Using Internet Technology to Make Students Learning Better in Video/Audio Design Course

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Abstract: - Teachers in a traditional video/audio design course usually divide students into small groups and ask every group doing a short film as semester project. The semester grades are given by teachers according to the project quality and how well that students apply the knowledge they had learned from the classes. This paper describes that how the internet technology can be applied to such traditional video/audio design course to make students learning better. The experiment involves two classes. Students in different classes do not know each others, since these two classes belong to the day-school and night-school respectively. Therefore, these two classes are seen as the Experiment Group (EG) and Traditional Group (TG) for proving the differences of the learning effects between those students (EG students) whose course is internet technology-enhanced and those students (TG students) whose course is classical one.

Key-Words: e-Learning, Performance Measurement, Tool, Learning Effects, Accuracy Counter.

1 Introduction

With the popularization and development of the computer and Internet, the teaching activities in the traditional classroom has been replaced by the Internet [1][12][14]. The purpose of such kind of learning is to assist the teacher to improve the instructions of course, however, it still has a lot of issues which are faced by teachers when they are applying technologies into their courses and classes.

In order to improve the learning effects of students on Internet, the methods of measurement, tracking, and evaluation are used to discover the learning states of students and decide the suitable teaching materials, it is so-called the performance technology of learning [6][9]. According to Clark and Langdon's opinions, interaction is one of the indispensable characteristics in teaching and the main shaft designed of interaction system on Internet is the test and the commenting of achievement [13].

Teachers in a traditional video/audio design course usually divide students into small groups and ask every group doing a short film as semester project. The semester grades are given by teachers according to the project quality and how well that students apply the knowledge they had learned from the classes. Sometimes teachers would give students a chance to see other's works by holding a presentation workshop, usually the workshop is held at the end of the semester. There is a problem arise no matter when the workshop will be held. For example, if the workshop is held at the end of semester, then students have no opportunity to do better; one another way, even if the workshop is held at the middle of semester, students still don't have enough motivation to drive them doing better. The reason that makes the middle semester workshop fail to encourage students doing their film project better is because most of students think the audiences are only their teachers and classmates. Under such situation they feel the audiences' feelings and comments are somehow iniquitous and irrelevant to them.

In this paper, the authors are trying to use the internet technology, called Accuracy Counter (AC for short) [2], into the traditional video/audio design course. The goals of the project are to reveal how the learning effects of students change while applying the internet technology such as AC to a traditional course. In the experiment the AC is used to demonstrate the differences of the learning effects in the two different classes (EG and TG).

First of all, the tool - accuracy counter will be described in Section 2. Section 3 modifies the curriculum of the Video/Audio design course for applying the tool into the course. Section 4 analyzes the measurement of learning effects with the three index values of the accuracy counter. Section 5 reveals the details of the experiment and makes some discussion in the experiment data. Finally, a simple conclusion and possible future works are discussing in Section 6.

2 Internet Technology & Learning

In traditional classroom environments, learning often occurs with the limited levels of reflection. However, researchers find that the reflection plays a critical role in group learning.[8] Another point needs to be described is the reflection has a social aspect and will strongly influences within the community activity. As many researches pointed out, the social learning environments are significant for learning.[10]

The most famous and common e-learning tool is Discussion Board. Discussion mechanism on the web has attracted many educators and researchers because its characteristics [7]. However, although the discussion mechanism on the web shows its potential for promoting and supporting learning, it is still a challenge to involve students in its usage in teaching and learning settings. In previous researches we can find out that students will only participate with a great effort from the instructor's part. Oliver and Shaw also mentioned that only the technology is insufficient, the instructors' enthusiasm and competence are important in stimulating the participation of students [11].

In our previous researches, an e-learning tool, Accuracy Counter (AC), had been developed [2][4]. The basic function of the AC is to eliminate those "unreasonable" accesses to the webpage. In general, users will not tend to repeatedly access the same webpage within a short period. Therefore, when the same computer accesses the same webpage again in a short time, it is feasible to consider this connection attempt as "unreasonable". The AC system is designed to block increments of the counter's value under such circumstances.

To filter those unreasonable visit, first of all the system needs to know what the unreasonable visit looks like. In general, the unreasonable visit is robot, which means there is no real person visit the webpage and there is only a software program tries to access the webpage instead. Sometimes, the reasonable visits are also human-made, which means there is a person who keep click on the browser's refresh button to reload the webpage.

The first task of the AC system is to check a connection is whether built by a human visitor or a software program. There is one easy way to make the AC have the capability of connection recognition, cookies accessibility. The system can easily save a random number to a named cookie and then try to access the cookie. The connection is most likely a software-made connection if the cookie's value can not be recovered. Usually a software-made connection can not allow the server to do cookies accessing due to most of software only use standard HTTP protocol rather than a web-browser to build the connection with the web server.

However, not all connections which allow the web server to access cookies are built by human visitors, because some software programs still use web-browser components to connect with the web server. At this moment, the AC needs to do gap control. The system can check the time difference between client's two connections to see whether there is an implied rule or not. The principle of gap control is based on the characteristics of programming. Usually most of programmers write such automatically connecting software would probably use timers to tell the software when the connection should be rebuilt.

Besides detecting the software-made connection, the system can also apply browsing behavior analysis to detect the unreasonable access from human visitors. For example, no matter what a visitor should not click the refresh button five times in several seconds neither in a minute. The reason is because a real visitor can not read all materials on the webpage during such short period, furthermore, even a real visitor can read the webpage he/she will not refresh the webpage again and again.

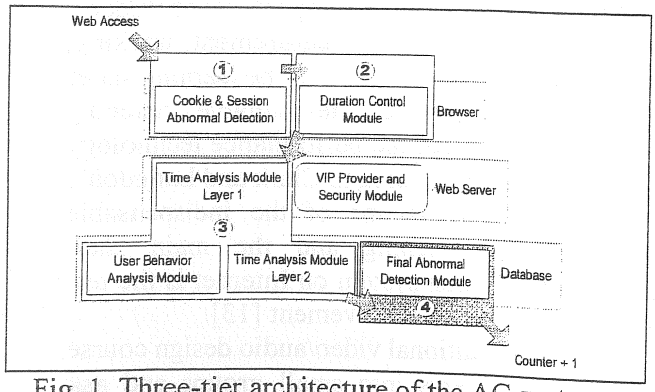


Fig. 1. Three-tier architecture of the AC system

After revealing the ways of making unreasonable visits, a three-tier architecture of the AC system can be designed. There are three stages needed to pass

before a visit could be finally counted, the three stages are abnormal detection (step 1), gap control (step 3 and 4), and browsing behavior analysis (step 2) as Fig.1 shows. The whole operation flow of the AC shows in Fig. 2.

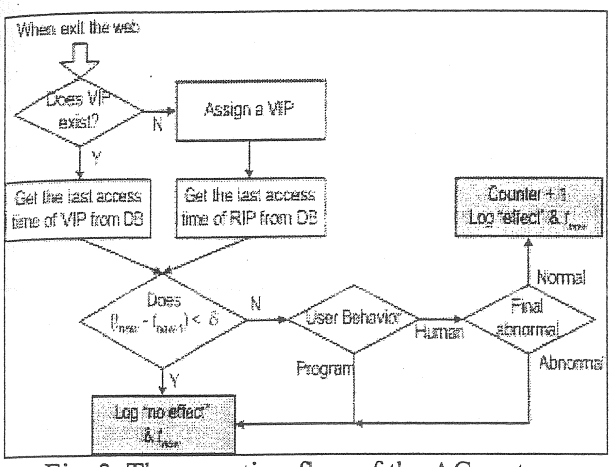


Fig. 2. The operation flow of the AC system.

Abnormal Detection

First the system has to be able to identify the client. With today's Web architecture, the system can identify the client by IP address. However, there is a limitation in the use of IP addresses. If the client is located behind a proxy, a NAT or a firewall, then the IP address that the system acquires is only the address of the proxy, the NAT or the firewall. In other words, it is not enough to just identify each client by IP address only.

As mentioned previously, the system also needs to use cookie to filter most of software-made connections. In order to allow the system to identify the client and filter the software-made connections at the same time, the system gives, at the first connection time, each computer a special identification number, called a Virtual IP (VIP for short). Virtual IP is stored in a cookie located in the client's computer, and no two VIPs will be the same.

Moreover, in general, a cookie is only a text file and is not encrypted, making its security very weak. To take security problems into considerations, each data that the system stores to the cookie must be encrypted first.

Gap Control

Once the system is able to access the cookie of the client, the system stores a time stamp for the connection into the cookie and database. The Time Analysis Module Layer 1 and Layer 2 in Fig. 1 are in charge of checking the time gap between the client's two visits at the web server and the database via time stamps respectively.

If the system finds the client has ever visited the webpage before, the system then checks whether the current visit is a reasonable visit or not by calculating the time difference with the last visit time stamp. If the time difference shows unreasonable, then the checking process stops and the webpage count will not be changed; on the other hand, if the time difference shows reasonable, then the Layer 2 double checks the time difference according to the time stamps stored in the database.

Browsing Behavior Analysis

A real visitor should spend some time in reading the webpage he/she links to, also, a real visitor should not reconnect to the webpage again in short time. Based on the assumptions, there are two check-points here.

Essentially, the concept of effective time-span is that a potential visitor should at least "stay" on the same webpage for a minimum amount of time (e.g., 20 seconds) in order to make a "least meaningful" sense out of the page. If the time he/she "stays" on a webpage is below the minimum threshold, then it is an unreasonable visit and ineligible to increment the count.

Consequently, the check-point should only occur when the user "exits" a webpage (i.e., when the page viewing operation officially terminates), and not when the user "enters" a webpage (i.e., when the page viewing operation begins). This is so that the system is able to compute the length of time that the user has "stayed" on the webpage. If the time-span is too short to meet the minimum threshold, then the system simply considers the connection as unreasonable and the webpage count will not be changed; on the other hand, the system takes the connection as a candidate of reasonable visit and does the last check.

Since programmers can use timers to ask web browsers to initiate a connection to specific webpage automatically day and night. For example, one popular and easy way is to put the following html codes in a file called index.html:

<meta http-equiv="refresh" content="300">
<iframe src="http://www.wseas.org"></iframe>

After a web designer or a programmer does this, for every 300 seconds (5 minutes = 60 seconds * 5), the human-made webpage will refresh automatically. Every time when the browser reloads the self-made index.html, the html tag <iframe> enforces the browser to connect specific web resource.

When a situation like this happens, the system needs to know. The system still uses time stamps to handle such situation at the second check-point. If the time gaps are very close, the connection is probably built by a timer-enabled connection robot, a

software-made connection. For example, the first time gap between the client's last two connections is twenty minutes and the second time gap from the client's last connection is twenty minutes plus ten seconds.

In order to prove the AC had effects on stimulating the learning motivation of the students, a "Web Design" course was taken and to be the evaluation way for two years [5]. There were FOUR classes from TWO universities (CYCU and ShengTe) in that two-yeas experiment. The four classes were Dept of Special Education (from CYCU), Dept. of International Trade (2 classes from CYCU) and Dept. of Mass Communication (from ShengTe). The grading criteria were divided into two parts: data stored in AC and average score gave from other three groups (selected from different classes and schools randomly.)

Accuracy Counter was used for measuring and recording the learning status of students. The counts recorded by AC were used to be one of the criteria when the teacher evaluated the students' learning performance. Students could also look others' achievement with the AC, and might want to compete with others. Through the counts recorded by AC and the final scores were given from other learners, the effects of AC had been proven [3].

Although the effects of the AC had been proved, it was still used in IT related curriculum just as other e-learning tools. In this paper, we want to apply the AC to the traditional course suchlike the Video/Audio design course, and try verify the learning effects of the AC.

3 Curriculum Design with AC

To apply the e-Learning in the course of video/audio design, we have to adjust the curriculum design to let students know the e-learning tool and understand what the role it plays at this course. The main change is the film assignment from one film in a semester to two films in a semester. This change is not only to let students know the procedure of uploading films, the more important is to feel and face the films on the public. After that, we try to get and compare what the e-Learning tool influences on the students' learning.

3.1 Traditional Video/Audio Course Design

There are 18 weeks in the Video/Audio design course in one semester. The goal of the course is to finish a digital ten-minute-short film at the end of the semester. The curriculum includes teaching students how to use digital camera, shooting knowledge, editing theory, and editing operation. In general, there are three stages in the Video/Audio design course, which are pre-production, production and post-production. We plan 9 weeks for the pre-production, 4 weeks for the production, 4 weeks for the post-production, and the 18th week is used for the film show and the group presentation.

There are two parts in the nine-week pre-production. The first part involves the basic digital camera operation, lighting, acting and editing theory. The second part includes the idea creating to script, treatment, and storyboard. The four-week production is acting instruction, rehearsal and shooting. Then the four-week postproduction instructs the students the editing operation in order to let them equip the capability of finishing a 10 minutes digital film. The traditional video/audio curriculum design is shown in Table 1.

Table 1. Schedule of Traditional Video/Audio Course

Week	Content of Lectures
1	Curriculum Demonstration and Digital Camera operation instruction
2	Camera Instruction & Camera Moving
3	Shooting and Lighting
4	Acting and Editing Theory
5	Practice and Review
6	Idea Creating to Script
7	Treatment
8	Storyboard
9	Storyboard
10	Acting Instruction
11	Rehearsal
12	Shooting
13	Shooting
14	Editing Operation
15	Editing Instruction
16	Editing Instruction
17	Editing Instruction
18	Film Display and Presentation

3.2 Curriculum Design with e-Learning Tools

In the e-Learning course design, we make a main difference to apply e-Learning on the video/audio course design is two films assignments required instead of one film assignment in the course before. On the traditional course there is only one film assignment at the end of course and only one show at the end of semester. But there are two films assignment on the e-Learning course design, the first

one-minute-long film is asking students to finish at the fifth week and the second ten-minute-long film should be finished at the seventeenth week on the e-Learning applying course. The first film has same subject, that is "New Life", to the all groups in the class and the required shooting location is school. This one-minute-long film assignment expects to stimulate the student's imagination and creativity with the same subject and observe the environment that they are familiar with to find something by the camera.

The second film doesn't limit the subject and the shooting location, only requirement is the length of film must be within 10-minute-long. Both of the two films must be public displaying on the Internet, the first film takes three weeks for opening to the public and the second film has just only one week to the public. The modified e-Learning curriculum design for Video/Audio design course is listed in Table 2. These changes on the e-Learning course design are in order to let the students know and familiar with the e-Learning tool, the Accuracy Counter. Besides that, we also want the students to feel and understand the differences between public displaying on the Internet and display once in the class. More important is trying to get the learning effects of students when applying such kind of e-Learning tools into a traditional course.

Table 2. Schedule of Traditional Video/Audio Course

Week	Content of Lectures
1	Curriculum Demonstration and Digital Camera operation instruction
2	Camera Instruction and Camera Moving
3	Acting and Basic Editing Theory & Operation
4	Shooting
5	First Assignment on Internet
6	Idea Creating to Script
7	Treatment
8	Storyboard
9	Storyboard
10	Acting Instruction
11	Rehearsal
12	Shooting
13	Shooting
14	Editing Operation
15	Editing Instruction
16	Editing Instruction
17	Editing Instruction
18	Final Film Assignment on Internet

4 Measuring Learning Effects

In the course design, the values that are recorded by AC are taken into the consideration of grading. Before the relations between the learning effects and those recorded counter values are described, three major valuable measures stored and recorded by AC are analyzed firstly.

4.1 Traditional Video/Audio Course Design

The AC records the values created by three indices [5]. They are the number of visitors (V), the number of occurrences of expected events (E), and the number of (different) users (U), respectively. The relations between these values and the learning effects are explained as following.

4.1.1 Visits (V)

V represents the number of "reasonable" visitors. The "reasonable" means even the same user makes more than two connections in a short time, our system only records it once. To increase the score from this index, students need to introduce their film works to the public and try to attract more people to see it. Of course, the ways to attract more people are various, including advertisement and produce a better film.

4.1.2 Duration Time (T)

The duration time records how long each visitor spends to look the students' film work. We let students in the EG (Experiment Group) class know that if they do not pay any attention on their work, the score they obtain will be low. Hence, through the duration time, students will try their best to design their film and wish visitors feel interesting and meaningful.

4.1.3 Different Users (U)

The more different people come to see the students' film work, the more popular that the film work is. To raise the score from this index, students have to advertise for their work constantly. It also implies that their work should be a finished film. That is because if the film is unfinished, the second index about duration time will be decreased.

4.2 Learning Effects and Counter Values

As the students know their film works will be published on the Internet, the first feeling comes to them is amazing and a little nervous. Because that means their film works will be displayed to the public who can replay it and comment it, so their learning

ability will be recognized by the public. Not just like before, the films will only play once in the last class of the semester and the only audiences are their classmates, teacher, and reviewers. Therefore, the students become more active in learning, work hard and pay much more attentions on their film works averagely.

The differences of learning effects showed out between the two different classes, EG (Experiment Group) class and TG (Traditional Group) class, including active learning and aggressive learning. The students who know the existence of the counter value always observe and are aware of the changes of their own counter value and others. They ask to change their film works after upload and remark what causes the different counter value among the films at the first assignment and what they can do to make more people see their film works. The learning attitudes of the students in the EG class are changed and improved continuously during the semester. Therefore, they keep more higher learning interesting until the end of semester.

In the experiment, the students belong to the TG class who doesn't know the existence of the counter value are also learning actively at the first four weeks for making their first film assignment on the Internet. However, after that, they think no one will see the film except themselves unless they promote the film by themselves. If they don't promote their own film works, then there will not many people to see it. However, the students in the TG class feel it is fine for them to do the film without any further pressure. Hence, the students in the TG class do neither pay attention nor work hard like those students in the EG class in making the film works.

At the end of the semester and experiment when the students of the TG class see the films that are making by the students of the EG class, they realized that their learning attitudes and performances are not good as the students of the EG class. It is obviously to see the differences of the learning effects between those students who know the e-learning tool (in EG) and don't know (in TG), although both of the students in two classes will be ask to public displaying their works on the Internet.

5 Experiment and Evaluation

5.1 Experiment Course and Participants

As mentioned in previous section, there are two classes participate this experiment, one is the Experiment Group (EG) class and the other is the Traditional Group (TG) class. The students of the EG class know the existence of the accuracy counter from the beginning of the semester; on the contrast, the students of the TG class have no idea about the accuracy counter until the end of the semester.

All of the participants are the students of the department of Visual Communication Design at Shu-Te University. In the EG class, there are 53 students who are divided into 7 groups and know the existence of the accuracy counter. In the TG class, there are 42 students who are divided into 7 groups and don't know the existence of the accuracy counter. The students in the both of the EG and the TG classes have a pre-test about the basic Video/Audio background knowledge before this experiment in order to know their average understanding about V/A knowledge. The results of pre-test shows it is consistent between the EG and the TG classes.

The announcements of the experiment are demonstrated as following.

1. Same announcements to the EG class and the TG class
   - All films must be uploaded to the public website with the same deadline.
   - All films will be opening to the public on the Internet on the same day.
2. Different announcements
   - Only to the EG Class - Explaining the functions and meanings of the accuracy counter and its measures, and requesting students to promote their films to the public as possible as they can, and asking students to observe the changes of the counter values.
   - Only to the TG Class - Expecting students to promote their films to the public as possible as they can in order to make more people have the opportunities to see their film works.

5.2 Experiment Data

Table 3 is the records of the first film assignment. The groups, dvd01-dvd07, belong to the TG class, and the groups, vad01-vad07, belong to the EG class. Table 4 is the records of the second film assignment. Be notable is the values in the Table 3 are observed after the three weeks opening to public and the values in Table 4 are observed after only one week opening.

Table 3. The First Film Assignment

Group	Visits	Duration Time (seconds)	Different Visitors
dvd01	36	63	28
dvd02	39	72	34

dvd03	26	58	22
dvd04	37	73	28
dvd05	26	64	20
dvd06	14	87	13
dvd07	20	81	18
TG avg.	**28**	**71**	
vad01	1067	63	942
vad02	2031	63	1838
vad03	1092	74	962
vad04	1150	72	1051
vad05	2126	64	1922
vad06	719	64	652
vad07	736	69	681
EG avg.	**609**	**66**	

dvd03	7	68	7
dvd04	8	19	7
dvd05	9	76	8
dvd06	8	67	8
dvd07	10	63	7
TG avg.	**7**	**56**	
vad01	701	81	643
vad02	2213	67	2067
vad03	238	76	215
vad04	3900	75	3480
vad05	3052	72	2767
vad06	2680	83	2471
vad07	1466	85	1360
EG avg.	**2035**	**77**	

5.3 Evaluation and Discussion

As mentioned, the TG class is not active as the EG class. From the visits (V) and different visitors (U) in Table 3 and Table 4, we can see that the visit counts of the second film assignment of the TG class are less than the first film assignment obviously. However, the results of the EG class's visit counts are totally different to the TG class's. Although the values which are listed in the Table 4 are the one-week opening, the visit counts are still more than the first film assignment's three weeks opening.

The groups in the EG class advertise their films so hard, because of the students now care how many visits to their films and whether the content of the film is attractive or not. They ask friends to give them suggestion for producing the film work. On the contrary, the TG class thinks it doesn't matter and the Internet is just one way to show their film, hence, if the film is not good, then forget about the advertisement and no one will see their works. Therefore, they had never asked themselves to do their best. The research result shows that the e-learning tool did change the learning attitudes of students apparently and increase the learning effects of the students indirectly, and of course, this result can be proved through these collected data (Table 3 and 4) and their final grades (Table 5).

Table 4. The Second Film Assignment

Group	Visits	Duration Time (seconds)	Different Visitors
dvd01	9	38	6
dvd02	2	61	2

Table 5. The Score of Groups

Class/Group	1	2	3	4	5	6	7	avg
Experiment (EG)	85	93	80	88	90	88	90	87.7
Opposite (TG)	80	83	77	85	75	80	78	79.7

Another fact that we have to pay attention is the duration time. The duration time in the Table 3 is around 60 seconds and in the Table 4 is around 70 seconds. Although the number is better in the second film assignment, there is still an alarm. Because according to the curriculum design the assignment of the first film is one-minute-long and the second film should be extended within ten-minute-long, however, the average duration time has only 10 seconds difference as we can see from Table 3 and Table 4. What meanings that we can get from it? Is "the film's content is not so good to attract audiences to see it" or "the students care how many visitors saw (advertisement) without emphasizing the content of films"?

However, at the end of the course, the groups in EG class still got much higher score than the groups in the class as Table 5 listed below. It is needed to explain how the final grades come out. The final grades were given by two reviewers (other teachers) only according to the students' final works (second film assignment) and with no idea about the Internet publication and accuracy counter. Therefore, the final grades should be fair enough.

6 Conclusion

As a teacher, we are happy to apply the e-Learning tool, Accuracy Counter, to a traditional Video/Audio design course and see the differences of learning effects. This research does not only can figure out how the students learn, but also is a good mechanism to investigate the way that a teacher is teaching. There are three goals when we designed such kind of course, which is one kind of traditional course but we put the learning technologies into it:

1. To let the students learn more actively.
2. To encourage students to competes with other groups and even other classes.
3. To make the students building his/her confidence and professional skills.

At the end of course, not only the goals are achieved, but the students also feel learning effectively. Students came to the teacher's office and said their works are better than other classes before (who took the same course before them).

Applied the e-learning tool into the course of Video/Audio design can help students learn more aggressive and active, and help teacher to think how to teach will be better for the students. There are three classes in the next semester. We will consistently adopt the e-learning tools on the Video/Audio design, and looking for the possible way for the students to attract audiences.

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