

## QUALITY EFFECTS OF USING ADVANCED TECHNOLOGIES IN LEARNING PROCESS AT UNIVERSITIES

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Received October 2018; accepted December 2018

**ABSTRACT.** *This work aims to investigate the quality effects of integrating creative technology as an instructional tool in higher education. In 2015, Al-Zaytoonah University of Jordan established a pilot project entitled “Interactive Learning Using Smartboards”. In this project, each faculty received a number of smartboards, desktops, Internet connection, and lecturers training. 450 participants completed a 28-item survey. The questionnaire included questions about demographic information and Likert scale questions related to 4 hypotheses which predicted that lecturers and students would offer favourable opinions about various aspects of smartboards use and benefits, as well as written comments and concerns. The findings indicated a high degree of user’s satisfaction with most aspects of the smartboard and its use. Thus, accessibility to such technology should be extended to more lecturers and students by adding smartboards to more classrooms and laboratories in the university.*

**Keywords:** Information technology, Smartboards, Interactive board, Quality effects, Learning process, Advanced technology

**1. Introduction.** This paper describes evaluation research conducted in Al-Zaytoonah University of Jordan, which examined different aspects of the contribution of the smartboard technology to learning and teaching processes. Smart classrooms were built in various faculties in the university. The smart classroom consists of an electronic whiteboard that enables interaction, writing, and surfing the Internet using educational software that accompanies the board. This project provided lecturer training sessions, and all of the curriculum materials and learning objects were developed and delivered independently by the lecturer or groups of lecturers who know their subject areas and teach it frequently. Thus, materials were developed in various subjects such as science and IT modules, law, and art.

This study is unique in examining different models of implementing smartboards in different faculties in Al-Zaytoonah University of Jordan. These include using smartboards in classrooms, in laboratories, or in both. Moreover, it examines how these models are related to the number of hours that students learn in classrooms using smartboards as well as the lecturer skills in using smartboards. The long-term outcome of having smart classrooms in general and smartboards in particular, is their use to develop thinking and learning skills that are appropriate for the I-Generation which allows lecturers to bring various perspectives from the outside world into the classroom, through the formation of an authentic and more relevant connection to their students [1]. The main benefit of the use of smartboards integrates the functions of a regular board with additional means that enable interactive and constructivist learning and teaching [2].

With the use of smartboards now in various education institutes its impact on all the aspects which are related to both learners as well as teachers and others that use it has been examined. It is through various studies that it has found positive lecturer attitudes towards working with smartboards. [3] concluded that teachers feel more up to date when working with a smartboard. [4] also examined the teacher attitudes towards the smartboard in various studies, and reported that teachers find working with smartboards relatively easy. Even though the preparation time is much longer, it takes less time for the actual lesson to be presented, and the value is worthwhile.

Several studies have shown that the use of smartboard has a positive and effective impact on the learning process. [5,6] have found that using the smartboard in the classroom improves the student-teacher interaction and cooperation, and increases interest and participation through social interaction. In [7,8] the smartboards were used to allow students to build their own knowledge through an interactive learning process, and it enabled the development of learning and teaching instructions, activities and interaction between students and teachers. Moreover, it helped students through reflective cognition and improved the learning experience. According to the finding of [9], smartboards motivate students, enable better understanding and increase their academic performance. In addition, the results of a research conducted by [10] indicate that the use of smartboards for teaching and learning process in Jordanian primary schools affects students' creative thinking as compared to traditional teaching.

Based on this discussion, this paper tries to utilize the finding of these studies to investigate the role of smartboard in the teaching process, and whether learning in smart classrooms can contribute to the development of I-Generation skills, enhance the student-lecturer interaction, enable a rapid response and increase student's attention inside the classroom. The rest of this paper is organized as follows: the work methodology will be presented in Section 2, while Section 3 discusses the results of the research instruments, and Section 4 will conclude the paper.

**2. Methodology.** The main goal of this research is to examine the influence of using the smartboards from both of students and lecturers perspectives. The research population was divided into two groups. The first group of participants was 15 lecturers who taught different subjects using the smartboards. The average work experience of teaching for those lecturers is eight years, with no previous experience in the use of smartboards. The second group of participants was 435 students from different years of study and different majors.

**2.1. Research instruments.** The study included different research instruments for the groups that participated. The following measures were included.

- 1) **Lecturer Questionnaire:** The questionnaire was given to lecturers who use the smartboard. Lecturers were asked to describe and characterize their instruction using the smartboard, their attitudes toward the training they received for instructing via the smartboard, their expectations concerning the role of lecturer, the students interactivities during the class, the advantages and difficulties of such learning technique.
- 2) **Student Questionnaire:** The students were asked about the differences between regular lessons versus lessons using the smartboards, motivation to learn, and interest and interaction with the lecturer using the smartboard.

**2.2. Implementation models for the smartboards in faculties.** Faculties selected some methods for installation either in classrooms only or in both classrooms and laboratories. The number of weekly hours of learning ranged from an average of 15 hours to 30 hours.

**a. Placement of the smartboard in classrooms only:**

The most efficient location for the smartboard is in the typical classrooms. The advantage of this implementation is that the uses of the smartboard can then become more routine and continuous. A possible disadvantage is that not all lecturers make use of it. Thus, this resource is not fully utilized.

**b. Placement of the smartboard in both classrooms and laboratories:**

Possible advantages to the placement of the smartboard in laboratories and classrooms for specific faculties are: the preparation of the full array of lesson materials by the faculty staff, that is, cooperative thinking by a number of lecturers who prepare the lessons, clear assignation of responsibilities for maintaining the room, and it becomes associated with all departments, rather than only certain department.

Also, many lecturers can create a pace of learning with the smartboard among the same group of students and overcome the lack of utilization of the classrooms during the full weekly schedule and exposure of this technology to few students, as students tend to learn in these rooms in small groups.

**3. Results and Discussion.** In this project, a 28-item survey was completed by 450 participants. The questionnaire included questions about demographic information, Likert scale questions, and written comments and concerns. Each of Likert scale questions could be related to one of the following hypotheses. The first hypothesis stated that lecturers and students presently using the smartboard would express satisfaction with its ease of use. The second hypothesis stated that they would express enthusiasm regarding its effectiveness as a teaching tool. The third hypothesis presented in this work would describe student reactions to smartboard presentations as attentive and enthusiastic. The prediction stated in the fourth hypothesis would conclude that lecturers and students prefer using the smartboard over the other presentation methods.

**3.1. Lecturer perspective.** The lecturer survey of smartboard use was answered by 15 participants; there were 5 females and 10 males, ranging in age from 20's through 60's. Most respondents were in the 31-40 years age range. 8 participants were IT lecturers, 3 were law and 4 were art lecturers with a variety of subjects taught in each faculty. The experience of work was varied among the participants, ranging from 1 year to more than 10 years of work experience; and the largest number of respondents was a Ph.D. degree holder. Lecturers were asked how they used the smartboard during instruction. The primary uses for the smartboards reported by lecturers were projecting presentations, while the least frequent use was surfing the Internet. Moreover, lecturers were presented with statements expressing attitudes toward the use of the smartboards during instruction and were asked to mark the extent to which they agree with each statement on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). Their answers can be seen in Table 1.

The responses for the Likert scale questions indicated a high degree of lecturer's satisfaction with the smartboard use and its features. Participants were positive in their assessments of the smartboard's value as an instructional tool. From Table 1, it appears that the statements that were most agreed with relate to the teachers: "Using the smartboard is considered to be an easy process because it has commands and icons that are similar to the common commands in windows software such as the Paint". The statements that were least agreed with were that "Using the smartboard is a reason for wasting time during the lecture for someone who does not master using it amongst teaching staff and students".

Based on this, lecturers see the project's contribution to learning in the use of up-to-date instructional tools that lead to greater variety, illustration, and motivation to learn. Participants indicated that marking and erasing at the smartboard were easily

TABLE 1. Lecturers attitudes toward instructing using the smartboard

Statement	Scale				
	1	2	3	4	5
1. The smartboard requires high-level training so that the instructor could use it efficiently.	13%	20%	54%	0%	13%
2. Using the smartboard contributes to enhancing the competence of students and motivates them to study.	0%	40%	40%	20%	0%
3. Using the smartboard is a reason for wasting time during the lecture for someone who does not master using it amongst teaching staff and students.	54%	13%	0%	33%	0%
4. The smartboard offers the option of retrieving the previous lessons and saved data.	0%	13%	0%	40%	47%
5. The smartboard offers the option of printing and storing unfinished material and distributing it for students, saving it or ever forwarding it through email.	0%	0%	13%	40%	47%
6. By using the smartboard, students do not need to copy whatever is written on the board, for this might distract the attention and hinder concentration in lecture.	0%	13%	27%	33%	27%
7. The smartboard attracts the attention of the students, especially when using different multimedia elements.	0%	0%	40%	40%	20%
8. The interaction provided by the smartboard enhances the students' ability to understand properly and in function manner.	0%	14%	53%	33%	0%
9. Using the smartboard dispenses the need to use board markers, which might cause different diseases in the long term.	13%	13%	13%	13%	48%
10. Using the smartboard contributes to a better understanding of complicated and difficult concepts which require time and learning tools.	0%	13%	13%	34%	40%
11. Using the smartboard decreases laziness and boredom amongst students. It also forces them to partake in class activities and increases their desire to use the board.	0%	6%	27%	27%	40%
12. Using the smartboard helps to utilize a different type of technologies such as multimedia software, special topics libraries, browsing the Internet, uploads & downloads via the Internet.	0%	27%	0%	33%	40%
13. The smartboard corrects misspelling phrases and sentences automatically when writing, which helps to deliver the correct information directly to the students.	13%	6%	27%	13%	40%
14. The smartboard allows the use of Microsoft Office applications, with supported features for these programs.	0%	0%	0%	60%	40%
15. Using the smartboard contributes to achieving better results in exams and term work.	0%	33%	54%	0%	13%
16. Using the smartboard is an easy process; it includes commands and icons that are similar to common windows software such as the Paint.	0%	0%	27%	13%	60%

accomplished. They also expressed satisfaction with the ease of making notations and erasures from the computer during shared use of the smartboard. However, some users had difficulty setting up the smartboard in preparation for use, and they expressed a less degree of satisfaction in the training they received in the use of the smartboard, and they requested additional technological training.

**3.2. Student perspective.** The student’s survey of smartboard use was answered by 435 undergraduate students; there were 268 females and 167 males, ranging in age from 18’s through 30’s. Most respondents were in the 18-22 years age range. 121 participants were IT students, 174 were law and 140 were art students with a variety of subjects were been taken. The participants’ degree study level was ranging between first-year and fourth-year level. The largest number of respondents was in the third year of their degree.

TABLE 2. Students attitudes toward learning using the smartboard (N: Number of responses)

Statement	N	Scale		
		1	2	3
1. The smartboard requires high-level training so that the instructor and students could use it efficiently.	426	27%	45%	28%
2. Using the smartboard contributes to enhancing the competence of students and motivates them to study.	431	7%	47%	46%
3. Using the smartboard is a reason for wasting time during the lecture for someone who does not master using it amongst teaching staff and students.	429	23%	32%	45%
4. The smartboard offers the option of printing and storing unfinished material and distributing it for students, saving it or ever forwarding it through email.	421	19%	30%	51%
5. By using the smartboard, students do not need to copy whatever is written on the board. For this might distract the attention and hinder concentration in lecture.	434	21%	36%	43%
6. The smartboard attracts the attention of the students, especially when using strong and clear colours. It also helps to direct attention to a specific direction. It also makes patterns and graphics sound real and enjoyable which would contribute to understanding much better.	433	9%	36%	55%
7. The interaction provided by the smartboard enhances the students’ ability to understand correctly and in function manner.	435	11%	38%	51%
8. Using the smartboard decreases laziness and boredom amongst students. It also forces them to partake in class activities and increases their desire to use the board.	430	12%	47%	41%
9. Using the smartboard contributes to achieving better results in exams and term work.	433	24%	47%	29%
10. Using the smartboard contributes to a better understanding of complicated and difficult concepts which require time and learning tools.	435	15%	48%	37%
11. Using the smartboard is an easy process for it includes orders and icons which resemble large extent the simple windows software and as paint.	435	8%	44%	48%
12. Do you feel that the instructor is competent in using the smartboard?	435	12%	30%	58%

Students were presented with statements expressing attitudes toward the use of the smartboards during the lectures and were asked to mark the extent to which they agree with each statement on a scale ranging from 1 (No), 2 (Almost), and 3 (Yes). Based on student responses in the study, it seems that learning via the smartboard is impressive and efficient to them as can be seen in Table 2 which shows the students questionnaire analysis.

The responses to the survey questions indicated a high degree of student's satisfaction with the smartboard use and its features. From Table 2, it appears that the statements that were most agreed with relate to the students "Do you feel that the instructor is competent in using the smartboard?". The statements that were least agreed with were that "Using the smartboard contributes to achieving better results in exams and term work". However, the students have stated that their achievements in subjects learned using the smartboards are similar to their achievements in other subjects learned in typical classrooms. Figure 1 shows the majority of participants believe that using the smartboard is an easy process, and it does not require a high level of training to use it efficiently.

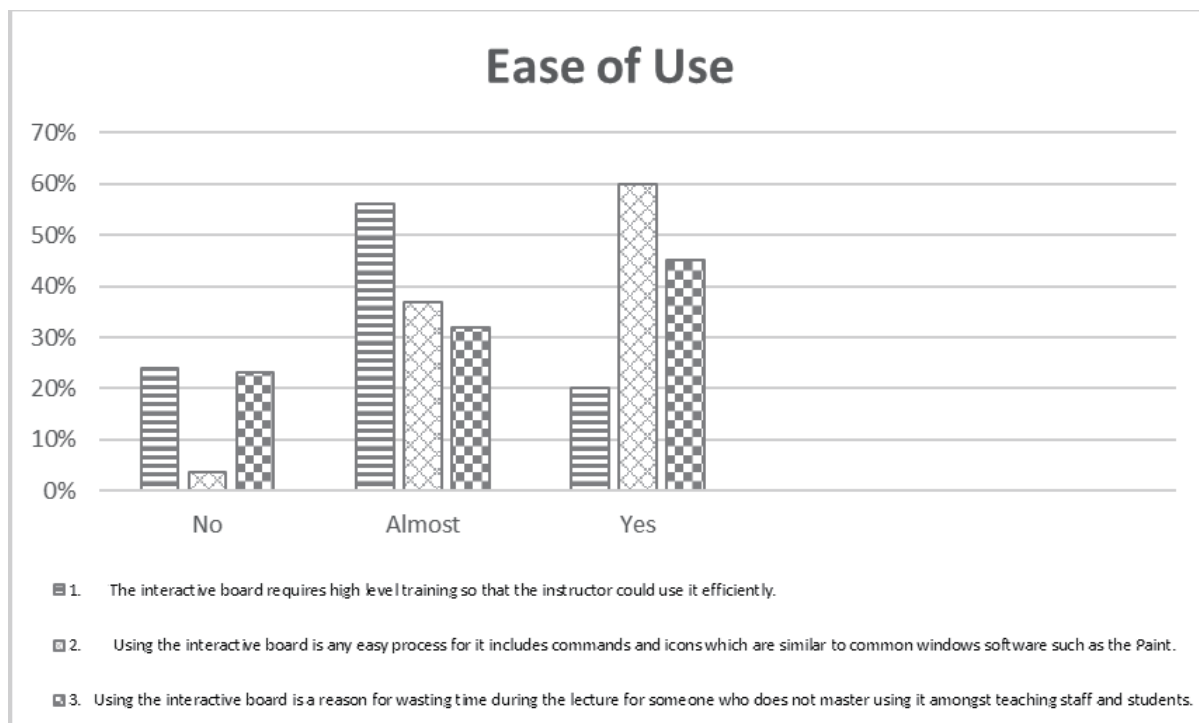


FIGURE 1. Participants assessment of the smartboard first hypothesis (Ease of Use)

The findings of this survey reveal that student attitudes toward learning with the smartboards are highly positive, and it has contributed effectively to their understanding of the material. Figure 2 illustrates the second hypothesis results related to smartboard effectiveness as a teaching tool; this figure shows that the smartboard contributes to enhancing the competence of students and motivates them to study when using strong and clear colours which would contribute to understanding much better.

From the results of this study, it appears that learning via the smartboard enhances the acquisition of the development of independent learner in many ways, especially by saving the learning materials and sending them to the students. Also, it provides students with the opportunity for greater focus and concentration when learning on their own, since they are not occupied with summarizing the learning materials as shown in Figure 3.

Even though smartboard use did not increase students academic achievement significantly, it was stated that it encouraged student participation in the lessons, and created

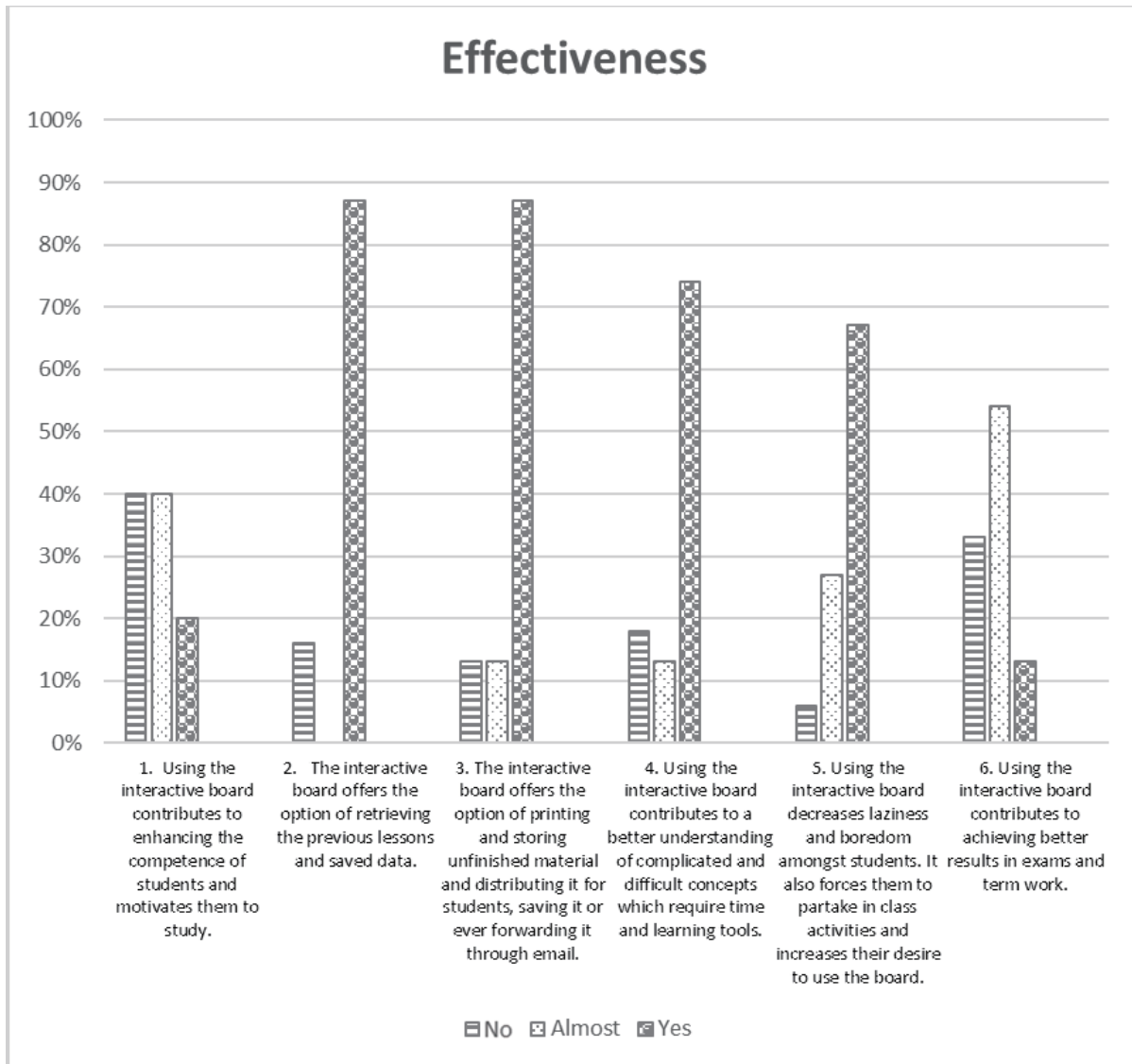


FIGURE 2. Participants assessment of the smartboard effectiveness

a more exciting and enthusiastic atmosphere, also it helps to utilize different types of technologies such as multimedia software, special topics libraries, browsing the Internet, uploads & downloads via Internet. Moreover, it proves that using the smartboard dispenses the need to use board markers, which might cause different diseases in the long term. The responses overall indicated a high degree of user satisfaction with the smartboard and its features comparing to other traditional teaching and learning methods, as illustrated in Figure 4.

**4. Conclusion.** The smartboard technology is considered to be a powerful tool that provides an interactive learning and teaching atmosphere which needs to be effectively employed in order to encourage students' participation and motivations. The overall response to the survey regarding the use of the smartboard was very positive. Responses indicated that lecturers were using the boards in different ways, and the students were more involved and attentive when lessons were offered using the smartboard rather than using other teaching methods. Features of the smartboard repeatedly praised were interactivity, ability to mark and save notations, and ability to manipulate lectures from the board. Many respondents expressed the hope that additional boards would be available on many other classes in the future.

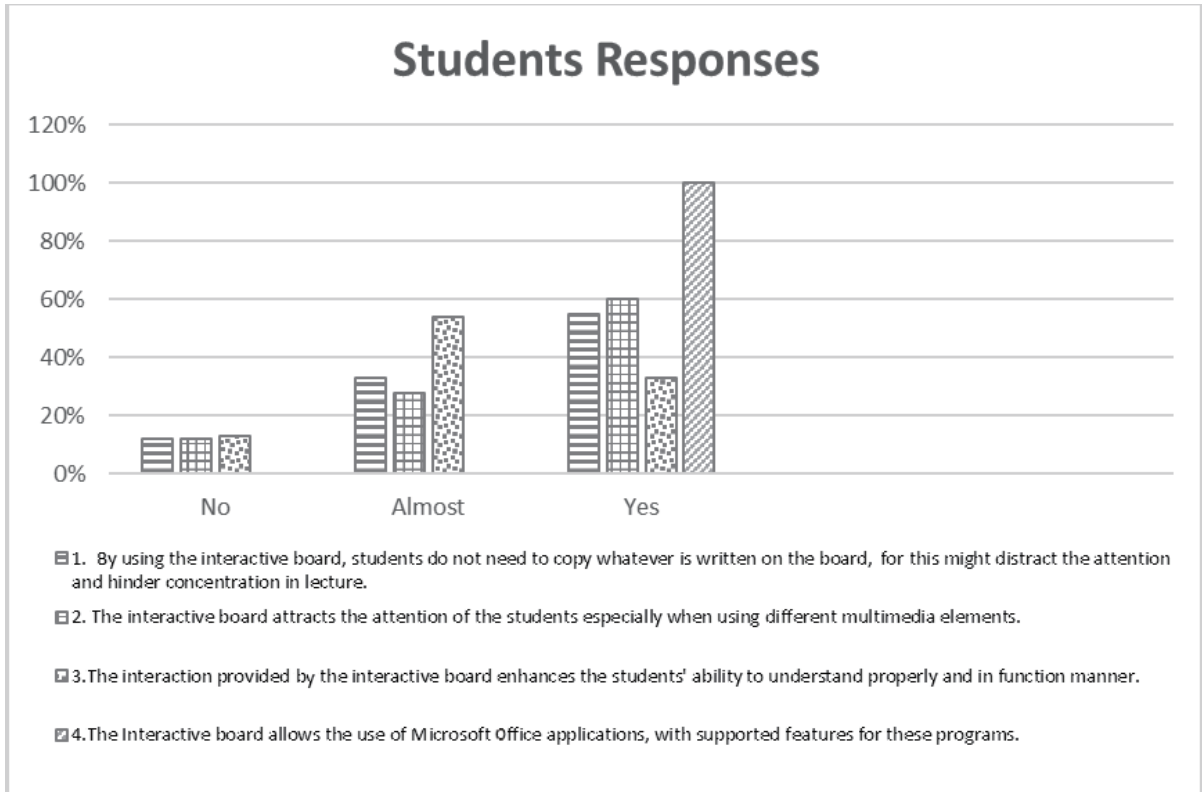


FIGURE 3. Students reactions to smartboard presentations in the classroom

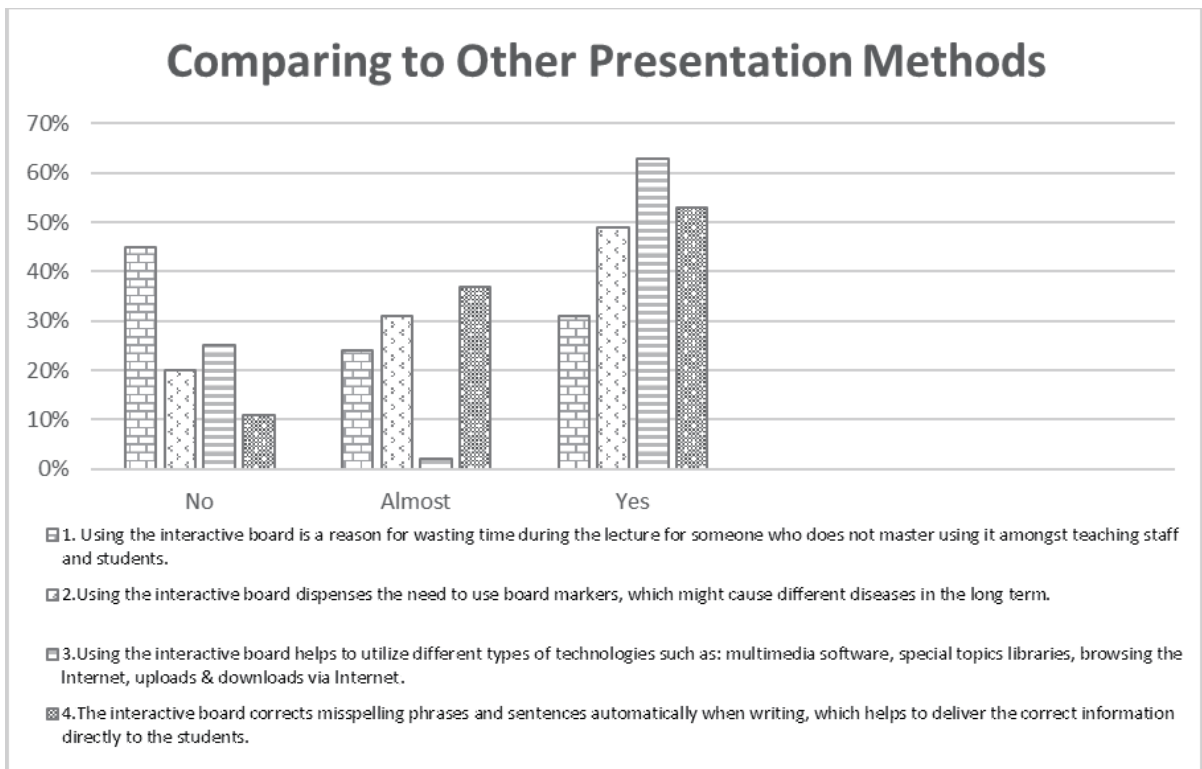


FIGURE 4. Participants assessment of the smartboard comparing to other traditional presentation methods



Furthermore, it was reported that the smartboard was not difficult to use by all participants. However, some lecturers indicated problems which they felt were the result of too brief and incomplete training. The lack of training is often cited as a reason technology is not embraced by more lecturers. It was suggested that comprehensive training in how to use the smartboard is needed. Such training should include instructions about which skill level is required for each given module as well as the available features for each topic.

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