

## Why Teach What Students Can Learn Themselves?

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### Abstract

One of the major challenges information technology teachers in the US face is motivating students to learn what teachers want to teach. Often teachers fail in doing so. This leads teachers to learn and apply better teaching techniques. Students keep getting doses of better teaching techniques akin to overfeeding, which become counterproductive. This may also have contributed to the decline in student-enrollment in the information technology major.

Students inherently may not be unmotivated. This can be confirmed by another surprising trend. Most young people are found to be using technology to a much greater extent. They take to the Internet, chat, instant messaging cell phones, video games etc. like a duckling takes to water. If they can learn all that on their own why can't they educate themselves? The purpose of this paper is to explore how teachers can avoid teaching and yet educate the next generation by letting them do so.

**Keywords:** Pedagogy, Pedagogical, Learning, Teaching, Teaching Approaches, Student, Teacher, Higher Education, Undergraduate, Training, Student Led Teaching

### Background

Lecturing may be one of the most popular methods of teaching. However, research (Meyers and Jones, 1993) on the lecturing method indicates a limitation of lecturing. I too found that lecturing causes disinterest among the students. This makes educating them more difficult. To involve students to a greater degree and hence to retain their interest and ultimately increase in their learning I wondered why teach what students can learn themselves? I experimented with student-led learning.

### Spring 2006

I used to feel frustrated when my students would not be able to fully learn what I taught them. This led me to change my focus to student-led learning in spring 2006. Instead of me using the instructor's computer and doing a lecture and demo, I availed the help of a student who would demo on the instructor's computer and I would be lecturing him or her on how to do it. I was amazed to notice that this approach significantly improved the learning of students. According to my guesstimate, more than 90% of the students would learn more than 90% of the contents of the course. Earlier about 60% of the students would learn about 80% of the contents of the course.

**Fall 2006**

I became bolder and attempted to further increase student involvement. In fall 2006, I formed groups of two students in each of my classes for: microcomputer applications (using Microsoft: Word, Excel, Access, and PowerPoint), electronic spreadsheets (using Microsoft Excel), and database applications (using Microsoft Access). I asked the groups to make presentation of chapters in the book. I also assured them that they need not feel insecure because I will always be available in case of need. The chapters include hands-on practice on microcomputer applications. Most of the instructions in the book were click this or click that, and type this or type that.

It very went well with my microcomputer applications class. It did not go well with my classes on electronic spreadsheets, and database applications. All the students in my microcomputer class were new to me and I was new to them. For them it was not a change in pedagogy. It was the pedagogy. That was not the case with my electronic spreadsheets and database applications classes. Many of the students had known me teaching them by lecturing so they noticed the change in pedagogy distinctly. This also caused a little bit of unease among them. My assurance that I will always be available in case of need eased their tension. I did not have to help them much in the actual practice. The students in all the classes finished learning much better than if I had taught them. They also did it much faster. At the end of the semester I found added confidence among the students.

**Spring 2007**

In spring 2007, I taught similarly in five classes. These classes are microcomputer applications (21 students), a freshman level course; object-oriented programming (9 students), a sophomore level course; systems analysis and design (11 students), a senior level course, and two classes of principles of financial management (29 and 30 students), a sophomore level course, where I also used Microsoft Excel for teaching financial analysis.

In the microcomputer applications class the groups were expected to carry out hands-on practice using textbook projects. In the object-oriented programming class students were required to use the source codes in each chapter made available by the publisher. They were required to explain the source codes and modify programs as per my instructions. In systems analysis and design and principles of financial management classes the students were required to use modified PowerPoint slides provided by publishers of the books. They were asked to limit the number of PowerPoint slides to 10 to 15 as opposed to the publisher's 30 to 50. This was to allow more time for the class discussion. Additionally systems analysis and design class students were required to learn and use MS Visio and MS Project by themselves.

My involvement was minimal in the microcomputer class. This was followed by the systems analysis and design class wherein I provided lot of input from real world examples. Since most students lacked much work experience, this was expected. In the object-oriented programming class my involvement was higher. I had to explain basic concepts and repeat them often to students. In principles of financial management classes the results were mixed. One of the classes was housed in computer lab. Students had access to a computer in front of them and this provided ample opportunity for students to get distracted by engaging themselves in doing chat, IM, e-mail, web surfing etc. I had to supplement up to half the course in some of the classes. Since this was a required course some of the students did not display the required level of enthusiasm

## *2007 ASCUE Proceedings*

to learn it. These students would make substandard presentations often reflecting bare minimal preparation. Their response to my motivation to prepare better was not satisfactory.

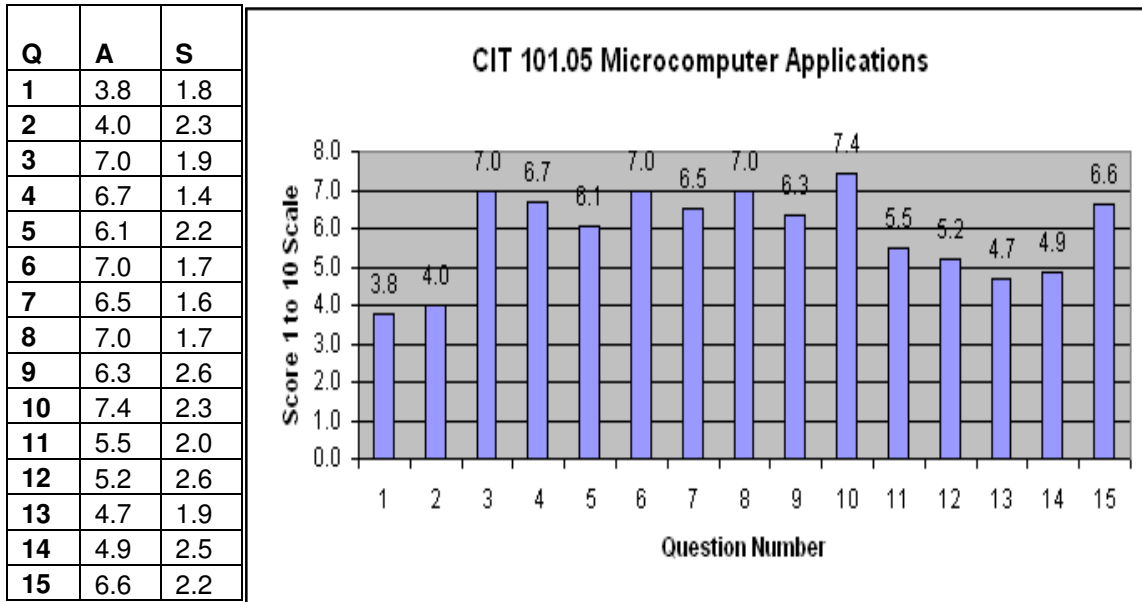
### **Survey**

At the end of the semester I carried out a survey in all classes to learn how students viewed at this pedagogy. I asked following questions:

1. How **difficult** did you find it for you or your group **to prepare** for your presentation? (Very Easy = 1, Average = 5, Very Difficult = 10)
2. How **difficult** did you find it for you or your group **to do your presentation**?
3. (Very Easy = 1, Average = 5, Very Difficult = 10)
4. **How well** did **you or your group** make **preparation** for their presentation?
5. (Not Effective = 1, Average = 5, Very Effective = 10)
6. **How well** did **other students or groups** make their **presentation**?
7. (Not Effective = 1, Average = 5, Very Effective = 10)
8. **How good** did you find the **question/answer session** that followed the presentation?
9. (Not Effective = 1, Average = 5, Very Effective = 10)
10. Did you find **yourself more involved** in the learning?
11. (Not Involved = 1, Somewhat = 5, Very Involved = 10)
12. Did you find other **students** in your class were **more involved** in the learning?
13. (Not Involved = 1, Somewhat = 5, Very Involved = 10)
14. **How good** did you find such **verbal interaction** by the **instructor**?
15. (Not Effective = 1, Average = 5, Very Effective = 10)
16. **How good** did you find such **supplementary notes** provided by the **instructor**?
17. (Not Effective = 1, Average = 5, Very Effective = 10)
18. **How much** did you learn in this course from the **textbook**?
19. (Not Much = 1, Somewhat = 5, Very Much = 10)
20. **Whom** would you **credit** for your **learning** in this course from the **textbook**?
21. (Instructor = 1, Both Instructor & Students = 5, Students = 10)
22. **How much** did you learn in this course that was from the **real world situations** outside of the textbook?
23. (Not Much = 1, Somewhat = 5, Very Much = 10)
24. **Whom** would you credit for your learning from the **real world situations** outside of the textbook?
25. (Instructor = 1, Both Instructor & Students = 5, Students = 10)
26. **How much** did you improve your **presentation skills**?
27. (Not Much = 1, Somewhat = 5, Very Much = 10)
28. How much **do you appreciate** overall **this approach** where students or their groups are required to make preparation and presentation of the textbook chapters?
29. (Not Much = 1, Somewhat = 5, Very Much = 10)

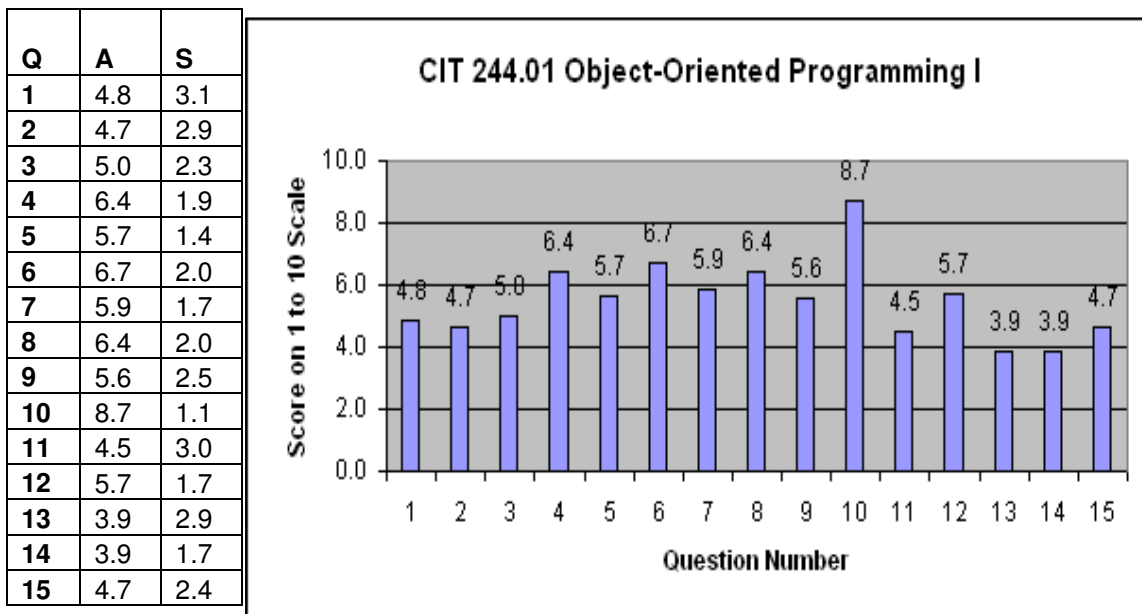
Data gathered are presented along with chart class-wise in Table 1 through 5 as follows:

**Table 1**



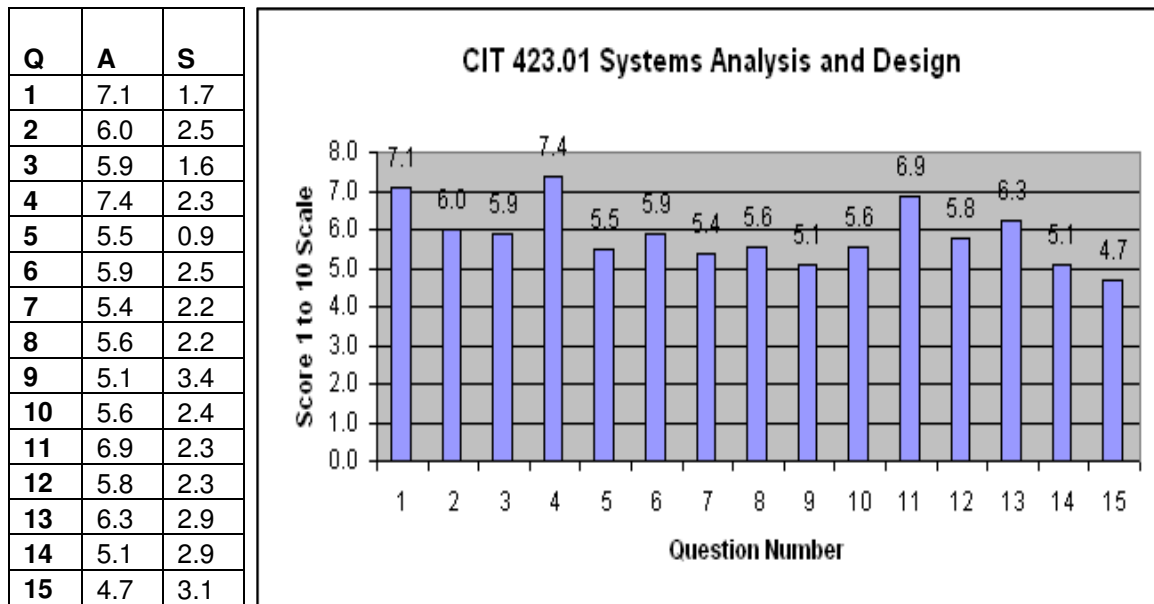
Valid response was received from 14 students out of 21 students i.e. 67%

**Table 2**



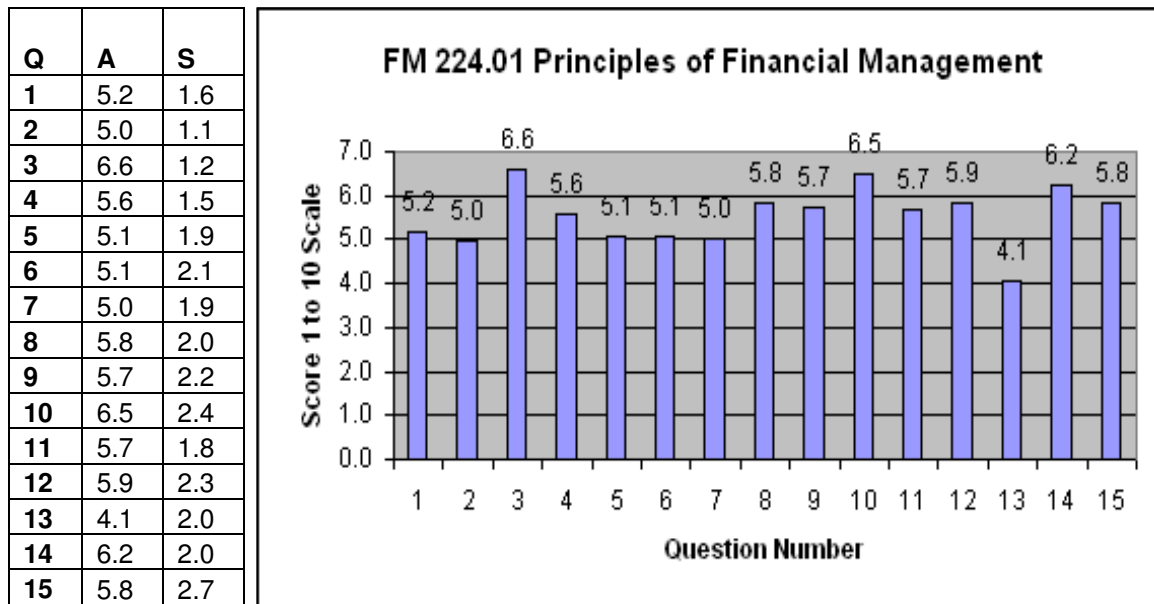
Valid response was received from 7 students out of 9 students i.e. 78%

Table 3



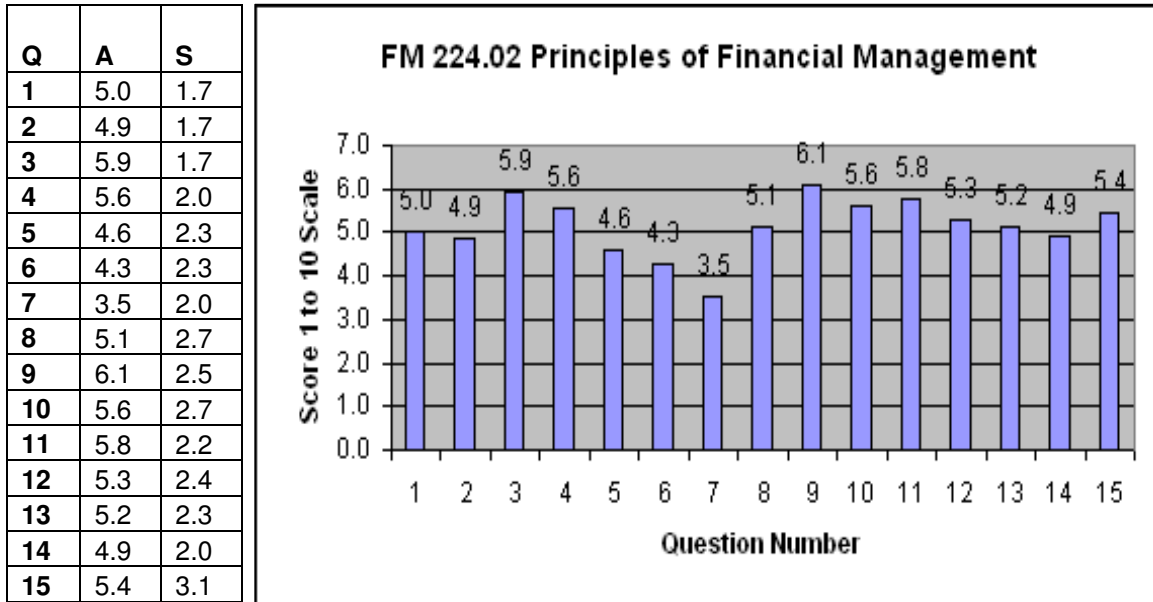
Valid response was received from 9 students out of 11 students i.e. 82%

Table 4



Valid response was received from 21 students out of 29 students i.e. 72%

Table 5



Valid response was received from 21 students out of 30 students i.e. 70%

To get comparative idea the data gathered in all the classes are presented in Table 6 as follows:

Table 6

CIT 101.5 Microcomputer Applications			CIT 244.01 Object- Oriented Programming I		CIT 423.01 System Analysis & Design		FM 224.01 Principles Financial Management		FM 224.02 Principles Financial Management	
Q	A	S	A	S	A	S	A	S	A	S
1	3.8	1.8	4.8	3.1	7.1	1.7	5.2	1.6	5.0	1.7
2	4.0	2.3	4.7	2.9	6.0	2.5	5.0	1.1	4.9	1.7
3	7.0	1.9	5.0	2.3	5.9	1.6	6.6	1.2	5.9	1.7
4	6.7	1.4	6.4	1.9	7.4	2.3	5.6	1.5	5.6	2.0
5	6.1	2.2	5.7	1.4	5.5	0.9	5.1	1.9	4.6	2.3
6	7.0	1.7	6.7	2.0	5.9	2.5	5.1	2.1	4.3	2.3
7	6.5	1.6	5.9	1.7	5.4	2.2	5.0	1.9	3.5	2.0
8	7.0	1.7	6.4	2.0	5.6	2.2	5.8	2.0	5.1	2.7
9	6.3	2.6	5.6	2.5	5.1	3.4	5.7	2.2	6.1	2.5
10	7.4	2.3	8.7	1.1	5.6	2.4	6.5	2.4	5.6	2.7
11	5.5	2.0	4.5	3.0	6.9	2.3	5.7	1.8	5.8	2.2
12	5.2	2.6	5.7	1.7	5.8	2.3	5.9	2.3	5.3	2.4
13	4.7	1.9	3.9	2.9	6.3	2.9	4.1	2.0	5.2	2.3
14	4.9	2.5	3.9	1.7	5.1	2.9	6.2	2.0	4.9	2.0
15	6.6	2.2	4.7	2.4	4.7	3.1	5.8	2.7	5.4	3.1

It was noted that:

1. Preparation for or making presentations was found to be the least difficult for the Microcomputer Applications class whereas the Systems Analysis and Design class found it most difficult. This may be because the Microcomputer Applications textbook has clear-cut instructions that are easy to follow even for freshman students whereas the Systems Analysis and Design textbook probably was the most challenging textbook representing real-life Systems Analysis and Design practices that are more difficult to follow for even senior students who were without practical work experience in the field of Systems Analysis and Design.

The standard deviation in Object-Oriented Programming I class was highest. Some of the students had good programming logic and found it easy to prepare whereas some of the students struggled to grasp programming concepts and logic.

2. As to the effectiveness of the presentations, the Microcomputer Applications class found it most effective. Principles of Financial Management Section 2 found it least effective. It is interesting to note that students in the Object-Oriented Programming I class and the Systems Analysis and Design class found that other students or groups in the class had made a more effective presentation compared to their own presentation. It should be noted that the standard deviation in the Systems Analysis and Design class was the highest implying some students made more effective presentations whereas some were not very effective. That indeed was the case according to me.
3. The Microcomputer Applications class found that the question/answer session following the presentation was more effective whereas the Principles of Financial Management Section 2 class found it least effective. It also had the highest standard deviation implying more variation in response of students.
4. Students in the Microcomputer Applications class found themselves to be the most involved of all the classes and the Principles of Financial Management Section 2 the least involved. The difference in involvement by self verses other students was significant in the Principles of Financial Management Section 2 class. This was the class that was held in a computer lab classroom and the students suffered more distractions. The classes of Microcomputer Applications, and Object-Oriented Programming I were also held in computer labs but students had lot of class-work to do before they could be tempted by distractions.
5. The Microcomputer Applications class found verbal interaction by the instructor to be most effective. The Principles of Financial Management Section 2 class found it to be the least effective. It also had highest standard deviation.
6. One consolatory aspect of the Principles of Financial Management Section 2 class was that it found supplementary notes provided by instructor to be among the most effective.
7. The Object-Oriented Programming I class followed by the Microcomputer Applications class found that they learned the most from the textbook. The Object-Oriented Programming I class had the least standard deviation.
8. The Object-Oriented Programming I class credited the instructor most for their learning. The Systems Analysis and Design class credited the students. This was by design. While it makes me happy to learn that students of my Object-Oriented Programming I class gave me more credit for their learning, what I wanted was that the students would learn themselves and give more credit to them. The standard deviation was highest in the Object-Oriented Programming I class, though. This implies that there were some students who gave more credit to themselves. I wish the proportion of such students to increase.

9. The students of the Systems Analysis and Design class and the Principles of Financial Management Section 1 class found that they learned the most about the real world situations outside of the textbook. They gave more credit to students and instructor respectively. The Object-Oriented Programming I class gave the most credit to the instructor among all the classes. It also had a high standard deviation.
10. the students of Principles of Financial Management Section 1 class found that they improved their presentation skills the most. It is not surprising that a technical class like Object-Oriented Programming I found that it did not improve their presentation skills very much. Their focus was on improving the technical knowledge which would help in controlling programming codes and whoever did that successfully was valued more than those with more theatrical presentation skills. The standard deviation was the lowest implying higher degree of agreement among the students.
11. The Microcomputer Applications class appreciated this approach the most. The classes of Object-Oriented Programming I and Systems Analysis and Design found it to be the least appropriate. The degree of difficulty of the class may have something to do with this conclusion.

Two Yes/No type of questions were excluded from the analysis due to seeming confusion among the students in grasping their meaning. They are: Did the **instructor supplement** student learning in class by **verbal interaction**? Did the instructor supplement student learning out of class by providing **additional notes**?

The feedback received to one open-ended question (Would you like to make **suggestions** to change the approach adopted in this class so as to make the student learning more effective?) may be summarized as follows:

- 1) The Microcomputer Applications class provided one feedback comment: The class is good set up the way it is.
- 2) The Object-Oriented Programming I class provided two feedback comments summarized as:
  - a) (*provide*) More student-led working with other students (debugging)
- 3) The Systems Analysis and Design class provided two feedback comments summarized as:
  - a) Do main project in parts along with chapters from beginning of the semester.
- 4) The Principles of Financial Management Section 1 class provided twelve feedback comments that may be summarized as:
  - a) Positive or corroborative feedback included:
    - i) ...this was a very good approach to make verbal presentations a real part of class learning... every person in business needs communication skills; this class helped... with this. I think that this approach needs no change.
    - ii) ...this approach was a lot more effective than just being lectured to by the instructor... Q&A after the PowerPoint (presentation) was effective & helped us to learn by ourselves with the instructor's help.
  - b) Negative or critical feedback included:
    - i) This class was very boring. It was hard to get motivated... It would be a much more effective class if we didn't rely so heavily on the textbook and student presentations and instead focused on real life situations.
    - ii) ...the self-learning approach is a good idea however it is tough for a required class because a majority of the students are not interested... instructor should do chapter presentations
    - iii) Have more in-class group work.

## 2007 ASCUE Proceedings

- iv) ... Instructor should do the presentations but continue to ask questions during class.
  - v) ... introduce an online discussion component in the course
  - vi) The students are not knowledgeable enough to teach material because they haven't learned it yet. The questions (*by the instructor*) are hard to answer if the group doesn't know.
- 5) The Principles of Financial Management Section 2 class provided eight feedback comments that may be summarized as:
- a) Positive or corroborative feedback included:
    - i) I like being able to use the computers during class to do a good job of teaching. Don't change anything.
  - b) Negative or critical feedback included:
    - i) Students do not make good presentations or make poor presentations. The course should go at a slower pace and should cover less material (*chapters*) but go in more depth.
    - ii) The approach is inappropriate and unacceptable. Instructor should screen students and only if they are found to be good should he approve them to make presentations.
    - iii) This approach might be fine in a grad school but not in undergraduate school (*such as ours*).
    - iv) Students are disinterested and ill-prepared and make shabby presentations.
    - v) The instructor should do more lecturing and teach half or the whole class.
    - vi) The students would have performed better in exams if the instructor did more teaching.
    - vii) The class should not have been held in a computer lab where there are too many distractions.

### Conclusion

The student-led learning approach is a good approach for classes like Microcomputer Applications. It may work with qualifications in classes like Object-Oriented Programming or Systems Analysis and Design. It may also work with some qualifications in classes like Principles of Financial Management if the students are committed and work hard to prepare for and take interest in making a good presentation and avail the instructor's help if lacking in preparation or presentation skills.

### References

Meyers, Chet and Jones, Thomas B., Promoting Active Learning, Strategies for the College Classroom, Jossey-Bass Publishers, San Francisco, 1993, Page 14.