Enhanced Multi-Faceted Teaching Methods: Phase II

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ABSTRACT

This paper is an extension of a previously published paper of the same name which created a matrix of soft and hard learning technologies and two evaluation scales measuring the value of use and level of use of various teaching technologies and methods for undergraduate and graduate students. A questionnaire was subsequently developed to gather data from full time faculty on the actual classroom utilization and evaluation of sixteen "hard" and "soft" teaching technologies. This paper represents the analysis of data from eighteen faculty members from the Adelphi University School of Business. The third phase of this research will gather data from adjunct faculty to develop comparisons between the two groups.

INTRODUCTION

In 2003, this research began with the intent of developing an instrument to measure "level of use" and "value of use" of various teaching technologies and methodologies of the full time business faculty at the Adelphi University School of Business. An instrument was designed and presented at the Teaching and Learning Conference in January 2004. The paper was subsequently accepted for publication (Payette 2004). With the encouragement of that experience and valuable input from the paper presentation and comments from colleagues it was decided to pretest the instrument and then administer it to the full time business faculty at Adelphi University. This was done during the Spring semester and Summer of 2004. Data analysis began in the Fall semester of 2004 and completed in mid November 2004. This paper describes the results of that data analysis.

The overarching goal of the research was to have an accurate portrait of what methods and technologies faculty actually use and then evaluate the methods from a variety of perspectives, i.e., hard technologies, soft technologies, and classroom types. The data will be used for discussion with faculty on continuous improvement initiatives in providing high quality instruction throughout The School of Business.

PREVIOUS RESEARCH

We know from the classic study on diffusion of technology by Rogers (1983, p.5) that innovations do not take place evenly over time nor are they universally accepted. Rogers suggested many complex and interdependent characteristics must be present for adoption to occur. In recent years a barrage of new teaching and learning technologies have developed including course management software (Morgan 2003), laptop computers for students and faculty (Hall 2003, p.301) as well as the belief that new teaching methods such as collaborative learning (Gokhale 2003) can make a positive difference in student learning. Morgan (2003, p.2) reported on a statewide study of the University of Wisconsin that "the use of course management systems by faculty in the University of Wisconsin system are increasing rapidly, but much of this use is concentrated on the content presentation tool within the CMS."

Other studies focus on the use of the internet technologies to enhance instruction (MA 2004, p.5,6) that, "In comparison with the traditional teaching model, the new teaching model clearly offers a superior instructional approach…and the internet is seen as a vehicle to increase academic productivity and enhance academic effectiveness in institutions of higher learning".

Others are not quite as certain about the role of technology and see new methods and technology as a support mechanism "but it does not take the place of fundamental teaching tasks" (Wark 2004, p.2). In a paper on the use of the Wide World Web on teaching Alexander (1995, p.1) suggested that "many adopters of new technologies such as Wide World Web have as their primary focus, the features of the new technology." Her research goes on to say that focus on technological features instead of learning as the goal results in surprise when "learning gains are not realized." Another factor inhibiting the growth and perhaps the effectiveness of learning with new technologies is the major training and support requirements needed for an "e-learning environment (Arabasz and Baker 2003, p.5, 6). Some research now shows dramatic growth in the development of support centers throughout the world (see Dalhousie University listing of support centers on http://dal.ca/noidt/ids/html). For information on new technological means of enhancing instruction see "The Collaboration for the Advancement of College Teaching and Learning at http://collab.org.

The Educause Center for Applied Research (ECAR) recently completed a major survey of student use of information technology (Caruso 2004, p.1). Interestingly, this study focused on "level of skill" and "benefits of the use of technology in the classroom" which closely parallels the scales used in the study on faculty use in the present study. The ECAR study supports the premise that more information is needed about both students and faculty on level of use, level of skill, and value of use to more fully understand the perceived effects of technology upon learning. The Chronicle of Higher Education, in an article by Young, on the ECAR study reported that "Colleges have spent a lot of money putting technology in the classroom, and while innovations have made courses more convenient, the spending has yet to have a large impact on learning…" (Chronicle of Higher Education; 8/13/04, p. A28).

Since the instant study is focused on business faculty at Adelphi University a brief review of their efforts to enhance learning technologies for students and faculty alike is appropriate. Adelphi, like many institutions, continues to make major investments in infrastructure, technology, training, and support. In 2001, Bradley and Quigley developed a presentation, "Transforming the Faculty: A Case Study at a Comprehensive University (2001). In addition to a student help center centrally located in the library a dedicated faculty facility, the Faculty Center for Professional Excellence, was created and staffed to provide in service training and support for all faculty (http://fcpe.adelphi.edu). Technical and training support is also provided by the Information Technology Center (http://infotech.adelphi.edu) in addition to the FCPE.

The preceding review has barely covered the body of literature that now exists on the subject of technology and learning in higher education. What it has done, however, is to demonstrate that changes in teaching and technologies is in fact happening on a widespread basis as witnessed by global resources and research. This review was intended to lay the groundwork for the faculty research at the School of Business at Adelphi University. Finally, as Ma and Runyon (2004, p.1) reported "There is little doubt that technology has the potential to enhance teaching and learning, but there is a lack of agreement on how it should be used for improving academic productivity and enhancing higher learning".

SAMPLE DESCRIPTION

We administered the questionnaire to twenty-four faculty members and received eighteen responses for a seventy-five percent response rate. We collected data on three factors "Teaching Experience" at four levels; "Teaching Field" for the five departments; and "Tenure" status. Technologies/Methods investigated were classified under three categories; "Soft" technologies, "Hard" technologies, and "Class Room" type. "Soft" technologies consisted of Essay Exams, Attendance, Research Projects, Guest Lecturers, and Student Teams. Hard Technologies consisted of Overhead Projectors, Email, Streaming Video, Internet Access, BlackBoard, PowerPoint, Publisher Aids, Laser Pointer, Laptop computers, Elmo Projector, and Infocus Projector. Classrooms were divided into Smart Classrooms, Hybrid Classrooms, and Standard Classrooms.

Responses were numerical at five levels on both the level of use and the value of use of each Technology/Method at both the graduate and undergraduate levels. The responses numbered "5" for both the Level of Use scale (response 5 is "Intend to use") and Value of Use scale (response five is "Have not used") did not enter into

the primary analysis. The response "Intend to use" was collected as a measure of demand or sentiment for a technology or method. For primary statistical analysis, "Intend to use" responses were recoded into the response "Never" which is the first scale item for analysis. The response "Have not used" was collected as a response for those not able to make an assessment of the value of a particular technology or method and was coded as missing for analysis. Analyzed responses were at four levels. See Figure 1 for the data collection instrument. Figure 2 shows the instrument complete with demographic data and mean responses to the questions.

Figure 1 - Survey Instrument

Faculty Survey on Teaching Methods and Technologies

Teaching Experience:	< 3___	4 - 7 years___	8 - 12 years___	>12___	
Teaching Field:	Acct___	Fin___	Mkt___	Mgmt___	MIS/OPS___
Tenured?	Yes ___	No ___			

Scales:

Level of Use
1. Never
2. Occasionally
3. Frequently
4. Always
5. Intend to use

Value of Use
1. Worthless
2. Worthwhile
3. Good
4. Very good
5. Have not used

Teaching Methods and Technologies with Level of Use and Value of Use

Technologies/Methods	Graduate		Undergraduate	
	Level of Use	**Value of Use**	**Level of Use**	**Value of Use**
Soft Technologies				
Essay Examinations				
Attendance				
Research Projects				
Guest Lecturers				
Student Teams				
Other (specify)				
Hard Technologies				
Overhead Projector				
Email				
Streaming Video				
Internet Access				
Blackboard Program				
PowerPoint				
Publisher Aids, e.g. CD's, VCR, DVD's				
Laser Pointer				
Laptop				
Elmo Projector				
Infocus Projector				
Other (Specify)				
Class Rooms				
Smart Classroom				
Hybrid Classroom				
Standard Classroom				

RESEARCH QUESTIONS

The research questions addressed in this paper are:

1. Which technologies or classroom types are valued most highly by faculty?
2. Which technologies or classroom types are used most intensely by faculty?
3. Does the level of teaching, graduate vs. undergraduate, affect the level or value of use of the technologies or classroom types?
4. Are the levels of use and value of use similar for the technologies and classroom types?
5. What are the effects of the factors teaching experience, teaching field, and tenure status on the mean responses for each significant difference?

RESULTS

Descriptive Statistics

Table 1 uses the questionnaire format to summarize the sample and to present the mean responses for each of the cells. Two thirds of the sample possessed over twelve years of teaching experience and the sample was evenly split between tenured and non-tenured members. The data collected allows analysis pertinent to research questions one through five by comparing means and then testing for significant differences in means by level of use and value of use within graduate and undergraduate level. The influence of factors was tested through ANOVA on items found significant through testing for mean differences.

Table 1 - Demographics and Mean Responses

Panel A: Respondents

Teaching Experience:	< 3 (1)	4 - 7 years (4)	8 - 12 years (1)	>12 (12)	
Teaching Field:	Acct (3)	Fin (4)	Mkt (1)	Mgmt (7)	MIS/OPS (3)
Tenure Status:	Yes (9)	No (9)			

Panel B: Mean Responses – Soft Technologies

Technologies/Methods	Graduate		Undergraduate	
	Level of Use	**Value of Use**	**Level of Use**	**Value of Use**
"Soft" Technologies				
Essay Examinations	2.72	3.44	2.44	3.00
Attendance	2.76	2.66	3.33	3.29
Research Projects	3.22	3.69	2.63	3.21
Guest Lecturers	1.61	3.14	1.56	3.17
Student Teams	3.17	3.60	2.81	3.13

Table 1 – Continued
Demographics and Mean Responses

Panel C: Mean Responses – Hard Technologies

Technologies/Methods	Graduate		Undergraduate	
	Level of Use	Value of Use	Level of Use	Value of Use
Hard Technologies				
Overhead Projector	1.94	2.87	2.00	2.79
Email	3.28	3.81	3.06	3.71
Streaming Video	2.00	3.40	1.75	3.63
Internet Access	2.61	3.64	2.31	3.64
Blackboard Program	2.44	3.25	2.31	3.44
PowerPoint	2.89	3.50	2.88	3.54
Publisher Aids, e.g. CD's, VCR, DVD's	2.78	3.38	2.75	3.50
Laser Pointer	1.39	2.40	1.44	2.40
Laptop	1.83	3.44	1.71	3.50
Elmo Projector	1.69	3.22	1.69	3.43
Infocus Projector	2.28	3.55	2.44	3.44

Panel D: Mean Responses – Classroom Types

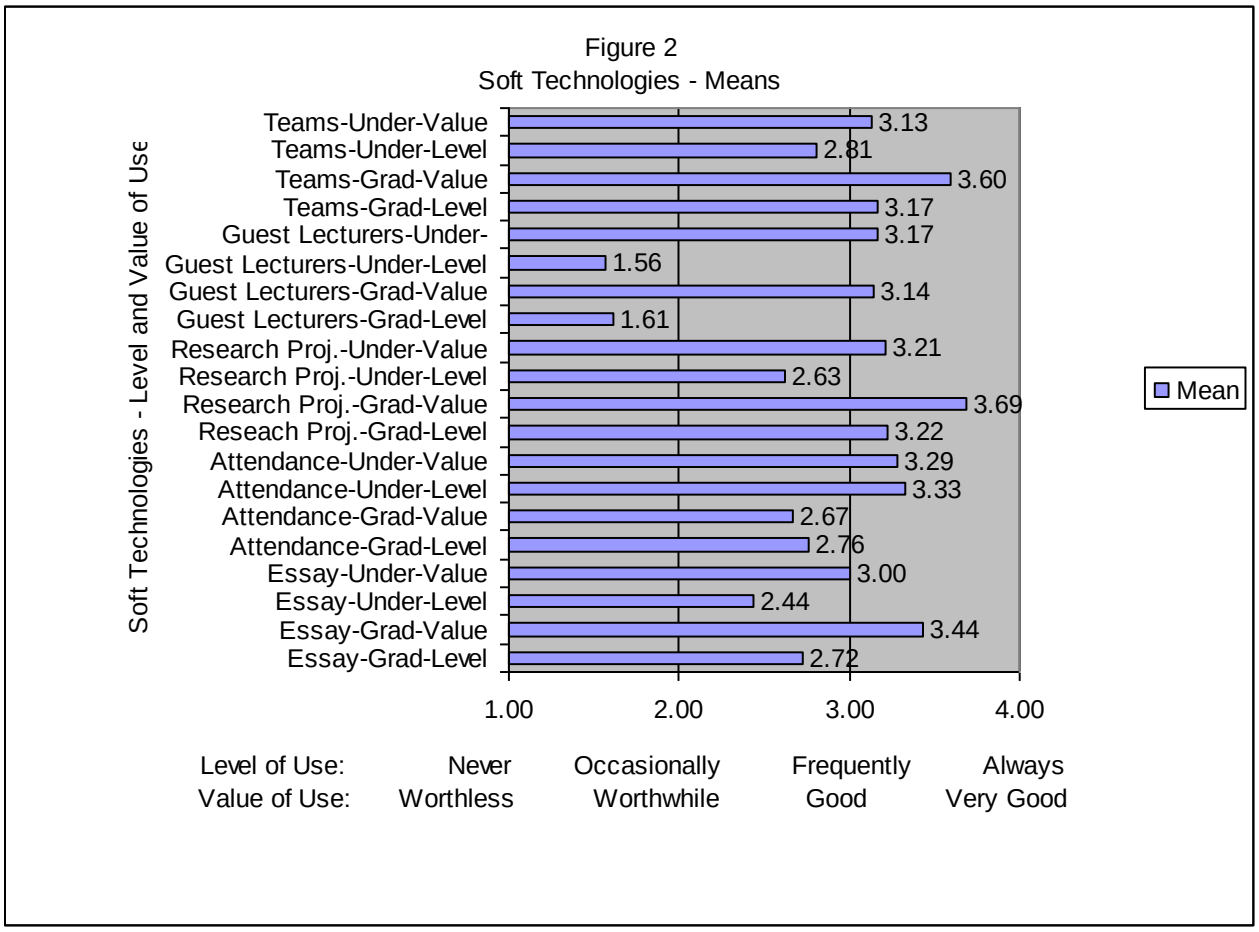
Technologies/Methods	Graduate		Undergraduate	
	Level of Use	Value of Use	Level of Use	Value of Use
Class Rooms				
Smart Classroom	3.11	3.65	2.94	3.71
Hybrid Classroom	1.72	3.44	1.75	3.63
Standard Classroom	2.67	2.50	2.69	2.50

Research Questions 1 and 2: Which technologies and classroom types are valued most highly and used most intensely by faculty?

Questions 1 and 2 address the overall issues of value and level of use for the three categories soft technologies, hard technologies, and classroom types. In order to examine for these items, refer to Figures 2, 3, and 4 that plot the mean values of the responses.

The three highest valued soft technologies (Figure 2) were graduate research projects (3.7), graduate team work (3.6), and graduate essay work (3.4). The three highest valued undergraduate soft technologies were attendance (3.3), research projects (3.2), and guest lecturers (3.1). Essay work (3.0) was ranked somewhat lower in value for the undergraduates (3.0) than for graduate students. We note the relatively high value score for guest lecturers at both the graduate (3.1) and the undergraduate levels (3.2), and the large gap between the value of this techniques and its level of use (1.6) at both the graduate and undergraduate levels.

When reviewing the perceived value of hard technologies, there appears to be strong agreement on the value of certain technologies at both the graduate and undergraduate levels (Figure 3). The means for these values appeared similar and high. All hard technologies except for Overhead Projectors and Laser Pointers had mean scores over three. There was strong perceived value in a host of technologies including e-mail, internet access, streaming video, laptops, BlackBoard, Infocus projectors, Elmo projectors, and Publishers Aids. A visual inspection of the means indicates several areas where the perceived value of use significantly exceeds the level of use of these technologies.



In terms of classroom types (Figure 4), respondents ranked Smart classrooms (3.7) and Hybrid classrooms (3.5) as highly valued and equally valuable at both the undergraduate and graduate levels. Standard classrooms (2.5) received a significantly lower ranking. Similar to the cases of several soft and hard technologies, the level of use of the desired classrooms is lower than their perceived value.

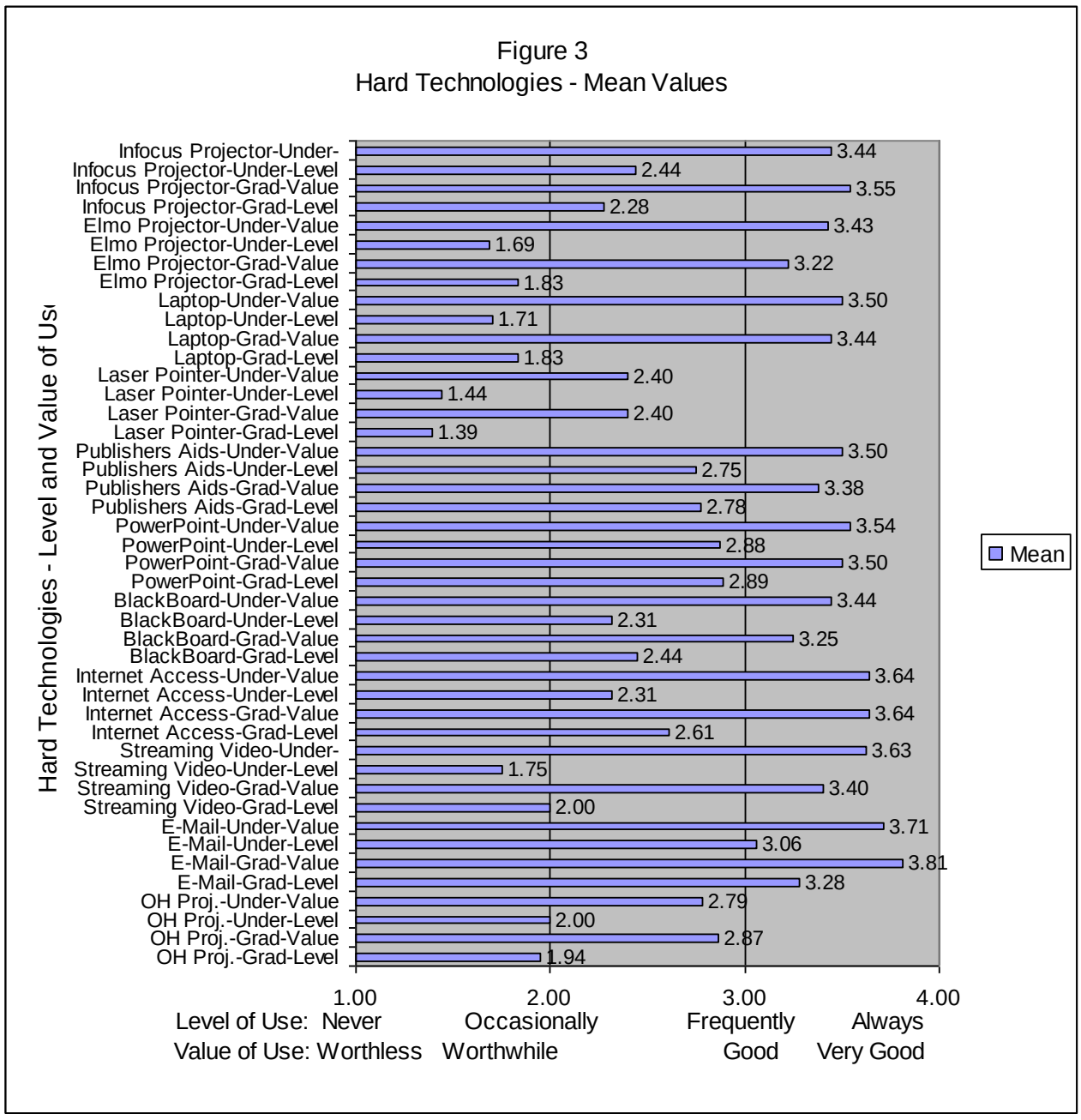
The general pattern of the data set indicates that the values of the technologies or classrooms tend to be higher than their level of use. Only the means for attendance at both the graduate and undergraduate levels appear to describe a case where value and use are in balance. Also, there appear to be some differences in value and level of use when comparing graduate and undergraduate levels. (Note: graduate level courses include MBA and MS Finance classes.)

Research Question 3: Does the level of teaching affect the level or value of use of soft technologies, hard technologies, or classroom types?

In order to examine question three, we ran a series of paired samples t-tests for each technology type (soft and hard) and for classroom types. The pairs were defined as Graduate and Undergraduate for both level and value of use for each individual technology. We used paired sample t-tests because each respondent was measured twice for each pair. (All statistics were run on SPSS v. 12. The column titled "mean" on this and following tables shows the difference in means between the means of the items in the paired samples. These may not match the item means as not all items resulted in pairs due to missing data. The sign denotes which mean was higher.) Table 2 indicates four pairs were significantly different at .05 for either the value or level of use of soft technologies. The value of essays at

the graduate level was significantly higher (.047) than at the undergraduate level. The level of use of attendance scored significantly higher at the undergraduate level (.012). Consistent with the level of use difference, the value of attendance ranked significantly higher at the undergraduate level (.027). The fourth significant item in soft technologies is that the use of research projects is used at a significantly higher level for graduate students. Interestingly, the value of research projects was not judged as significantly different (.096) at the undergraduate vs. graduate level.

Figure 3
Hard Technologies - Mean Values



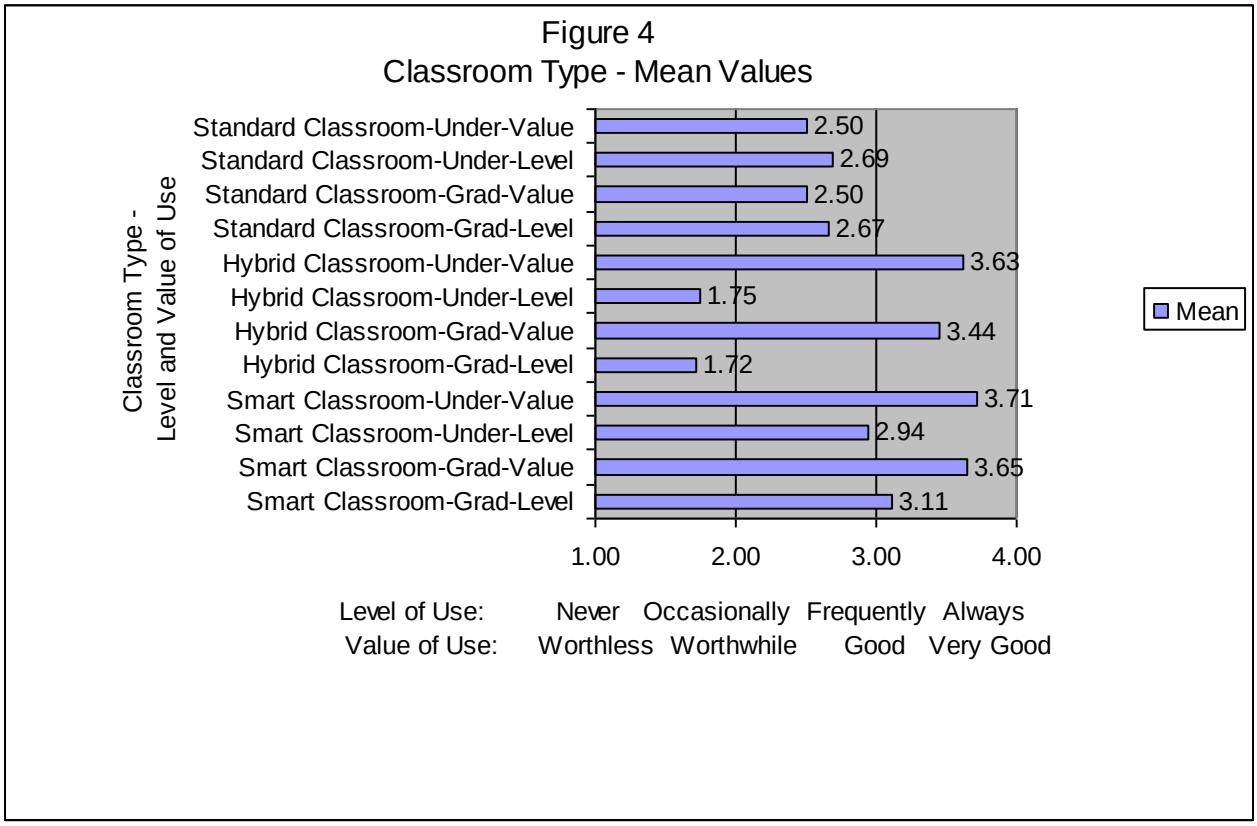


Table 3 presents the results of paired sample t-tests for all pairs of hard technologies and classroom types at both the graduate and undergraduate levels. No significant differences are evident in any of the pairs. Graduate and undergraduate levels are insignificant in explaining the level of use and value of use of the hard technologies and classroom types. This finding is not unexpected, as both undergraduate and graduate classes would experience similar benefits or lack of benefits from technology and class type.

Research Question 4: Are the levels of use and value of use similar for soft technologies, hard technologies and classroom types?

Research question four explores differences between the level of use and the value of use of soft technologies, hard technologies, and classroom types at both the graduate and undergraduate levels. We interpret a significant negative difference between level and value of use as a constraint. These constraints might be self constraints (not taking advantage of training opportunities or not redesigning an existing delivery method), time constraints (perception of inadequate time to utilize or properly implement the technology) or resource constraints (a lack of training opportunities or a physical resource inadequacy). It is beyond the scope of the paper to investigate the nature of the constraints and ways to elevate those constraints.

Table 2 - Paired Samples T-Test - Soft Technologies
By: Graduate vs. Undergraduate - Level and Value of Use

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Essay-Grad-Level Essay-Under-Level	.25000	.85635	.21409	-.20632	.70632	1.168	15	.261
Pair 2	Essay-Grad-Value Essay-Under-Value	.50000	.85485	.22847	.00642	.99358	2.188	13	**.047**
Pair 3	Attendance-Grad-Level Attendance-Under-Level	-.66667	.89974	.23231	-1.16492	-.16841	-2.870	14	**.012**
Pair 4	Attendance-Grad-Value Attendance-Under-Value	-.46154	.66023	.18311	-.86051	-.06257	-2.521	12	**.027**
Pair 5	Research Proj.-Grad-Level Research Proj.-Under-Level	.50000	.81650	.20412	.06492	.93508	2.449	15	**.027**
Pair 6	Research Proj.-Grad-Value Research Proj.-Under-Value	.38462	.76795	.21299	-.07945	.84868	1.806	12	.096
Pair 7	Guest Lecturers-Grad-Level Guest Lecturers-Under-Level	.00000	.51640	.12910	-.27517	.27517	.000	15	1.000
Pair 8	Guest Lecturers-Grad-Value Guest Lecturers-Under-Value	.09091	.83121	.25062	-.46750	.64932	.363	10	.724
Pair 9	Teams-Grad-Level Teams-Under-Level	.31250	1.01448	.25362	-.22808	.85308	1.232	15	.237
Pair 10	Teams-Grad-Value Teams-Under-Value	.23077	.43853	.12163	-.03423	.49577	1.897	12	.082

Figures in Bold = significant at .05

In terms of soft technologies (see Table 4), the value of essays at the graduate level is significantly higher than that at the undergraduate level (.027). The value of guest lecturers is significantly higher than the level of use of this technique at both the graduate (.000) and undergraduate levels (.000). There is a very strong perception of the usefulness of guest lecturers and a low actual usage. For the remaining variables, we interpret the non-significant findings as indicative that the perceived value and level of use of the technology is in balance.

For hard technologies (See Table 5), nine pairs out of twenty-two show significant differences with all significant pairs indicating that the value of a technology is significantly greater than its use. The value of overhead projectors at both the graduate (.022) and undergraduate levels (.033) significantly exceeds the level of use. Streaming video at both the graduate (.008) and undergraduate levels (.015) are both valued more highly than used. Internet access at the graduate (.026) and undergraduate (.024) likewise are valued more highly than used. Publishers' aids at the undergraduate level (.029), Laptops at the undergraduate level (.018) and Elmo projectors at the undergraduate level (.045) all are valued more highly than used. Most of these differences are perceived to be the product of rationing. As newly designed rooms come increasingly on line, we expect the level and value of use to move to equilibrium. Even the significant difference with respect to overhead projectors fits the rationing scenario as rooms without screens remain without screens as they are slated for remodeling.

Finally, in terms of classroom types (Table 6), hybrid classrooms at both the graduate (.04) and undergraduate (.038) levels are valued more highly than they are used. Standard classrooms, quite consistently, are used at both the graduate (.029) and the undergraduate levels (.028) at a level that is higher than their perceived use.

Table 3
Paired Samples T-Test - Hard technologies and Classroom Type
By: Graduate vs. Undergraduate - Level and Value of Use

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	OH Proj.-Grad-Level OH Proj.-Under-Level	-.06250	.44253	.11063	-.29831	.17331	-.565	15	.580
Pair 2	OH Proj.-Grad-Value OH Proj.-Under-Value	.00000		nmf			nmf		nmf
Pair 3	E-Mail-Grad-Level E-Mail-Under-Level	.12500	.61914	.15478	-.20492	.45492	.808	15	.432
Pair 4	E-Mail-Grad-Value E-Mail-Under-Value	.21429	.57893	.15473	-.11998	.54855	1.385	13	.189
Pair 5	Streaming Video-Grad-Level Streaming Video-Under-Level	.12500	.80623	.20156	-.30461	.55461	.620	15	.544
Pair 6	Streaming Video-Grad-Value Streaming Video-Under-Value	-.12500	.35355	.12500	-.42058	.17058	-1.000	7	.351
Pair 7	Internet Access-Grad-Level Internet Access-Under-Level	.25000	1.00000	.25000	-.28286	.78286	1.000	15	.333
Pair 8	Internet Access-Grad-Value Internet Access-Under-Value	.09091	.30151	.09091	-.11165	.29347	1.000	10	.341
Pair 9	BlackBoard-Grad-Level BlackBoard-Under-Level	.12500	.34157	.08539	-.05701	.30701	1.464	15	.164
Pair 10	BlackBoard-Grad-Value BlackBoard-Under-Value	.00000		nmf			nmf		nmf
Pair 11	PowerPoint-Grad-Level - PowerPoint-Under-Level	.12500	.34157	.08539	-.05701	.30701	1.464	15	.164
Pair 12	PowerPoint-Grad-Value - PowerPoint-Under-Value	.00000	.40825	.11323	-.24670	.24670	.000	12	1.000
Pair 13	Publishers Aids-Grad-Level - Publishers Aids-Under-Level	.00000	.36515	.09129	-.19457	.19457	.000	15	1.000
Pair 14	Publishers Aids-Grad-Value Publishers Aids-Under-Value	.00000		nmf			nmf		nmf
Pair 15	Laser Pointer-Grad-Level Laser Pointer-Under-Level	.00000		nmf			nmf		nmf
Pair 16	Laser Pointer-Grad-Value Laser Pointer-Under-Value	.00000		nmf			nmf		nmf
Pair 17	Laptop-Grad-Level Laptop-Under-Level	.05882	.24254	.05882	-.06588	.18352	1.000	16	.332
Pair 18	Laptop-Grad-Value Laptop-Under-Value	.00000	.53452	.18898	-.44687	.44687	.000	7	1.000
Pair 19	Elmo Projector-Grad-Level - Elmo Projector-Under-Level	.06250	.25000	.06250	-.07072	.19572	1.000	15	.333
Pair 20	Elmo Projector-Grad-Value Elmo Projector-Under-Value	.00000		nmf			nmf		nmf
Pair 21	Infocus Projector-Grad-Level - Infocus Projector-Under-Level	-.18750	1.04682	.26171	-.74531	.37031	-.716	15	.485
Pair 22	Infocus Projector-Grad-Value - Infocus Projector-Under-Value	.22222	.66667	.22222	-.29022	.73467	1.000	8	.347
Pair 23	Smart Classroom-Grad-Level Smart Classroom-Under-Level	.25000	.57735	.14434	-.05765	.55765	1.732	15	.104
Pair 24	Smart Classroom-Grad-Value Smart Classroom-Under-Value	.00000		nmf			nmf		nmf
Pair 25	Hybrid Classroom-Grad-Level - Hybrid Classroom-Under-Level	.06250	.25000	.06250	-.07072	.19572	1.000	15	.333
Pair 27	Standard Classroom-Grad-Level Standard Classroom-Under-Level	-.06250	.25000	.06250	-.19572	.07072	-1.000	15	.333
Pair 28	Standard Classroom-Grad-Value Standard Classroom-Under-Value	.00000		nmf			nmf		nmf

Note: Cells marked "nmf" had no difference in the means or standard error of the mean

Table 4
Paired Samples Test - Soft Technologies
Graduate and Undergraduate – Level vs. Value of Use

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Essay-Grad-Level Essay-Grad-Value	-.50000	.81650	.20412	-.93508	-.06492	-2.449	15	**.027**
Pair 2	Essay-Under-Level Essay-Under-Value	-.35714	.92878	.24823	-.89341	.17912	-1.439	13	.174
Pair 3	Attendance-Grad-Level Attendance-Grad-Value	.33333	.81650	.21082	-.11883	.78549	1.581	14	.136
Pair 4	Attendance-Under-Level Attendance-Under-Value	.21429	.57893	.15473	-.11998	.54855	1.385	13	.189
Pair 5	Research Proj.-Grad-Level Research Proj.-Grad-Value	-.18750	.54391	.13598	-.47733	.10233	-1.379	15	.188
Pair 6	Research Proj.-Under-Level Research Proj.-Under-Value	-.35714	.74495	.19910	-.78726	.07298	-1.794	13	.096
Pair 7	Guest Lecturers-Grad-Level Guest Lecturers-Grad-Value	-1.35714	.92878	.24823	-1.89341	-.82088	-5.467	13	**.000**
Pair 8	Guest Lecturers-Under-Level Guest Lecturers-Under-Value	-1.41667	.66856	.19300	-1.84145	-.99189	-7.340	11	**.000**
Pair 9	Teams-Grad-Level Teams-Grad-Value	.00000	.84515	.21822	-.46803	.46803	.000	14	1.000
Pair 10	Teams-Under-Level Teams-Under-Value	-.20000	.67612	.17457	-.57442	.17442	-1.146	14	.271

The results in this section indicate a profile of unmet demand for a range of technologies and classroom configurations. While a thorough discussion of the implications of the statistical differences is beyond the scope of this paper, we interpret most of the differences as attributable 1) a process of resource build outs of hybrid classrooms that is underway, 2) an ongoing process of faculty training, and 3) an interaction between hard and soft technologies. The interaction between hard and soft technologies suggests that some of the most highly valued and less used hard technologies such as streaming video and internet access are mostly a function of the current limited number of equipped rooms. As the number of technology capable rooms continues to increase, we suggest that faculty members are convinced of the value proposition and that value and use will come into balance. However, in the short term only a few respondents expressed intent to use most technologies. (Recall this was response five under the level of use questions.) The highest number of those intending to use was three and that intent was to use guest lecturers. A tentative explanation may be that more active policy intervention may be necessary, or that there may be a lag time as faculty members attain a required confidence level with a particular technology.

Table 5
Paired Samples Test - Hard Technologies
Graduate and Undergraduate – Level vs. Value of Use

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	OH Proj.-Grad-Level OH Proj.-Grad-Value	-.73333	1.09978	.28396	-1.34237	-.12429	-2.582	14	**.022**
Pair 2	OH Proj.-Under-Level OH Proj.-Under-Value	-.64286	1.00821	.26945	-1.22498	-.06074	-2.386	13	**.033**
Pair 3	E-Mail-Grad-Level E-Mail-Grad-Value	-.25000	.93095	.23274	-.74607	.24607	-1.074	15	.300
Pair 4	E-Mail-Under-Level E-Mail-Under-Value	-.35714	.84190	.22501	-.84324	.12895	-1.587	13	.136
Pair 5	Streaming Video-Grad-Level Streaming Video-Grad-Value	-1.00000	.94281	.29814	-1.67444	-.32556	-3.354	9	**.008**
Pair 6	Streaming Video-Under-Level Streaming Video-Under-Value	-1.12500	.99103	.35038	-1.95352	-.29648	-3.211	7	**.015**
Pair 7	Internet Access-Grad-Level Internet Access-Grad-Value	-.57143	.85163	.22761	-1.06315	-.07971	-2.511	13	**.026**
Pair 8	Internet Access-Under-Level Internet Access-Under-Value	-.72727	.90453	.27273	-1.33495	-.11960	-2.667	10	**.024**
Pair 9	BlackBoard-Grad-Level BlackBoard-Grad-Value	-.08333	.90034	.25990	-.65538	.48871	-.321	11	.754
Pair 10	BlackBoard-Under-Level BlackBoard-Under-Value	-.11111	.60093	.20031	-.57302	.35080	-.555	8	.594
Pair 11	PowerPoint-Grad-Level PowerPoint-Grad-Value	-.07143	.82874	.22149	-.54993	.40707	-.322	13	.752
Pair 12	PowerPoint-Under-Level PowerPoint-Under-Value	-.23077	.72501	.20108	-.66889	.20735	-1.148	12	.273
Pair 13	Publishers Aids-Grad-Level Publishers Aids-Grad-Value	-.37500	.71880	.17970	-.75802	.00802	-2.087	15	.054
Pair 14	Publishers Aids-Under-Level Publishers Aids-Under-Value	-.50000	.75955	.20300	-.93855	-.06145	-2.463	13	**.029**
Pair 15	Laser Pointer-Grad-Level Laser Pointer-Grad-Value	.00000	.70711	.31623	-.87799	.87799	.000	4	1.000
Pair 16	Laser Pointer-Under-Level Laser Pointer-Under-Value	.00000	.70711	.31623	-.87799	.87799	.000	4	1.000
Pair 17	Laptop-Grad-Level Laptop-Grad-Value	-.77778	1.09291	.36430	-1.61786	.06230	-2.135	8	.065
Pair 18	Laptop-Under-Level Laptop-Under-Value	-1.00000	.92582	.32733	-1.77400	-.22600	-3.055	7	**.018**
Pair 19	Elmo Projector-Grad-Level Elmo Projector-Grad-Value	-.55556	.72648	.24216	-1.11398	.00287	-2.294	8	.051
Pair 20	Elmo Projector-Under-Level Elmo Projector-Under-Value	-.85714	.89974	.34007	-1.68926	-.02503	-2.521	6	**.045**
Pair 21	Infocus Projector-Grad-Level Infocus Projector-Grad-Value	-.45455	.68755	.20730	-.91645	.00736	-2.193	10	.053
Pair 22	Infocus Projector-Under-Level Infocus Projector-Under-Value	-.33333	.70711	.23570	-.87686	.21020	-1.414	8	.195

Figures in Bold = significant at .05

Table 6
Paired Samples Test - Classroom Type
Graduate and Undergraduate – Level vs. Value of Use

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Smart Classroom-Grad-Level Smart Classroom-Grad-Value	-.41176	.93934	.22782	-.89473	.07120	-1.807	16	.090
Pair 2	Smart Classroom-Under-Level Smart Classroom-Under-Value	-.50000	1.16024	.31009	-1.16990	.16990	-1.612	13	.131
Pair 3	Hybrid Classroom-Grad-Level Hybrid Classroom-Grad-Value	-1.00000	1.22474	.40825	-1.94142	-.05858	-2.449	8	**.040**
Pair 4	Hybrid Classroom-Under-Level Hybrid Classroom-Under-Value	-1.12500	1.24642	.44068	-2.16704	-.08296	-2.553	7	**.038**
Pair 5	Standard Classroom-Grad-Level Standard Classroom-Grad-Value	.37500	.61914	.15478	.04508	.70492	2.423	15	**.029**
Pair 6	Standard Classroom-Under-Level Standard Classroom-Under-Value	.42857	.64621	.17271	.05546	.80168	2.482	13	**.028**

Figures in Bold = significant at .05

Research Question 5: What are the effects of the factors teaching experience, teaching field, and tenure status on the mean responses for each significant difference?

We tested the role of teaching experience, teaching area, and tenure status by running a series of ANOVAs in a fixed effects model for all items identified as significant in the paired t tests. Figure 6 shows the result for an ANOVA with the soft technology item Essay at the Graduate level for perceived Value of Use. The factors were insignificant. All such ANOVAs were insignificant at the .05 level. The instructional environment within which we gathered the data, although functionally broken into departments, is physically integrated with various department members interspersed, and is characterized by a relatively high level of interaction among faculty members without regard to departmental affiliation. All faculty members face similar opportunities and constraints regarding the various technologies and class settings. Finally, for many of the items, there may be no a priori reason to expect significant differences. Even in areas such as Accounting, there has been a consistent thrust to incorporate technology, teams, and writing into the learning experience. We tentatively conclude that a secular trend towards the desire to use similar methods and tools coupled with a small and integrated faculty cadre suggests that both valued technologies and valued teaching settings should be roughly similar across departments.

With respect to tenure status, the series of ANOVAs yielded no significant findings. Hard technology adoption and recognition of the values of certain soft technologies such as the use of teams affected the faculty broadly. With respect to teaching experience, none of the ANOVAs yielded a significant finding. Teaching experience was strongly correlated with tenure.

We conclude with respect to research question five, that under the conditions of a relatively small, physically integrated, and interactive faculty, the factors of department, teaching experience, and tenure were not significant in explaining variable levels in either variable in pairings found significant by the t tests.

Table 7
ANOVA - Tests of Between-Subjects Effects
Dependent Variable: Essay-Grad-Value

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2.771(a)	11	.252	.318	.941
Intercept	111.005	1	111.005	140.217	.000
TENURE	.010	1	.010	.012	.917
TEXP	.850	2	.425	.537	.622
TFIELD	1.050	4	.262	.331	.845
TENURE * TEXP	.000	0	.	.	.
TENURE * TFIELD	.480	1	.480	.607	.480
TEXP * TFIELD	.350	2	.175	.221	.811
TENURE * TEXP * TFIELD	.000	0	.	.	.
Error	3.167	4	.792		
Total	195.000	16			
Corrected Total	5.938	15			

(a) R Squared = .467 (Adjusted R Squared = -1.000)
Note: ANOVA were run for each pair member in each significant t-test. All of the three factors (tenure, experience, or department) were not significant at .05 in all ANOVA analyses.

Discussion, Limitations, and Future Research

We believe that the primary intent of the research has been achieved, mainly, to develop an accurate profile of what this particular faculty group is actually using by way of selected teaching methods and technologies. In addition we have solid clues as to how various factors are valued by the faculty on both the undergraduate and graduate (MBA and MS) level. While this information is delimited by the small size of the sample (n=18), nonetheless many statistically significant results were achieved that provide valuable insight into the actual classroom practices of the faculty. Clearly, it is impossible to generalize from this research; however, researchers might wish to take note of some of the findings for future research.

The third phase of this research will be to administer the same survey instrument to the adjunct faculty in the Adelphi University School of Business which numbers about thirty faculty members. The goal will be to first, develop the same profile of teaching methods and technologies as was done for the full time faculty. Secondly, a comparison of the results for both groups will be examined. Thus, having empirical data for both groups will permit a more robust understanding of how the faculty as a whole is using the "hard" and "soft" technologies and how these methods are valued and actually used. Should significant differences exist between the full and part time faculty it will be extremely important to understand why those difference exist. There is an implicit assumption that there are no fundamental differences or invariance between the two groups. The research goal is to find out. The ultimate goal is to assist in the continuous improvement process within the Adelphi University School of Business.

With so much research being conducted on the influence of technology in the learning process it is hoped that this research will provide a basis to examine the levels and value of use of various teaching methods and technologies on a larger scale for faculty. The research conducted by EDUCAUSE (Morgan 2003) on faculty use of one item, course management software, was a valuable contribution but focused on only one element of the modern teaching process.

As a consequence of this study researchers in the future will have clues to examine in new research on faculty teaching methods and practices. It must be noted, however, that given the small size of the sample no generalization of the results can be made. There is significant local value in using the results to gain a profile of this particular faculty group with respect to continuous improvement initiatives for both the use of emerging technologies and teaching methods.

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