

2005

# Student Reaction to the Use of Classroom Performance and Personal Response Systems in College Level Courses

Edmund A. Donato  
*Old Dominion University*

Follow this and additional works at: [https://digitalcommons.odu.edu/ots\\_masters\\_projects](https://digitalcommons.odu.edu/ots_masters_projects)

 Part of the [Education Commons](#)

---

## Recommended Citation

Donato, Edmund A., "Student Reaction to the Use of Classroom Performance and Personal Response Systems in College Level Courses" (2005). *OTS Master's Level Projects & Papers*. 123.  
[https://digitalcommons.odu.edu/ots\\_masters\\_projects/123](https://digitalcommons.odu.edu/ots_masters_projects/123)

This Master's Project is brought to you for free and open access by the STEM Education & Professional Studies at ODU Digital Commons. It has been accepted for inclusion in OTS Master's Level Projects & Papers by an authorized administrator of ODU Digital Commons. For more information, please contact [digitalcommons@odu.edu](mailto:digitalcommons@odu.edu).

**Student Reaction To The Use Of Classroom  
Performance And Personal Response Systems in  
College Level Courses**

A Research Paper

Presented To the Graduate Faculty  
Of The Department Of Occupational Technical Studies  
At Old Dominion University

In Partial Fulfillment  
Of The Requirement For The  
Master of Science in Business and Industry Training

By

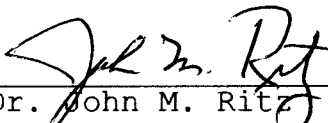
Edmund A. Donato

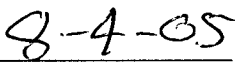
August 2005

## Approval Page

This research paper was prepared by Edmund A. Donato under the direction of Dr. John M. Ritz in OTED 636, Problems in Occupational and Technical Studies. The paper was submitted to the Graduate Program Director as partial fulfillment of the requirements for the Degree of Master of Science with Business and Industry Concentration.

Approval By:

  
\_\_\_\_\_  
Dr. John M. Ritz  
Advisor and Graduate  
Program Director

  
\_\_\_\_\_  
Date

## Table of Contents

	<b>Page</b>
Approval Page	i
Table of Figures	iv
<b>Chapter</b>	
I	
INTRODUCTION	1
Statement of the Problem	2
Research Goals	2
Background and Significance	3
Limitations	4
Assumptions	4
Procedures	5
Definition of Terms	5
Overview	6
II	
REVIEW OF LITERATURE	8
The Classroom Performance System and Personal Response Systems	8
Engaging the Student	9
Evaluating Student Learning	9
Summary	10
III	
METHODS AND PROCEDURES	11
Population	11
Instrument Design	11
Methods of Data Collection	12
Statistical Analysis	12
Summary	12

<b>Chapter</b>		
IV	FINDINGS	14
	Introduction	14
	Presentation of Data	14
	Summary	17
V	SUMMARY, CONCLUSIONS, AND	18
	RECOMMENDATIONS	
	Summary	18
	Conclusions	20
	Recommendations	22
	<b>References</b>	24
	<b>Appendix A</b>	25
	Survey	26
	Raw Data	33

## Table of Figures

Figure		Page
1	Data Table for Research Goal One	14
2	Data Table for Research Goal Two	15

## Chapter I

### Introduction

Getting feedback from students in a classroom has been a challenge for educators since there have been students and teachers. Traditionally, teachers employed the question, hand-raise and answer method, but since technology has been making its way into educational venues, educators have been becoming more innovative with approaches to soliciting and receiving feedback from students. Recently, a few of these technologies seem to be taking their queues from game show television. From our television sets, on a brightly-lit stage, we view a verbose larger than life host prompting the contestants to hit the buzzer after the question has been asked. Now to a classroom, the lights are not as bright and in most cases the teacher is not quite as flamboyant as the game show host, but in the hand of each student is an electronic remote that allows the student to "click" in with an answer to a question.

The system in question has gone under different names. The two monikers most seen are Classroom Performance System and Personal Response System. While seeming to have a rather entertaining beginning, systems such as Classroom

Performance System and Personal Response System are allowing educators and institutions to gather real-time comprehension and evaluation data. Classroom Performance Systems and Personal Response Systems technologies store data and have been gaining prominence in today's educational world. The manufactures of these systems promise great things.

The Classroom Performance System (CPS) hand-held interactive response system appeals to a new generation of learners, while the ease and aid in data collection appeals to a new generation of teachers. CPS is interactive, fun, and highly productive (Classroom Performance System, 2005).

The question that arises is to determine if Classroom Performance Systems and Personal Response Systems are a valuable evaluation tool and do students perceive a benefit from using these systems?

#### **Statement of the Problem**

The problem of this study was to determine reaction level responses of students to the use of Classroom Performance System and Personal Response Systems in their respective classes at Old Dominion University.

#### **Research Goals**

The goals of this study were established to determine:



1. How do students perceive the effectiveness of the Classroom Performance System and Personal Response Systems in engaging them in the learning process?
2. How do students perceive the effectiveness of the Classroom Performance System and Personal Response Systems in aiding educators with evaluating their learning?

### **Background and Significance**

In 2004, a number of departments at Old Dominion University, in Norfolk, Virginia, initiated trials with Classroom Performance System and Personal Response Systems in a select number of courses. Departments that have included Classroom Performance System and Personal Response Systems into their courseware include Physics, Nuclear Medicine, and Educational Curriculum and Instruction.

At the end of 2004, a survey was circulated to all participants, both student and faculty, involved in classes using the new Classroom Performance System and Personal Response Systems. The survey was developed and executed by Old Dominion Universities Office of Communications and Computing Services. Since the Office of Communications and Computing Services survey for the Classroom Performance System was not presented to the Old Dominion University

College Human Research Subjects Committee or the University Institutional Review Board for approval, the results of the survey cannot officially be published in any research initiatives. Because of the deposition of the aforementioned survey, Old Dominion University does not have a baseline study to use as a comparison to other research to assess the effectiveness of the Classroom Performance Systems.

### **Limitations**

The limitations of this study were pursuant to the participant and the outcomes. Participates were limited to instructors who facilitated classes employing Classroom Performance Systems and students who attended classes using Classroom Performance Systems. The outcomes were limited to reaction level responses based on the Kirkpatrick scale level I (Reiser & Dempsey, 2002, p. 149).

### **Assumptions**

The assumptions established for this study were as follows:

1. All students surveyed were attending a class using a Classroom Performance System.
2. All students surveyed completed the entire class using a Classroom Performance System.
3. Participants were being surveyed for reactions to the

Classroom Performance System.

### **Procedures**

The method of evaluation for this study was a survey. The survey was circulated to students at the end of their courses and just prior to completing their respective courses. The audience included students from six colleges within the university. The results served as a benchmark for Old Dominion University and means of comparison to future studies.

### **Definition of Terms**

The following definitions and abbreviations were given to the reader for clarification and standardization in the study.

#### ***Classroom Performance System (CPS) and the Personal Response System (PRS):***

CPS and PRS are electronic systems, which allow for real-time computer based student instructor interaction and data collection.

#### ***Clicker:***

The clicker is the student activated infrared electronic remote device, which allows the computer to render their input to class activities as statistical data.

#### ***Receiver:***

The receiver is the back end of the Classroom Performance System. The unit receives student input and integrates the input into the program for display and analysis.

***Traditional Classroom:***

A classroom that does not make extensive use of technology, whose use of technology is limited to lectures, whiteboards, transparencies, non-inactive computer-based slides shows, and uses a verbal question and answer methodologies.

**Overview of Chapters**

The first chapter acquainted the reader with a new technology, the Classroom Performance System (CPS), otherwise known as Personal Response System (PRS). Old Dominion University is currently employing this technology in several university curriculums. The University has no valid research on the performance of this system. Using a survey this study will poll the current group of students and facilitators. This group included students from six colleges within the university. The results will be used as a baseline to evaluate reaction level responses and comparison to existing research.

Chapter II is a literature review. The chapter will look at exiting research on Classroom Performance Systems to determine current views on system effectiveness. Chapter III

will give an overview of the studies methodologies and procedures. Chapter IV documents the findings of the study. Finally, Chapter V gives a study summary, presents conclusions, and offers recommendations for future research.

## **Chapter II**

### **Review of Literature**

This chapter will provide background on the genesis of the Classroom Performance System and Personal Response Systems. The information in this chapter will also present relevant research concerning student perceptions. The perceptions in question were the effectiveness of Classroom Performance System and Personal Response Systems in engaging students in the learning process and how students perceived Classroom Performance System and Personal Response Systems effectiveness in aiding instructors with student learning evaluation.

#### **The Classroom Performance System and Personal Response Systems**

There is a body of work dating back over forty years to the 1960s concerning Classroom Performance Systems and Personal Response Systems (Judson & Sawada, 2002). The versions of Classroom Performance Systems and Personal Response Systems started with the slightly archaic hardwired affair with voltage meters reading a percentage of correct answers out to the instructor, in which, entire auditoriums were wired with hand switches (Judson & Sawada 2002).

Today's technology has advanced the systems. The current crop of Classroom Performance System and Personal Response Systems use infrared handset transmitters wirelessly linked to laptop computers to provide educators with feedback (Draper & Brown, 2004).

### **Engaging The Student**

Current research says that Classroom Performance Systems and Personal Response Systems show promise for student engagement by affording students the chance to teach one another through peer instruction (Draper & Brown 2004). Studies at Lancaster University in England corroborate the perception of engagement. Students at Lancaster found that not only were they aware that using the PRS improved alertness, but improved their concentration levels when using the technology (Elliot, 2005).

### **Evaluating Student Learning**

Research supports the idea that Classroom Performance System and Personal Response Systems aid the instructor in evaluating students. In a study published in *Studies in Higher Education*, Nicol and Boyle discovered that eighty percent of students surveyed agreed that the use of the Personal Response Systems helped instructors to become more

aware of student difficulties with a subject matter (2003).

### **Summary**

This chapter gave an overview of the start of Classroom Performance System and Personal Response Systems and their hardwired beginnings. Classroom Performance System and Personal Response Systems in their current wireless and computerized configuration afford a speed and flexibility the older counterparts could not match. Classroom Performance System and Personal Response Systems engage students and give an opportunity for students to engage in discussion and peer instruction. Students see the systems capabilities in aiding instructors in evaluating performance. Chapter III will cover the methods employed and the procedures used to achieve the research goals.



## **Chapter III**

### **Methods and Procedures**

The purpose of Chapter III was to explain the methods and procedures used to conduct this study. Areas covered in the chapter were population, instrument design, methods of data collection, and statistical analysis.

#### **Population**

The subjects in this study were taken from a body of students at Old Dominion University. These students, approximately 1500, were enrolled in classes that integrated the Classroom Performance System and Personal Response Systems into the curricula. The population embodied these colleges: Arts and Letters, Business and Public Administration, Education, Engineering and Technology, Health Sciences, and Sciences. This study used responses from all the colleges in the population.

#### **Instrument Design**

The test instrument for this study was a survey. The survey was a questionnaire coupled with a "SCANTRON" based response sheet. The instrument consisted of sixteen questions which were based upon the study's research goals. The questions were eliciting reaction level responses from the students concerning the use of the Classroom Performance

System and Personal Response Systems. The evaluation scale for each question was a one to five Likert scale. The responses were as follows: strongly disagree, disagree, undecided, agree, and strongly agree, respectively. See Appendix A for a copy of the student survey

#### **Methods of Data Collection**

The instrument was administered to the subjects at the conclusion of their respective classes in the Spring 2005 semester at Old Dominion University. The survey was solicited to the population as part of the respective course evaluations. The evaluations were anonymous. The sixteen questions of this instrument will be used in other studies. Of the sixteen questions, four (SQ12, 14, 15, and 16) were directly aligned with the research goals.

#### **Statistical Analysis**

As stated in the instrument design section, the instrument had a one to five Likert scale with responses ranging from strongly agree to strongly disagree. The collected data were presented in table and charts. The means were calculated for the four questions pertinent to answering the research goals.

#### **Summary**

This chapter covered design of the researches Likert

scale survey. The survey was administered to Old Dominion University students enrolled in classes that used the Classroom Performance System and Personal Response Systems in the class. This chapter discussed the statistical treatment of the data, which serves as a baseline for future studies. In the next chapter, Chapter IV, the findings of the study will be reported.

## **Chapter IV**

### **Findings**

The problem of this study was to determine reaction level responses of students to the use of Classroom Performance System and Personal Response Systems in their respective classes at Old Dominion University. This chapter presents the results of the survey administered to the population. There were 221 respondents from the six colleges at the university.

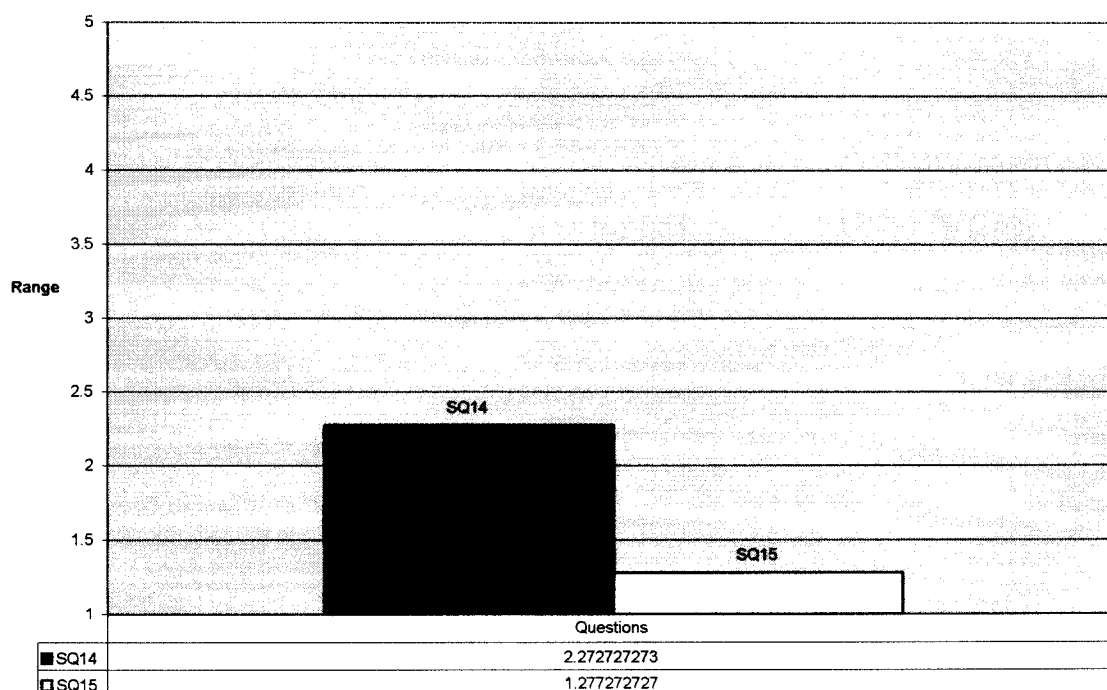
#### **Presentation of Data**

The first research goal addressed how students perceive the effectiveness of the Classroom Performance Systems and Personal Response System in engaging them in the learning process. There were two questions in the survey that addressed this goal.

- The Clicker System Made Me Feel More Comfortable About Participating in Class (SQ14)
- The Clicker System Allowed Me to Control the Pace of the Information Given in Class (SQ15)

In the case of question SQ14, the clicker system made me feel more comfortable about participating in class. The data revealed a mean score of 2.27 (rounded). Collectively, the respondents tended toward disagreeing with the statement.

In the case of Question SQ15, the clicker system allowed me to control the pace of the information given in class. The data revealed a mean score of 1.28 (rounded). Collectively, the respondents tended toward strongly disagreeing with the statement.



**Figure 1. Result Research Goal #1**

The second research goal addressed how do students perceive the effectiveness of the Classroom Performance System and Personal Response Systems in aiding educators with evaluating their learning? There were two questions in the survey that addressed this goal.

- The Clicker System is Effective for Providing

## Feedback/Information to the Instructor (SQ12)

- The Use of the Clicker System Helped Me Learn More in the Course (SQ16)

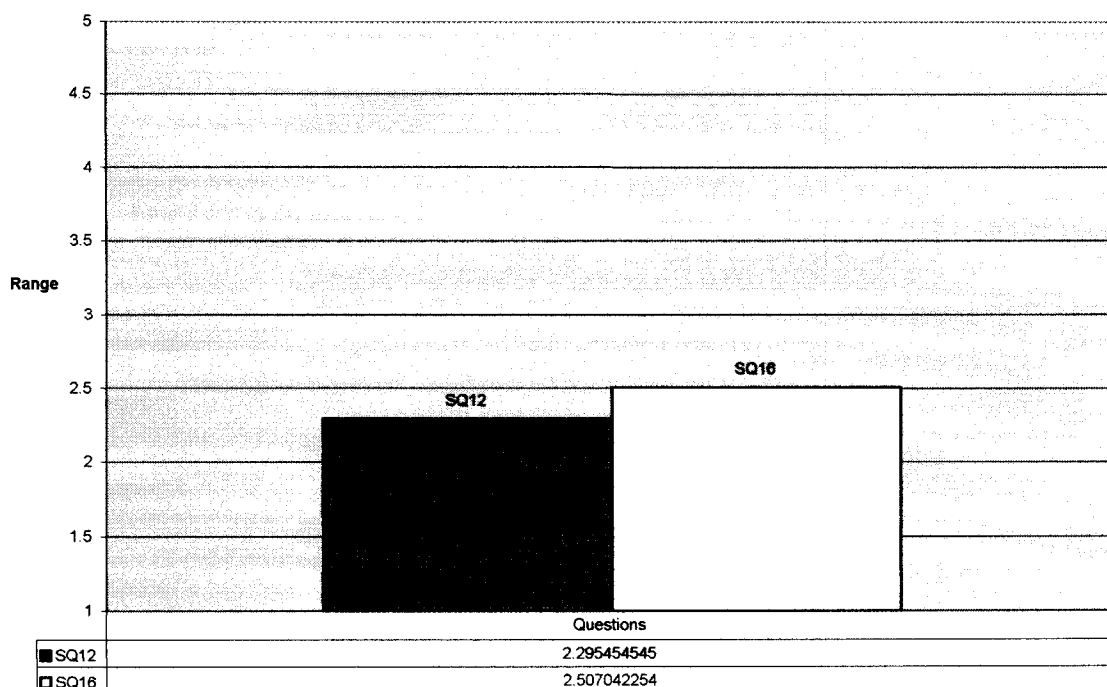


Figure 2. Results Research Goal #2

In the case of question SQ12, the clicker system is effective for providing feedback/information to the instructor. The data revealed a mean score of 2.30 (rounded). Collectively, the respondents tended toward disagreeing with this statement. In the case of question SQ16, the use of the clicker system helped me learn more in the course. The data revealed a mean score of 2.51 (rounded). Collectively, the respondents tended toward being undecided with the statement.

### **Summary**

This chapter reported the results of the survey to determine reaction level responses of students to the use of Classroom Performance System and Personal Response Systems in their respective classes at Old Dominion University. The data for the pertinent questions rendered means for each question. Narratives and figures presented the findings. Chapter V will provide findings, conclusions and recommendations for the study.

## Chapter V

### Summary, Conclusions, and Recommendations

#### Summary

The use of Classroom Performance System and Personal Response Systems had become more popular over the last few years. Old Dominion University had no official study concerning the use of Classroom Performance System and Personal Response Systems in the classroom. The problem of this study was to determine reaction level responses of students to the use of Classroom Performance System and Personal Response Systems in their respective classes at Old Dominion University.

The study had two goals. The first goal of this study was established to determine how do students perceive the effectiveness of the Classroom Performance System and Personal Response Systems in engaging them in the learning process? The second goal of this study was to determine how do students perceive the effectiveness of the Classroom Performance System and Personal Response Systems in aiding educators with evaluating their learning?

In 2004, a number of departments at Old Dominion University, in Norfolk, Virginia, initiated trials with



Classroom Performance System and Personal Response Systems in a select number of courses. Old Dominion University does not have a baseline study to use as a comparison to other research to assess the effectiveness of the Classroom Performance Systems. This study would provide baseline data for future studies.

The limitations of this study were pursuant to the participant and the outcomes. Participates were limited to instructors who facilitated classes and students who attended classes using Classroom Performance Systems. The outcomes were limited to reaction level responses based on the Kirkpatrick scale level I (Reiser & Dempsey, 2002, p. 149).

Students enrolled in classes that used the Classroom Performance System and Personal Response Systems in the curricula. The population included these colleges: Arts and Letters, Business and Public Administration, Education, Engineering and Technology, Health Sciences, and Sciences. This study used responses from all the colleges in the population.

The instrument was a survey coupled with a "SCANTRON" based response sheet. The questionnaire had sixteen questions. Fourteen of the questions were tied to goals for

another university study. Four of the questions were based specifically upon this study's research goals. The survey assessed reaction level responses from the students concerning the use of the Classroom Performance System and Personal Response Systems. The evaluation scale was a one to five Likert scale. The responses were as follows: strongly disagree, disagree, undecided, agree, and strongly agree, receptively.

The instrument was administered to the subjects at the conclusion of their respective classes. The survey was solicited to the population as part of the respective course evaluations. The evaluations were anonymous. The sixteen questions of this instrument will be used in other studies. Four of the sixteen questions were directly aligned with this study's research goals. The means were calculated for each of the four questions. The collected data was presented in combination figures.

### **Conclusions**

These conclusions to the research goals were based on the data collected.

#### ***First Research Goal***

How do students perceive the effectiveness of the Classroom Performance System and Personal Response Systems

in engaging them in the learning process? The two questions (SQ14 and SQ15) providing data in this instance looked for responses from the students in the Classroom Performance System and Personal Response Systems ability to raise comfort levels for class participation and controlling the pace of the flow of information. The data revealed a mean of 2.27 and 1.28 respectively. These results for this population would indicate that the students do not perceive the Classroom Performance System and Personal Response Systems to be successful in creating participation by making the student feel more comfortable. The results further indicated the Classroom Performance System and Personal Response Systems found wanting in enabling the student to control the flow of information.

### ***Second Research Goal***

How do students perceive the effectiveness of the Classroom Performance System and Personal Response Systems in aiding educators with evaluating their learning? The two questions (SQ12 and SQ16) in this instance looked for responses from the students in the Classroom Performance System and Personal Response Systems ability to give feedback to the instructor on student learning and enabling the student to learn more. The data revealed means of 2.30

and 2.50 respectively. These results for this population would indicate that the students do not perceive the Classroom Performance System and Personal Response Systems to be successful in providing viable feedback to the instructor. The results indicated that students felt the Classroom Performance System and Personal Response Systems did not assist in improved learning.

### **Recommendations**

*Recommendations based upon the results of the study were as follows:*

1. Ensure instructors were aware of and trained in the full function of the Classroom Performance System and Personal Response Systems. As any technology increased its presence in the classroom, the educator must be familiar with the capabilities of the system. A thorough understanding of a technology's ability increased the possibility of a positive learning outcome from its use.
2. Ensure students had an understanding of the Classroom Performance System and Personal Response Systems intended use and capability for the particular course. The participant needed to understand the role the technology will take in the learning environment. The learner should also be encouraged to give feedback and suggest improvements

in the systems use. This would help the learner to accept and integrate the technology as a norm in the learning environment.

3. Ensure the course materials were designed with consideration for proper integration of the Classroom Performance System and Personal Response Systems and not as an afterthought.

Recommendations for future studies include:

1. Continuation to this study using this survey. The continuation of this study was vital to ascertaining, whether or not, the technology was being accepted or rejected.
2. A study to assess instructor knowledge on the Classroom Performance System and Personal Response Systems. This type of study would be used to identify the knowledge level of system users. This was especially true of late adopters of the technology, while early adopter usually immersed themselves in the technology.
3. A study to assess current modes of Classroom Performance System and Personal Response Systems operation by Old Dominion professors. This would assess how the technology was being adapted into the learning environment, and if these adaptations followed sound curriculum design criteria.

## References

- Classroom Performance System (CPS) Hand-held Interactive Response System. (2005). Retrieved February 13, 2005 from <http://www.pearsonncs.com/cps/>
- Draper, S. W. & Brown, M. I. (2004). Increasing interactivity in lectures using an electronic voting system. *Journal of Computer Assisted Learning* 20, pp81-94. Retrieved February 21, 2005. <http://www.psy.gla.ac.uk/~steve/ilig/papers/draperbrown.pdf>
- Elliott, C. (2005). Using a Personal Response System in Economics Teaching. *International Review of Economics Education > Volume 1 Issue 1*, pp4. Retrieved February 15, 2005. <http://www.economics.ltsn.ac.uk/iree/i1/elliott.htm>
- Nicol, D.J. & Boyle, J.T. Peer Instruction versus Class-wide Discussion in large classes: a comparison of two interaction methods in the wired classroom. *Studies in Higher Education* (2003). 28(4), 458-473. Retrieved February 21, 2005. <http://www.psy.gla.ac.uk/~steve/ilig/papers/nicol2.pdf>
- Reiser, R.A. & Dempsey, J.V. (Ed.). (2001). *Trends and Issues in Instructional Design and Technology*. Upper Saddle River: Merrill Prentice Hall.
- Judson, E., Sawada, D. (2002). Learning from Past and Present: Electronic Response Systems in College Lecture Halls. *Jl. of Computers in Mathematics and Science Teaching* 21(2), 167-181. Retrieved February 21, 2005, <http://www.ace.org/dl/files/JCMST/JCMST212167.pdf>

## Appendix A

### Survey and Raw Data

Personal Response System Student Survey

Col 1: Age of Student

Col 2: Class where survey was administered

SQ1. College you are enrolled in:

1. Arts and Letters
2. Business and Public Administration
3. College of Education
4. College of Engineering and Technology
5. Health Sciences
6. Sciences
7. Undecided

SQ2. Class:

1. Freshman
2. Sophomore
3. Junior
4. Senior
5. Graduate

SQ3. I enjoy doing things on a computer

1. Strongly Disagree
2. Disagree



3. Undecided
4. Agree
5. Strongly Agree

SQ4. I would work harder if I could use computers more often

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

SQ5. I feel comfortable working with a computer

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

SQ6. Using a computer is very frustrating

1. Strongly Disagree
2. Disagree

3. Undecided
4. Agree
5. Strongly Agree

SQ7. I believe that the more often teachers use technology, the more I will enjoy my courses.

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

SQ8. The clicker system increased my attention in the course.

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

SQ9. The use of the clicker system created a more interactive environment in the course.

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

SQ10. The use of the clicker system increased my motivation in the course.

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

SQ11. The use of the clicker system made me feel more involved in the course.

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

SQ12. The use of the clicker system helped me learn more in the course.

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

SQ13. The use of the clicker system made the course more interesting.

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

SQ14. The clicker system made me to feel more comfortable about participating in class

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree

5. Strongly Agree

SQ15. The clicker system allowed me to control the pace of the information given in class.

1. Strongly Disagree

2. Disagree

3. Undecided

4. Agree

5. Strongly Agree

SQ16. The clicker system is effective for providing feedback/information to the instructor.

1. Strongly Disagree

2. Disagree

3. Undecided

4. Agree

5. Strongly Agree

Comments:

	age	class	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16
1.	21	1	4	2	1	1	3	1	2	4	4	3	4	4	2	3	1	4
2.	20	1	4	2	3	2	3	1	3	3	3	3	3	3	4	4	2	3
3.	21	1	4	2	4	2	4	0	4	3	4	2	4	4	4	4	0	2
4.	42	1	4	2	3	1	3	1	3	4	4	4	4	3	4	3	2	4
5.	21	1	4	2	4	2	4	1	2	4	4	4	4	4	4	4	3	4
6.		1	4	2	3	2	3	2	2	3	3	3	3	3	2	3	3	3
7.		1	4	2	3	2	3	2	1	4	3	3	3	4	3	4	3	3
8.		1	4	2	4	2	4	1	2	4	4	3	4	4	3	2	3	4
9.		1	4	2	4	3	3	1	2	1	3	0	2	3	2	3	1	4
10.		1	4	2	3	1	4	1	2	1	4	1	3	3	3	3	1	4
11.		1	4	2	3	2	3	1	1	2	3	2	2	2	2	3	1	2
12.		1	4	2	3	2	3	3	3	4	4	4	4	4	4	3	3	4
13.	21	2	2	2	4	3	4	0	4	4	3	3	3	3	3	3	2	2
14.	26	2	2	3	3	2	3	0	2	3	3	3	3	2	3	3	1	3
15.	30	2	2	2	3	1	3	2	2	3	3	3	3	3	2	3	2	3
16.	33	2	2	3	3	1	3	1	0	0	1	1	1	3	1	1	0	2
17.	24	2	2	4	3	2	3	1	3	4	4	3	4	4	4	4	2	4
18.	19	2	2	1	4	1	4	0	3	3	3	2	3	3	3	3	2	3
19.	20	2	2	2	4	2	4	0	3	3	3	2	3	3	2	3	1	*
20.	20	2	2	2	1	1	3	1	3	4	4	1	4	4	4	1	4	
21.	24	2	2	4	4	2	4	3	3	3	4	3	3	3	2	3	2	3
22.	21	2		2	3	2	4	3	2	3	3	2	2	2	2	3	2	2
23.	20	2	2	1	0	1	2	3	2	3	3	2	3	3	2	3	1	3
24.	22	2	2	2	2	1	3	3	3	2	3	2	3	3	3	3	2	3
25.	21	2	2	2	3	2	3	2	3	3	3	3	3	3	3	3	1	3
26.	21	2	2	2	4	3	4	1	3	4	4	3	3	4	4	4	3	4
27.	21	2	2	2	1	1	1	0	1	3	3	2	3	3	3	4	2	2
28.	24	2	2	4	3	1	3	3	2	3	3	1	2	3	3	1	0	3
29.	21	2	2	2	4	4	4	0	4	4	4	4	4	4	4	1	4	
30.	20	2	2	1	3	2	3	3	0	3	4	4	4	4	4	4	4	4
31.	22	2	2	2	4	4	4	0	4	4	4	4	4	4	4	4	3	4
32.	20	2	2	1	3	3	3	1	2	3	3	3	3	3	3	2	3	

	age	class	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16
33.	19	3	4	1	3	1	4	0	1	2	3	2	2	2	3	2	1	3
34.	22	3	4	1	4	1	4	0	2	4	4	4	4	4	3	4	3	4
35.	22	3	5	3	0	1	0	3	2	1	3	1	1	2	1	2	1	0
36.	26	3	0	4	3	3	3	1	3	3	3	3	3	3	3	3	2	3
37.	22	3	5	3	4	4	4	0	2	0	1	0	1	1	0	0	0	1
38.	20	3	4	1	0	3	0	1	2	3	4	3	4	4	4	4	3	4
39.	20	3	5	2	2	3	4	0	4	2	2	1	1	3	1	4	0	2
40.	19	3	5	1	4	4	4	0	4	4	4	4	4	4	4	4	4	4
41.		3	2	3	4	3	4	1	3	4	4	3	3	3	3	3	2	4
42.	18	3	6	0	3	2	3	1	3	2	3	2	3	3	1	3	1	3
43.	18	3	6	1	3	2	1	3	3	1	4	2	3	3	1	4	1	3
44.	20	3	0	0	4	4	4	0	3	2	3	3	3	3	1	2	3	1
45.	21	3	2	3	4	4	4	1	4	3	3	2	3	2	2	2	2	3
46.	18	3	1	0	3	2	3	1	2	3	2	2	2	2	2	2	2	2
47.	19	3	6	0	3	2	3	1	2	4	4	4	4	4	4	4	3	4
48.	19	3	4	1	4	1	4	1	2	2	3	0	3	2	1	2	1	3
49.	19	3	4	1	4	3	4	1	3	3	4	3	3	3	3	3	1	3
50.	21	3	4	2	3	3	3	1	3	3	3	3	3	3	3	3	1	4
51.	19	3	1	0	4	3	3	1	2	3	3	3	3	3	2	3	3	3
52.	19	3	5	0	3	1	2	2	2	3	3	3	3	2	3	1	0	4
53.	18	3	6	0	4	3	4	0	3	4	3	3	2	2	3	1	2	3
54.	19	3	1	1	4	2	4	0	2	0	2	1	2	1	0	3	0	2
55.	20	3	5	2	3	2	4	0	2	4	4	2	4	4	2	4	1	4
56.	20	3	6	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
57.	20	3	4	1	3	2	3	1	3	4	4	3	4	4	3	4	3	3
58.	39	3	2	3	4	1	3	1	3	3	4	4	4	4	4	4	4	4
59.	18	3	2	0	4	0	4	0	1	4	3	2	3	3	3	3	2	4
60.	19	3	1	0	3	2	4	0	3	4	3	2	3	4	3	3	2	4
61.	25	3	1	1	3	2	4	1	3	3	4	3	3	3	2	3	3	3
62.	26	3	2	3	3	1	3	1	3	1	2	1	2	1	2	3	0	3
63.	19	3	6	0	4	2	4	1	1	1	3	3	1	3	2	1	2	4

	age	class	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16
64.	20	3	4	1	1	1	3	1	2	3	3	1	3	3	1	3	1	3
65.	22	3	1	2	3	1	3	1	1	4	3	1	2	1	3	2	1	3
66.	18	3	1	0	3	2	4	0	3	1	3	2	3	1	1	4	1	3
67.	19	3	4	1	4	1	4	1	4	4	4	3	4	4	3	4	3	3
68.	20	4	4	1	4	1	4	1	3	1	3	1	3	3	1	4	1	4
69.	19	4	4	1	4	1	4	0	2	2	3	1	2	3	1	2	0	2
70.	19	4	4	1	4	1	4	0	2	1	3	2	3	3	1	1	0	3
71.	26	4	4	2	3	1	3	3	3	0	3	0	0	1	0	0	0	0
72.	21	4	4	2	3	2	4	2	3	3	3	2	3	3	2	3	2	1
73.	19	4	4	1	3	2	3	2	3	3	3	2	3	3	2	2	1	3
74.	20	4	4	1	0	0	0	3	0	0	1	0	0	0	1	2	0	0
75.	21	4	5	2	3	1	3	1	3	3	3	0	1	1	1	1	1	3
76.		4	4	0	3	1	3	3	1	3	3	3	3	3	3	3	3	3
77.	21	4	4	2	3	2	3	1	2	0	1	0	1	0	0	0	0	3
78.	23	4	4	3	2	1	2	3	2	2	2	1	1	1	0	0		
79.	18	4	4	0	3	1	3	2	1	3	1	3	2	0	0	0	0	3
80.	21	4	4	1	1	1	3	2	3	1	2	0	1	0	1	4	1	3
81.	34	4	4	3	3	2	3	1	2	3	3	3	3	3	3	2	3	1
82.	20	4	6	2	2	3	4	0	4	1	1	1	1	1	1	1	1	1
83.	21	4	2	2	3	0	2	1	0	3	2	1	1	3	2	3	1	3
84.	21	4	2	3	3	1	3	1	2	3	1	1	1	2	1	3	0	2
85.	18	4	4	0	4	3	4	1	3	3	3	2	2	1	3	3	1	3
86.	20	4	4	0	1	1	3	2	1	3	1	1	1	3	1	1	1	3
87.	19	4	4	1	3	1	3	2	1	1	3	1	2	3	1	1	3	3
88.	20	4	4	2	3	4	3	1	3	3	4	1	3	3	0	2	0	3
89.	19	4	4	1	3	1	3	1	3	3	3	3	3	3	3	3	3	3
90.	20	4	2	1	3	2	3	1	2	1	2	1	2	2	1	2	1	1
91.	20	4	2	1	2	1	3	2	1	2	3	2	1	1	2	1	1	3
92.	20	4	4	1	3	1	3	3	3	3	3	2	3	3	2	2	1	3
93.	20	4	1	1	2	2	2	2	3	0	0	0	0	0	0	0	0	0
94.	18	4	4	0	3	2	4	1	2	3	3	3	3	3	2	3	2	3



	age	class	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16
95.	23	4	4	1	3	1	3	1	2	1	3	1	3	3	1	3	0	1
96.	30	4	4	1	4	4	4	0	3	0	0	0	0	0	0	1	0	2
97.	19	4	4	1	3	1	4	1	4	3	3	2	3	3	2	3	0	2
98.	34	4	5	4	3	2	4	1	0	0	1	1	1	1	1	3	1	3
99.	18	4	4	0	4	4	4	0	4	1	1	1	1	3	1	1	0	3
100.	32	4	5	3	2	1	4	2	2	0	0	0	0	0	0	0	0	0
101.	21	4	4	2	3	3	3	1	3	1	3	2	3	2	3	3	1	3
102.	19	4	4	1	3	2	3	1	2	1	2	1	1	2	1	3	1	3
103.	18	4	4	0	3	2	3	1	3	2	3	2	3	3	3	3	1	3
104.	21	4	4	2	3	2	4	1	2	3	3	2	3	3	2	3	1	2
105.	18	4	4	0	3	2	3	1	2	3	3	2	2	3	3	3	2	4
106.		4	4	2	3	0	1	3	3	3	1	3	3	3	3	3	0	3
107.	22	4	5	1	4	2	4	2	3	3	3	3	3	3	3	3	3	4
108.	20	4	2	1	2	2	3	2	2	3	3	1	2	1	2	2	0	1
109.	21	4	4	3	3	3	3	2	2	1	2	2	2	2	2	1	2	2
110.	20	4	5	1	2	0	3	3	0	0	0	0	0	0	0	0	0	0
111.	22	4	4	2	3	3	3	1	2	2	3	2	3	2	2	3	2	2
112.	21	4	5	2	3	1	4	1	1	3	1	1	1	3	1	1	1	0
113.	20	4	5	2	3	2	3	2	3	3	3	3	3	3	3	3	2	2
114.	24	4	0	4	3	1	3	0	0	1	3	0	1	3	1	0	3	3
115.	22	4	0	4	3	2	2	1	2	3	3	1	2	3	2	1	3	3
116.	23	4	5	4	3	2	4	1	2	3	3	1	2	2	2	3	0	1
117.	21	4	5	1	4	2	4	2	1	3	3	1	3	3	2	3	1	3
118.	19	4	4	0	2	2	3	2	2	2	2	1	1	1	1	1	1	2
119.	23	4	4	4	3	3	3	1	3	2	3	1	3	3	3	3	1	3
120.	35	4	5	3	4	1	4	0	2	0	1	1	2	3	1	1	0	1
121.	19	4	4	1	3	0	3	1	3	3	4	1	3	3	3	3	0	0
122.		4	4	1	4	2	4	0	3	3	3	2	3	2	3	2	3	4
123.	20	4	4	1	4	1	3	1	3	4	4	4	4	4	3	3	1	3
124.	22	4	5	2	1	1	1	1	3	3	3	3	3	3	2	3	3	3
125.	21	4	5	2	1	1	3	1	1	1	1	1	1	3	1	3	1	2

	age	class	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16
126.	19	4	4	0	3	2	3	1	3	1	3	1	2	1	1	1	1	1
127.	19	4	4	1	3	2	4	1	3	2	3	3	3	3	3	3	2	3
128.	20	4	4	1	4	1	4	1	2	2	3	2	2	3	2	2	1	4
129.	29	4	4	3	3	2	3	1	2	2	1	1	1	2	2	2	2	1
130.	21	4	5	2	3	2	3	1	2	3	3	3	3	3	1	3	3	4
131.	20	4	5	1	3	2	3	1	2	1	1	1	1	1	1	1	0	1
132.	20	4	2	1	1	1	3	2	1	4	4	3	3	3	2	2	0	3
133.	19	4	4	1	3	2	3	3	3	1	3	2	3	1	1	3	0	1
134.	18	4	4	0	3	2	3	1	1	3	3	2	3	3	3	1	1	1
135.	19	4	4	0	3	2	4	1	3	3	3	1	2	3	2	4	0	4
136.	20	4	4	1	3	2	4	2	2	3	3	3	3	2	3	3	1	3
137.	20	4	4	1	3	2	3	1	3	0	0	0	0	0	0	0	0	0
138.	18	4	4	0	3	2	3	1	2	3	3	3	3	3	3	3	1	3
139.	20	4	2	1	4	2	4	1	1	0	1	0	0	1	0	0	0	0
140.	26	4	4	2	4	4	4	0	4	4	3	2	3	3	1	3	1	2
141.	1	4		2	3	4	0	2	3	3	3	2			2	3	1	
142.	19	4	4	1	4	2	2	1	3	3	1	1	1	0	1	0	0	0
143.	21	4	5	2	1	1	1	3	1	0	1	2	1	3	1	2	1	0
144.	19	4	4	1	3	2	4	0	2	2	2	3	1	3	2	3	1	4
145.	19	4	4	0	4	*	3	0	3	2	2	3	2	2	1	3	0	1
146.	22	4	4	3	3	0	2	2	1	0	0	0	0	0	0	0	0	0
147.	21	4	5	2	3	1	3	1	2	1	1	1	1	1	1	1	1	3
148.		4	2	2	3	1	3	0	1	3	3	1	2	1	0	1	1	2
149.	20	4	4	1	2	1	3	2	1	3	2	2	3	3	2	1	3	2
150.	19	4	4	1	3	1	3	1	1	1	3	1	1	1	1	1	1	2
151.	21	4	5	3	1	1	3	1	0	1	3	0	1	2	2	3	1	3
152.	20	4	5	1	3	1	3	1	1	4	4	3	3	3	3	1	1	4
153.	20	4	4	1	1	1	3	3	3	1	3	3	3	1	1	1	1	3
154.	33	4	4	3	4	4	4	1	4	1	3	1	3	3	1	3	1	3
155.	20	4	4	2	2	2	4	0	2	1	3	1	3	3	1	3	0	2
156.	21	4	2	3	3	2	3	1	3	3	3	3	2	3	3	2	1	3

	age	class	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16
157.	21	4	4	2	3	0	4	0	1	0	3	0	2	3	2	4	0	2
158.	19	4	4	0	3	1	3	3	2	1	1	1	1	1	1	2	1	3
159.	21	4	5	3	4	2	4	1	4	2	2	1	4	3	2	3	3	3
160.	20	4	4	2	3	3	3	0	3	3	3	3	3	3	3	3	3	3
161.	19	4	4	1	3	2	4	1	2	0	3	0	0	0	0	0	2	0
162.	21	4	4	2	3	2	4	1	3	4	4	3	3	3	3	4	0	4
163.	19	4	4	1	9	9	9	0	3	3	3	1	3	3	1	3	0	2
164.	19	4	4	1	3	2	3	1	2	2	3	1	3	1	3	3	0	3
165.	19	4	5	0	3	1	3	3	1	1	1	1	1	3	3	1	1	3
166.	18	4	4	0	1	1	3	1	1	3	3	2	1	3	2	3	2	2
167.	20	4	4	1	3	2	3	1	3	1	3	1	3	2	1	3	1	3
168.	20	4	4	1	1	1	3	1	2	3	3	3	2	3	2	3	1	3
169.		4	4	1	4	2	4	1	3	1	3	3	3	1	1	3	0	3
170.	19	4	5	2	4	4	4	0	2	5	5	2	4	3	3	3	3	4
171.	21	4	4	2	0	0	1	4	1	3	3	1	3	3	2	1	1	1
172.	19	4	2	1	3	1	3	2	3	2	3	3	3	2	1	3	1	2
173.	21	4	4	2	3	1	3	1	1	0	1	0	0	0	0	3	0	0
174.	19	4	4	1	3	2	3	0	2	1	1	1	1	1	1	1	0	1
175.		4	5	0	4	2	4	0	2	3	3	3	3	3	3	3	2	3
176.	19	4	4	0	3	2	3	1	2	3	3	2	3	3	1	1	0	3
177.	19	4	4	0	2	1	3	1	3	4	4	3	3	3	3	3	2	3
178.	20	4	2	1	3	1	3	2	3	1	3	1	3	2	3	3	1	4
179.	18	4	4	0	2	1	1	3	2	3	3	3	3	3	3	3	1	2
180.	20	4	4	1	2	1	3	1	1	3	3	1	1	1	1	1	0	3
181.	18	4	4	0	4	2	4	1	2	1	1	1	2	2	1	3	0	4
182.	18	4	4	0	4	2	4	0	3	3	2	3	1	0	1	3	0	3
183.	31	4	4	2	3	4	3	1	3	0	0	0	0	0	0	0	0	0
184.	22	5	5	3	3	1	3	3	1	0	2	1	3	1	1	0	0	1
185.	21	5	5	3	4	0	3	1	1	0	0	1	0	0	0	0	0	2
186.		5	5	1	3	0	4	4	0	0	1	5	2	2	2	0	3	
187.	19	5	4	1	3	2	3	1	3	1	2	1	2	1	2	2	1	1

	age	class	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16
188.	23	5	5	3	3	1	3	3	1	3	3	3	3	2	3	4	1	3
189.	20	5	4	2	1	2	1	3	3	0	0	0	1	1	1	1	1	1
190.	20	5	3	2	4	2	4	0	4	3	4	2	3	4	2	2	2	4
191.		5	3	1	0	0	3	3	0	1	1	0	0	3	0	4	4	
192.	46	5	5	3	3	1	3	1	2	1	3	0	1	1	1	1	1	2
193.	23	5	6	4	3	1	3	2	0	0	0	0	0	0	0	0	0	0
194.	23	5	3	2	4	4	4	0	4	4	4	4	4	4	4	4	4	4
195.	19	5	5	1	4	2	4	1	1	3	3	1	3	3	2	2	2	3
196.		5	5	1	2	1	2	4	1	1	1	1	1	1	1	1	1	1
197.	26	5	5	2	3	2	4	0	2	1	2	1	1	2	1	3	0	1
198.	22	5	5	3	4	1	4	0	3	3	3	1	2	1	3	3	0	4
199.	23	5	4	4	4	3	4	1	1	3	3	1	3	3	0	3	0	3
200.	20	5	*	2	3	1	4	1	3	1	3	0	0	0	0	0	0	3
201.	24	5	6	3	4	2	3	1	3	1	3	2	2	1	1	3	1	3
202.	36	6	5	3	3	1	4	1	3	1	1	1	1	1	1	1	1	1
203.	24	6	4	2	3	1	3	0	1	1	1	1	1	1	1	1	1	1
204.	28	6	4	3	3	1	3	0	1	0	0	0	0	0	1	1	2	2
205.	21	6	4	3	3	2	4	0	2	2	3	2	3	3	2	1	1	4
206.	25	6	4	3	3	1	4	0	2	1	2	1	1	3	3	3	1	1
207.	27	6	4	2	3	1	2	2	1	1	3	0	1	1	1	3	1	3
208.	24	6	4	3	3	2	3	2	3	3	3	2	3	3	3	3	3	4
209.	29	6	4	2	3	2	2	1	2	2	3	1	3	3	2	3	1	3
210.	24	6	4	3	3	1	3	1	1	0	0	0	0	0	0	0	0	1
211.	27	6	4	3	3	1	2	2	1	0	0	0	0	0	0	0	0	0
212.	42	6	4	4	4	4	4	0	2	0	0	0	0	0	0	0	0	0
213.		6	5	3	4	2	3	1	2	1	1	2	2	2	1	2	1	3
214.	27	6	4	3	0	0	0	1	2	1	2	3	2	0	2		1	3
215.	26	7	5	4	3	2	3	3	1	3	3	1	3	1	2	1	1	3
216.	23	7	5	4	4	3	3	1	3	4	3	3	3	3	3	3	3	3
217.	26	7	5	4	4	0	4	0	4	3	4	4	3	3	2	2	1	4
218.	27	7	5	4	4	2	4	0	3	3	4	3	4	3	3	2	1	3

