

## SPINNING YOUR COURSE INTO A WEB CLASSROOM - ADVANTAGES AND CHALLENGES

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**Abstract** — *Web based online course becomes a new generation of distance and asynchronous learning. A rapid development in web technology and its applications widen the variation and offers of online course. However, the advantages and challenges of teaching a course online shall be addressed when implementing. It is also important to address what main differences an online course will make when compared with teaching a course in a traditional classroom. This article is writing about the data analysis on few sampled online courses and the analysis was focused on the class performance by 3 statistical surveys in numbers of registered documents throughout an online course. The analysis illustrated the advantages in teaching a web based online course, as the natural part of an online world. The analysis also showed some challenges in an online course, which are different from a traditional classroom based course.*

*Index Terms* - asynchronous learning, class performance, data analysis, online course.

### ONLINE COURSE - ENTHUSIASM OR SKEPTICISM

Web based online course becomes a popular alternative of course delivery for many educators. A rapid development in web technology provides a wider opening for delivery of different courses online. There is little doubt about the future prospective for web applications in teaching and implementing an online course.

However, the experiences and opinions of web based online course are widely divided among the users. There are both enthusiasm and skepticism attitudes toward this new way of teaching and learning. Many research papers were also published, the conclusions of these papers are also widely divided and many aspects are brought in [3]-[9]. Some are well optimism for web applications and believe the traditional classroom based courses will be gradually replaced by these new applications [13]. Others are more critical against the negative effect of "high-tech" issues during the implementation of an online course. Indeed, we should never underestimate the technical difficulties for a web based online course, as well as the closeness of a direct or face-to-face contact in a traditional classroom [6]-[12]. Some researchers concluded that by using online technology for delivery a course, the traditional teaching culture (teacher centered) will be challenged by a new teaching culture

(student centered) because students have more flexibility to question and participate in a course online [14].

Another phenomenon is that few of these research papers have focused on systematic analysis [6], especially a quantitative approach or a statistical survey. The research of online course is still in an anthropology stage and analysis was usually conducted case by case. There is a need to clarify and summarize the advantages and challenges of teaching a web based online course, and address what are differences when compared with teaching a traditional classroom based course and such differences shall also be able to illustrate by a statistical survey.

The current study is a summary of the data analysis on few sampled college online courses. The data analysis focuses on the classroom performance and activities in an online environment. Throughout the data analysis, we will discuss the advantages and challenges of these web based online courses, in course designing and teaching, especially in effectiveness of teaching.

### ONLINE ACTIVITIES - ACTIVE AND PASSIVE

One of basic questions for teaching activities is effectiveness and its measurement. Traditionally, we have different forms of evaluations for effectiveness measurement, which applies both for students and teachers. For example, we require our students to complete their a relevant assignments after each chapter in order to check their understanding and ability to implementing for the content of that chapter. By the end of lecture term, our student will evaluate their teacher's performance through a survey questionnaire.

A practical dilemma for a such evaluation form is the response rate. As a college teacher, we all are probably familiar with problems of response rate, both in terms of gathering student assignment delivery during a course and collecting teacher evaluation questionnaire by the end of a course. The only solution we usually have to come up, is to define these assignments and evaluations as a student's duties, so in a way, force them to complete these tasks.

Online course offers a great advantage in data collection, compared with a traditional classroom situation. During an online course process, every online activity will be recorded and registered in the course database, so that it will be easy documentation to track back. In a way, this is a kind of secondary data collection. However, it will be as much up-dated as the primary data collection.

Before we initiate the online course data collection, we probably need to define some measurable parameters for an online course. We can define an online class performance in the following ways:

- An active activity is a document or message transferred by a course participant, either by an online teacher, an online student or by an online student group.
- An active day is a day when document or message transferring has been recorded in an online classroom.
- 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 a document or message to his/her online classmates or teachers.

We can image a similar situation for these definitions in a traditional classroom. An active activity will then be any activity in a class, such as lecturing a topic, writing a note or an equation on the blackboard, raising up a question for teacher or classmates, etc. In a traditional classroom, these activities will be formulated in different ways, as oral, virtual, or two-way communication. On contrast, these activities can only be formulated or recorded in a documentation format. This kind of format will offer the great advantage in data collection. However, it will also result some challenges for communication between online students and their teacher [7].

As supplement for these active definitions, we can also define an passive activity in this way:

- An passive activity is number of web pages in an online course that has been read or browsed by an online student.

Every time an online student has entered an online classroom, his/her online activities will be recorded and registered by the course database. The registration will also, depends on types of courseware, be able to record this student's "indirect" activities, such as number of web pages has been displayed on receiver's PC screen, which can be used as an indicator for counting on number of read web pages. We can name these "indirect" activities as "passive" activities.

In this way, we can "see" an online student's "passive" activities. A similar situation for a traditional classroom will be a student's appearance in a classroom, without asking any question or participating in any discussion during the class hours. Hence, the definition of "passive" will provide a wider content than the word itself, because we know that even that student is silent and not saying any thing, it does not mean that student is not actively engaged in the course progress. That student can still be a good student and read a lot of course materials. However, by checking number of read web pages, we will be able to know that student's course engagement in this specific aspect.

By clarifying the above definitions, we have established a quantitative approach to measure an online class performance. We can measure an online class performance, simply by counting the number of these online activities as

dependent variables, and their different grouping as independent variables.

### CLASS PERFORMANCE - STATISTICAL SURVEYS

4 college's online courses were used for the statistical survey. All course participants are college's part-time students and they are located in different regions of Norway. Internet is the only place where they meet together without getting away from their daily duties. The online courseware is Lotus LearningSpace Forum and these 4 courses are:

- Pre-course mathematics
- Mathematics method 1
- Physics I
- Physics II

Basically, the online student activities consist of similar class activities as a traditional class lecture, such as reading lecture materials, accomplishing assignments, discussing with classmates, asking questions for teachers and reporting troubles. For online teachers, the main activities will be answering questions from students and commenting their assignments. The main difference, compared with a traditional class lecture, will be the ways of communication, which are mainly documentation based for an online class, while a traditional class lecture is undertaken with many oral and spontaneous interactions as well.

Table I shows a statistical survey over the active class performance for these 4 online courses. It means this survey is focused on the measurement in counting the numbers of documents that were transferred during the courses.

TABLE I  
Online Class Performance Analysis I - Active Activities

Course Name	Pre-Math.	Math.I	Physics I	Physics II
Active Period	2000/9/1 - 2001/4/30	2001/1/5 - 2001/4/30	2000/9/13- 2001/2/2	2001/1/18- 2001/4/30
Student number	16	7	31	24
Active days	79	22	93	51
Total documents	138	38	350	135
Average documents each student	9	5	11	6
Average documents each active day	2	2	4	3
Total discussion documents	65	15	204	87
Open documents	45	13	106	62
Percentage for open documents	69%	87%	52%	71%
Teacher documents	21	11	94	71
Open teacher documents	18	10	66	56
Percentage for teacher documents	32 %	73 %	46 %	82 %

Pre-Math. (Pre-Course Mathematics)  
Math. I (Mathematics Method 1)

It should be noticed that a document could be as short as one sentence or as long as 10 pages, so counting the number of documents transferring will only reflect the class performance and activity level in one particular aspect. It is not necessarily true that a most active online student whom sent most number of documents. However, in most cases, the most active student is also the one whom sent many documents.

In addition, the passive class performance was also measured by counting the numbers of web pages that were read or browsed by a particular student or the whole class. Table II shows a statistical survey over such passive class performance for these 4 online courses.

TABLE II

Online Class Performance Analysis II - Passive Activities

Course Name	Pre-Math.	Math.1	Physics I	Physics II
Active Period	2000/9/1 - 2001/4/30	2001/1/5 - 2001/4/30	2000/9/13- 2001/2/2	2001/1/18- 2001/4/30
Student number	16	7	31	24
Active days	79	22	93	51
Total pages read	1284	1037	1325	1051
Average pages each active day	16	47	14	21
Total pages read by students	971	823	1007	746
Most pages read by an individual student	227	200	213	233
Least pages read by an individual student	6	37	3	1
Average pages read each student	61	118	32	31
Total pages read by teachers	190	206	258	288
Most pages read by a teacher	100	176	258	288
Least pages read by a teacher	90	30	258	288

Pre-Math. (Pre-Course Mathematics)

Math. 1 (Mathematics Method 1)

There can also be a debate about the validity in such measurement for passive activities. Again, it is true that the number of read or browsed web pages does not necessarily indicate a similar level of understanding in lecture materials. However, it will reflect one aspect of an online student's class activities. We can not assume naturally an online student, whom read or browsed 233 pages (see table II for details), is a good student, but we can assume that student has been engaged in reading and has probably read many pages. On the other hand, we can surely assume an online student, whom only read or browsed 1 page (see table II for details), is not an engaged online student.

It is important to clarify a fact that neither measurement on active or passive activities will indicate a fully picture of online class performance. It has to be combined with other evaluation methods, such as grading student assignments, reviewing student reports, or asking students a particular lecture related question, etc..

## ANALYSIS - ADVANTAGES AND CHALLENGES

Nevertheless, the great advantages for online courses can be observed through these statistical surveys on active and passive class performance. For active activities, we can summarize their advantages as the follows:

**Asynchronous learning:** This is a bizarre issue, so the discussions could be quite extensive and we will probably never get the right answer. However, by counting active days, we can see there are respectively 79, 22, 93, 51 active days for these 4 online courses. The same courses in a traditional classroom will be placed in 30 active lecturing days (2 days each week and 2 hours each day). A student must be in the classroom and work intensively in these 2 lecture hours in order to understand the course materials. On the other hand, an online student can work anywhere and anytime for the same lecture. In a way, there will be more space for an individual student to plan and schedule the class activities, so better class performance.

**Average documents each student:** It is a measurement that reflects how active an online student will be engaged in the course. There are 9, 5, 11, 6 documents in average from each student and the numbers seem to be modest throughout the whole course term. We may think a active student will question or comment more than 9 or 11 times in a traditional classroom during the whole course. However, there are also students whom has been silent in a traditional classroom during the whole course. In a way, online course offers more space for each individual student, especially whose are shy to question or comment the lecture.

**Total discussion documents:** It is a measurement that reflects the number of discussion or question related documents. We can use this measurement to indicate the level of discussions in online class. There are 65 and 15 for two mathematics courses and 204 and 87 for these two physics courses. The differences may reflect a fact that there is a need for more discussions in physics lecturing compared with mathematics, which sounds reasonable.

**Open documents:** This is a measurement on number of documents that displayed in front of the whole online class. The courseware that has been used for these 4 college online courses (Lotus LearningSpace Forum) has both an open and a private function for document transferring. An online student is able to send a document in open function, so the whole class can read it, or in private function, so only a teacher can read it.

**Teacher documents:** A good online class should be proactive from students, so a teacher need not to question so much. This phenomenon could be measured though the number of teacher documents, the fewer, the better. The comparative measurement could be illustrated by percentage for teacher documents. Again, we can interpret the fact that the course Physics I is the most proactive class performance since the teacher initiated fewer question (46%). There may

be a positive correlation with highly active level of discussions (204) for the same course.

For passive activities, we can use the survey results as a control measurement. Combined with survey results for active activities, we may observe some interesting phenomenon for further research. For example, the active activities in total documents for discussion for these 4 online courses are respectively 65,15, 204, 87, while the passive activities in average numbers of pages each student read or browsed for same courses are 61, 112, 32, 31. Can we assume the more students discussed actively, the less they read passively?

Another online course advantage is possibility for an individual performance analysis. Table III shows an online performance analysis for individual student in number of pages each of them read or browsed during the course.

TABLE III  
Online Performance Analysis III - Individual Activities

Course Name	Pre-Math.	Math.1	Physics I	Physics II
Active Period	2000/9/1 - 2001/4/30	2001/1/5 - 2001/4/30	2000/9/13- 2001/2/2	2001/1/18- 2001/4/30
Individual Activities Name(1), Pages read	AR 60 FG 93 FK 76 GP 63 JL 28 HS 6 JK 138 JF 20 DN 48 MT 51 SM 27 OT 48 AS 9 AT 18 BH 227 SL 59	AS 113 GF 131 FL 155 GS 88 NM 99 OP 200 TD 37	BT 44 CF 3 GH 6 FK 38 GH 213 SN 14 KD 75 MN 5 NP 85 OA 122 PM 49 RL 27 TG 65	FP 7 GD 206 GL 42 JB 1 JP 233 GH 26 BP 10 KP 42 MN 100 OA 58 PT 3 RH 16 RD 2
Total pages read	971	823	1007	746

Pre-Math. (Pre-Course Mathematics)

Math. 1 (Mathematics Method 1)

(1) For the privacy reason, all student names are faked.

By reviewing this analysis, it is easy to distinguish each student's online performance and engagement during the course. For example, during Physics II course, student JP is obviously an engaged student since 233 pages were read or browsed by JP. For the same course, student JB is probably laziest one in the class, since only 1 page was read or browsed by JB. In fact, an online teacher could use these individual measurements as one of course character criteria. And the good thing is, everything is recorded or registered.

Summarizing these advantages does not mean that we will ignore the challenges of an online course. In addition to communication difficulties, there are few other challenges which can be mentioned for online courses:

**Percentage for open documents:** It is an overviewed measurement that reflect how open an online class are undertaking discussions. Clearly, the percentage of open documents are rather modest for these 4 online courses, respectively 69%, 87%, 52%, 71% (see table I). Especially for Physics I course where only 52% open documents in the class. This means nearly half part of documents were sent as private to the teacher, which indicate a fact that many online students are still too shy to question in front of the whole class, even online.

**Teaching capacity** is another huge challenge for online course. We mentioned early that an online classroom offers more space for each student, which probably will result more student's activities in an online class. Consequently, the increasing student's activities may bring a similar increasing for teacher's work loading. Experience from early online teaching has already showed 20-40% more time spending compared with traditional classroom teaching [11]. This phenomenon has also been confirmed by our statistical surveys both for active activities and passive activities analysis as the follows:

For active activities (see table I), the percentage of teacher documents for each online course is respectively 32%, 73%, 46%, 82%, which indicates a fact that teacher documents represent a majority or over half part of document transferring in the class.

For passive activities (see table II), total read or browsed pages by online teachers for each course is measured as 190, 206, 258, 288, against average read or browsed pages by each student for the same course, measured as 61, 118, 32, 31. The online teacher will have to read or browse more than an average online student will have to do so. The teachers work load is either from twice (206/118) or 9 times (288/31) as much as an average online student does so.

Reviewing the above analysis, it is easy to notice who will be most heavily loaded during an online course. This is huge challenge that every online teacher has to confront and deal with.

Someone suggests a possible solution for this problem will be organizing or grouping students as groups. This suggestion will probably bring us to a new challenge for online teaching activities: How to organize or group students so that they work together effectively?

**Organizing or grouping students in an online class** will be our next challenge. In a traditional classroom, this task can be easily completed since a teacher could simply conduct the organizing or grouping as a process during the class hours. The process could be spontaneous, short, flexible and changed underway. For online classroom, it is not that easy to conduct group process so spontaneously and flexibly. Again, an online teacher may have to put a lot of efforts at the course beginning to organize class and student groups, for example, making student self-representation in the class or grouping themselves as the first student assignment.

A possible way in organizing students is based on their individual performance level and mix them together. It will be ideally best way to engage the most active students with "laziest" student in the class, such as student JP and student JB (see table III) are combined within one group for Physics II course. Hopefully, JP will be able to initiate student talks with JB and help JB in reading or working with course.

### CONCLUSIONS - BE REALISM ONLINE

Online course teaching is a popular debate topic for many scholars and researchers. By now there seems to be no standard answer or recommendation for any direction we should go. The only direction we could see, is that more or more courses are already taught online. It is reasonable to believe that the debate will still be continued and online research will still be an pre-matured stage. However, the more we are getting familiar with online teaching practice, the more realism we will be practiced for online teaching. Our online teaching experiences show the following remarks for online practice:

- Online course will never be able to replace the traditional classroom teaching [10], and will never provide the same effectiveness as the traditional classroom teaching [15]. However, online course will compensate traditional classroom teaching when the later is not able to practice, such as remote or physic divided class.
- Both teachers and students should have realistic expectations for online teaching . Technology offers certain, but not all possibilities. It also requires quite effort to be familiar with these new things.
- Online students are not the same as students in a traditional classroom. A good online student does not have to be a good student in traditional classroom (active in writing, but shy to question in public). The same is for a good traditional student (active in talk and spontaneous comments in traditional classroom, but "lazy" to writing and reading online). An online teacher needs to learn a new way to encourage his/her online students [1]-[2]-[5]-[8].
- Open discussions, self-managed group work, student centered model are healthy and stimulated online activities that should be practiced more and more. In practice, this means we expect to see more percentage of open and student documents.
- We should use online course's database more actively. As mentioned early, the online teaching is mainly documentation based and the technology offers the great advantage for data recording and registering. These data contain quite much information for online teaching and activities. A more quantitative approach, such as statistical analysis, should be used in online research, and the above data information is one of important sources for such analysis.

Online course teaching is a new aspect for many college teachers, so many are still not quite comfortable with this new aspect yet. Our online implementing experience shows there are two major aspects in problems with many teachers. Fear of new technology and unrealistic expectation for the new technology. In fact, these two aspects usually are combined each other. A person who is not familiar with technology or a new courseware, often expects new technology or a new courseware will be a perfect solution and take care of everything automatically. We know the fact that there is no such perfect solution and automatic function for everything. One has to learn some basic ABC of new technology or a courseware in order to use them. It is important to clarify these aspects for potential online teachers before they are learning any new courseware.

Another aspect is need assessment. Too teachers are learning a new courseware without even identifying clearly what was the basic needs to convert own courses online. Any courseware will have its advantages and limits, and identifying these elements are the one important task before learning that courseware. However, it is an even more important task to identifying your own needs for technology and assess which possible online functions you are going to use before choosing any technical solution. These are the essential issues for online teaching that every potential online teacher should be aware of.

There seems to be many aspects and elements that have to be taking care of in online teaching and it seems to be overwhelming for many new beginners. Being realism to online teaching is the best thing we could do. Online teaching is nothing else than the other technological applications which we used frequently today, such as automobile, telephone, fax, PC or internet communication vehicle. Actually, it is an extensive aspect of internet communication and an integrated vehicle for many users. Like other technological applications, it takes time and efforts to learn its functions and to be familiar with, but once you have learned it, you will manage it.

The principle for online teaching should not be different from other teaching practice. It is still an issue of how to motivating, encouraging, organizing and leading students to accomplishing course materials. However, the technique for online teaching could be very different from traditional classroom since the environment is different. It is important for an online teacher to be motivated, encouraged and getting familiar with this new environment first [4]. Then it will be possible for that teacher to find new ways to motivating, encouraging, organizing and leading students to be enjoyed in working and accomplishing course materials, online.

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