2006-1839: LEARNING A WEB-BASED COURSE THROUGH MACROMEDIA BREEZE

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Abstract

What is the pedagogical ideal to advance web-based students' learning? There is no simple one-size-fits-all solution to this question, because in order to answer this question, there are three aspects that need to be addressed. The first aspect is: our customer. Every student is different; some learn more efficiently through visualization, some more efficiently through auditory assimilation, while others more efficiently through ability to feel, and ability to rationalize the information presented to them. The second aspect is the dimensions of learning: learning consists of the ability to understand, the ability to recall, and the ability to apply the knowledge meaningfully. The third aspect is the web technology; how much classroom interaction can it replicate?

Hence we think the question could be easier answered if it is phrased this way: is there any web-based instructional technique that could catered to all types of learners in a way that they could very efficiently understand, retain, and then meaningfully applied for problem solving.

We suspect there is, and we believe Macromedia Breeze has been helping our visual, auditory, kinesthetic, and logical students to understand, recall, and then apply the material they learned from warehouse management class (IT 332) more effectively than students whom have not had the experience via distance at Purdue University.

Since web-based learning communicates through the Internet, which is generally a one-way transaction, instructors do not receive real-time response from students as in a classroom. This limitation can be eliminated by the software, Macromedia Breeze. Macromedia Breeze offers many functions that would increase the learning efficiency. In this paper, we will be introducing what Breeze is, what advantages it brings to the four different types of learning experiences, why and how it enhances understanding, retention, and meaningful application.

The goal of this study is to raise awareness of Breeze so that future researchers will support or contest these pedagogical hypotheses through follow up empirical analysis. This paper will also present how this experiment was conducted, and what hypotheses were set up.

1. Introduction

When first developing the IT 332 Distance course, we determined that a good start was to incorporate audio with the existing course PowerPoint slides. Purdue University has a license for Macromedia Breeze, and using it is fairly straightforward. Once the setup executable file of Breeze is installed, all of Breeze's functionalities appear on a menu option in Microsoft PowerPoint. The first requirement is to invest in a headphone with microphone in order to add the audio to the PowerPoint slides. Choosing Breeze from the pull-down menu, you then just select the Record Audio option. (See Figure 1). Adding the audio to the slide is as simple as pressing the red dot button. If the slides contain multiple animations, the NEXT ANIMATION button will be highlighted and as you hit the space bar, the next animation will show up on the screen for the speaker to add the audio.

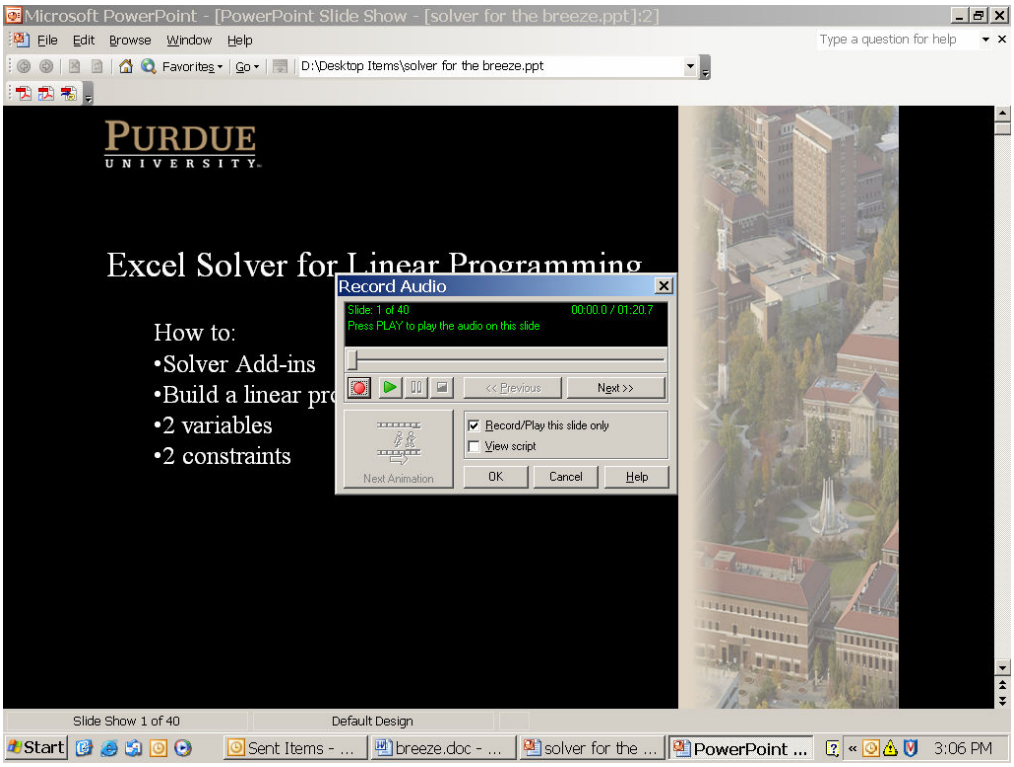

Figure 1. Screen shot of Macromedia Breeze recording function

The second application of Breeze is using the Breeze Meeting Room option. There are many benefits to using this, and we will just discuss the use of the Meeting Room with a tablet personal computer (PC). Again, using headphones and a microphone, you can either share the computer screen[1], document, or an application. You start the camera and voice, and then under Meeting, record the meeting. Using the Tablet PC, the instructor can show solutions and then

[1] Think of Trojan horse spy-ware employed in a constructive manner; sharing of instructor's computer screen, document or application empowered instructor with the ability to demonstrate even the most delicate details, tips or tricks. Products such as Camtasia and ScreenCorder display similar, sometimes better, capability as Breeze's sharing function. Stand alone screen sharing applications is becoming increasingly popular in recent years, especially in teaching the use of other software applications such as Microsoft (MS) Excel, or photo manipulation techniques using advance image applications such as Adobe Photoshop.

save them. Breeze creates a URL for the student to go to for watching the solutions to problems. This is just one option for using the Breeze Meeting room. There are many other interactive solutions. One benefit is that the URL doesn't require much memory to pull up, and student from all over can access the problem demonstration. Additionally, the solution can be saved as flash paper, so the student can not only walk through the audio and visual solution, but can print the solution for future use.

In education, since web-based and other distance learning techniques convey through the Internet, which is generally a one-way communication, instructor do not get the real-time response from student as in a classroom. This limitation can be eliminated by Breeze. Instructors can teach students with the Microsoft PowerPoint presentation with audio and video communication through Breeze. It offers several interactive functions that would increase the learning effectiveness. Since it is equipped with audio and video capability, student can see instructor's movement and hear the voice (See Figure 2), which is similar to a real classroom. Another benefit for students is that they can watch the lecture at anytime, on any platform that has an internet browser, and they can repeat lessons later on.

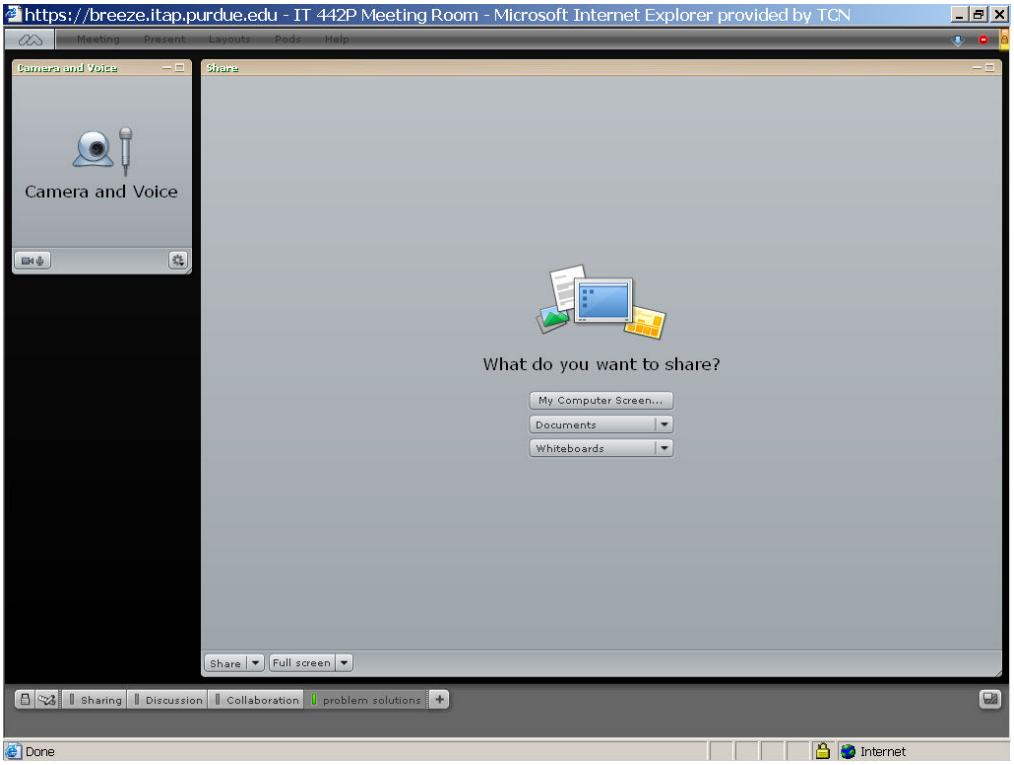

Figure 2. Screen shot of Macromedia Breeze with real-time video for the lecturers

There are also interactive functions in Breeze that would be helpful to get response from distance student in a real-time Breeze "classroom." For example, instructor can poll a multiple choice question and student chooses one answer. The answer from student will be available to instructor real-time anonymously. In this way, student is equally encouraged to participate actively in a real-time Breeze "classroom" as in a traditional physical classroom. Another useful function that focuses on interactivity is a chat session. Student can send feedbacks to instructor

real-time and contact classmate through a chat session as well. In comparison, chat session in a real-time Breeze "classroom" is not disruptive as chat session in a physical classroom.

From the instructor perspective, Breeze improves course management with a number of teaching tools. When a lesson is recorded, the instructor can upload the script and look at it. If the instructor is not satisfied or want to add comments to any PowerPoint slide, the instructor can return to the slide and re-record only the slide they want to edit. This script will also become available to students as the lecture progresses, hence facilitating student's absorption of the presentation through visual-audio coordination.

2. Literature Review

2.1. Process of Cognitive Learning

Benjamin Bloom with a group of educational psychologists divided the process of cognitive learning into six progressive levels. At the lowest level, learning takes place after repeated success in recalling or recognizing facts. Ability to recall data or information eventually develops into understanding. After that, learning is characterized by the development of higher level cognitive skills, which allow learners to apply the accumulated knowledge for resolving complex problems, analyze or criticize alternatives, synthesize new ideas based on inefficiency of the old, and ultimately, critically evaluate the value of evidence (Boom 1956; Krathwohl, D. R., Bloom, B. S., & Bertram, B. M. 1973).

The result of this paper will be based on a 40 minutes lecture, which goal is to help students learn the concept and application of Material Requirement Planning (MRP) in the most effective manner. Learning, for the purpose of a mere 40 minutes lecture, will therefore be superficially defined as the ability to understand, the ability to recall, and the ability to apply the knowledge meaningfully (Sekaran, 2003).

2.2. Demographic Survey

At analyzing the hypotheses, we wanted to know how experienced our students are with the technology (Breeze). To analyze the students, a demographic and experience level survey was administered after the lecture and post-test I. Our survey was designed by referencing Groff's work.

2.2.1. Demographics, Motivation for Taking Course, and Computer Experience Survey (Groff)

Groff came up with a survey seeking to analyze learner's experience with computer and internet knowledge, how recent their previous academic experience was, presence of any prior experience with a web-based course, part-time work obligation, current academic obligation, level of need to take this web-based course, and scores from the above two tests.

3. Method

All in all, one survey – modified from Groff's demographics, motivation for taking course, and computer experience survey – and two post-tests evaluating students' learning progress in three dimensions are administered after the lecture.

a. Post-test I and II

This instrument will examine students' learning progress in each of the three dimensions: recalling, comprehension, and application.

b. Demographics, Experience on Distance Learning, and Experience with Breeze Survey

This survey provides feedback on our sample's major, class, gender and workload. This survey also seeks to expose presence of prior experience with a web-based course, and more importantly students' perception of attending a recorded lecture online.

Learning in a Traditional Setting versus Learning in a Virtual Setting

Some hypotheses were established based on our belief and tested as described below.

	Post-Test 1	**Post-Test 2**
Breeze (Test Group)	A_{11} B_{11} D_{11}	A_{12} B_{12} C_{12} D_{12}
Traditional Class (Control Group)	A_{21} B_{21} D_{21}	A_{22} B_{22} C_{22} D_{22}

Figure 3. A pictorial representation of established hypotheses

From Figure 3, each cell consists of some X_{ij}, where

X = A symbolizes the ability to retain information
B symbolizes the level of comprehension
C symbolizes the competency level of application
D symbolizes the overall performances

i = 1 represents students in Breeze class
2 represents students in traditional class

j = 1 represents testing in post-test 1
2 represents testing in post-test 2

Hypotheses Group 1: Test within post-test 1
Hypotheses 1: For post-test 1, ability to retain information for Breeze class is no different from the traditional class (A_{11} vs A_{21})
Hypotheses 2: For post-test 1, the level of comprehension for Breeze class is not different from the traditional class (B_{11} vs B_{21})
Hypotheses 3: For post-test 1, the overall performance for Breeze class is not different from the traditional class (D_{11} vs D_{21})

Hypotheses Group 2: Test within post-test 2
Hypotheses 4: For post-test 2, the ability to retain information for Breeze class is not different from the traditional class (A_{12} vs A_{22})
Hypotheses 5: For post-test 2, the level of comprehension for Breeze class is not different from the traditional class (B_{12} vs B_{22})
Hypotheses 6: For post-test 2, the competency level of application for Breeze class is not different from the traditional class (C_{12} vs C_{22})
Hypotheses 7: For post-test 2, the overall performance for Breeze class is not different from the traditional class (D_{12} vs D_{22})

Hypotheses Group 3: Test for overall post-test
Hypotheses 8: In both post-tests, the ability to retain for Breeze class is not different from the traditional class (A_{11} and A_{12} vs A_{21} and A_{22})
Hypotheses 9: In both post-tests, the level of comprehension for Breeze class is not different from the traditional class (B_{11} and B_{12} vs B_{21} and B_{22})
Hypotheses 10: In both post-tests, the overall performance for Breeze class is not different from the traditional class (D_{11} and D_{12} vs D_{21} and D_{22})

Hypotheses Group 4: Test the Difference between post-test 1 and 2 for Breeze group
Hypotheses 11: For Breeze class, the ability to retain for post-test 1 is not different from post-test 2 (A_{11} vs A_{12})
Hypotheses 12: For Breeze class, the level of comprehension for post-test 1 is not different from post-test 2 (B_{11} vs B_{12})
Hypotheses 13: For Breeze class, the overall performance for post-test 1 is not different from post-test 2 (D_{11} vs D_{12})

Hypotheses Group 5: Test the Difference between post-test 1 and 2 for Traditional class group
Hypotheses 14: For traditional class, the ability to retain information for post-test 1 is not different from post-test 2 (A_{21} vs A_{22})
Hypotheses 15: For traditional class, the level of comprehension for post-test 1 is not different from post-test 2 (B_{21} vs B_{22})
Hypotheses 16: For traditional class, the overall performance for post-test 1 is not different from post-test 2 (D_{21} vs D_{22})

Research Design

In the Spring of 2006, students of IT 332 – purchasing, inventory and warehouse management course – were invited to attend one of the regular Thursday lecture as part of this quasi-experiment. The class consists of 29 students; 11 students of the class attended the lecture in a virtual setting (test group), 16 students attended the lecture in a traditional classroom (control group), and two were absent for work and health reasons. The demographic breakdown of the control group and test group is tabulated in Appendix A.

For the test group, the instructor assembled topics of MRP onto PowerPoint slides and recorded his verbal explanation of each slide using Breeze one week before. He has also included a ten minutes demonstration of building a MRP table on MS Excel – using Breeze's application sharing capability.

For the control group, the instructor taught the concept of MRP in a traditional classroom setting using chalkboard, and how to build a MRP table using MS Excel.

Lectures of both groups were structured similarly, and intended to cover as much material. After the 40 minutes lecture, students were required to take a 11-questions post test.

Post-Test I

This post-test was designed with 11 questions to test students on the ability to retain information presented during the lecture, level of comprehension, and ability to apply knowledge of MRP on a given MRP table.

The first five questions were structured as multiple choices with the intent to test students on their ability to recognize presented material. The next five questions were structured as short answers to test students on their level of understanding. The answers were either awarded half a point for partial correctness, or a full point for thoroughness.

The last question appeared as a MRP table with given gross requirement, lead time, current on hand inventory, and lot sizing rule. The purpose of this last question is to test if the students understood the material enough to be capable of applying the knowledge of MRP onto a given problem. Students were required to fill in the blank for the rows of net requirement, inventory, planned order receipt, and planned order release.

Post-Test II

This post-test was again designed with 11 questions to test students on the same three dimensions of learning defined as relevant for the purpose of this lecture.

The first ten questions were a mix of true/false and fill-in-the-blank questions. Similar to post test I, five questions were intended to test students on their ability to retain presented material over a period of time, while the other five questions were intended to test students on their understanding of the material over a period of time.

Like post test I, the last question was a MRP table with a different set of gross requirement, lead time, current on hand inventory, and lot sizing rule. Again, the purpose of this question was intended to test students on their ability to apply the knowledge gained from the lecture. Students were required to fill in the blank for the rows of net requirement, inventory, planned order receipt, and planned order release.

4. Result

Post-Test Results

After post-test 1 and post-test 2 were administered, all questions were graded and scores were collected as a percentage. These percentages are then categorized into the learning dimensions: the ability to retain information, the level of comprehension, and the competency level of application. The overall performance is calculated by averaging the score across all three dimensions.

The lecture given to the control group was slowed down by excessive discussion and questions-and-answer sessions. Because of this unintended delay, the lecture was not able to cover the material needed for the students to answer question 3, 5, and 11 on post-test 1. Since students who participated in traditional class did not learn the necessary material to answer the specific questions in post-test 1, their scores for question 3, 5, and 11 – the question that test application ability – are omitted. However, all questions in post-test 2 were covered sufficiently in the lecture, hence the application dimension was considered in post-test 2. The numbers of students finishing both post-tests are 10 and 12 for Breeze and traditional group respectively. A number of post tests were submitted in blank and therefore scrapped as invalid entry. Valid scores are kept anonymous and shown in the table 1 and table 2 below.

Attendee Number	Post-Test1			Post-Test2			
	Retain	Comprehension	Overall	Retain	Comprehension	Application	Overall
1	100.00	80.00	87.50	80.00	100.00	28.00	90.00
2	66.67	100.00	87.50	80.00	80.00	24.00	80.00
3	66.67	30.00	43.75	60.00	100.00	12.00	80.00
4	0.00	80.00	50.00	40.00	80.00	16.00	60.00
5	66.67	70.00	68.75	100.00	40.00	12.00	70.00
6	100.00	80.00	87.50	40.00	80.00	12.00	60.00
7	66.67	100.00	87.50	80.00	100.00	20.00	90.00
8	100.00	90.00	93.75	60.00	100.00	28.00	80.00
9	33.33	100.00	75.00	60.00	100.00	12.00	80.00
10	33.33	80.00	62.50	40.00	60.00	12.00	50.00

Table 1. Individual Score Obtained from Post-test 1 and Post-test 2 of the Test Group

Number	Post-Test1			Post-Test2			
	Retain	Comprehension	Overall	Retain	Comprehension	Application	Overall
1	100.00	100.00	100.00	60.00	100.00	16.00	80.00
2	66.67	100.00	87.50	80.00	80.00	12.00	80.00
3	100.00	90.00	93.75	80.00	80.00	12.00	80.00
4	66.67	90.00	81.25	80.00	100.00	12.00	90.00
5	66.67	80.00	75.00	100.00	60.00	12.00	80.00
6	100.00	80.00	87.50	100.00	100.00	12.00	100.00
7	100.00	50.00	68.75	100.00	80.00	12.00	90.00
8	66.67	80.00	75.00	40.00	80.00	20.00	60.00
9	66.67	80.00	75.00	100.00	100.00	16.00	100.00
10	66.67	60.00	62.50	60.00	100.00	12.00	80.00
11	100.00	80.00	87.50	100.00	100.00	28.00	100.00
12	100.00	70.00	81.25	80.00	80.00	0.00	80.00

Table 2. Individual Score Obtained from Post-test 1 and Post-test 2 of the Control Group

4.1 Data Analysis

From the above, some hypotheses were made and tested as described below.

	Post-Test 1	**Post-Test 2**
Test Group	A_{11} B_{11} D_{11}	A_{12} B_{12} C_{12} D_{12}
Control Group	A_{21} B_{21} D_{21}	A_{22} B_{22} C_{22} D_{22}

Figure 4. Layout for hypotheses testing

From Figure 4, each cell consists of some X_{ij}, which means

X = A symbolizes the ability to retain information
B symbolizes the level of comprehension
C symbolizes the competency level of application
D symbolizes the overall performances

i = 1 represents students in test group
2 represents students in control group

j = 1 represents testing in post-test 1
2 represents testing in post-test 2

Hypotheses Group 1: Test within post-test 1
Hypotheses 1: For post-test 1, ability to retain information for test group is no different from the control group (A_{11} vs A_{21})
Hypotheses 2: For post-test 1, the level of comprehension for test group is not different from the control group (B_{11} vs B_{21})
Hypotheses 3: For post-test 1, the overall performance for test group is not different from the control group (D_{11} vs D_{21})

Hypotheses Group 2: Test within post-test 2
Hypotheses 4: For post-test 2, the ability to retain information for test group is not different from the control group (A_{12} vs A_{22})
Hypotheses 5: For post-test 2, the level of comprehension for test group is not different from the control group (B_{12} vs B_{22})
Hypotheses 6: For post-test 2, the competency level of application for test group is not different from the control group (C_{12} vs C_{22})
Hypotheses 7: For post-test 2, the overall performance for test group is not different from the control group (D_{12} vs D_{22})

Hypotheses Group 3: Test for overall post-test
Hypotheses 8: In both post-tests, the ability to retain for test group is not different from the control group (A_{11} and A_{12} vs A_{21} and A_{22})
Hypotheses 9: In both post-tests, the level of comprehension for test group is not different from the control group (B_{11} and B_{12} vs B_{21} and B_{22})
Hypotheses 10: In both post-tests, the overall performance for test group is not different from the control group (D_{11} and D_{12} vs D_{21} and D_{22})

Hypotheses Group 4: Test the Difference between post-test 1 and 2 for Breeze group
Hypotheses 11: For Breeze class, the ability to retain for post-test 1 is not different from post-test 2 (A_{11} vs A_{12})
Hypotheses 12: For Breeze class, the level of comprehension for post-test 1 is not different from post-test 2 (B_{11} vs B_{12})
Hypotheses 13: For Breeze class, the overall performance for post-test 1 is not different from post-test 2 (D_{11} vs D_{12})

Hypotheses Group 5: Test the Difference between post-test 1 and 2 for Traditional class group
Hypotheses 14: For control group, the ability to retain information for post-test 1 is not different from post-test 2 (A_{21} vs A_{22})
Hypotheses 15: For control group, the level of comprehension for post-test 1 is not different from post-test 2 (B_{21} vs B_{22})
Hypotheses 16: For control group, the overall performance for post-test 1 is not different from post-test 2 (D_{21} vs D_{22})

This study was conducted as a quasi-experimental design at level of significant 5 percent. This means that every hypotheses tests were tested at α=0.05. If the p-value of hypotheses is less than 0.05, the decision is that there is significant difference in means of the factor. On the other hand, if the p-value of hypotheses is more than 0.05, the decision is that there is no significant difference in means of the factor.

Every test was performed in SAS. The first 3 hypotheses groups tested the difference in average score of each group, the test statistic used in these hypotheses are F test. For hypotheses group 4-5, it is a pairwise comparison, the test statistic used in these hypotheses are T test. Results for all hypotheses testing are shown in table 3 to 7 below

Area of Interest	Average		Standard Deviation		F-Value	P-Value	Decision
	Breeze	Class	Breeze	Class			
Retaining Information	63.63	81.25	31.46	17.80	3.54	0.0715	Accept
Comprehension	82.73	75.63	20.54	17.88	0.91	0.3487	Accept
Overall	75.57	77.73	17.11	12.07	0.15	0.7022	Accept

Table 3. Conclusion for hypotheses group 1

Area of Interest	Average		Standard Deviation		F-Value	P-Value	Decision
	Breeze	Class	Breeze	Class			
Retaining Information	65.45	81.67	20.18	19.92	3.75	0.0663	Accept
Comprehension	85.45	88.33	20.18	13.37	0.17	0.6884	Accept
Application	17.45	13.67	6.52	6.49	1.95	0.1773	Accept
Overall	56.12	61.22	9.64	8.03	1.92	0.1809	Accept

Table 4. Conclusion for hypotheses group 2

Area of Interest	Average		Standard Deviation		F-Value	P-Value	Decision
	Breeze	Class	Breeze	Class			
Retaining Information	63.67	99.17	22.36	61.86	2.95	0.1013	Accept
Comprehension	82.50	84.17	15.32	10.41	0.09	0.7651	Accept
Overall	74.19	83.13	13.13	8.28	3.79	0.0659	Accept

Table 5. Conclusion for hypotheses group 3

Area of Interest	Average	Standard Deviation	T-Value	P-Value	Decision
Retaining Information	-0.67	32.42	-0.06	0.9496	Accept
Comprehension	-3.00	27.91	-0.34	0.7427	Accept
Overall	0.38	17.03	0.07	0.9460	Accept

Table 6. Conclusion for hypotheses group 4

Area of Interest	Average	Standard Deviation	T-Value	P-Value	Decision
Retaining Information	1.67	22.76	0.25	0.8043	Accept
Comprehension	-8.33	19.00	-1.52	0.1567	Accept
Overall	-3.75	15.08	-0.86	0.4073	Accept

Table 7. Conclusion for hypotheses group 5

At the first glance, the score between Breeze and traditional class group appeared different. For example, in hypotheses 1, the average score of Breeze and traditional class is 63.63 and 82.73 respectively, in term of their ability to retain information. Although the difference of 17.62 looks significant, it should not warrant impulsive conclusion that students from traditional class did a better job than students in Breeze group. From statistics point of view, they are not significantly different. Since the p-value for this test is 0.0715, which is more than 0.05. It means that there is no strong evidence to reject the hypotheses that the average score is different at the level of 5 percent. The cause of this may be:

- The sample size is too small. In order to get the precise test, the sample size is suggested to be high. In this study, the total number of students is only 22. Generally, the rule of thumb for the sample size is at least 30.
- Variance is high. Standard deviation of student in Breeze group is very high. In this example, the standard deviation is 31.46, which is almost half of the means. High variation implies reduced precision of the average score, or high degree of error. There is a chance of overlapping of score. Therefore, the p-value is higher than it is supposes to be.

From results above, there is no significant difference for all hypotheses set up for the purpose of this study at α=0.05 level. It can be concluded that learning through Breeze has the same efficiency as in the traditional classroom.

Survey Results

In addition to the post tests, this study includes a short survey. This survey was administered after students had taken the MRP class. There are 3 major areas: demographic and background, experiences on distance learning, and Breeze experience from MRP class. All students were asked to answer the first two areas, while students only in Breeze group answered the third area as well. Note that the number of students filling the survey may different from the post-test. It is due to some students did not do the post-test either post-test 1 or 2 or both. This study will not relate the result from post-test to survey. Also, the number of students answer in each question will be different since some students did not answer some questions. Below are some results from survey by major areas

Demographic and Background

- The majority of students are in industrial distribution program, 11 out of total 26. Six are in industrial technology and the rest of them are in dual IT/ID.

- All students in this class are the upperclass men. Fourteen students are in senior, 11 are in junior, and 1 is the fifth-year.
- The majority of students are male. There are 22 males and 4 females in this class.
- Most students are taking 4-5 courses in this semester. Only 1 student is taking 2-3 courses, while 4 students have more than 5 courses.
- The number of hours that students spend on school work is distributed. Six students spend 0-5 hours per week, while 2 students spend more than 20 hours per week. However, the majority is at 6-10 hours per week.

Experiences on Distance Learning

- Almost half of students (12 out of 25) have taken the distance class at Purdue University before. Ten of them had taken it once, and 2 of them had it twice.
- The distance learning method they experience is mostly through the internet. Some of them did the self-learning.
- The effectiveness of distance learning compared to the traditional lecture is distributed. Two students think that the distance learning is very effective, while 1 student says it is very ineffective. Three students answer it marginally effective, same degree, and marginally ineffective each.
- If students can choose to learn between distance learning and traditional lecture, most students (17 out of 25) prefer to study in the traditional classroom. Six students want to take the distance class.
- About 30% of students who have taken the distance class before prefer the distance class, while 23% of students who have never taken the distance class before prefer it
- Reason that students prefer the traditional classroom
    - Instantaneous feedback from instructor
    - Better opportunity to ask question
    - Quick answer
    - More interaction in class
    - More efficiency in learning
    - More personal
    - Students can pay attention in class
- Reason that students prefer the distance learning
    - Anywhere, accessible from home
    - Anytime, 24/7
    - Students can work full-time
    - Independence
    - Students can repeat lecture
    - Flexible schedule

Breeze Experience from MRP Class

- This section of survey was dome only students who took the Breeze class. They provided some comments on learning through Breeze
- Students rate the importance of the quality that affects the learning through Breeze

Quality	Student Number											Average
	1	2	3	4	5	6	7	8	9	10	11	
Internet Connection	6	10	10	10	10	10	10	10	8	9	5	**8.91**
Instructor	8	10	8	10	6	8	10	N/A	10	9	10	**8.90**
Lecture Content	7	9	8	8	10	7	10	N/A	8	9	10	**8.60**
Video	8	10	10	10	7	6	10	N/A	8	9	3	**8.10**
Environment	6	10	8	7	8	10	3	N/A	10	9	8	**7.90**
Audio	7	8	7	4	10	10	10	N/A	8	8	2	**7.40**
Software Used	6	5	8	4	6	8	8	N/A	8	7	1	**6.10**

Table 8. Importance of the quality that affects the learning through Breeze

- Students think that the speed of Internet connection and instructor are the first two that have the most effect on the Breeze learning. The software that instructor used in lecture is not that important. One student thinks it does not affect at all.
- The property that Breeze has the same capacity as in the traditional class room are
    - Lecture content and concept
    - Time spent in lecture
    - PowerPoint presentation
- Things that students like in Breeze
    - PowerPoint presentation
    - Ease of use
    - Ability to access from home
    - Ability to access anytime
    - Students can take a break or pause during lecture
    - Students can repeat the lecture
- Things that students dislike in Breeze
    - No interaction
    - Small screen
    - Inability to ask the question
    - Inability to copy information from screen
    - Bad noise
- Things that students want to see more in Breeze
    - A summary of main topics
    - Interaction
    - More robust screen size
    - More video
    - More demo
    - Exam review

5. Discussion

5.1 Comments from the hypotheses results:

- The ability to retain information is the area that has most effect from learning method. The p-value is almost significant, at 0.0715 and 0.0663 for post-test 1 and 2 respectively.
- Both learning methods do not affect students' level of comprehension. The p-value is not significant – 0.3487 and 0.6884 for post-test 1 and 2 respectively

- Contrast to the above abilities, the p-value for overall performance in hypotheses 3, 7, and 10 are different. For post-test 1 only, the p-value is 0.7022, while it is 0.1809 for post-test 2 and 0.0659 for overall test. It is because post-test 2 also considered the competency level of application. In this area, student got very low score, less than 20 percent for both methods. Therefore, it affects the overall performance and its p-value.
- The score of post-test 1 and 2 is very close. Score of post-test 1 is higher than post-test 2 only in the dimension of students' ability to retain information from traditional class. Both student groups have post-test 2 higher score than post-test 1 comprehension ability. It may imply that students have more comprehension ability for long-term than short-term. In Breeze group, the p-values are very high. It means that the differences between 2 post-test are very low or that students did a similar performance for both tests. However, for traditional class group, the comprehension ability has lower p-value. Students in this group did the questions regarding to comprehension ability in post-test 2 a lot better than post-test 1.

Based on the demographic survey, majority of the students had not had prior experience with a class taken online. Because of this, we can infer that many of the students from the control group had enough curiosity to instigate them to check out the online lecture over the weekend before post test II was released to them. By checking out the online lecture after physically attended the traditional classroom lecture, students from the control group were able to learn the approaches to MRP being explained in two different ways. "Understanding of concepts involves the ability to connect several smaller components of one phenomenon in a logical and meaningful way" (Omelicheva & Avdeyeva, 2006). As such, there is a high degree of likelihood that the control group would fare better than the test group in term of understanding the concept of MRP.

5.2 Advantages it brings to the Four Different Types of Learning Experiences

For the old-fashioned method, instructors who taught the distance learning courses by Microsoft PowerPoint can demonstrate only in the presentation format, which is good for presentation, but not for teaching. In education, PowerPoint has one disadvantage, which is flexibility, especially for an interactive class. An example is a lecture showing how to use computer software. To show students step-by-step, instructor need to capture screens every step and paste them to PowerPoint, which is pretty tedious and difficult.

Macromedia Breeze allows instructor to switch from one program to others easily. Students can see the same screen as instructor. In an example above, instructor activates Excel and it appears in the virtual classroom as it appears on the instructor's laptop. Seeing the interaction or movement in Excel helps students gain more understanding during demonstration. At the same time, Breeze also displays the instructor's face through the video system equipped in the program. It makes students feel like they are in the real classroom, which stimulates their interest.

Some distance learning methods do not have instructor's voice such as learning via CD. Students just watch the lecture step-by-step by hitting a keyboard. It makes students lose their attention in the lesson because of boredom. Further than the video, Macromedia Breeze is also

equipped with the audio system. Students can listen to what instructor said through a headphone or speaker. Instructor can decrease the tedium by making an interesting sound.

Generally distance learning is a one-way communication, from instructor to students. Feedback from students can be sent to instructor after the lesson via email, phone, etc. Except by the telephone, it is almost impossible to get the instant response from students.

Macromedia Breeze provides a chat session for instructor and students to have an interaction immediately. A chat session is a small window at the bottom of screen. When students have questions or comments, they can type their questions or comments and instructor can answer them immediately. This interaction simulates the activity in the real classroom. Breeze also has another function that allows instructor to ask a question with multiple choices. Students can choose an answer and response immediately. The answer will be available to instructor real-time anonymously.

In Macromedia Breeze, students can repeat their lesson as long as it is available on the course website. After the first time, they have an amount of time to think and study the lecture. If they do not understand the lecture or they want to get more comprehension, they can take a lesson repeatedly.

5.3 Feedback of Using Macromedia Breeze as a Distance Learning Tool

To the extent that PowerPoint-inclined professors are guilty of rigid teaching, the lecturer of the control group is guilty of being led astray by students through excessively discussion, hence failing to complete teaching the syllabus-of-the-day, resulting in students' failure to correctly answer two of the post test questions. This phenomenon can be observed and explained by hypothesis 1.

6. Future Research

We will be able to conduct a pre-test post-test evaluation for the student doing IT 442 class as a web based course this semester. But without the pre-test post-test result from a traditional lecture course as comparison, the result we obtained from the web based course will be lacking in significance. Hence, a follow up research shall be conducted in the following semester where the same pre-test post-test will be administered to a traditional lecture course. Subsequently, the comparison of result will provide conclusion to the effectiveness of Macromedia Breeze as a web based tool.

During the process of literature review, we found that above and beyond the four styles that we analyzed for the intent of this paper, a person's learning style is also heavily influence by his personality. So then, what sort of personality will benefit more from Breeze than traditional classroom lecture?

A popular personality survey instrument, Myers Briggs Type Indicator (MBTI), profiles personality types based on four sets of preferences: extraversion versus introversion, sensing versus intuition, thinking versus feeling, and judging versus perceptive. As a result, these preferences can be translated into 16 different combinations of learning styles (Brightman, n.d.).

Future studies can be conducted to identify which of the personality combinations influence perception of taking a web-based course with Breeze.

7. Conclusion

The intent of this paper is two fold; first, it attempts to promote Macromedia Breeze as an effective candidate for distance learning, second, it attempts to explain why Breeze has the technological versatility to fulfill the various facets of distance learning: namely, (1) the ability to offer comparable services to all students, (2) the ability to assist faculty in adapting technology into their teaching, and (3) the ability to offer one or more significant academic programs to new learners (Markwood & Johnstone, 1994).

Converting a traditional warehouse management course to an online course offering where students are actively involved in the learning process takes time and effort. Instructors are challenged to provide students with a learning environment that stimulate learning in all dimensions. One way to meet this challenge is to create media-rich online teaching modules. These modules help to create a learning environment that is student-centered where students are actively involved in the learning process.

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