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PERCEPTIONS OF YEMENI COLLEGE STUDENTS ABOUT TECHNOLOGY IMPACT ON COURSES

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Abstract *This paper studies the opinions of Yemeni college students about the impact of technology on courses. The researcher has collected data through a survey questionnaire administered to 403 university students at Sanaa University, Aden University, and University of Science and technology. 77.4 percent of respondents agree that technology improves their learning. 14.2 percent disagree that technology in courses improves their learning. There is no significant difference among respondents in their perceptions about technology's impact on courses with relation to their major.There is a significant difference between male and female respondents in their perceptions about technology impact on courses. Females are more positive about technology impact on courses.Response patterns for the study's outcome statements about the impact of technology on courses are consistent across the factors of age, university, class standing, and performance percentage.There is a significant relationship between student perceptions on the impact of technology on courses and their technology preference in courses. Respondents who prefer more technology in courses show more agreement that technology has a positive impact on course work.There is a significant relationship between student perceptions on the impact of technology on courses and their technology adoption. Respondents who are early adopters of technology are more likely to be positive about the impact of technology on courses and learning.*

Keywords: *Technology Impact, Major, Improve, Learning, Computer*

INTRODUCTION

The Internet and advancements in computer hardware and software as well as the increasingly improving telecommunications have created a lot of opportunities for every person to succeed in all fields of human interaction. Higher education is no exception in this connection. Students and instructors can benefit from the huge amount of information and the streamlined services that are made available via the Internet. Information and communication technologies have transformed education and made it available and attainable to all learners any time everywhere. They represent the infrastructure to e-learning.

There has been a remarkable change in the learning paradigm due to the introduction of information technology and newer methods of spreading education. It might be true that the Internet is the greatest educational revolution since the invention of the printing press since the 15th century. The Internet allows virtual classrooms; digital libraries provide knowledge warehouses; the Web offers latest information for seminar discussions; computer simulations offer an alternative to labs. In spite of the dominance of traditional lecture/discussion method in college education, more and more technological applications are gaining hold in the classrooms (Sharma, 2008).

There is a great difference between learning supported by technology and pure traditional learning. It is assumed that in the former students are more likely to be good performers that can adapt with contemporary knowledge age. Almost the furthest extent of Yemeni education goes to undergraduate education, i.e. bachelor's degree. When a Yemeni student wishes to continue his graduate study, especially if he wishes to study abroad, he is likely to encounter obstacles in his graduate learning if he has not been exposed to any use of technology in learning. If the student chooses to go to work, he will not be ready for the workplace as technology has dominated everywhere and become essential for many jobs. Therefore, Yemeni students have to get familiar the use of technology in learning in order to cope with graduate education and to be marketable in the job market. Also the researcher noticed that there is a kind of technophobia among learners. So the study will be a step towards improving the current situation of Yemeni teaching-learning processes in the higher education stage, and will help to create interest among both teachers and learners in technology use in learning/teaching activities. The researcher aims to study

college students' opinions on technology's impact on their courses.

The study investigates student perceptions on technology's impact on courses.

The paper's topic is stated as follows:

"Yemeni college student opinions about technology impact on courses".Thus the research problem statement is *what are the perceptions of Yemeni college students about the impact of technology on their courses?*

Objectives of the Study

This study aims at evaluating Yemeni college students'perceptions about the impact of technology on their academic activities.

The specific objective of the study can be expressed as follows:

- to identify college students' opinions about technology impact on courses; and
- to check whether opinions about technology'simpact on coursesvary across respondents' demographics.

Hypotheses

The following hypotheses have been developed.

- Hypothesis 1: There is no significant difference among respondents in their opinions about technology impact on courses on the basis of their demographics.
- Hypothesis 2: There is no significant relationship between respondents' opinions on technology impact on courses and their technology preferences.
- Hypothesis 3: There is no significant relationship between respondents' opinions on technology impact on courses and technology adoption.

Sample Design

Students included in the sample are randomly selected from the target population (i.e. students from Sana University, Aden University, and University of Science and Technology) using simple random sampling method. Student IDs are fed into MS-Excel worksheet and the function "rand between" is used to randomly select the target student sample. The sample consists of 1194 students. The sample is proportionately distributed among demographics (see Table 1).

Table 1: Profile of Student Respondents

	Male (N=199)	Female (N=204)	Total (N=403)
University			
Sanaa University	21.8%	25.1%	46.9%
Aden University	15.9%	14.6%	30.5%
University of Science & Technology	11.7%	10.9%	22.6%
Class Standing			
Senior	24.8%	24.3%	49.1%
Freshman	24.6%	26.3%	50.9%
Age			
18-20	14.4%	19.4%	33.7%
21-23	25.1%	26.8%	51.9%
24 and more	9.9%	4.5%	14.4%
Major of study			
Social sciences	3.7%	4.2%	7.9%
Humanities	7.2%	8.2%	15.4
Fine arts	4%	6.5%	10.4%
Life sciences	6.5%	9.7%	16.1%
Physical sciences	5.2%	7.2%	12.4%
Education	3.5%	5%	8.4%
Engineering	13.2%	4.5%	17.6%
Business	6.2%	5.5%	11.7%

The survey questionnaires are distributed to students in person. The questionnaires were distributed to 1194 students in three universities, two public and one private. Only 403 (33.8 percent) responded but that was sufficient for the analysis based on previous survey comparisons.

Table 1 gives an overall picture of the respondent distribution profile on the basis of gender. This is explained in detail in chapter four of this study.

Methodology

The study uses a survey questionnaire and personal interviews in order to gather and analyze quantitative and qualitative data from 1193 students of three universities, Sana University, Aden University, and University of Science and Technology.

The study commences with a literature review in order to define the major elements of the study and help create the objectives of the study.

The researcher has designed a survey questionnaire to gather quantitative data so as to assess student technology device ownership, their general use of technology, and their skills at using technology. The survey questionnaire is mainly based on the ECAR Longitudinal Studies of Students and Information Technology, 2004-2011. The researcher has administered the survey questionnaire to the sample of 1193 students in Sanaa and Aden Universities, and in the University of Science and Technology.

Literature review

College student perceptions about technology impact on courses can be studied in the context of e-learning and the use of technology in higher education. In fact few studies have been conducted in this respect.

Alsalehi (2001) shows that the employment of computer in teaching/learning processes of Sanaa University is weak. Khushafa (2006) finds out that college administrators are interested in the use of computer as an administrative tool and a teaching aid.

Abdulghani (2007) opines about a computer program that proves effective in increasing the skill level of student teachers at using technology devices. However, the program is ineffective in improving the student attitudes towards technology.

Al-Maqtari (2009) offers a project that proposes a detailed three-year implementation plan for Sanaa Community College's (SCC) e-learning system. It also develops a prototype web-based e-learning system in order to help SCC manage its learning/teaching processes. The current and the proposed systems are modeled using Unified Modeling Languages (UML). The project utilizes the plans of international higher education institutions and promises a great improvement in supporting traditional education in Yemeni higher education institutions.

Qatran (2010) states that universities are interested in e-learning as a kind of advertisement. The universities adopt e-learning while they lack in the infrastructure necessary for it.

There is no specific study about college student ownership of technology devices as a physical component of student readiness for the adoption of e-learning and the use of technology in their learning processes.

Data Analysis

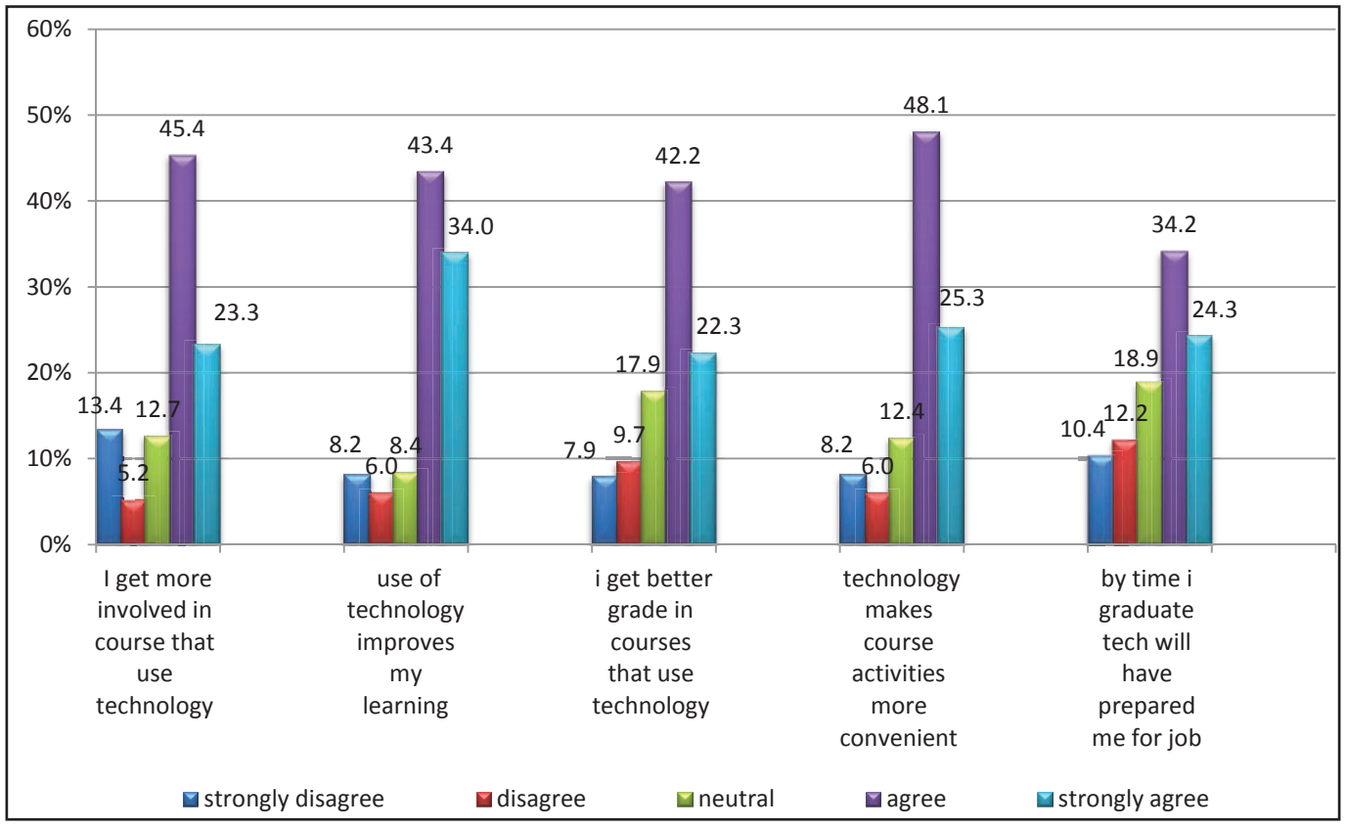
The survey asks respondents about the outcomes they get from technology employment in their academic activities.

What is your opinion about the following statements?

Fig.1 shows the distribution of responses for the survey outcome questions about student involvement, learning improvement, increase in grades, convenience, and workplace preparedness.

	Strongly dis-agree	Disagree	Neutral	Agree	Strongly agree
Iget more actively involved in courses that use technology					
The use of technology in my courses improves my learning					
I get better grade in courses that use technology					
Technology makes doing my course activities more convenient.					
By the time I graduate, the tech I have used in my courses will have adequately prepared me for the workplace.					

Fig. 1: Student Perceptions About Technology's Impact in Courses



Learning improvement is the clear favourite. Here, the number of agree responses (77.4 percent) far outweighs the combined disagree and neutral responses (22.6 percent). As one student commented, "technology makes learning less a burden."

This comes in concurrence with results from other studies: (1) e-learning resulted in a 60 percent faster learning curve as compared to traditional teaching; (2) students' content retention was up to 50 percent higher for e-learning over traditional classroom instruction; (3) e-learning students showed 56 percent greater gains in learning than did students who were taught by traditional instruction; (4) consistency of learning was up to 60 percent better for students taught through e-learning over those taught traditionally; (5) consistency of the presentation of material was 40 percent higher for e-learning over traditional methods and (6) training compression was up to 70 percent faster for e-learning than it was for traditional training (link2math.com).

Thus students perceive that technology in courses actually improves their learning. The data show that more than two thirds (77.4 percent) of respondents agree or strongly agree. Students frequently referred to technology in this connection, with comments such as "I feel that technology will make my study easier and more exciting." or "I took some chemical experiments using simulations because these are dangerous to carry out in reality." This finding does not agree with that of Abdulghani (2007) that states that students' attitudes towards technology have not been improved through the use of computer program. However, that study is only about a computer program and the coverage of the study is only the faculty of education at Sanaa University.

Moderate comments appreciated the contribution technology makes and at the same time stated that classroom learning is important and that technology must be used effectively. A common thought was, "technology is a useful tool to support learning, especially if it is effectively employed."

On the other hand, 14.2 percent students disagree that technology in courses improves their learning. Some of their comments disprove the notion that all of today's students are happy with technology tools. A freshman commented, "I prefer to learn using no technology, at least I know that electricity cut offs won't stop the Power Point presentation in the middle of the lecture."

More than half of the respondents (58.5 percent) agree that upon graduation the technology used in their courses will have adequately prepared them for the workplace, and another 18.9 percent are neutral. This large number of neutral responses might be justified on the basis of respondent lack of familiarity with the workplace. And 22.6 percent disagree with the statement. Students' comments about career and workplace preparedness criticize the institutions for their

Table 2: Student Perceptions about Tech Impact by Major

Major	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	F	Sig
					Lower Bound	Upper Bound				
Social Sc.	32	18.4375	5.82507	1.02974	16.3373	20.5377	5	25	1.068	0.383
Humanities	62	18.7742	5.04868	0.64118	17.4921	20.0563	5	25		
Fine Arts	42	16.7143	4.56009	0.70364	15.2933	18.1353	6	25		
Life Sc.	65	18.5385	3.97286	0.49277	17.554	19.5229	7	25		
Physical Sc.	50	19.04	5.34889	0.75645	17.5199	20.5601	5	25		
Education	34	18.2353	5.15257	0.88366	16.4375	20.0331	5	25		
Engineering	71	18.0141	4.41909	0.52445	16.9681	19.0601	5	25		
Business	47	18.9362	4.883	0.71226	17.5025	20.3699	5	25		
Total	403	18.3672	4.83191	0.24069	17.8941	18.8404	5	25		

Table 3: Students' Perceptions about Technology Impact on Courses, by Major

Major	N	Course involvement*	Learning improvement*	Getting better grade*	convenience*	Workplace preparedness*
Business	47	3.70	3.85	3.81	3.85	3.72
Engineering	71	3.48	3.90	3.52	3.69	3.42
Physical Sciences, including Maths	50	3.82	4	3.66	3.78	3.78
Education	34	3.85	3.94	3.47	3.79	3.18
Life/Biological Sciences, including Agriculture and Health Sciences	65	3.69	3.91	3.72	3.85	3.37
Fine Arts	42	2.95	3.69	3.36	3.69	3.02
Social Sciences	32	3.78	4	3.44	3.56	3.66
Humanities	62	3.60	3.85	3.76	3.82	3.74
All students	403	3.60	3.89	3.61	3.76	3.50

*scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree.

inability to provide technology in class for immediate learning/teaching processes.

Of the outcome statements, there is most agreement about technology contribution to student engagement. The majority, about two thirds (68.50 percent) agree, the rest of respondents are either neutral (14.06 percent) or actually disagree (17.44 percent). This big agreement indicates students' positive attitudes towards e-learning irrespective of the current status-quo of e-learning in Yemeni Universities. The following section reports that students' opinions about technology's impact on their engagement is most strongly associated with their preference for technology in courses, indicating that those students preferring more technology in courses are the ones who most often report more engagement in courses that use technology.

It is previously reported in this study that students' use of and skill with technology varies on the basis of students' major. Also the study makes a hypothesis that students' perceptions about the impact of technology on courses vary on the basis of major.

We expect that there is a significant difference among respondents in their perceptions about technology impact in courses based on their majors. Table 2 elucidates this relationship.

The mean values of majors are calculated. Overall, the mean values range between 16.7 and 19.0. Physical Sciences has the highest mean value at 19.0 followed by business at 18.9. Fine Arts has the lowest mean value at 16.7.

To test whether there is a significant difference in the mean values of majors, the ANOVA is conducted. F-value equals

Table 4: Students' Perception about Technology Impact on Courses by Gender

Gender	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	F	Sig
					Lower Bound	Upper Bound				
Male	199	17.7337	5.04269	0.35747	17.0287	18.4386	5	25	6.858	0.009
female	204	18.9853	4.54477	0.3182	18.3579	19.6127	5	25		
Total	403	18.3672	4.83191	0.24069	17.8941	18.8404	5	25		

1.068 and p-value is 0.383 (>0.05). The null hypothesis cannot be rejected. The data show that there is no significant difference among respondents in their perceptions about technology impact on courses with relation to their major.

Table 3 shows that students' perceptions about the impact of technology on courses also do not vary much on the basis of major.

Overall, actual differences between majors are very small, and the pattern of responses is similar for each of the outcome statements. Engineering and Life Sciences majors are somewhat more positive about the value of technology to their academic experience than students in the other disciplines. For example, 13.60 percent of Engineering majors agree that technology in courses improves their learning; and 12.90 percent of Life Sciences majors do so. One explanation might be that students in disciplines such as Life Sciences and Engineering are using more technology in courses (for example, simulations and PowerPoint presentations) that directly applies to the course subject. In contrast, students in majors such as Social Sciences and Humanities may use technology more as a support function (such as PowerPoint presentations) and find face-to-face discussions more central to the course subject matter.

We expect that students' perceptions about the impact of technology on their courses vary on the basis of gender. Table 4 clarifies this relationship.

The mean values of gender are calculated. The mean value of females is higher than the mean value of females, at 19.0 and 17.7 respectively.

To verify whether there is a significant difference among the mean values of gender, the ANOVA is executed. F-value is 6.858 and the p-value .009 (<.05). The null hypothesis is rejected at 5% level of significance. The data show that there is a significant difference between male and female respondents in their perceptions about technology impact on courses.

Fig. 2 shows how student's gender affects their perceptions about technology impact on their courses.

Females are more positive about technology impact in courses. For example, 42.20 percent of females agree that "use of tech in courses improves my learning" compared to 35.20 percent of males agreeing on the same.

Response patterns for the study's outcome statements about the impact of technology on courses are consistent across the

Fig. 2: Respondents' Perceptions about the Impact of Technology by Gender

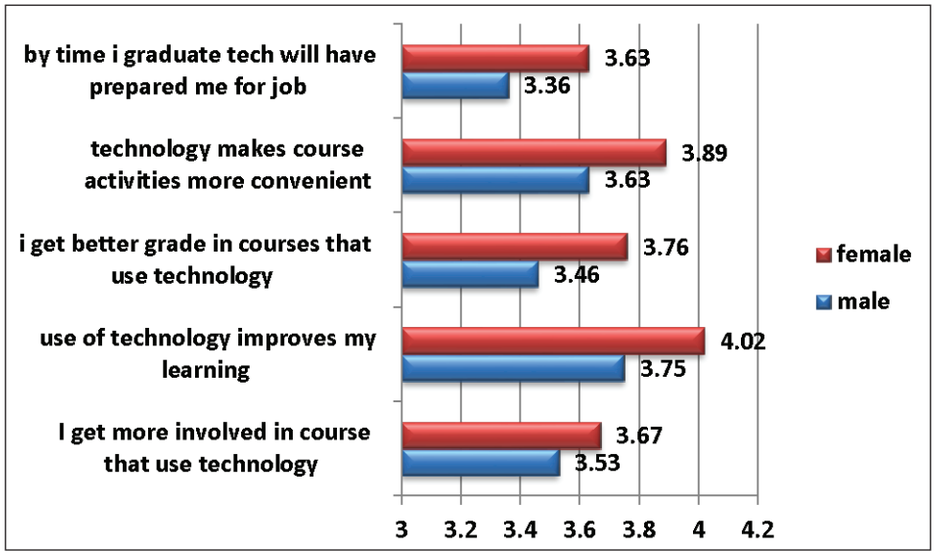


Table 5: Students' Perception on Tech Impact on Courses by Age

Age	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	F	Sig
					Lower Bound	Upper Bound				
18-20	136	18.8676	4.60886	0.39521	18.086	19.6492	5	25	1.386	0.251
21-23	209	17.9952	5.01296	0.34675	17.3116	18.6788	5	25		
24 and more	58	18.5345	4.63857	0.60907	17.3148	19.7541	5	25		
Total	403	18.3672	4.83191	0.24069	17.8941	18.8404	5	25		

Table 6: Students' Perceptions on Tech Impact on Courses by University

university	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	F	Sig
					Lower Bound	Upper Bound				
Sanaa Univ	189	18.5503	4.80844	0.34976	17.8603	19.2402	5	25	0.63	0.533
Aden Univ	123	17.9593	5.04472	0.45487	17.0589	18.8598	5	25		
Univ. of Sci & Tech	91	18.5385	4.60026	0.48224	17.5804	19.4965	5	25		
Total	403	18.3672	4.83191	0.24069	17.8941	18.8404	5	25		

Table 7: Student Perceptions on Tech Impact on Courses by Class Standing

Class standing	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	F	Sig
					Lower Bound	Upper Bound				
senior	198	18.1515	4.92969	0.35034	17.4606	18.8424	5	25	0.775	0.739
freshman	205	18.5756	4.73829	0.33094	17.9231	19.2281	5	25		
Total	403	18.3672	4.83191	0.24069	17.8941	18.8404	5	25		

factors of age, university, class standing, and performance percentage.

We expect that there is a significant relationship between student's technology preference in courses and student's age. Table 5 shows this relationship.

The mean values of age categories are calculated. The mean value of 18-20 age group is the highest at 18.9 followed by the mean value of 24-and-more age group at 18.5. The mean value of 21-23 age group is the lowest at 18.0.

To test whether there is a significant difference in the mean values of age groups, the ANOVA is conducted. F-value is 1.386 (>1) but p-value is .251 (>.05). The null hypothesis cannot be rejected at 5% level of significance. Thus the data show that there is no significant relationship between student technology preference in courses and student age.

We expect that there is a significant relationship between student's technology preference in course and university. Table 6 shows this relationship.

The mean values of universities are calculated. The mean value of Sanaa University is the highest at 18.6 followed by the mean value of UST at 18.5. The mean value of Aden University is the lowest at 18.0.

The ANOVA is conducted to verify whether there is a significant difference in the mean values of universities. F value is 0.63 (<1) and sig. is 0.533 (>0.05). The null hypothesis cannot be rejected at 5% level of significance. Therefore there is no significant relationship between student technology preference in courses and university.

We expect that there is a significant relationship between student's technology preference in course and student's class standing. Table 7 explains this relationship.

The mean values of class standing are calculated. The mean value of freshmen is higher than the mean value of seniors, at 18.6 and 18.2 respectively.

To test whether there a significant difference in mean values of class standing, the ANOVA is conducted. F value is 0.775 (<1) and sig. is 0.379 (>0.05). The null hypothesis cannot be rejected at 5% level of significance. Therefore, there is no relationship between students' technology preference in courses and students' class standing.

The study expects that there is a significant relationship between students' technology preference in course and students' performance percentage. Table 8 shows this relationship.

The mean values of performance percentage are calculated. In general, the mean values range between 16.6 and 20.6. The mean value of 90-100 performance group is the highest at 20.6. The mean value of under-50 performance group is the lowest at 16.6.

The ANOVA test is executed to verify whether a significant difference in the mean values of performance percentages exists. F value is 2.152 (>1) and sig. is 0.059 (>0.05). The null hypothesis cannot be rejected at 5% level of significance. Therefore, there is no significant relationship between students' technology preference in courses and students' performance percentage.

Preference for Technology in Courses, Technology Adoption Practice, and Outcomes

We expect that there is a significant relationship between students' perceptions on the impact of technology on courses and their technology preference in courses.

According to Table 9, Pearson Correlation is .285 and p-value is 0. The null hypothesis is rejected at 1% level of significance. There is a significant relationship between students' perceptions on the impact of technology on courses and their technology preference in courses. Respondents who prefer more technology in courses show more agreement that technology has a positive impact on course work.

We expect that there is a significant relationship between students' perceptions on the impact of technology on courses and their technology adoption.

According to Table 10, Pearson Correlation is .244 and p-value is 0. The null hypothesis is rejected at 1% level of significance. There is a significant relationship between student perceptions on the impact of technology on courses

Table 8: Students' Perceptions on Tech Impact on Courses by Performance Percentage

Perform. Percentage	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	F	Sig
					Lower Bound	Upper Bound				
Don't know	93	18.5161	4.70109	0.48748	17.548	19.4843	5	25	2.152	0.059
Under 50	5	16.6	5.77062	2.5807	9.4348	23.7652	9	25		
50-59	8	17.25	3.15096	1.11403	14.6157	19.8843	13	21		
60-79	121	17.8099	5.11259	0.46478	16.8897	18.7302	5	25		
80-89	138	18.2826	4.77981	0.40688	17.478	19.0872	5	25		
90-100	38	20.5526	4.14401	0.67225	19.1905	21.9147	7	25		
Total	403	18.3672	4.83191	0.24069	17.8941	18.8404	5	25		

Table 9: Correlation between Tech Preference and Tech Impact

		Tech Preference	Opinion on Tech Impact
Tech Preference	Pearson Correlation	1	.285**
	Sig. (2-tailed)		.000
	N	403	403
Opinion on Tech Impact	Pearson Correlation	.285**	1
	Sig. (2-tailed)	.000	
	N	403	403

**.Correlation is significant at the 0.01 level (2-tailed).

Table 10: Correlation between Tech Impact and Tech Adoption

		Opinion on Tech Impact	Tech Adoption
Opinion on Tech Impact	Pearson Correlation	1	.244**
	Sig. (2-tailed)		.000
	N	403	403
Tech Adoption	Pearson Correlation	.244**	1
	Sig. (2-tailed)	.000	
	N	403	403

**. Correlation is significant at the 0.01 level (2-tailed).

Fig. 3: Students' Perceptions About Technology Impact in Courses, by Preference for Technology in Courses

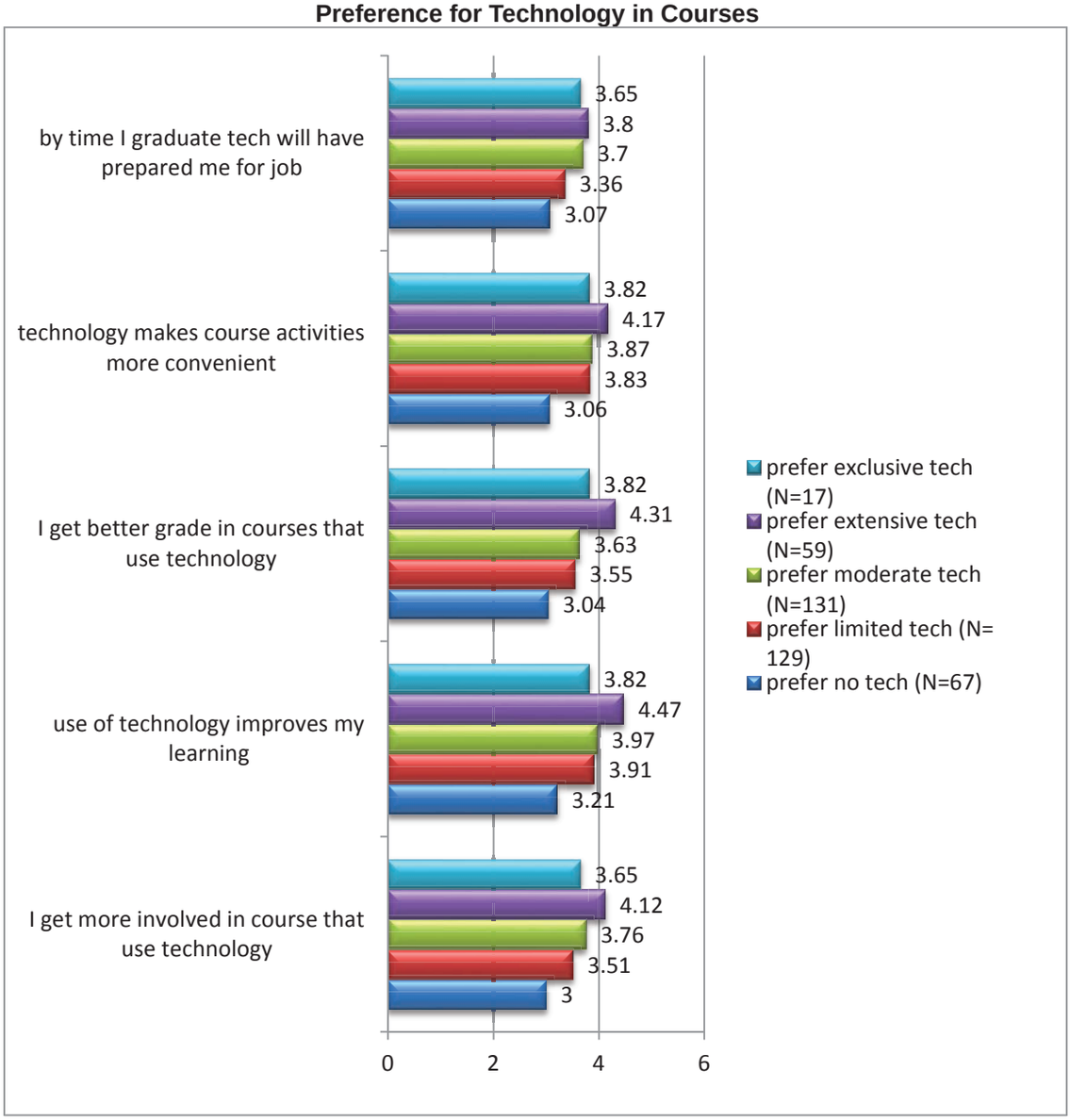


Table 11: Correlation between Tech Preference and Tech Adoption

		Tech Preference	Tech Adoption
Tech Preference	Pearson Correlation	1	.314**
	Sig. (2-tailed)		.000
	N	403	403
Tech Adoption	Pearson Correlation	.314**	1
	Sig. (2-tailed)	.000	
	N	403	403

**. Correlation is significant at the 0.01 level (2-tailed).

and their technology adoption. That is, there is a similar pattern (as with technology preference) when looking at respondents' technology adoption practices. Respondents who are early adopters of technology are more likely to be positive about the impact of technology on courses and learning.

The study suggests that technology preferences have strong relationship with technology adoption.

According to Table 11, Pearson Correlation is .314 and p-value is 0. The null hypothesis is rejected at 1% level of significance. The data show that technology preferences have strong relationship with technology adoption.

The factor most strongly associated with the outcome statements about technology's impact on courses is how much technology respondents prefer in their courses, as shown in Fig.3.

Among students who say that they prefer exclusive technology in courses, the mean of the students who think that they get more involved in courses that use technology is 3.7. While among students who say that they prefer no technology in courses, the mean of the students who think they get more involved in courses that use technology is 3. With respect to learning for example, 26.80 percent of respondents who prefer moderate technology in courses agree that technology improves their learning; 1.74 percent neutral; and 3.97 percent disagree. These relationships are clearly strong, and the wide range of student preference for technology makes it necessary to recognize and integrate into institutional decisions. For example, some US institutions now provide information about the technology that will be used in scheduled courses so that students can make use of this into their course enrollment selection (Salaway *et al*., 2008).

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