WORKING DOCUMENT (Dated 12-19-05) (by Veronica Thomas)

**Finding from the Department of Electrical and Computer Engineering Student Survey
on Use of the Tablet PC in Classes: November-December 2005**

A total of 47 undergraduate engineering students enrolled in Electronics I and

Microcomputer Fundamentals and Design in the Department of Electrical and Computer

Engineering (DECE) completed an in-class survey in November/December 2005 designed to

obtain their perceptions on utilizing Tablet PCs in their courses. Student satisfaction and other

related indicators were assessed. Most (60.4%) of the survey respondents were male and junior

classification.

Quantitative Findings

Overall, the students expressed very positive attitudes regarding the use of the Tablet PC in

their courses. With possible mean scores ranging from 1 – 5, students rated the use of the Tablet

PC as quite favorable in terms of increasing their (a) ability to apply the theory (M= 4.00, SD =

1.16), (b) knowledge of the subject matter (M = 3.72, SD = 1.09), and (c) interaction with other

students in the course (M= 4.15, SD = 1.00). See Table 1 for more additional results.

**Table 1. Selected Findings from Pilot Student Survey on Tablet PC Use in
Undergraduate Engineering Courses at Howard University (N= 47)**

Using the Tablet PC increased my:	Mean Score
Understanding of the lecture	3.91 (1.06)
Ability to apply the theory	4.00 (1.61)
Knowledge of the subject matter	3.72 (1.09)
Attention to the lecture	3.83 (1.10)
Interest in the subject matter	3.79 (1.16)
Class attendance	3.47 (1.25)
Motivation in class	3.62 (1.13)
Participation in class	3.89 (1.14)
Interaction with the instructor	3.60 (1.19)
Interaction with other students in the course	4.15 (1.00)

Note: Scores could range from 1 – 5, with higher scores indicating stronger agreement with the
item. Standard deviations are in parentheses.

Some other notable findings include:

(a)   75.7% (M = 4.68 out of 5.00) rated the potential of the Tablet PC in terms of teaching and learning in the DECE as "*very positive*"

(b)   59.6% of the students indicated that they felt "*very comfortable*" using the Tablet PC (M = 3.51 out of 4.00)

(c)   51.1% rated the use of the Tablet PC in their course as "*excellent*" (M = 3.38 out of 4.00)

(d)   70.2% indicated "*definitely yes*" in terms of wanted to see the Tablet PC integrated into their other courses within the department

Qualitative Findings

To obtain more in-depth data on the students' attitudes toward the use and potential of the Tablet PC in engineering instruction, the students were also asked to respond to three open-ended items on the survey, including:

(a)   In this course, what were the most valuable attributes of the Tablet PC for teaching and learning?

(b)   What difficulties, if any, did you experience as a result of professor's use of the Tablet PC?

(c)   Provide any additional comments about the use of PC Tablets for teaching and learning within your major program of study.

Sample findings from the qualitative data revealed that students viewed the (a) *hands on environment*, (b) *practical application of the subject matter*, and (c) *the ability to analyze information through different outlets* as some of the most valuable attributes of the Tablet PC for teaching and learning.   In terms of difficulties experiences as a result of using the Tablet PC in the course, sample responses included (a) *some of the software did not work properly*, (b) *the instructor would sometimes go too fast, so we weren't able to follow what he was doing,* (c) *finishing class assignments on ti*me, and (d) *poor*

2

wireless network connections on one or two occasions. All of the students' responses to

the three open-ended items are provided below. (See Table 2)

Table 2: Responses to the Open Ended Items –

ID	6. In this course, what were the most valuable attributes of the Tablet PC for teaching and learning?	7. What difficulties, if any did you experience as a result of using the Tablet PC in this course?	8. Any additional comments about the use of Tablet PCs for teaching and learning within your major program of study (write here)
1	Tablet PCs made calculations easier to complete because we use a lot of charts and graphs. With the PC's we were able to write directly on the figures, including drawings of our own.	None	We need more! Each student should be allowed the use of a personal tablet for the entire semester.
2	The hands on environment	None	No
3	We learned how to use specific programs like SPPICE. Because of this, I was able to use this knowledge and apply it to other classes	The instructor would sometimes go too fast, so we weren't able to follow what he was doing	
4	Practical appreciation of the theories we learn in class	Poor wireless network connection on one or two occasions	
5	Seeing practical applications of theory	Malfunctions of software	They are good when they provide support for the lecture but should not be the focus of the course
6	• Gaining experience with the software application of various topics • Ability to manipulate schematics there by gaining a better understanding of the various topics	None	
7	N/A	N/A	
8	Practical application	Some of the software did not work properly	I hope that here @ Howard University the tablet PC is integrated into the courses
9	Practical learning	Finishing in class assignments on time	
10	The tablet could be very valuable but ½ of the time the software does not work. This is very frustrating.	There needs to be a technician that works on the tablets daily to make sure they work.	In addition, when a student falls behind on following the class in the tablet the professor just continues and doesn't stop to see what the problem with the tablet is. Tablets would be good if they worked.
11		Some of the programs were not working properly. There also are not enough PC's for the students.	

ID	6. In this course, what were the most valuable attributes of the Tablet PC for teaching and learning?	7. What difficulties, if any did you experience as a result of using the Tablet PC in this course?	8. Any additional comments about the use of Tablet PCs for teaching and learning within your major program of study (write here)
12	It allowed me to participate and be hands on in this course	Not having actual mouse	N/A
13	It allowed me to apply the knowledge to the various programs. They are convenient to use.	There were not enough for the entire class, the availability was limited.	I believe these PC's would be very useful in our Networks course and Probability course.
14	Practical applications of subject matter	Navigation of the wireless connections	
15	Helped to get a more hands on approach of the material we were covering in class.	None	Teacher should be taught how to properly integrate the PCs with the class materials.
16	Hands on experience	Instructor moved a little too fast	
17	The tablet PC enabled us the opportunity to analyze information through different outlets. It also serves as an avenue to introduction of technology.	Understanding functions of programs.	
18	Well, it lets you get the feel of what was just been discussed by the professor, it also lets us know more about what has been read in a book.	Sometimes the programs installed do not work properly	Well, more of them should be introduced.
19	Using the tablet pc gave the opportunity to simulate a lot of the material being taught in the class. This really helped my understanding of the material	No real difficulties were encountered.	
20	None	None	
21	Practicalizing what was discussed in class that morning helps to make it stay in ones brain and understand it better.	The software we use is unstable so that can be frustrating.	Nope
22	It helped me to learn the implication of what was being taught in class	None	None
23			
24			
25	Accessibility of PSPICE, online information	Little familiarity and hardware, network failure, lack of accessibility outside class hours.	
26			No
27	Adding tangible evidence of theory taught. Making lecture more interesting and easily understood.	Software needs to be checked e.g. cleaning of saved files to prevent program crashes.	

ID	6. In this course, what were the most valuable attributes of the Tablet PC for teaching and learning?	7. What difficulties, if any did you experience as a result of using the Tablet PC in this course?	8. Any additional comments about the use of Tablet PCs for teaching and learning within your major program of study (write here)
28	Helps one see practical output of circuits' performance.	None	
29	The software that is installed inside the PC are very convenient to do the work required	None	
30	Being able to interact with what the lecture discusses	The RPI/O Program constantly crashes and it's really annoying.	No
31	Everyone was able to apply theory on problems instead of working with a large group on one computer.	Some of the software, such as the RPI board is very unreliable because it crashes a lot.	
32	Being able to simulate the circuit design on the tablet pc for visual learning	It would be nice if they came along with tablet pc	
33	The internet to look up terms and their definitions	Just tedious work, work was not hard just blown up and repetitive with the applet pc	
34	The ability to go online and obtain course materials in real time		
35	Hands on practice of code in class	None	
36	As he teaches, we can literally type our codes. Also its personal, so we don't have to share PC	N/A	
37	Its not more so the tablet PC then just a computer notebook	N/A	N/A
38	Being able to test programs and theory immediately and if there are any problems it can be addressed.	None	
39	The ability to independently do experiments and compare within a class period.	N/A	N/A
40	Portability and adaptability	None	
41	Access to online material	Limited internet access for class website	They should be available for every class.
42	Reviewing the PDF documents of the lesson	Inability to connect to the internet.	
43		N/A	N/A
44	Internet	N/A	
45	Actual programming a language	Not knowing how to turn it on	
46	Easy access to internet and other software while learning in class		

ID	6. In this course, what were the most valuable attributes of the Tablet PC for teaching and learning?	7. What difficulties, if any did you experience as a result of using the Tablet PC in this course?	8. Any additional comments about the use of Tablet PCs for teaching and learning within your major program of study (write here)
47	Simulation of codes	Internet access	