

The effect of Interactive Whiteboard (IWB) on the performance of undergraduate students and their perceptions towards it

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Abstract

Interactive Whiteboard (IWB) captured the interest of faculty members in view of facilitating the teaching process at universities through stimulating dialogue and discussion during the lecture in addition to attracting students' attention and concentration throughout the lecture. For the purpose of identifying the contribution of the IWB in improving students' performance; a comparison between the scores in the IWB exams and retrieval exercises with their scores in the exams of three semesters taught through traditional lectures for a Vocational Education Technology course alongside with evaluating questionnaires for the students' perception. It was revealed that students' performance in the IWB exams was in general better than in conventional lectures. The two researches used the Empirical Research method for a study sample of (64) students where the results concluded that students who used the IWB in their lectures excelled in comparison with the performance of the conventional lectures students; they also displayed positive feedback about the use of IWB in teaching.

Keywords: Interactive Whiteboard (IWB), Vocational Education Technology.

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1. Introduction

Universities Faculty members have the potential to practice teaching in an easier and faster approach as a result of the evolution of the educational process (Bakadam & Asiri, 2012; Bidaki & Mobasher, 2013; Berson, Cross, Ward & Berson, 2014; Majid & Najmeh, 2013) whereas the technological development has contributed to the qualitative transfer of educational curricula by adopting the IWB as one of the modern technology methods which can be used collectively by the faculty members at their lectures (Begolli & Richland, 2015). The use of IWB is characterized with flexibility necessary to consider the methods of learning as visual learners see colorful animated pictures also charts can be presented on it in addition to the dynamic movement which can be discovered through moving letters, numbers, words and pictures with every single tap on the screen with their fingers or the pen. It also allows using multimedia and loudspeakers as a pattern of audio learning (Lopez, 2010; Mercer, Hennessy, & Warwick, 2010; Türel, 2011; Povjakalová, 2012; Whitby, Leininger & Grillo, 2012; Bourbour, Vigmo & Samuelsson, 2015).

The IWB creates an attractive learning environment and constitutes an integrated system of hardware, software, and resources to improve student participation and enhance their performance as the IWB user can retain explained material through storage, printing, emailing and post it through the internet whenever necessary as well as it can operate most of the computer applications which helps in presenting the study material in attractive patterns. In light of the achieved results, the IWB is considered an ideal tool for any usage requiring visual connection (Hockly, 2013; Sari & Güven, 2013; Gouzi, Hedon, Blervaque, & et al, 2019).

The importance of the IWB lays in assisting students to better understand information due to the simplified taught lessons through the IWB which contributes to the raising their academic level, boosting their personality and empowering them to express themselves positively which result in allowing faculty members to gain interaction between students as well as passing the message in a better proper manner without interruption; such aid in lifting up their spirits and give them a good impression about the university they belong to (Miller & Glover, 2002; Lee & Boyle, 2004; Swan, Schenker, Kratoski, & Hooft, 2010; Türel & Johnson, 2012; Linder, 2012; Lewin, Smoekh & Steadman, 2008).

The educational blackboard has evolved throughout history from slabs of stones and wood to the chalkboard and then the whiteboard until it reached the interactive whiteboard as an alternative to the traditional blackboard. That the teacher explains and sends it through other means of communication. The use of the interactive whiteboard in universities is one of the important things to achieve the educational outcomes of the courses (Mahasneh, 2020; Mahasneh, 2021).

Within the limits of the researchers' knowledge; various related studies to the research topic were found. Blervaque, Hedon & Gouzi (2019) conducted a study on the use of IWB in clinical reasoning sessions to teach diagnostic test ordering and interpretation to undergraduate medical students. The results revealed the students' satisfaction about the use IWB in teaching.

Another study was conducted by Ajelabi (2015) to reveal the Nigerian undergraduate students' attitude to the use and integration of interactive whiteboard for instruction. The student showed positive tendencies towards the use of the IWB in teaching.

Akbas & Pektas (2011) conducted a study that aims to understand the effects of using an interactive whiteboard on the academic achievement of university students. The researchers used the experimental design to study electrical conduction through two methods (interactive whiteboard and

laboratory practices); the results showed that there was no effect of the teaching method on student' achievement while the students showed positive trendies towards the use of the IWB in teaching.

Digregorio & Sobel-Lojeski (2010) conducted a study that aims The Effects of Interactive Whiteboards (IWBs) on Student Performance and Learning, The results of the study showed that teachers and students view the interactive board as a positive addition to the learning environment, and there are a number of factors that contribute to its effective use.

2. Study Problem and Questions

In light of the sustainable follow-up for the areas of teaching development, the new methods of enhancing knowledge and increasing achievement, building a student who is able to keep pace with changes, and the creation of a human who can build oneself with a scientific methodology that adapts to today's developments such as Corona and others; the current study came to reveal the effect of the use of the IWB as one the learning strategies in achieving learning objectives. Also, the current study is connected to the previous studies; however, is different in methodology and targeted groups. The study attempts to answer the following two questions:

First Question: What are the students' perspectives towards the usage of the IWB?

Second Question: Are there any differences in the average grades for the experimental and control group?

3. Methodology

The researchers used the quasi-experimental approach through data collection tools, tests and interviews

3.1. Sample

The study sample consisted of 190 students.

3.2. study tools

The researchers used the test and interview tools after ensuring their validity and reliability

3.3. Validity tools

The tools were presented to a group of arbitrators to show their suitability to answer the study questions, all observations were taken

3.4. Reability tools

The method of testing and retesting was used, the results showed the accuracy of the results in all cases. The difficulty and discrimination coefficient of the test items were found, all of which are suitable for the purposes of the study.

3.5. Study procedures

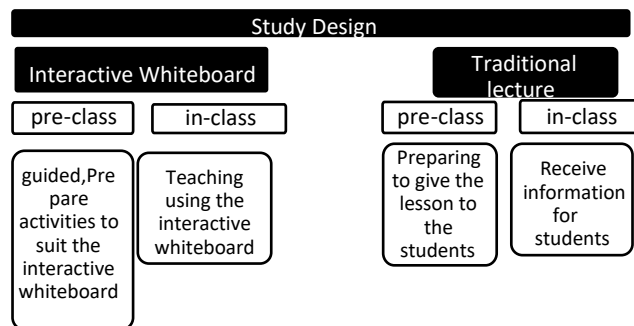
After the approval of the Dean of the Al Shoubak University College; a group of 190 students of the age range between 20 and 22 were included in a "Learning Technology Course" during their third year of the Bachelor Degree in Vocational Education at Al Shoubak University College. This course was presented during a regular fall semester of 16 weeks. The course was taught by the researchers 3 days a week for 50 minutes per class. The curriculum of the course was the four chapters of the "Pre-vocational Education Technology" book (Mahasneh, 2013). The researches developed the book chapters in the manner that suits the course and they projected it through the IWB. The researchers

used data collection, exams and questionnaires tools after checking their psychometric properties. The number of students for each semester ranged between 60 to 80 students of both genders. The exam constituted from 50 items which were prepared in accordance with the specification table and were applied on the students in the form of pre and post exams.

3.6. study design

Figure 1

illustrates the study design



Note. This figure shows the experimental and control groups

The researchers explained the first four chapters in one semester through the IWB utilizing all of the distinguished services of the IWB and allowed the students to pose questions at the end of the class then the pre-exam of 50 item was conducted. Also; students of three semesters were taught through the conventional lecture and they were also allowed to pose question and were given the pre-exam of 50 items.

3.7. Statistical Analysis

The arithmetic mean was used by the statistical analysis program SPSS to compare the students’ performance of the three semesters taught through the white board with the students’ performance who were taught through the IWB.

4.Results

4.1. first question result

To answer the first question: What are the students’ perspectives towards the usage of the IWB? The students were interviewed and their answers were monitored . Table 1. illustrates the students’ perceptions towards the usage of IWB which point out to their need for more learning resources which led the researchers to study this topic. Therefore, the current study aims to testing the IWB effect on students’ performance and comparing the IWB scores in tests and main exams with the grades of three semesters of traditional teaching system based on lectures.

Table 1. illustrates the students’ perception towards using the IWB

N	Classroom 4, 64 responses about the IWB
1.	92% encourage the use of the IWB in teaching (n=64):
2.	“The ability to write with different colors”
3.	“The IWB enable the use of multimedia”
4.	“The ability to interact with content by editing, deleting or storing for reference when needed”

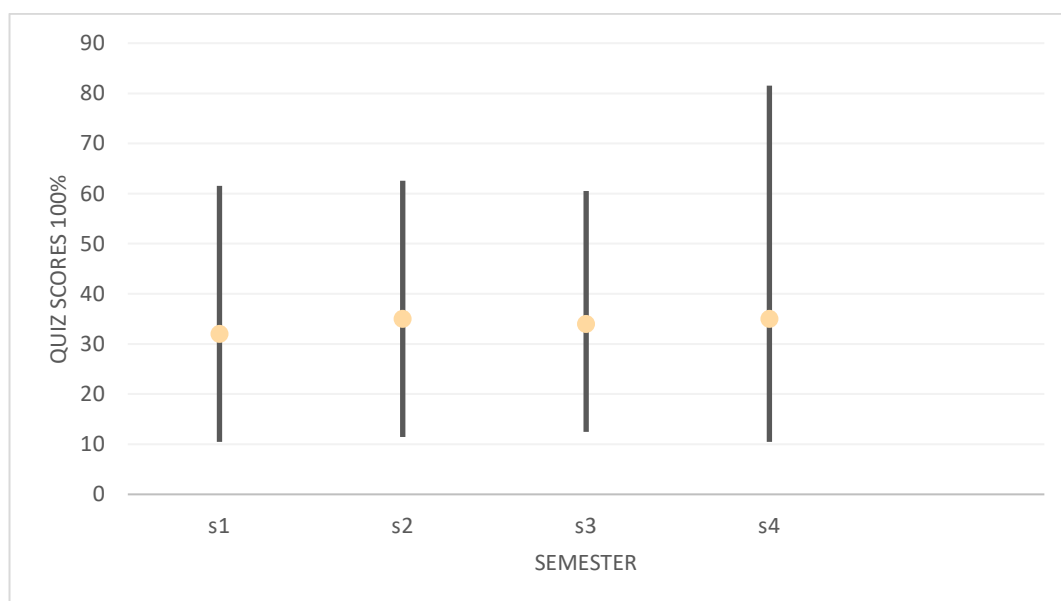
5. "The IWB enables teachers to save time used in writing lessons and lectures on the classical board"
6. "The IWB is attractive"
7. "The ability to save lectures with picture and sound through the recording program"
8. "The ability to easily retrieve information and not to lose them through the easy recording function"
9. "Saving the time and effort of both students and teachers"
10. "Achieving continuous connection and interaction between the student and faculty members which contribute in dispelling fear, increasing familiarity, and constantly encouraging and motivating learning"
11. "Encouraging the spirit of cooperation between students and working as one team in gathering and discussing the academic materials for the course"
12. "A very suitable way to increase our motivation towards learning by highlighting the effort of active learners in enriching the educational materials, publishing topics and explanations about them, in addition to the most discussed and analyzed topics"
13. "A very suitable mean for self-assessment in regard of the educational outputs, tasks and projects that we are assigned to in line with the current education strategy for projects"
14. "The IWB satisfies my hunger for curiosity and discovery"
15. "The IWB gave me new skills"
16. "The use of the IWB is suitable for technological developments"

4.2. Second question result

The result of Second Question: Are there any differences in the average grades for the experimental and control group? were summarized in figures 2. a comparison between the gathered scores from the first three exams for conventional lecture and the exam of the IWB. The scores from the IWB exam were much higher than the other classes taught with the conventional lecture for the first, second and third semesters.

Figure 2

comparison between three semesters of conventional lecture (S1-S3) and one semester of the IWB (S4).



Note. This Figure is a comparison between the exam scores of three semesters of conventional lecture and of one semester of the IWB.

5. Conclusion

The study results revealed that the student who used the IWB in their learning process excelled in comparison to the conventional way in addition to the positive tendencies towards using it in university teaching; researches attributes such to number of reasons:

1. The use of the IWB increases students' attentions as a result to utilizing more than one sense in the teaching learning process which urges students to focus, concentrate, and follow-up events, it also increases their activity, attracts their attention to the presence of clear expressive colors, and focuses their attention in a limited light space and in one direction. The use of illustrative info-graphs better clarifies the concept and gives students a comfort while understanding the lesson. The use of both audio and movement attract their attention and focus away from deviation. This result matches the characteristics of the IWB in the theoretical literature of the current research and with the results of many previous researchers (Bakadam & Asiri, 2012).
2. The use of the IWB increases students' enthusiasm due to the interaction provided by the possibility of manipulating texts and drawings and combining learning styles which brings out attention and focus in students' behavior during the teaching process. This result matches the characteristics of the IWB in the theoretical literature of the current research and with the results of many previous researchers (Berson, Cross, Ward & Berson, 2014).
3. The IWB assists in enhancing the students' experiences, stimulating their interest, and meeting their learning needs by functioning as a tablet that displays interactive material in a variety of attractive ways that bring the required fun and diversity needed in learning process by students. This result matches the characteristics of the IWB in the theoretical literature of the current research and with the results of many previous researchers (Sari & Guven, 2013).

Appendix 1

An example of one of question from achievement test

Who are the scientists suggested interactive whiteboard (IWB)?	{ID 15}
<input type="checkbox"/>	David Martin and Nancy Knowlton
<input type="checkbox"/>	Einstein
<input type="checkbox"/>	Kirchhoff
<input type="checkbox"/>	Plato

Appendix 2

Interview for perception about interactive whiteboard (IWB)

What are students' perceptions of using the interactive whiteboard (IWB)?

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