysis. Compared with the previous indicator, it is easy to notice that the most active date often appeared right before the deadlines.

• **Activity types:**

  This indicator classifies the documents after their nature and belongs. As we can see, most of documents were sent locked function, which can be read only by own group members and teachers. It is also noticeable that most students used this online courseware mainly for their assignments, and relatively modest for other functions (386 assignments, 56 discussions and 196 comments).

Upon to February 24, 2003, there has been totally 106 active days for this CEP course. The total calendar days of the same period were 179 days, so the online active days for this CEP accounted 59%. This was an active level above the average, but not in advanced. The overall statistical analysis for this CEP course so far has confirmed this temporary conclusion.

### The Questionnaire Survey

A questionnaire-based survey was assigned for qualitative data. The questionnaire was designed as a middle term evaluation for CEP and the survey was conducted on January 2003. There were 11 questions, which 5 were open and 6 were closed. There were 127 students participated in the survey, with a respond rate in 85%, which was a quite nice rate. Table IV displays the outcomes of these 6 closed questions.

The outcomes in table IV can be summarized the follows:

• **For question 1:** Were you visited CEP course online before today? The answers were clear and concentrated. Majority of the class did so, and only one student was not online the survey day.

• **For question 2:** Have you been work CEP online actively and written any document? The answers were divided, though majority of students did write once online.

• **For question 4:** Did you have any trouble with your PC or network during your online CEP visits? The same (57 vs. 70) rate was observed for the question 4: Did you have any trouble with your PC or network during your online CEP visits?

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**TABLE IV: Online survey for CEP course (for closed questions)**

<table>
<thead>
<tr>
<th>Question</th>
<th>1. Online experience</th>
<th>2. Online active written</th>
<th>3. Start module read</th>
<th>4. PC or network troubles</th>
<th>5. Course ware troubles</th>
<th>6. How often were you online weekly?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>126</td>
<td>97</td>
<td>71</td>
<td>57</td>
<td>90</td>
<td>1-5 times (6)</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>30</td>
<td>56</td>
<td>70</td>
<td>37</td>
<td>6-20 times (69)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21-30 times (52)</td>
</tr>
</tbody>
</table>
• As expected, there were a large number of online users whom did experience the problems or
trouble with courseware (90 vs.37). However, there are over one third of class (37 users) did
not think there was a problem to work with courseware. This is also a positive signal for the
online CEP practice.

It was a more challenged task to summarize the answers for open questions. The document con-
tains 61 pages, over 3000 lines and 13 000 words, and the answers included many opinions and
were spread over different directions. For simplifying the analysis, table V displays a statistic for
key words from the an-
swers of these open ques-
tions.

For these open questions,
the students were asked to
point out or mention
whether the problems they
met during the CEP course
or the improvement they
want to suggest. With 127
answers for each question, it was almost impossible to
quantify the answers, or
summarized them in a
short content. The key
word statistic, will on the
other hand, address the
main directions where the
most answers might intend
to be.

A detailed analysis of in-
formation in table V can
be listed as the following
points:

• Question 7: Which PC
or network problems
did you experience
during the CEP online course?

Courseware LearningSpace was mentioned most frequently (25), followed by PC (23) and
log in (16). There were however, few mentioned/experienced sever (3) as a problem. This
outcome also indicates the difficulty for many students to distinguish the problems of
courseware and problems of PC/network.

• Question 8: Which courseware problems did you experience during the CEP online course?

Generally feeling difficult (42) was the most common answer, followed by other negative ex-
periences. The total key words in positive answers for this question were 11
(handly+OK+good).

• Question 9: Please mention 2 positive aspects/experiences during this CEP online course.

Again, courseware, PC and online were not so popular, but group and quiz were appraised
positively by students.
• Question 10: Please mention 2 negative aspects or experiences during this CEP online course.

It is understandable the courseware was again target as a negative practice (52). It is however surprised to notice the word “quiz” also was mentioned 21 times among the answers for this question.

• Question 11: Please suggest 3 aspects or elements of further improvement for next CEP course.

Similarly as the other answers, the courseware is the key element for further improvement.

As mentioned early, this online CEP practice was an ultimate test for the capacity for the courseware, as well as course organizing. It is therefore expected and understandable to notice negative experience and criticism. Upon to the closed date of this paper, this online CEP course is not finished yet, so it is too early to draw the final conclusions. It is however, reasonable to summarize the temporary data analysis and address the following remarks for the 5 key research questions:

1. How manageable and serviceable is organizing of such a large online class with 150 students and long course period in almost 10 months?

It was a challenge to organizing of a large online class with 150 students manageably and serviceably. It requires the total and integrated efforts, not from chief teachers, but also assistant teachers and technical assistant, and most of all, students, especially when the course lasting 10 months.

2. How easy and available for learning of the courseware, getting familiar with LearningSpace for the most of CEP students, especially for whose without ICT backgrounds?

It was not easy to learn and use properly the courseware. It also required patience or maybe ICT basic knowledge to learn the courseware for many.

3. How active and dynamic in online performance of each individual and group throughout the CEP course?

It was much divided online activity levels among the users. The chief teachers are the most active, but the students were the least, so the balance between them should be adjusted.

4. How will the target group and users, thus the CEP teachers and students appraise such an online approach?

The general appraisal for the courseware was not positive with many criticisms and frustrations. However, there were considerably many users did manage the courseware (37 for open question 5) well.

5. How applicable and suitable for practicing of such an online approach into this CEP course, especially for on campus students?

Based the survey outcomes and general opinions among the students, it seemed to be a negative answer for the question of appropriateness and suitability for further online CEP practice. However, the brightness of this issue was the most students also wished to improve this courseware for next uses. It is therefore a question of further improvement.

There were few intentions to reason this online CEP practice. Paperless work and process documentation were among the two most essential. It is reasonable to believe these two intentions have been achieved to some extent during this online CEP practice, at the least the latter one. The current analysis was used the data from this process.

For further in-depth analysis, it is recommended to sample few pilot student groups to investigate their survey responses and comments, combined with interviews. It was not clarified whether it is
distressing of technical difficulties or lack of motivations for online learning among the negative comments. The interviews might be a good way to find out the answer to this question.

There are and will be however, many new questions, problems and paradigms appeared continually for this online CEP practice and this perhaps is the nature of online course, that we all shall understand and deal with in the future.

References


Biographies

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