EFFECTIVENESS OF LAPTOP USAGE IN UAE UNIVERSITY UNDERGRADUATE TEACHING

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ABSTRACT
Laptop use for undergraduate students is increasingly becoming commonplace, and is often deemed a necessity. Students are using laptops for academic as well as non-academic activities. Researchers are debating the effect of this trend on students' educational and learning outcomes, thus, there is a need for investigation to determine how efficient the use of laptops is in the educational process. The main purpose of this study is to investigate the effectiveness of the use of laptops in enhancing learning at the undergraduate level. This is achieved by collecting data from a random sample of students at the United Arab Emirates University's Colleges of Engineering, Science, and Information Technology. The data are also analyzed to explore if students perceive that instructors should have control over the use of laptops in their classes, students' Information Technology (IT) knowledge and the effect of the use of laptops in class on the consultation of text books.

1. INTRODUCTION

Laptops have become standard tool used by most universities' students. Furthermore, it is mandatory in many undergraduate colleges around the world for students to utilize them in their study. The number of universities with plans for campus-wide computer adoption is quickly growing (Weaver & Nilson, 2005; Brown, Burg, & Dominick, 1998). E-learning as well as design and simulation programs are main drivers of the development in this field. In United Arab Emirates University (UAEU), it is a mandatory that each student, regardless of his/her major, to have a laptop; the campuses are equipped with wireless network connectivity in all academic and non-academic facilities. The university policy is promoting the use of laptops in lectures in the aim of developing a more interactive type of classes and enhancing lecture delivery. Therefore, the UAEU campus will be selected for implementing this study. Educators all over the world are having mixed feeling about students having full access to internet and laptops in class (e.g., Meierdiercks, 2005; Young, 2006). In his study, Fried (2008) reported the effect of laptop programs throughout what known as ubiquitous computing environment on schools' campus on the student learning. Fitch (2004) and Stephen (2005) in their study found out that faculty-student interaction is promoted throughout using of laptop and it improved in class participation which encourages active learning. Driver (2002) reported that class satisfaction and enhancing group project could be achieved by using laptops coupled with web-page activities. Granberg & Witte (2005) did not find major differences in students' grades when laptops were used as compared to their grades when laptops weren't used. Fried (2008) discussed the shortcoming of studies addressing the benefits gained by the students using laptops. He limited his discussion to two main reasons: first, the lack of having objective tools to assess the actual level of learning and benefit and orienting the focus on the level of student participation. The second reason that most studies concentrated on classes which are designed for using such technology and how professors tuned their classes to make use of the new technology. This is why the study suggested the idea of the comprehensive use of laptops in class is not used all over the universities. Meanwhile, many educators raised the issue that usage of laptops is a source of distraction for students in class and it should be carefully monitored. Indeed, some studies, such as the one done by Levine (2002a) & (2002b), suggested that instructors should have special software to control the students' use of laptops during class time. Kay & Lauricella (2011) investigated and compared beneficial and challenging laptop behaviours in higher education classrooms. Kay & Lauricella (2011) and Lindorth & Bergquist (2010) reported beneficial behaviours such as note-taking activities, in-class laptop-based academic tasks, collaboration, increased focus, improved organization and efficiency, and addressing special needs. Challenges observed by Kay & Lauricella (2011) are as follows: students' distracting laptop behaviours, instant messaging, surfing the web, playing games, watching movies, and decreased focus. However, Kay & Lauricella (2011) reported beneficial behaviours more often than challenging behaviours by a factor of 2:1. They concluded that actively integrating meaningful laptop activities into the classroom will increase the frequency of beneficial laptop behaviours. Indeed, a number of researchers have concluded that if faculty do not make an active attempt to meaningfully integrate technology into the classroom, distractions and decreased performance are inevitable (Baron et al., 2008; Hall & Elliot, 2003; Kolar, Sabatini,& Fink, 2002; MacVay, Snyder, & Graetz, 2005; Weaver & Nilson, 2005).

Whitefield (2012) emphasized that educators should not assume that all students are the same, use technologies the same way, or that they learn in the same way. Watulak (2012) warns us that there are some students who feel disconnected between their participation in a pro-technology discourse of the educational and their own personal technological practices. Educators need to be mindful of these types of students and offer a range of learning opportunities for all kinds of students that will allow them to succeed (Whitefield, 2012).

The present study addresses primarily the question of the effectiveness of laptop use on the educational earning of university students in United Arab Emirates University students in particular, in traditional lecture classes' environment. In addition to that, the study explores if students perceive that instructors should have control over the use of laptops in their classes, students' IT knowledge and the effect of the use of laptops in class on the consultation of text books.

2. METHODOLOGY

This study has been conducted in a sample of undergraduate female students from the United Arab Emirates (UAE) University's Colleges of Engineering, Science, and Information Technology. Indeed, the university official statistics indicates that 74.9% of the students registered at the UAE University, during the 2010/2011 academic year, are female students (3,082 male students and 9,197 female students).

A questionnaire (Appendix A) was developed to determine the effectiveness of the use of laptops in the class room. Prior to the distribution of the questionnaire, reliability was calculated using the Cronbach's alpha coefficient which revealed that the questionnaire has an overall reliability of 0.77which indicates that the test is deemed reliable.

The questionnaire was distributed to 143 female students in the colleges of Science, Engineering and Information Technology to asses primarily the effectiveness of the use of laptops in the class room. Laptops were deemed to be effective in increasing educational learning if:

1) Their use enhanced faculty-student interaction
2) They were used for academic purposes by students
3) They weren't used much for non-academic purposes
4) They helped students to perform class-related work and projects more efficiently
5) They improved work organization
6) They helped students in increasing their concentration in class
7) Their use improved the learning experience for students with special needs.

The above criteria for educational effectiveness were presented in the questions one to seven in the questionnaire in the respective order. The students were allowed to answer each question on a Likert scale from one to five; one being strongly agreed and five strongly disagree.

In order for the use of laptops to be considered effective in enhancing the learning experience, a standard of at least 70% of the students should answer questions one to seven with the exception of question three with agree and strongly agree and at least 70% of students answering to question three with disagree and strongly disagree was preset. We selected 70% as a standard for positive responses due to our judgement of the adequacy of this percentage to evaluate the results of our study. In fact, 80% was deemed to be very high which would have led us to exclude true satisfactory responses. On the other hand, 60% would have been too low therefore resulting in including some false satisfactory responses.

In addition to assessing effectiveness, it was of interest to explore whether students think that instructors should have a high control over the use of laptops in their classes. Question eight explored this issue and it was considered that instructors must have a say on the use of laptops in their classes if 70% of the students answered to this question with agreed and strongly agreed. Students' IT knowledge was another area of interest for the researchers in this study and students were considered to have a strong IT knowledge if 70% of them answered to question nine with agreed and strongly agreed. The last issue that was explored in this study is the effect of the use of laptops in class on the consultation of text books and laptops were considered to decrease use of textbooks if 70% of students answered to question 10 with agreed and disagreed.

3. RESULTS AND ANALYSIS

This research focuses on the study of the effectiveness of laptop use in traditional lecture classes' environment in UAE University's Colleges of Engineering, Science and Information Technology. Also this research explores if students perceive that instructors should have control over the use of laptops in their classes, students' IT knowledge and the effect of the use of laptops in class on the consultation of text books. In this section, we

present the results of a survey distributed to the students in the colleges of Science, Engineering and Information Technology to asses primarily the effectiveness of the use of laptops in the class room.

A random sample of 143 students from the above colleges filled the questionnaire. The distribution of students by their college is shown in the following table:

College	Number	Percent
IT	55	38.5
Science	30	21
Engineering	58	40.5
Total	**143**	**100**

3.1 Students Responses

The report below shows the response to each question and the designated percentages.

Q1. I can understand the lecture better and interact more effectively with the instructor when I view the lecture on the laptop.

	Frequency	Percent	Cumulative Percent
Strongly agree	28	19.6	19.6
Agree	48	33.6	53.1
Neutral	33	23.1	76.2
Disagree	28	19.6	95.8
Strongly disagree	6	4.2	100.0
Total	**143**	**100.0**	

The above table shows that only 53.1% of the students either strongly agree or agree with question number 1, while 23.8% either disagree or strongly disagree. 23.1% of the students are neutral.

Q2. I use my laptop for academic purposes only (ex: note taking, finding information online, viewing the lecture notes etc.)

	Frequency	Percent	Cumulative Percent
Strongly agree	30	21.0	21.0
Agree	46	32.2	53.1
Neutral	33	23.1	76.2
Disagree	27	18.9	95.1
Strongly disagree	7	4.9	100.0
Total	**143**	**100.0**	

The above table shows that only 53.1% of the students either strongly agree or agree with question number 2, while 23.8% either disagree or strongly disagree. 23.1% of the students are neutral.

Q3. I use the laptop for chatting, checking my e-mail, playing games, or watching movies

	Frequency	Percent	Cumulative Percent
Strongly agree	29	20.3	20.3
Agree	40	28.0	48.3
Neutral	36	25.2	73.4
Disagree	25	17.5	90.9
Strongly disagree	13	9.1	100.0
Total	**143**	**100.0**	

The above table shows that 48.3% either agree or strongly agree with question number 3, while only 26.6% of the students either strongly disagree or disagree. 25.2% of the students are neutral.

Q4. I am able to do my class-work more efficiently when I have access to a laptop.

	Frequency	Percent	Cumulative Percent
Strongly agree	32	22.4	22.4
Agree	57	39.9	62.2
Neutral	28	19.6	81.8
Disagree	20	14.0	95.8
Strongly disagree	6	4.2	100.0
Total	**143**	**100.0**	

The above table shows that 62.2% of the students either strongly agree or agree with question number 4 which is considered the highest level of agreement among the first seven questions. 18.2% of students either disagree or strongly disagree. 19.6% of the students are neutral.

Q5. I take better notes when I have access to a laptop.

	Frequency	Percent	Cumulative Percent
Strongly agree	17	11.9	11.9
Agree	31	21.7	33.6
Neutral	35	24.5	58.0
Disagree	52	36.4	94.4
Strongly disagree	8	5.6	100.0
Total	**143**	**100.0**	

The above table shows that only 33.6% of the students either strongly agree or agree with question number 5, while 42.0% either disagree or strongly disagree. 24.5% of the students are neutral.

Q6. I am more concentrated and focused when I can view the lecture notes on Power Point on my laptop.

	Frequency	Percent	Cumulative Percent
Strongly agree	25	17.5	17.5
Agree	49	34.3	51.7
Neutral	35	24.5	76.2
Disagree	20	14.0	90.2
Strongly disagree	14	9.8	100.0
Total	**143**	**100.0**	

The above table shows that only 51.7% of the students either strongly agree or agree with question number 6, while 23.8% either disagree or strongly disagree. 24.5% of the students are neutral.

Q7. I have a visual/hearing or any other kind of impairment and using a laptop enhances my learning experience in class.

	Frequency	Percent	Cumulative Percent
Strongly agree	15	10.5	10.5
Agree	39	27.3	37.8
Neutral	54	37.8	75.5
Disagree	27	18.9	94.4
Strongly disagree	8	5.6	100.0
Total	**143**	**100.0**	

The above table shows that only 37.8% of the students either strongly agree or agree with question number 7, while 24.5% either disagree or strongly disagree. 37.8% of the students are neutral.

Q8. Instructors should have the authority to forbid the use of laptops during class time

	Frequency	Percent	Cumulative Percent
Strongly agree	22	15.4	15.4
Agree	55	38.5	53.8
Neutral	34	23.8	77.6
Disagree	21	14.7	92.3
Strongly disagree	11	7.7	100.0
Total	**143**	**100.0**	

The above table shows that only 53.9% of the students either strongly agree or agree with question number 8, while 22.4% either disagree or strongly disagree. 23.8% of the students are neutral.

Q9. I am scientifically prepared to use IT as needed in my courses

	Frequency	Percent	Cumulative Percent
Strongly agree	38	26.6	26.6
Agree	72	50.3	76.9
Neutral	25	17.5	94.4
Disagree	6	4.2	98.6
Strongly disagree	2	1.4	100.0
Total	**143**	**100.0**	

The above table shows that 76.9% of the students either strongly agree or agree with question number 9, while 5.6% either disagree or strongly disagree. 17.5% of the students are neutral.

Q10. The laptop replaces my hard copy text book.

	Frequency	Percent	Cumulative Percent
Strongly agree	35	24.5	24.5
Agree	35	24.5	49.0
Neutral	30	21.0	69.9
Disagree	25	17.5	87.4
Strongly disagree	18	12.6	100.0
Total	**143**	**100.0**	

The above table shows that only 49% of the students either strongly agree or agree with question number 10, while 30.1% either disagree or strongly disagree. 21% of the students are neutral.

3.2 Statistical Evaluation of the Effectiveness of Laptops for In-class Learning Enhancement

As we mentioned in Section 2 of this paper, and to evaluate the effectiveness of laptops in enhancing the learning experience based on students feedback, a standard of at least 70% of the students answering questions one to seven with the exception of question three with agree and strongly agree and at least 70% of students answering to question three with disagree and strongly disagree should be preset. We will test if the average percentage of students, who answered strongly agree and agree for the first seven questions, is greater than 70% (except question 3).

To do this, the researchers entered the cumulative percentages again and tested the average percentage against %70. The null and alternative hypotheses are as follows:

$\mathbf{H_0}$: Average percentage of students selected strongly agree or agree for question number one to question number seven is less than 70% ($x<70\%$).

$\mathbf{H_1}$: Average percentage of students selected strongly agree or agree for question number one to question number seven is greater than or equal 70% ($x\geq70\%$).

Test statistics

Note that in this paper, the **Std. Error Mean** is the distance between a sample mean and the population mean or it is considered the level of error (dispersion) of the data from a population mean; **Std. Deviation** is the distance between a score and a population mean or it is a measure of dispersion within the data set; and **N** is the number of samples. Also note that the selection of a confidence level for an interval determines the probability that the confidence interval produced will contain the true parameter value. Common choices for the confidence level are 0.90, 0.95, and 0.99. These levels correspond to percentages of the area of the normal density curve. In this paper, we are using the **95% confidence interval of the difference** which covers 95% of the normal curve, i.e., the probability of observing a value outside of this area is less than 0.05. Because the normal curve is symmetric, half of the area is in the left tail of the curve, and the other half of the area is in the right tail of the curve. Also in this paper, the **mean difference** is a measure of statistical dispersion equal to the average absolute difference of two independent values drawn from a probability distribution; **Sig. (2-tailed)** is Two Tailed Significance Tests; **df** is degrees of freedom; and **t** is the value of the T-Test.

The researchers used the one-sample T-test to test the likelihood that the results do not fit the null hypothesis. The results presented in the below table show that the observed data set provides no strong evidence against the null hypothesis, i.e. based on the answers analyzed from the drawn sample, the researchers can't say that the use of laptops in the class room is effective. (Only 45% of students support this idea)

T-Test

One-Sample Statistics

Std. Error Mean	Std. Deviation	Mean	N	
4.85734	12.85131	45.4429	7	Percent

One-Sample Test

Test Value = 70						
95% Confidence Interval of the Difference		Mean Difference	Sig. (2-tailed)	df	t	
Upper	Lower					
-12.6717	-36.4426	-24.55714	.002	6	-5.056	Percent

The researchers also used the same test statistic to test questions from eight to ten. The null and alternative hypotheses and the results of the test are shown in the following sub-sections.

3.3 Statistical Evaluation of Question Number 8

H_0: Average percentage of students selected strongly agree or agree for the question pertaining to the Instructors should have the authority to forbid the use of laptops during class time is less than 70% ($x<70\%$).

H_1: Average percentage of students selected strongly agree or agree for the question pertaining to the Instructors should have the authority to forbid the use of laptops during class time is more than or equal 70% ($x\geq70\%$).

Test statistics

The researcher used the one-sample T-test to test the likelihood that the results do not fit the null hypothesis. The results presented in the below table show that the observed data set provides no strong evidence against the null hypothesis, i.e. based on the answers analyzed from the drawn sample, the researcher can't say that the students support that Instructors should have the authority to forbid the use of laptops during class time. (Only 54% of students support this idea)

T-Test

One-Sample Statistics

Std. Error Mean	Std. Deviation	Mean	N	
4.183	50.027	53.85	143	Q8_coded

One-Sample Test

Test Value = 70						
95% Confidence Interval of the Difference		Mean Difference	Sig. (2-tailed)	df	t	
Upper	Lower					
-7.88	-24.42	-16.154	.000	142	-3.861	Q8_coded

3.4 Statistical Evaluation of Question Number 9

H_0: Average percentage of students selected strongly agree or agree for the question pertaining to the fact that the students are scientifically prepared to use IT as needed in their courses is less than 70% (x<70%).
H_1: Average percentage of students selected strongly agree or agree for the question pertaining to the fact that the students are scientifically prepared to use IT as needed in their courses is more than or equal 70% (x≥70%).

Test statistics

The researchers used the one-sample T-test to test the likelihood that the results do not fit the null hypothesis. The results presented in the below table show that the observed data set provides strong evidence against the null hypothesis, i.e. based on the answers analyzed from the drawn sample, the researchers accept the alternative hypothesis that says that students are scientifically prepared to use IT as needed in their courses. (77% of students support this idea).

T-Test

One-Sample Statistics

Std. Error Mean	Std. Deviation	Mean	N	
3.536	42.281	76.92	143	Q9_coded

One-Sample Test

Test Value = 70						
95% Confidence Interval of the Difference		Mean Difference	Sig. (2-tailed)	df	t	
Upper	Lower					
13.91	-.07	6.923	.052	142	1.958	Q9_coded

3.5 Statistical Evaluation of Question Number 10

H_0: Average percentage of students selected strongly agree or agree for the question pertaining to the fact that the laptop replaces their hard copy text book is less than 70% (x<70%).
H_1: Average percentage of students selected strongly agree or agree for the question pertaining to the fact that the laptop replaces their hard copy text book is more than or equal 70% (x≥70%).

Test statistics

The researchers used the one-sample T-test to test the likelihood that the results do not fit the null hypothesis. The results presented in the below table show that the observed data set provides no strong evidence against the null hypothesis, i.e. based on the answers analyzed from the drawn sample, the researchers can't say that the laptop has replaced their hardcopy text books. (Only 49% of students support this idea).

T-Test

One-Sample Statistics

Std. Error Mean	Std. Deviation	Mean	N	
4.195	50.165	48.95	143	Q10_coded

One-Sample Test

Test Value = 70						
95% Confidence Interval of the Difference		Mean Difference	Sig. (2-tailed)	df	t	
Upper	Lower					
-12.76	-29.34	-21.049	.000	142	-5.018	Q10_coded

3.6 Variability Analysis based on One-way ANOVA

In this section, the researchers will use one-way ANalysis Of VAriance (abbreviated one-way ANOVA) to test whether the students from different colleges have different opinion regarding the effectiveness of the laptop and difference in their response to questions 8, 9 and 10.

Generally there is only a single F statistic ($MS_{between}/MS_{within}$) in one-way ANOVA, and this is shown on the "Between Groups" row in the following tables, where MS is the mean squares. There is also only one p-value (labeled "sig."), because there is only one (overall) null hypothesis, namely H_0: $\mu_1 = \ldots = \mu_k$, and because the p-value comes from comparing the (single) F value to its null sampling distribution.

3.6.1 Variability Analysis of the Effectiveness of Laptops

One-way
Descriptive
Effectiveness

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
ENG	30	50.0000	26.19421	4.78239	40.2189	59.7811	0.00	85.71
IT	55	47.2727	28.28864	3.81444	39.6252	54.9202	0.00	100.00
SC	58	41.3793	27.24879	3.57794	34.2146	48.5440	0.00	100.00
Total	143	45.4545	27.47579	2.29764	40.9125	49.9965	0.00	100.00

ANOVA
Effectiveness

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1,764.890	2	882.445	1.172	0.313
Within Groups	105,433.625	140	753.097		
Total	107,198.516	142			

By looking in the F-table with $\alpha = .05$ we see that $F_{2,140}(0.05) = 3.00$, the above table shows that F-ratio (1.172) is less than this critical value (3.00). In other words, this table shows that sig. (or p) = 0.313 is greater than 0.05, hence we conclude that this table shows that there is no significant difference between students opinion regarding effectiveness of laptops in the three different colleges.

3.6.2 Variability Analysis of Question Number 8

One-way
Descriptive
Q8_coded

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
ENG	30	50.00	50.855	9.285	31.01	68.99	0	100
IT	55	50.91	50.452	6.803	37.27	64.55	0	100
SC	58	58.62	49.681	6.523	45.56	71.68	0	100
Total	143	53.85	50.027	4.183	45.58	62.12	0	100

ANOVA
Q8_coded

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,240.415	2	1,120.207	0.444	0.642
Within Groups	353,144.201	140	2,522.459		
Total	355,384.615	142			

The above table shows that F-ratio (0.444) is less than the critical value ($F_{2,140}(0.05) = 3.00$) extracted from F-table which indicates that there is no significant difference between students opinion, in the three colleges, regarding the question if instructors should have control over the use of laptops in their classes.

3.6.3 Variability Analysis of Question Number 9

One-way

Descriptive

Q9_coded

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
ENG	30	70.00	46.609	8.510	52.60	87.40	0	100
IT	55	83.64	37.335	5.034	73.54	93.73	0	100
SC	58	74.14	44.170	5.800	62.52	85.75	0	100
Total	143	76.92	42.281	3.536	69.93	83.91	0	100

ANOVA

Q9_coded

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4,366.530	2	2,183.265	1.225	0.297
Within Groups	249,479.624	140	1,781.997		
Total	253,846.154	142			

The above table shows that F-ratio (1.225) is less than the critical value ($F_{2,140}(0.05) = 3.00$) extracted from F-table, hence we conclude that there is no significant difference between students opinion, in the three colleges, regarding the question if the students are scientifically prepared to use IT as needed in their courses.

3.6.4 Variability Analysis of Question Number 10

One-way

Descriptive

Q10_coded

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
ENG	30	40.00	49.827	9.097	21.39	58.61	0	100
IT	55	54.55	50.252	6.776	40.96	68.13	0	100
SC	58	48.28	50.407	6.619	35.02	61.53	0	100
Total	143	48.95	50.165	4.195	40.66	57.24	0	100

ANOVA

Q10_coded

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4,151.435	2	2,075.717	0.823	0.441
Within Groups	353,191.223	140	2,522.794		
Total	357,342.657	142			

The above table shows that F-ratio (0.823) is less than the critical value ($F_{2,140}(0.05) = 3.00$) extracted from F-table. Hence, this table shows that there is no significant difference between students opinion, in the three colleges, regarding the question if the laptops replace their hard copy text books.

4. Final Remarks on the Effect of Laptop Use on Education Quality

This study results in interesting thoughtful results about the effectiveness of the use of laptops in enhancing learning at the undergraduate level. Laptops, of course, should make a student's life easier, hence, they make education easier because the course material can be presented in a more effective way. For example, a software tool can be demonstrated in front of a class using a live demo or a recorded video, rather than asking students to read a 500 page reference manual. However, while in-class usage of laptops should increase the effectiveness of education, instructors have been given an even harder challenge. The number of contact hours for courses has

been gradually decreasing without decreasing the course content (Blazquez et al., 2010; Twigg, 2005; Webb, 2010). The most common justification used for this is that since instructors have more effective tools for delivery, so they should be able to cover more material in class in less time. This very interesting reasoning usually comes from someone who is not a teacher, an administrator perhaps. We, as educators working in academia, strongly disagree with this proposition. Of course, we don't have to write as much on the board as we had to before the increased availability of technology in the classroom. However our target audience has not evolved as fast as the computers and technology have in terms of processing information. The computers have become 6 orders of magnitude faster in the last 3 decades, i.e., from a 1MHz PC to 1GHz PC in less than 30 years. The number and speed of neurons in a human brain, however, is still the same which is close to 100 billion, and they all work at a few kHz speed each, since as far back as recorded human history can tell us. Also, students these days, have more distractions than we had when we were undergraduate students. Technology allows us to present material faster in some way, but if the purpose of a university education is to create a younger generation that is ready to meet the challenges of the future, we should not speed up this process. We should give the same amount of time and attention to presenting the material, while giving enough time to absorb the material rather than less. There should be fewer one-week intensive courses than four-month courses. If the same material is spread over more time, it gives enough time to everyone to learn and to reflect. Universities have become assembly lines in our opinion, in some cases money making machines, and teaching, once considered a noble profession, has been converted into a mechanized robotic process: instructors and students run from one class to another and are always tempted by short cuts. They never have enough time to teach or learn properly or to exercise their newly acquired skills. We propose that anytime saved from the use of laptops should be dedicated to other learning activities such as in-class problem solving and working more examples with the students, and it should not be used to add more material.

5. CONCLUSION

Results were presented of a survey study on laptop use by undergraduate female students, for both academic and non-academic purposes. The effectiveness of laptop use in learning was considered, as well as exploring if students perceive that instructors should have control over the use of laptops in their classes, students' IT knowledge and the effect of the use of laptops in class on the consultation of text books. This study has been conducted in a Middle Eastern public university, and results could differ in other regions and other universities due to many factors, including gender, cultural factors, and differences in student attitudes at public and private universities. The level of competition between students existing at a university could also influence the results. After a comprehensive analysis, the study resulted in the following conclusions:

- This study did not provide strong proof that the use of laptops in the class room is effective. The majority of students are not using laptops in class for class-related material. Rather, most use laptops in class for nonrelated material, implying that laptops are likely a source of distraction during class time. This suggests that the use of laptops in class should be improved to serve the courses more effectively. Overall, the students had a positive feeling about use of laptops in specific types of classes, believing that their use improves the level of interaction between students and instructors, thus enhancing the educational process.
- The students do not support that Instructors should have the authority to forbid the use of laptops during class time. Indeed, the students had mixed feelings, ranging from neutral to disagreement on the possibility of the instructor controlling the use of laptops in class.
- This study confirmed that students are scientifically prepared to use IT as needed in their courses.
- This study confirmed that laptops did not replace their hardcopy text books. In other words, the results did not show strong evidence that students' use of laptops results in abandoning the hardcopy textbooks or the use of libraries.
- Lastly but not the least, this study showed that there is no significant difference between students opinion regarding effectiveness of laptops in the three different colleges. Indeed, the survey results did not show differences in opinion between the three involved areas of study (engineering majors, sciences and information technology).

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Appendix A

Question No.	Question	(1) Strongly Agree	(2) Agree	(3) Neutral	(4) Disagree	(5) Strongly Disagree
1.	I can understand the lecture better and interact more effectively with the instructor when I view the lecture on the laptop.					
2.	I use my laptop for academic purposes only (ex: note taking, finding information online, viewing the lecture notes etc.)					
3.	I use the laptop for chatting, checking my e-mail, playing games, or watching movies					
4.	I am able to do my class-work more efficiently when I have access to a laptop.					
5.	I take better notes when I have access to a laptop.					
6.	I am more concentrated and focused when I can view the lecture notes on Power Point on my laptop.					
7.	I have a visual/hearing or any other kind of impairment and using a laptop enhances my learning experience in class.					
8.	Instructors should have the authority to forbid the use of laptops during class time					
9.	I am scientifically prepared to use IT as needed in my courses					
10.	The laptop replaces my hard copy text book.					