

December 2003

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Recommended Citation

Phanse, Deepali and Hackbarth, Gary, "Student Desired Attributes of PDAs" (2003). *AMCIS 2003 Proceedings*. 82.
<http://aisel.aisnet.org/amcis2003/82>

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STUDENT DESIRED ATTRIBUTES OF PDAS

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Abstract

A modified Delphi study cross-comparing American and International students from a major Midwestern University found that students do not routinely use PDAs for classroom activities. The students primarily used PDAs for schedulers, calendars, address books, calculators and to-do-list types of applications. Students not owning PDAs anticipated higher usage of Internet and Office Productivity tools which contrasted with how students actually used their PDAs. Interestingly, American students compared to the foreign counterparts in general felt less strong in their evaluation of PDA features.

Keywords: Information technology management, higher education, schools and educational services

Introduction

During the past few years, Personal Digital Assistants (PDAs) have begun to influence and change our daily lives as the need for paper or preprocessing of paper has been virtually eliminated. The just-in-time world is not only a guiding principle for business (Winblad et al. 2001) but increasingly a strategic necessity in the world of education. Schools primarily use technology for Internet research, e-mail and office productivity tools (Lahey 2002). Higher education institutions with a careful eye toward managing their IT budgets are reevaluating some IT projects while continuing to invest in wireless connections, handheld devices, and network security (Cruz 2001).

Investment in wireless technology makes content more easily available to students and faculty around campus. Interestingly, PC sales are dropping while sales of PDAs are rising (Dritsas 2001) suggesting the increasing usefulness of these type of products. The PDA category of products is diversifying rapidly with increases in features concurrent with price declines. Given the interest in these products and the relatively low cost of PDAs compared to PC computers, it is a fair question to ask students to what extent they use these products, find them useful, and what features they would like to include in future PDA products?

Background

Growth in PDA sales will grow at an annual rate of 17.6 percent between 2001 and 2006. World wide retail sales will reach \$6 Billion by 2006 (Advisor.com 2002). Future PDA products will provide consumers a wide range of size, configuration, and price ranges. Upgrades will be available in components that include the processors, memory, display technology. Expansion ports, batteries, and operating systems. More corporations will buy PDAs for their employees to take advantage of the knowledge base created by the employees who bought and use their own PDAs.

Access to the Internet through PDAs is increasing; 19 percent of PDAs in 2002 had this capability. PDA access to the Internet is expected to increase to 70 percent by 2006 (Advisor.com 2002). Alternatively, increased competition for PDAs will come from smart phones with increased functionality. Newer technologies allow hand-held devices, for instance, *InfoPoint*, allows different devices to have drag and drop capability over a network (Kohtake et al. 2001). Groupware applications like Lotus Notes, can be run on handheld devices (Roth et al. 2001) (Caudill 1998). The bottom line is that the use and spread of PDAs will become more pervasive.

The importance of mobile devices is not their capability to duplicate desktop PC's but their ability to provide location specific tasks (Fano 2001). This would make them useful in the classroom. Students could electronically receive assignments, read

PowerPoint slides, and receive grades over wireless networks without the bulk and expense of a desktop or portable PC. Activities like note taking could exist outside the classroom and extend outward to laboratories, libraries and other learning specific locations. It would be unnecessary to outfit classrooms with PCs and their attendant updating and maintenance costs. Biometric technology might overcome the accompanying testing and student verification issues.

Methodology

In order to understand what features students desired in PDA devices, the Delphi technique ranked student attitudes concerning PDA features. A random sample of 20 American and 20 International graduate students enrolled in a major Midwestern University were asked to fill out a questionnaire which contained questions related to PDA preferences regarding how student might use a PDA in a classroom setting. Students named the five most important features they use on their PDA. If they did not own a PDA, they indicated which features they would like to have. All students were MBA or Information Assurance majors. International students held a valid student visa. Collected responses resulted in the development of a survey instrument focusing on 19 PDA features. A second group of 126 foreign and American students (so far) ranked each PDA feature on a Likert scale (1-7), very important to very unimportant. Our intent is to use a Latin Square design to evaluate student perceptions of PDA features contrasting PDA owners and non-owners with gender, undergraduate versus graduate, and foreign or American student status as treatments.

Results

All students participating in the Delphi study were between 23 and 24 years of age. Nine Americans and six International students owned PDAs. The remaining 25 students did not own a PDA. Based on our study, evidence suggests that International students owning a PDA considered the calendar, appointment and the notepad features the most useful applications. Those not owning a PDA also wanted to use a PDA for calendar, notepad, calculator, and address applications. Interestingly, a number of potential users listed Internet access and mobile phones as potential applications they would use. Figure 1 summarizes this information with students not owning a PDA shaded the darkest.

Figure 2 summarizes the contrasts between American students having a PDA and those not having a PDA. American students who owned a PDA used the calendar, address, appointment, and calculator applications the most often. Those who do not have a PDA wanted to use for scheduling, clock, Internet surfing, games, notebook, or address book applications.

Figure 3 compares features between International and American students who own a PDA. The difference in the number of students differs somewhat in that more American students own PDAs than the international students. In general, owners of PDAs whether they are International or American students use a PDA for the same purposes. Small differences exist in that some students use PDAs for Internet accessibility, games and PC compatibility applications.

Figure 4 compares International and American students who do not own a PDA. For the most part these students would use the same applications. International students may not recognize the usefulness of the notepad feature.

Figure 5 reflects the initial data collection of 126 randomly selected students divided between owners and non-owners of PDAs. Figure 5 rank orders PDA features by the mean value of each PDA feature established by foreign owners of PDAs. Approximately 19% of students in this sample owned a PDA. Statistically valid results require further data collection but we can make some general observations from Figure 5. We did observe some interesting differences. Based on our study, evidence suggests that foreign students who own a PDA seem to rate those features they use higher than those anticipated by non-owners and American students. Non-users wanted a cell phone capability however, PDA users felt less strong about that feature. American students did not consider expense-tracking features as valuable as did their foreign student counterparts. Owners of PDA were willing to spend more money on a PDA with advanced features than a non-owner (\$329.52 versus \$272.23). This same relationship remained when students considered what they would spend on a PDA (\$287.36 versus \$186.90).

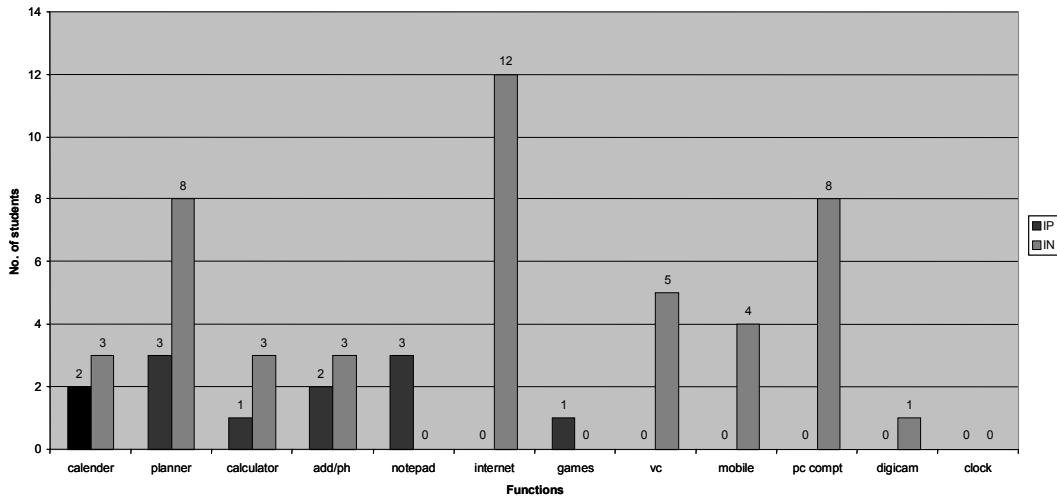


Figure 1. Comparison of International Students Owning a PDA and Not Owning a PDA

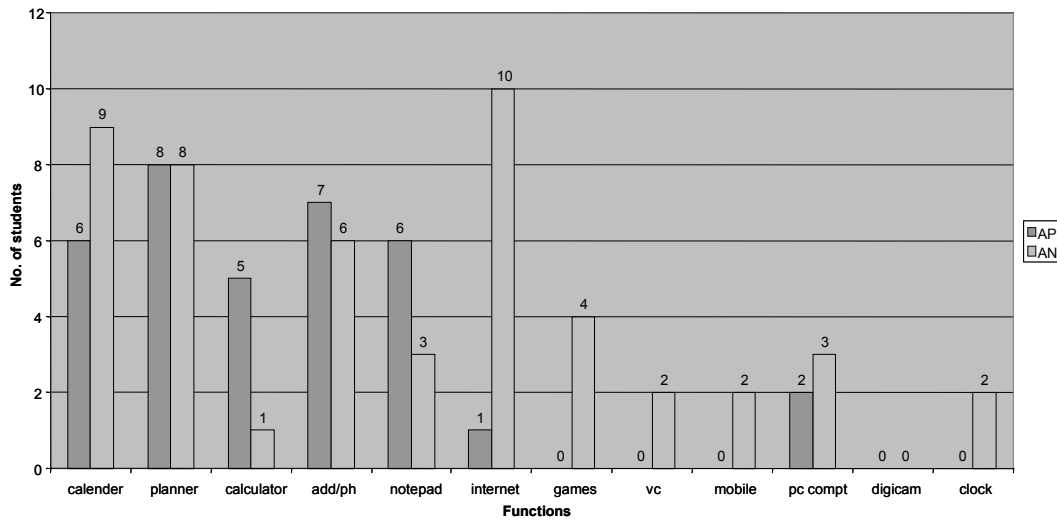


Figure 2. Comparison of American Students Owning a PDA and Not Owning a PDA

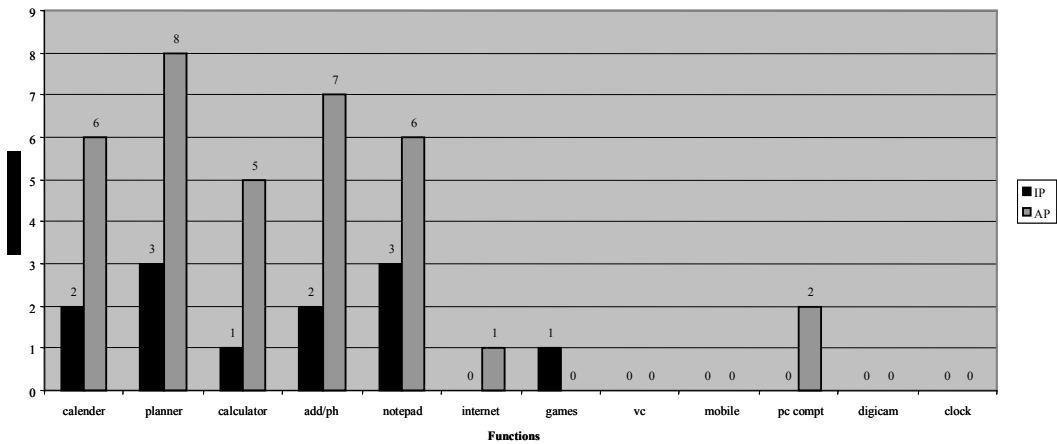


Figure 3. Comparison of International and American Students Who Own a PDA

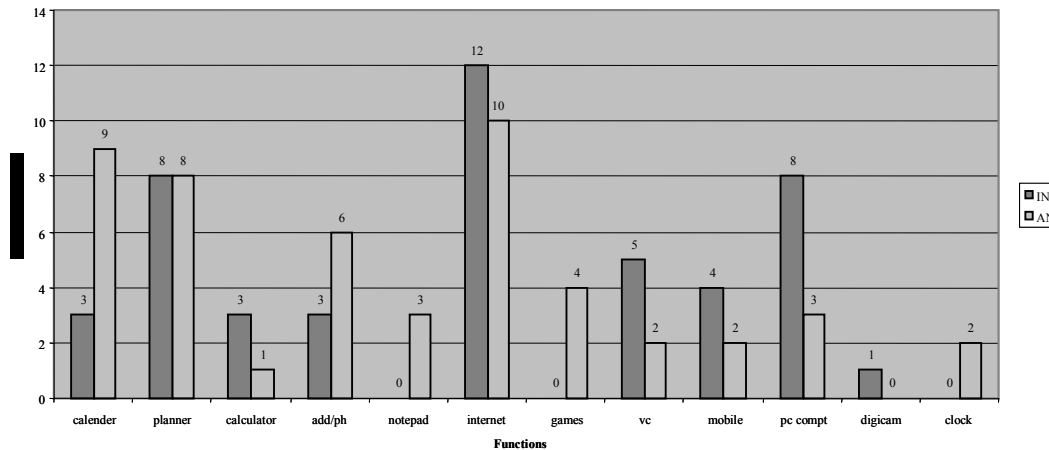


Figure 4. Comparison of International and American Students Who Do Not Own a PDA

Discussion

Not as many students owned PDAs in an academic setting as we would have thought. Few functions of PDAs were directly associated with classroom activities. Interestingly, more female students owned a PDA than male students (16 to 8). Striking similarities existed between International and American students whether they owned a PDA or not in the applications, they used or wanted to use. Responses were very similar for functions like planner, address book, calendar, and calculator. We do begin to see some differences when we look at time, expense tracking and digital camera features between American and foreign students.

Students who did not own a PDA generally rated Internet connectivity and office tools higher than their PDA owner counterparts. These differences might be attributed to current advertising emphasizing these advanced features. PDA owners did not value the cell phone feature highly. Some students may lack the technological knowledge to use a PDA. Post survey interviews suggested to us that students wanted faculty to use PDAs and require their use in the classroom. Some International students never heard of PDAs or had just heard about it but did not know its uses. Other differences may exist because students who do not own a PDA think in broader terms about the uses of PDA than those who have experience using their own PDA.

This paper suggests opportunities for the companies that manufacture PDAs to increase their marketing to students and universities to target instructional strategies to serve students. Additional features and applications relevant to academic settings may include greater internet accessibility, games, and other uses such as video conferencing, digital camera interfaces and clock/scheduler programs may be important. Cost is a factor to students. Several students mentioned special buying programs or the distribution of free PDAs as part of their University technology fee. Students want internet accessibility features included in their PDA and want to use their PDAs in a classroom setting. However, the added cost of these extra features precludes students from purchasing high-end models with these features.

Limitations

Our sample size was small. Our results may not be attributable to all undergraduate and graduate students or students from countries represented in our sample. There may be cultural differences in how students use PDAs. For instance, Simputers read web pages aloud in Indian languages (Singh 2002), a feature not commonly found on U.S. PDAs.

Further Research

We started this research with the basic question of whether it is worthwhile to consider the idea of replacing laptops, computers and cell phone with PDAs. Collected data assessed which features students found useful in a PDA. There are some differences in the way international students and American students use and want to use a personal digital assistant. Further data collection underway might provide additional insights into gender and student perceptions. These results might be useful in encouraging faculty to use PDAs in the classroom and administrators to add Wi-Fi capabilities to support faculty instructional initiatives.

PDA Features	Nationality	Students Who Own PDAs			Students Who Do-Not Own PDAs		
		N	Mean	Std. Deviation	N	Mean	Std. Deviation
Planner/Date Book	Foreign	12	1.17	0.577	53	1.53	1.030
	USA	12	1.33	0.651	47	1.55	0.974
Calendar	Foreign	12	1.17	0.389	52	1.56	1.018
	USA	12	1.33	0.492	47	1.57	0.972
Address list	Foreign	12	1.42	0.793	53	1.89	1.368
	USA	12	1.58	0.669	46	2.24	1.728
Calculator	Foreign	12	1.58	1.165	53	1.94	1.420
	USA	12	2.17	1.267	47	2.32	1.576
To-do-list	Foreign	12	1.75	0.965	53	1.75	1.270
	USA	12	1.33	0.492	46	2.28	1.455
Time	Foreign	12	1.92	1.730	53	2.08	1.579
	USA	12	2.92	2.466	47	1.91	1.412
Memo Pad	Foreign	12	2.00	1.758	53	2.13	1.455
	USA	12	2.25	0.754	47	3.17	1.579
Expense tracking	Foreign	12	2.33	1.371	53	2.70	1.716
	USA	11	3.55	1.753	46	4.07	1.855
E-mail	Foreign	12	2.42	1.782	53	1.91	1.471
	USA	11	2.36	1.567	46	2.43	1.695
Internet Connectivity	Foreign	12	2.50	1.883	53	1.92	1.479
	USA	11	2.55	1.695	46	2.46	1.735
Dbase Applications	Foreign	11	3.18	2.272	53	2.85	1.844
	USA	12	3.33	1.557	46	3.52	1.709
Word Processing	Foreign	12	3.42	2.065	53	2.28	1.634
	USA	11	3.36	1.963	46	2.98	1.961
Spreadsheet	Foreign	11	3.45	2.252	53	2.62	1.712
	USA	11	3.09	1.514	46	3.48	1.894
Cell phone	Foreign	11	4.00	2.366	53	2.38	1.690
	USA	8	4.00	2.138	45	3.69	2.162
Digital camera	Foreign	9	4.22	1.922	53	3.34	1.720
	USA	7	5.00	1.915	47	4.26	1.882
Games	Foreign	12	4.67	2.188	53	4.32	2.083
	USA	11	4.18	1.779	47	4.28	2.134
Slide Presentation	Foreign	11	4.73	1.794	53	2.89	1.706
	USA	10	5.00	1.155	46	4.15	1.738
Video-conferencing	Foreign	10	4.80	1.619	53	3.28	1.801
	USA	7	5.57	0.976	46	5.24	1.852
Graffiti/Drawing	Foreign	10	5.00	1.826	53	3.53	2.044
	USA	12	4.83	1.528	46	5.07	1.611

We found that students expect a lot more than just the basic features available in a PDA like tracking contacts and phone numbers, taking quick notes, maintaining schedules and To-do lists. Students desired PDA features such as internet connectivity, voice recorders, digital cameras, cell phones etc. but felt constrained by cost factors. However, we still have to find out how many of these students would be ready to pay the high prices of including these features in a small device. We can do further research on price sensitivity issues and can try to find out the actual market for PDAs with such features. It is quite possible that students who prefer advance features in their PDA will not want to buy them if it is too costly.

We are continuing to gather more data. However, the relatively small number of students who own a PDA constrains our ability to gather critical data and make informed comparisons. We would like to include additional survey questions related to Image and Subjective Norm to evaluate student peer pressure and its affect in influencing students to buy and use PDAs on campus.

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