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Techi-Teaching: Productivity Analysis of Using Technological Devices in Teaching Business Subjects

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Abstract

This study aims to analyze the productivity and effective utilization of technological devices used by faculty members of the College of Business Administration of Bulacan State University, Philippines. Technological devices aids the faculty member in classroom instruction, report preparation and presentation, record keeping, updating and dissemination of information thru social networks, mobile communication and the like. With the integration of the these technological devices in the performance of the function of faculty members, this study will look into its contributory improvements or dis-improvements and bring to light its usefulness or uselessness and other issues that might impact the user itself.

Introduction

　　　　In the advent of technology explosion, faculty members are inclined to adapt their performance of duty for improvement and facilitate faster and accurate data and information recording. As technology devices are integrated in their function, the delivery of their services is expected to improve and may directly affect the effective discharge of their roles in the transfusion of knowledge process.   But, both the faculty and the machine or technological devices are limited. The objective of this study is to measure the productivity of the faculty in terms of time consumed to prepare lesson plan, finish the discussion of scheduled topic of the day in a business subject, evaluation through quizzes, seatwork and the like, and calculation of final grades. This study also intends to measure the utilization of technological devices used by the faculty based on its expected capacity. In

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light of the foregoing objectives, the research may result to the measurement of the effectiveness of the faculty with the aid of the devices and the over or under capacity of the devices.

Research Problem

This study aims to measure the degree of productivity of faculty in performance of function with the aide of technological devices. Specifically, the study aims to answer the following questions:

1. What technological devices used by the faculty members in teaching business subjects?
2. What is the degree of productivity change in using these devices in instruction of faculty?
3. What is the level of utilization of these technological devices in performance of functions of faculty?

Literature Review

In a case study published in *The Technology Source Archives* at the University of Northern California, entitled Using Technology Productivity Tools in Teaching (Morrison, 1997), the integration of information technology productivity tools in instruction results to great improvement to the students' oral and written communication and competencies. In the advent of globalization and with a massive impact of telecommunication in the economy, as well as downsizing and reengineering in the workload, the students are expected to be technologically literate and able to lead their organizations in using technology to enhance productivity and learning. Although the experiment resulted to a successful improvement, the students' evaluation was low due to substantial incremental class workload and the author failed to convey the importance of written and oral communication skills and the use of technological productivity tools.

Research Methodology

This study was conducted in the College of Business Administration of the Bulacan State University, Philippines involving thirty-five (35) faculty members. These faculty members are teaching business subjects to students from different courses and they were all using technological devices in one way or another. Survey method was utilized to quantitatively describe specific aspect of a given population. (Kraemer, 1991). The survey is used to gather data on the teaching load of the faculty, kind of technological devices used by the faculty and the frequency of time they spent in using these devices. An online questionnaire using Google documents was sent to their email if they were unavailable to answer the printed survey questionnaire. Individual and focused group interview was also utilized in the study to determine the time spent in every phase of instruction to analyze the productivity changes in terms of time spent by faculty. In some cases, a time log sheet were used to record their activity time spent and an observation was conducted to corroborate the time spent in preparing the lessons, discussion and evaluation of the students with and without the use of technological devices. A comparative analysis was conducted from these data to determine and calculate the changes in terms of time spent to finish each phases.

Research Instruments

The instruments used in this research were; a printed and online self-constructed survey questionnaire, equipment list from the College of Business Administration, time log for instruction observation, and a structured interview questions. The self-constructed survey questionnaire was used to gather data related to the number of hours rendered by the faculty, types of teaching devices used, and time spent in using these devices. This is a multiple choice survey questionnaire sent to the faculty via Google documents or personally in their faculty room. The questionnaire was answered in minimum time duration of about 3 to 5 minutes.

The equipment list from the College of Business Administration is used to determine the available teaching devices that can be provided to the faculty for instruction. This was used to determine the utilization rate of each technological device.

The time log sheet was used to record the time spent by the faculty under observation in the conduct of instruction. This is used only when the faculty was not available for personal interview or in a group interview. Both for with and without the use of technological devices, the time log were used.

The structured interview questions were used during one-on-one interview and focused group discussion with the faculty. This is to gather information on the time spent by the faculty in the different phases of instruction and to confirm or validate some data gathered in the printed and online survey questionnaire and the result of the observation. Also, descriptive or qualitative data that are not included in the survey questionnaire were collected during the interview.

Research Findings and Analysis

After summarizing the result of the questionnaire, the data revealed the most used technological devices by faculty as presented below. This data will be used to compute the utilization rate of each device to assess the sufficiency of supply.

Table 1. Technological Devices Used by the Faculty

Technological Devices*	F	%	Rank
LCD Projector	26	74	2
Laptop	30	86	1
Desktop	12	34	
Printer	19	54	3.5
Photocopying Machine	19	54	3.5
Digital Camera	5	14	
Mobile Phone	12	34	
Router (wifi)	9	26	
Tablet	12	34	
Lapel	0	0	

*multiple response

It can be gleaned from the table that Laptop is the most used devices by the faculty due to its portability. Since faculty transfer from one room to another during the change of class, they simply carry with them their personal laptops or the one provided by the college. And since lectures are already saved in their laptops, they find it easier to present the topics or lessons. There is no need to rewrite it again in the board. Even during the class they can easily update their students records instantly. The second most number of responses is the LCD Projector. This implies that the faculty normally presents their lesson to a large class size, which is true in the university where class size ranges from 50 to 60 students per class. Normally, faculty borrows LCD projector from the college or if they have their own, they bring it with them during the class. The third and fourth most used devices are the printer and the photocopying machine. These devices aid the faculty in printing their lesson and disseminate it to the students in cases where the LCD projector is not available. Also, these devices are used to print quizzes, examinations and class records.

Utilization Analysis

Table 2. Utilization Analysis of Technological Devices based on Availability in the College

Technological Devices	Number of Units Available	Total Number of Hours* Available	Average Number of Usage Hours of	Utilization Rate (%)

	in the College	per week	Faculty per week**	
LCD Projector	3	120	210	175
Laptop	1	40	420	1,050
Desktop	1	40	105	262.5
Printer	1	40	210	525
Photocopying Machine	1	40	210	525
Digital Camera	1	40	105	262.5
Mobile Phone	0	0	210	0
Router (wifi)	1	40	210	525
Tablet	0	0	105	0
Lapel	0	0	105	0

* 8 hours a day x 5 days x number of units available in the college
** based on the result of the survey

The table shows that almost all technological devices are fully utilized. In fact, it is more than 100% utilization, and therefore implies that there is insufficiency of available technological devices provided by the college. The excess of the utilization rate implies that the faculty provides their own devices used in their instruction function. Among the technological devices used by the faculty, laptop has the highest average usage time, and has the highest utilization rate and therefore very useful to the faculty. This also implies that faculty members of the college are becoming more reliant to this technological device.

Table 3. Recommended number of devices

Technological Devices	Number of Units Available in the College	Total Number of Hours* Available per week	Average Number of Usage Hours of Faculty per week**	Deficiency in time	Additional Units Needed***
LCD Projector	3	120	210	90	3
Laptop	1	40	420	380	10
Desktop	1	40	105	65	2
Printer	1	40	210	170	5
Photocopying Machine	1	40	210	170	5
Digital Camera	1	40	105	65	2
Mobile Phone	0	0	210	210	0
Router (wifi)	1	40	210	170	5
Tablet	0	0	105	105	0
Lapel	0	0	105	105	0

* 8 hours a day x 5 days x number of units available in the college
** based on the result of the survey
*** deficiency in time / total number of hours available per week per unit of device

Table 2 presents the number of additional units needed by the college to support the full utilization of technological devices by the faculty.

On the average, all faculty members render a total of 420 hours a week, or about 12 hours per faculty. The table below shows the utilization of technological devices within the hours of instruction of faculty.

Table 4. Utilization Analysis of Technological Devices per week during Teaching Hours

Technological Devices	Average weekly Teaching Hours of Faculty	Average Number of Usage Hours of Faculty per week	Utilization during teaching hours
LCD Projector	>9 but <15	>3 but <9	partial
Laptop	>9 but <15	>9 but <15	full
Desktop	>9 but <15	<=3	partial
Printer	>9 but <15	>3 but <9	partial
Photocopying Machine	>9 but <15	>3 but <9	partial
Digital Camera	>9 but <15	<=3	partial
Mobile Phone	>9 but <15	>3 but <9	partial
Router (wifi)	>9 but <15	>3 but <9	partial
Tablet	>9 but <15	<=3	partial
Lapel	>9 but <15	<=3	partial

As presented in the table, the faculty fully utilizes their laptops during instruction while other devices are partially utilized. This means that during instruction function, their teaching strategy is fully aided with technological devices and therefore makes them a techi-teacher.

Productivity Analysis

Table 5. Comparative analysis and Productivity Change

Activities	Average Time Spent		Difference in Time Spent (min)
	without devices	with devices	
1. Preparing and Conveying the Lesson Phase (i.e. reading and writing the lectures on the board and allowing the students to copy/preparing the power point presentation including set up of equipment/typing and printing and/or photocopying of lesson)	49 mins	120 mins	71 mins
2. Discussion Phase (i.e. explaining each topic in details, giving situational examples or applying sample calculation, interacting with the students thru question and answer)	87 mins	123 mins	36 mins
3. Evaluation of Students Phase (i.e. students were given quizzes, check it and record the score)	20 mins	30 mins	10 mins

The table above shows the average time spent by the faculty in each phases of instruction. It shows that in the preparation and conveying of lesson phase, the faculty took more time with the use of technological devices as compared to without the use of the devices with a computed productivity change rate of -1.45%. This implies that the faculty consumes more time in choosing and arranging or editing the topic from the source to the power point due to the fact they are not very much aware of the different shortcuts or functions. This includes choosing the amount of information to be included in the slides, rephrasing the sentence from the source, choosing the right font size, color, font style and animation if necessary. Also, the faculty consumes more time in encoding formulas, tables, figures, operations and sample computations in the power point presentations. Other factors that increased the time spent are the set-up time, or the time used to set the projector and laptop; photocopying time and printing time. But, according to the faculty, it is more easy and convenient on the part of the students to have a copy of the lessons, since they can easily download it from their emails, group accounts, and social network site or simply reprint or reproduce for early distribution. And since the lessons in soft copy were available in advance, the students could study the topic before the scheduled classroom discussion.

The discussion phase shows that the faculty has more time of discussion and explanation of topic presented when technological devices are employed with productivity rate of 41%. This means that the time saved from writing the lessons in the board and allowing the students to copy were converted to additional time for more explanation and healthy discussion of additional topics. Also, since the topics are flashed on the board in a more concise form, and only a small space in the board is used, more topics were able to cover within the time allotted per meeting, and there is more space for writing of sample computation if necessary.

The student evaluation phase shows productivity rate of 50%, which means an additional time for the faculty to broaden the coverage of the quiz, seatwork or board work. The additional time available for evaluation is correlated to additional time saved from the discussion phase.

Result of the Interview

The individual and focused group discussion revealed other factors that affect the productivity of the faculty. In terms of preparing and conveying of lesson phase, the faculty states that they have difficulties in comprising as much information as possible in each slide, since the content in the slides is limited to the space available. On the discussion phase, they tend to focus on the topics flashed on board and forget other important information, which were not included in the slides but were provided in the source. The students also tend to limit their research and study on the topics included in the power point presentation only.

Conclusion

In general, the faculty of the College of Business Administration of Bulacan State University, Philippines is more productive when they use technological devices in their instruction in business subjects. Specifically, the study shows that there is a positive productivity in the discussion phase and evaluation of students phase during the instruction function of the faculty. The coverage of the discussion was broadened beyond the topics allotted within the day when the faculty utilized technological devices in instruction such as LCD projector, Laptops and printing devices. But since the preparation and conveying of lesson phase has a negative productivity, the study suggest that the faculty should be provided with ready-made power point presentation of topics in each business subjects to lessen the time of encoding and editing. A collection of the power point presentation of each subject should be maintained for updating and use of faculty. The research also shows that most of the technological devices are partially used during teaching hours. If funds will warrants, the technological devices needed to achieve full utilization of the faculty must be provided.

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Appendix A. Structured Questionnaire for Personal Interview

1. What technological devices do you use in performing your function as a faculty?
2. How often do you use these devices?
3. What are your considerations in choosing these devices?
4. In what area do you use these devices in performance of your function?
5. What are benefits or advantages do you derive from these devices?
6. How about disadvantages? If there is any.
7. Do you consider yourself productive? If yes, how did you say so? If not, why?
8. Do you prefer to use teaching devices? Why or why not?
9. Have you encountered any difficulties in using these devices in preparing your lesson, discussing it, and evaluating your students?
10. Have you encountered any difficulties in not using these devices in preparing your lesson, discussing it, and evaluating your students?

Appendix B. Self-made Survey Questionnaire

Name: (optional)_____

Please mark with check (/) the choices that correspond to your response.

Number of hours of teaching per week:

( ) 3 hours   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

What technological devices you use in instruction?

1. LCD Projector   _____   6. Digital Camera   _____
2. Laptop   _____   7. Mobile Phone   _____
3. Desk top   _____   8. Router (wifi)   _____
4. Printer   _____   9. Tablet   _____
5. Photocopying Machine   _____   10. Lapel   _____

How many hours do you use theses devices in a week in instruction?

1. LCD Projector

( ) 3 hours or less   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

2. Laptop

( ) 3 hours or less   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

3. Desk top

( ) 3 hours or less   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

4. Printer

( ) 3 hours or less   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

5. Photocopying Machine

( ) 3 hours or less   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

6. Digital Camera

( ) 3 hours or less   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

7. Mobile Phone

( ) 3 hours or less   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

8. Router (wifi)
( ) 3 hours or less   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

9. Tablet
( ) 3 hours or less   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

10. Lapel
( ) 3 hours or less   ( ) more than 15 hours but less than 21 hours
( ) more than 3 hours but less than 9 hours   ( ) more than 21 hours but less then 27 hours
( ) more than 9 hours but less than 15 hours ( ) more than 27 hours

Appendix C. Time Log Observation

Faculty Name:_____ Activities	Average Time Spent		Difference in Time Spent (min)
	without devices	with devices	
1. Preparing and Conveying the Lesson Phase (i.e. reading and writing the lectures on the board and allowing the students to copy/preparing the power point presentation including set up of equipment/typing and printing and/or photocopying of lesson)			
2. Discussion Phase (Explaining the each topic in details, giving situational examples or applying sample calculation, interacting with the students thru question and answer)			
3. Evaluation of Students Phase (Students were given a quizzes, check it and record the score)			