Web-based Learning in Teacher Education – Advanced Technology and Appropriate Tackling

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ABSTRACT

Early childhood teacher education in Norway is on-demand education defined by the Norwegian government. As a result, the vocational training for on-job early childhood teachers is an attractive and necessary education offer for this target teacher group. It is a natural thought to apply advanced technology, such as online or computer-assisted learning, in this kind of education offer so this education offer becomes accessible and affordable for teachers. There are however, many challenges and debatable issues for such an approach, for example, how to handling advanced technology and bringing motivations among the learners to work online and become familiar with computers. Is this a powerful weapon to support their learning environment or just a stressful wagon to drive them into confusion? The present study has introduced and analyzed a case of online and computer-assisted learning for such vocational teacher training at Østfold University College. The case was sampled from an early childhood teacher class with 20 on-job vocational teachers. It was applied online web-based virtual classroom, combined with face-to-face meetings throughout the training period. There were 4 major topics, Pedagogical Education, Mathematics, English and Norwegian, which divided into 4 independent courses, each with an own online web-based virtual classroom. The analysis focuses on candidates' expectations, their online class performance, their feedback and comments to the courses, and how their online behavior similarly contra differently at their each course or topic.

KEY WORDS

Web-based learning, pedagogical education, online class performance, data analysis.

1. INTRODUCTION

The age 0 - 3 years is an important epoch in a child's life. It must therefore be a central task for society to prepare the conditions for children's optimal development. The Norwegian law about early childhood day-care centers has therefore emphasized the aspect of giving children below compulsory school age good possibilities for development and activity in cooperation with the children's homes. A general plan for further education unit in early childhood pedagogy - pedagogical work with children in Norway below the age of 3 was initiated in 1997 [1].

As a result, the day-care centers became an educational offer to children between 1 and 5 years, which in its turn means new challenges for the day-care staff. The change in the distribution of age groups in the day-care nurseries will also mean a change in pedagogical contents [2] and forms of work with the children as the central point. From these perspectives it is of vital importance to make the early childhood teachers able to meet the 0-3 year's old children's needs in the day-care nurseries.

A large number of on-job early childhood teachers need therefore vocational training, so this education is now on-demand in Norway. Consequently, Østfold University College has continually conducted this vocation training for years [3], based on leisure time and evening lectures. For the academic year of 2002/2003, this offer was also combined with web-based learning practice online. The project was approved and received sponsorship from the Norwegian National Distance Education Network in Higher Education, so it seems to be a promised project.

There are however, still many debatable issues and questions around this practice. Many are hesitated to use this web-based learning practice and reluctance for learning new technology is always a part of nature for many people. It is therefore important to undertake continually the analysis and evaluations for such practice, so there are sufficient data and information facts for the debates. The present study will hence analyze the process of this practice and evaluate this new practice.

Both qualitative and quantitative methods are used for the analysis. The qualitative and descriptive information of candidates' expectations, feedback and comments are gathered by the pre-designed questionnaires. The quantitative analysis focuses on their online performance and behavior, based on their writings and visit statistics.

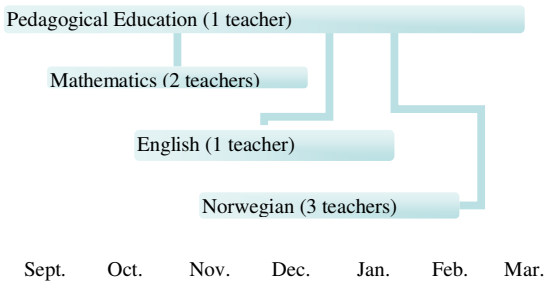
2. THE STRUCTURE OF COURSES

There were 20 on-jobs early childhood teachers registered in this web-based learning environment and practice. The vocation program was designed thematically into 4 independent online courses [4], [5], [6], [7] and every candidate must participate in and accomplish each course to receive their final degree. The designed courses are:

- Pedagogical Education (1 teacher)
- Mathematics (2 teachers)
- English (1 teacher)
- Norwegian (3 teachers)

The program has started on September 2002 and will be finished by March 2003 [8], with final writing exams. The structure and progress of course program are illustrated in figure 1 below.

Figure 1. Structure and schedules of course program



Pedagogical education is the main course of this program and will be therefore conducted throughout the whole period. The students will consecutively undertake the other specific courses, as Mathematics, English and Norwegian, which was taught intensively for a month or two. In the meantime, the students would go back to their workplace and continue their daily practices.

There is no obligated assignment throughout theses courses, so the students are supposed to work with course materials voluntarily. There are however assigned a number of required face-to-face gatherings, and 7 of them were conducted. The intention was to summarize the course progress during each phase and collect feedback or comments from the students. There has been distributed and collected in answers for pre-designed questionnaires during every gathering.

The data information contains also students' expectations, their online class performance in statistical summaries. The statistical measurements are based their active document frequencies and their read only frequencies. It is intended to analyze their group online activities in their different courses and phases.

3. THE STUDENTS' EXPECTATIONS

There has been a part of standard schedules for the online course practice that a survey of students' expectations to the course will always be conducted at the beginning of the course. The intention is getting familiar with students and identifying their needs, so the later on, it can be easy to compare with final evaluation outcomes.

TABLE I
A selected quotation of students' expectations

Question 1: What general expectations do you have for this course program?
• My expectation to this course is learning more about learning skills for all related topics and disciplines for the early childhood major, especially to particular topics and learning skill methods. • Learning more about teaching for Norwegian, Mathematics and English. Looking forward to discussing and experience exchanges on read and writing ability learning. Wish to be comfortable with my own teaching subjects when I learned these mentioned. • Increasing knowledge for Norwegian and Mathematics, both in theoretical and practical skills. Learn how to work with subjects of different themes. Looking forward to learn more the English topic. • I hope the course will provide me more opportunities and flexibility. Face-to-face gatherings are tough for me, beside of my daily duties to work, wife and kids. • Hope to learn as much as possible and it will be exciting to "go to the college" online.
Question 2: What specific expectations do you have for this web-based learning practice in this course program?
• I look forward to use computer more, and I wish to learn my computer skills well. Get rid of the technical errors at the beginning. I believe the computer works well as a tool, when you can mange it. • I wish to be good at computer using. With this online learning, I will be "forced" to use computer. It makes me feel a lot of safe to being in a group and work with others. It is good to exchange experiences with other students online. • I consider myself will be good enough to complete the course and learn knowledge, so I just throw myself on the computer and grasp any learning opportunities there. • That one can cooperate equally well in a cyberspace as in a face-to-face learning environment. • Exciting for what's end up and how this works in practice.

There were merely two open questions for this survey. Question 1 collected their general expectations to the courses and question 2 focused on their expectations to this online practice. Table I has selected and listed 5 sampled answers (in Norwegian) from each question at the first days of the program.

There were 16 students responded this survey, so the respond rate was 80%. Generally, these answers are well positive, engaged and detailed related, which again, indicate the positive attitudes among the students. These answers also addressed their anxiety, needs and wishes, specifically for this web-based learning practice.

Another analysis is frequent key word accounting, thus a summary of the most relevant key words in their answers

to these expectations. The most relevant and essential key were accounted and summarized in table II and such statistics will also indicate certain potential of answers' directions.

TABLE II

Selected students' key expectation words to the courses

Mentioned word in question 1	Learn more	Methods	Norwegian	Exciting	English
Frequency	9	6	4	4	3
Mentioned word in question 1	Mathematics	Lectures	Discussions	Interesting	Theories
Frequency	2	2	2	2	1
Mentioned word in question 2	PC	Usage	Online	Tools	Exciting
Frequency	20	14	7	4	4
Mentioned word in question 2	Knowledge	Support or help	Looking forward	Communication	Interesting
Frequency	2	2	2	1	0

As the statistics in table II illustrated, the students' general expectations to the courses, referred to question 1, are much focused on learning, methodology and these specific courses (9,6,4,3,2), but little on lectures, discussions and theories (2,2,1).

Similarly, their specific expectations to this online practice are much application focused, as word PC, usage, online and tools are all among the most frequently appeared in their answers (20, 14, 7, and 4). On the other hand, less mentioned are knowledge, support/help, looking forward and communication (2, 2, 2, and 1).

The word "Exciting" appeared 4 times, a considerable frequency for answers to both questions. The word "Interesting" was however mentioned only once to question 1. Does this mean the students want to learn new things (exciting), but they temporarily know little about what they will learn (interesting)?

4. A SUMMARY OF ONLINE SURVEYS

As a requirement from the project sponsor, the Norwegian National Distance Education Network in Higher Education, this web-based learning practice must commit a good portion of resources for analysis and evaluations. There was therefore assigned monthly surveys for gathering the data and use information for this practice.

By the end of February 2003, there has been conducted and collected 7 questionnaire based surveys for students' feedback and comments for course practice. Table III has listed a summary of selected key words and total words accounted in the questions of these surveys. Combined with detailed analysis of the answers from these surveys, this is a simple way to depict the directions of overall respondents' feedback and comments.

Initially, there were only 2 simple questions for the students. The number of questions was however expanded to 5 by the end. The original questions were asked as:

- Please mention 3 positive elements for the period
- Please mention 3 negative elements for the period
- Please suggest any further improvement
- How would you appraise your own efforts so far?
- How would you consider using this practice future?
- How many hours did you spend for courses weekly?
- How many times did visit the course online weekly?

The key words for these questions are displayed on top of each survey in table III.

For summary of the answers, there are 3 elementary parameters assigned as the key and total words accounted, and they are: PC, Online and total words. The selection is based on a method that assumes the more frequencies a selected word appeared, the more indication it addresses to. The total words for a particular answer show the engagement and emphasis of the respondents' efforts to answer.

TABLE III

Selected key and total words accounted in the surveys

Question September 9 answers total words	Positive PC 4 Online 8 264	Negative PC 1 Online 0 97			
Question October 2 answers total words	Positive PC 0 Online 1 58	Negative PC 1 Online 1 90	Improve PC 1 Online 1 93		
Question October 11 answers total words	Positive PC 2 Online 1 307	Negative PC 1 Online 8 241	Improve PC 2 Online 1 28		
Question November 10 answers total words	Positive PC 2 Online 3 476	Negative PC 1 Online 9 284	Improve PC 1 Online 4 321		
Question December 2 teachers total words	Positive PC 0 Online 0 70	Negative PC 0 Online 3 62	Improve PC 0 Online 1 105	Efforts? PC 0 Online 74	Use? PC 0 Online 0 91
Question January 11 answers total words	Positive PC 0 Online 9 409	Negative PC 0 Online 2 140	Improve PC 0 Online 4 163	Efforts? PC 0 Online 2 289	PC 0 Online 5
Question February 18 answers total words	Positive PC 1 Online16 899	Negative PC 1 Online 5 495	Improve PC 0 Online 5 441	Hours/w 3: < 1 15: 1-10 0: > 10	Online/w 3: < 1 13: 1-10 2: >10
Total accounted	PC 9 Online 38 2483	PC 5 Online 28 914	PC 4 Online 16 1151	PC 0 Online 2 363	PC 0 Online 5 91

Table III has illustrated a statistical summary for the frequencies of appearance of these selected words throughout each answer for every survey. There are many interpretations can be addressed throughout the details of this summary.

First of all, let us look at the activity levels of respondents (in their number of answers). It seems to be an up-don-up again development throughout these 7 surveys.

As mentioned, 16 students engaged in the expectation survey, so this was a good respond rate. The number has however declined down to 9 for the first feedback survey, and even further down to 2 for October survey.

It was made efforts to promote students' activities from the chief teacher and online instructor, so the engagement level was better up to 11, 10, and 11 from later October to January. The last survey did collect the most respond rate, with 18 respondents (90%), a real progress.

Next focus can be moved to total accounted key and total words selected. It is reasonable to conclude generally that the positive feedback and comments dominated the negative by all 3 elements accounted. This can also be verified by detailed reviewing of individual's feedback and comments, which indicated most students are enthusiastic and engaged, at least by their wording.

PC seems not to be a big issue for the most, but the word online has appeared more frequently. There is an interesting digression to compare the word of PC with online. It may seem not to be easy to distinguish the differences for people without ICT backgrounds, since majority of online activities go usually through a PC. However, the word PC was not mentioned very often after the December survey (only twice in the February survey). This change may indicate a learning progress for respondents whom have gradually become aware of this distinction.

As a general conclusion for the surveys, the students seemed to be satisfied and engaged for this course program and its practice. Their answers seemed to be dominated by the positive outcomes and enthusiastic attitudes, though few negative elements were also mentioned. However, the respond rates have been varied from as high as 90% (18 respondents) to as low as 10% (2 respondents). Hence, there is still a need to combine with other analytical approaches to reveal the process of this practice.

It could be also be questionable to draw the final conclusions only based on respondents' purely subjective opinions and answers. What they think, what they believe and what they believe are not always matched with the real world where they live in. For this matter, it can be reasonable to combine the analysis with observation and quantitative measurements.

Few parameters can be applied for the quantitative measurements. The current study has used active writing account and read only online statistic, both are observation based and collected automatically by the courseware.

5. ONLINE ACTIVITY ACCOUNTS

Online activity account for the current analysis is a self-defined and self-explored quantitative method to measure the activity levels of online users. There are two major types of activity accounts, thus active writing accounts and passive read only accounts.

Writing documents and asynchronous communication are the central content and form of this web-based learning practice. It was therefore simple to record, mark out and summarize the document and online traffic accounts throughout the course period.

TABLE IV
Active online writing frequency account

Program	Ped. Ed.	Math.	English	Norw.	Sum
Course					
Schedule	13	16	17	22	68
Classroom	275	28	51	113	467
Course sum	288	44	68	135	535
Classroom					
Discussion	61	12	21	34	122
Comment	208	7	22	70	307
Duty task	6	9	8	9	31
Class sum	275	28	51	113	460
Weekdays					
Monday	22	6	12	15	55
Tuesday	40	4	14	8	66
Wednesday	66	11	7	11	95
Thursday	22	1	7	16	46
Friday	4	0	6	20	30
Saturday	111	1	1	12	125
Sunday	10	5	4	31	50
Class sum	275	28	51	113	467

The total active writing document accounts for all 4 courses are displayed in table IV (the statistic was updated on 28 February 2003, thought the courses are not completed yet by the date). There are 3 groups to classify the data, by course, by classroom and by weekdays.

1. By course

There are two major sections to group the documents, schedule and classroom. The schedule is assigned for reading materials and syllabus only, so students can only read the information in this section. The classroom, on the other hand, is a free space available for students to create and send their messages, questions, answers and tasks. Generally, the course syllabus can be reviewed through the schedule and the online class activities can be summarized through the classroom.

From the mentioned points of view, it can be observed the syllabus for these 4 courses have approximately the same loads, from 13 to 22 documents, but their class activities are rather more different by class activities accounts. The highest was the Pedagogical Education with 275 frequencies, followed by the Norwegian with 113, than the English's 51 and Mathematics' 28.

2. By classroom

The classroom is the most active place for a virtual classroom because most activities during the course would be occurred here. There are still many subsections in the classroom, where the most common types are discussion, comment and task (assignment).

Discussion usually applies for original message or document, as a question, inquiry or any initiative matter. It tells therefore how proactive an online environment is. Similarly, comment is defined as a reply or answer to any question or initiative matter, so it indicates how reactive this online environment supposed to be. Finally, task (assignment) is used for duty task, so this indicator may show how much work loading has been for students. It is not essential for this course program anyway, since there is no requirement for obligated tasks.

Reviewing the summaries and details of these types of document accounts in table VI, is shows again, the same potential that Pedagogical Education led the document frequency in discussion and comment (61, 208), followed by the Norwegian (34, 70), than the English (21, 22) and Mathematics (12, 7).

3. By weekdays

One of the important criteria of requirements from Norwegian National Distance Education Network in Higher Education to this project is identifying and mapping the detailed information of online users, as who they are, how they work online, where and when they actually work online and offline. The weekday's accounts are designed for this purpose.

Combined with course arrangement and practical information for each gathering, it will be easy to identify and track up the most active versus the least active weekdays of students' online work.

For the total active writing document accounts, Saturday seems to be the most busy, thus active weekdays (125), followed by Wednesday (95) and Tuesday (66). The least active weekday is Friday (30). This activity concentration can be true since the face-to-face gatherings are assigned on Saturday, so it will be nature for the students to work intensively online during the gatherings. There was however, only one document on Saturday for the English and the Mathematics, respectively, but this means students were not depended online to follow these two courses, even during their gatherings.

Reviewing the above analysis for writing document accounts, the active online class activities can be concluded as the follows:

- There were activities in the classroom, though the levels can be expected higher.
- The most active type of documents is comment, defined as reactive activities among the students.
- Saturday seems to be the busy and active for the students, and this may have connections with the face-to-face gatherings on the same day.

6. READ ONLY ACTIVITY ACCOUNTS

There is also a way to summarize the online reading traffic accounts throughout the course period. The course database has automatically recorded every online visitor and their times, types and their identities. This information can be used to analyze the online activity in read only accounts.

A sample of this method was illustrated in table V, where read only online activity frequency accounts for the course Pedagogical Education is displayed by schedule, classroom and profile. The data was registered in 3 different periods, but they all show a same tendency, that the most active frequency accounts are noticed in schedule. This means the schedule, where the course syllabus was settled, was the most frequently visited, again, indicates the major online activities focused on syllabus, but not much on discussion and interdependent communications.

TABLE V

Read only online activity frequency account by course sampled from the Pedagogical Education

Period	9/23-10/9 + 10/17-11/3	11/3–12/2	12/2-12/11	Sum
Schedule	2800	905	274	3979
Classroom	1989	261	56	2306
Profile	2717	304	68	3089
Course sum	7506	1470	398	9374

Another sample of the same method was read only activities by daytime. This information is important for answering the questions like when the online users are most active working online or offline. A detailed sample of this frequency account was listed in table VI. The ranking of daytime shows the 12 most active read only frequencies.

TABLE VI

Read only online activity frequency account by daytime sampled from the Pedagogical Education

Daytime	Frequency	Daytime	Frequency	Ranking
0000	67	1200	326	1500
0100	0	1300	227	1900
0200	6	1400	252	1700
0300	0	1500	437	1800
0400	0	1600	300	1200
0500	0	1700	366	2000
0600	0	1800	327	1600
0700	0	1900	384	2200
0800	26	2000	308	1400
0900	42	2100	205	1300
1000	70	2200	300	2100
1100	184	2300	120	1100

According to the rankings list, the most active read only activity seems to be the hours after evening meal. This activity interval also tends to be the most integrated (3 hours).

By sides, lunch hour (1200), afternoon (1400, 1500, and 1600) and later night (2200) are active intervals. It is a definitely low level of activity early in the morning or before noon. There is almost no read activity between 0100-0700, which may indicate the most students have a regular life or working routine for their every day.

7. CONCLUSIONS AND SUGGESTIONS

Though this web-based learning practice is not finished by the closed date for this paper, it is reasonable to summarize few temporary conclusions and suggestions:

- The most learners are motivated and appreciated for this web-based learning practice, and they have relevant and detailed expectations.
- It is possible and applicable to convert a traditional teacher education program online or adopt the syllabuses into web-based learning practice.
- It is also appropriate to introduce web technology for on-job learners with slightly or none ICT backgrounds. However, the face-to-face introduction and instruction lectures are the essential keys for success.
- The online activities have been an up-down-up progress. There is apparently a need for detailed following up assistance.
- It is important to have monthly evaluations, but it is even more important disseminate the evaluations' outcome to the learners soon.
- It is necessary to assign a number of obligated assignments in order to stress the learners and their motivations for work online.

The potential of this online practice can be good and this opening will surely provide more opportunities for on-job learners. It is therefore a challengeable, but important task for online researchers to analyze and evaluate such pilot projects, so the experiences and improvement will benefit the practice next time.

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REFERENCES

[1] The Norwegian government's St. melding nr.52 (1996-1997). http://odin.dep.no/ufd/norsk/publ/stmeld/014005-040010/index-dok000-b-n-a.html

[2] http://www.hiof.no/english/avd/ects_foer.htm

[3] http://www.lu.hiof.no/lu/skut/

[4] http://www.hiof.no/english/avd/ects_foer.htm#1

[5] http://www.hiof.no/english/avd/ects_foer.htm#8

[6] http://www.hiof.no/english/avd/ects_alm.htm#17

[7] http://www.hiof.no/english/avd/ects_foer.htm#9

[8] http://toralf.hiof.no/~gan/SOFF-PAPS2/index.html