



# Enhancing Student Motivation and Engagement in Business Statistics Via Instructional Technology

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**Abstract.** Today, Information and communication technologies have exponential growth in our daily life, where access to vast amounts of information is now available with ease. Today's generation of students has grown up with these technologies. To create an effective interactive classroom that meets the needs of the student, a modern teacher must utilize the advanced technology to enhance a student's motivation and engagement. In Dammam Community College (DCC), the conventional chalk-and-talk and PowerPoint methods are still used, where there is an increasing demand for innovative teaching to provide flexible learning opportunities. These conventional classes of Business Statistics are known to cause a lack of student motivation due to the mathematics content and computer software applications. In DCC, we developed an instructional technology that uses Tablet-PC and Online Learning Management System (OLMS). In this system, the instructor presents the lesson in an innovative way and the students can access the course material with ease through the OLMS. The system provides online student-student and student-teacher interaction. Furthermore, one of the major challenges for the teacher to effectively monitor student progress is the developed system enables the teacher to online monitor student assignments, Lab activities, and online homework. This study focus on how the adaptation of instructional technology has been used to foster good teaching and affect learning for students in Business Statistics. This paper aims to result in the instructional technology used and its implementation a boost in the intrinsic motivation of students in Business Statistics. To test this hypothesis, two surveys were conducted. The first survey is used to determine the level of student satisfaction on how the used instructional technology affects their learning and the second survey is used to identify the DCC instructor's perception towards the usage of the instructional technology. Results of this study revealed that students' attitudes are more convenient during the lectures, the students have positive perceptions that the instructional technology provides availability and easy to access course materials, and the instructional technology provides effective communication among the students and between the students and the instructor. For the instructor's survey, the result found that the instructors in DCC have positive perceptions that instructional technology can enhance their teaching practices and students' performance. In addition, the analysis found that instructors of the DCC recommended providing more training for instructors to sharpen their teaching skills by utilizing instructional technology.

**Keywords:** Instructional Technology, Teaching and Learning, Business Statistics, Student's motivation and engagement

# 1 INTRODUCTION

In the 21st Century, advanced information and communication technologies have swept into societies around the world at an exponential rapid. Many teachers today are facing digital natives in the classroom. Their students do not know the world without the world-wide-web. Their methods of communication, socializing, entertainment, and research all circle around a common core of technology [1].

Millennials, Today's students – K through college – represent the first generations to grow up with these new technologies. On average, Millennials spend 6.5 hours each day using computers, the Internet, smartphones, and social media [2, 3]. On the other hand, college classrooms and college systems are outfitted with information and communication technologies and resources vital to the learning needs of Millennial students. To effectively motivate and engage Millennial students in teaching and learning, instructors must be adaptable and develop to this new technology to promote a collaborative learner-centered environment. The Learner-centered environment is an active learning, student engagement, and other strategies that involve students and mention learning. Although learner-centered teaching and efforts to involve students have a kind of bread-and-butter relationship, they are not the same thing [4].

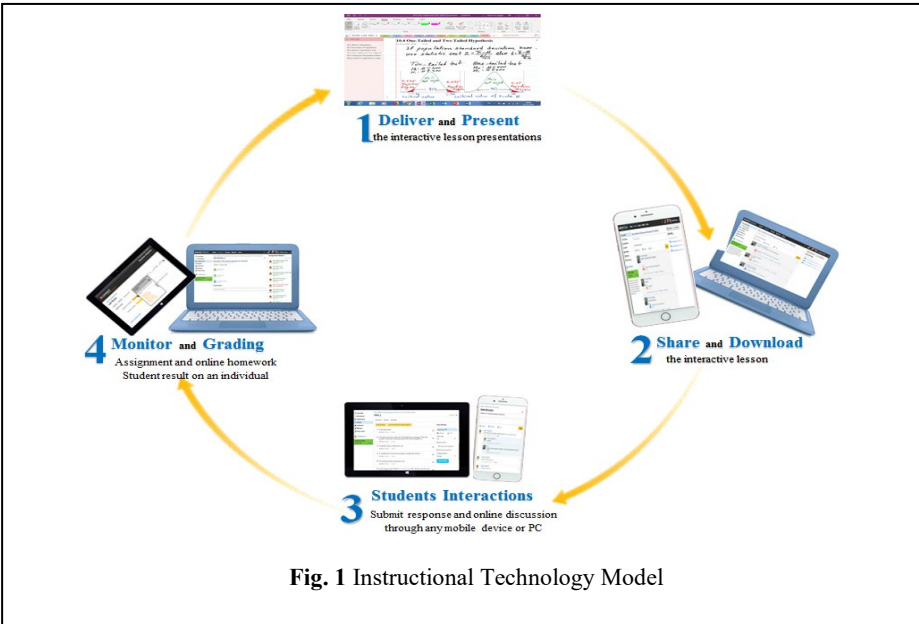
The use of technology for education and performance improvement is relatively young [5]. In 2008, Association for Educational Communications and Technology (AECT) states that Instructional technology is “the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources”. Instructional technology can be viewed as the use of a host of technological tools such as the Tablet-PCs, Internet, videos, websites, and multi-media for teaching and learning which facilities access to information of all types. Technology is being adopted in education to overcome geographical barriers, enhance service delivery, and streamline business processes [6]. Learning Management Systems LMSs is one type of technology that increasingly demand universities to systematically implement and manage learning system and have been proven successful in fostering effective collaboration among students and instructors, and aiding teaching materials [7]. Tablet PCs have also proven successful in presenting and delivering effectively the curriculum to replace traditional learning tools such as PowerPoint and smartboard [8–11].

With unlimited availability of the Internet, remote access services, equipped classes with projectors, and well-established computer labs in Dammam Community College (DCC). Also, students are rapidly moving from paper-based materials and using computers, smartphones, and Tablets (iPads). This growth of technology is the main reason to think about its impact on teaching and learning. Therefore, we developed an instructional technology to enhance Business Statistics students' motivation and engagement. This study focuses on how the adaptation of an interactive instructional technology using the technology tools Tablet PC, Online Learning Management System, and the cloud Office 365 to foster good teaching and effect learning for students in Business Statistics. This paper aims to result in an interactive instructional technology used and its implementation a boost the intrinsic motivation of students in Business Statistics. To test this hypothesis, two surveys were conducted. The first survey is used to determine the level of student's satisfaction on how the used instructional technology affects their learning and the second survey is used to identify the DCC instructor's perception towards the usage of the instructional technology.

## 2 INSTRUCTIONAL TECHNOLOGY MODEL

Meeting the requirements of the current generation of student education delivery is more challenging than the traditional methods in Dammam Community College. In view of this, a new learning method has been identified by the instructional technology model. This method emphasizes that students can make use of technology and communication means to achieve interactive and collaborative learning. This method of teaching changed the traditional method of delivering the curriculum and sharing paper-based production and face-to-face office hour. It addresses the student's needs and delivers the curriculum in an innovative way and students share and download the course material at any time and everywhere. This method focuses on assisting students to solve difficulties and encouraging interaction between the student-instructor and among students.

Tablet-PC, MS OneNote, the Online Learning Management System, and the Internet constitute the main components of the utilized Instructional Technology. The four-level teaching and learning process developed by the current instructional technology are illustrated in Fig. 1 and discussed below, which comprises a digital ink interactive presentation of the curriculum, the digital share of the interactive lessons, the digital instructor-student, and student-student communication interactive, and digital monitor and grade the student assignments progress.



### 2.1 Present and deliver the curriculum

Tablet-PC is known to be an interactive tool capable of generating discussions among students during classroom lectures [12]. Unlike PowerPoint presentations, Tablet-PC allows the use of digital Ink to solve a complicated problem and manage and organize

a large amount of data in an innovative way in Business Statistics. In Business Statistics, students like to understand step-by-step presenting and organizing the data, compute the measurement of the organized data, and analyze the results. With the Tablet-PC and MS OneNote software, these steps are presented in an innovative way and create student active interaction and participation, and also allow students freely ask questions. Furthermore, Tablet-PC organizes the curriculum in a fantastic way which allows the instructor to move through the sections and chapters easily. A sample screenshot in Fig. 2 from the Business Statistics class illustrates how lessons and discussions are managed.

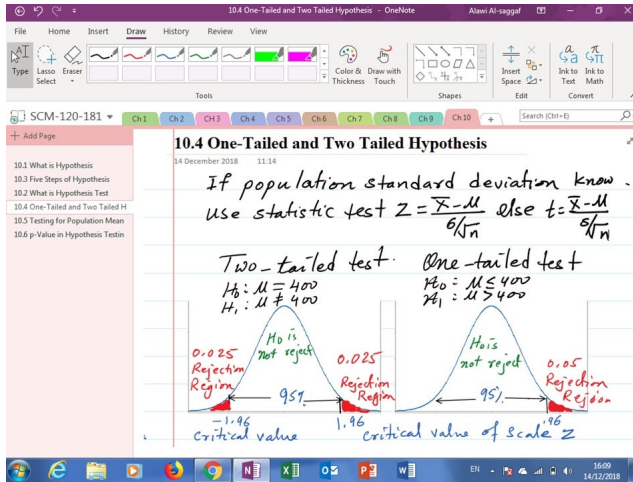


Fig. 2: Presenting and delivering Curriculum

## 2.2 Digital Sharing of the Interactive Lesson

The utilization of instructional technology has taken many effective measures to ensure the quality of teaching and learning. One critical measure is to share and download the digital interactive lessons and materials. The tremendous popularity and availability of the Internet and cloud storage services have started to transform the processes of teaching and learning in higher education. Online Learning Management System (OLMS) is an effective channel of communication that is consistently related to satisfaction with the learning process. The current instructional technology makes use of the free OLMS ([www.easyclass.com](http://www.easyclass.com)). An easyclass [13, 14] is easy to learn and use and presents a user-friendly interface, which allows instructors to create digital classes. By using OLMS, the digital course material in the class and related multimedia to the course can easily share with the students. In addition, students can send their comments on the digital material topic posted to open discussion on the specific topic either among the students or between student and instructor.

## 2.3 Student-student and student-instructor communication

The most effective measures of the teaching and learning process are keeping the students interacting with their instructor. This measurement is taken place in the current instruction technology by allowing students and instructor to exchange their thoughts

and problems via instant messaging via an OLMS using their computers, iPads, Tablets, or smartphones. The communication form can be in two ways, either by allowing students to send their comments on the digital material topic posted or open online office hours (online discussion) on the specific topics which will achieve student-student and student-instructor interactive communication. A sample of a screenshot in Fig. 3 from Business Statistics class illustrates the student-student and student-instructor interactive communication.

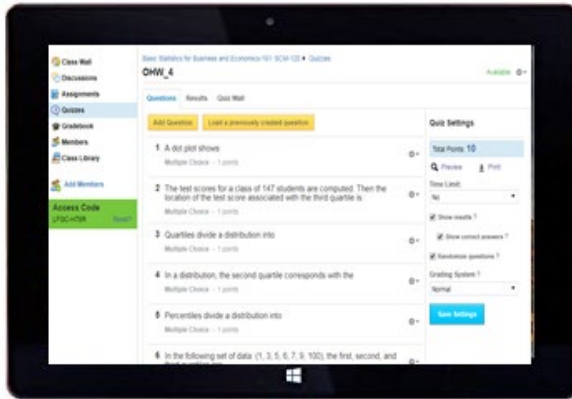


Fig. 3: Interactive Communications

## 2.4 Online monitoring and grading

The most learning motivation of the student is by letting them grade their assignment and homework without the prevalence of cheating. In the current instructional technology, we developed and conducted online homework, online take-home quizzes, and statistical computer software (Minitab 17) as Lab assignments with timeline submissions using OLMS and Connect plus. Students can get their grades and feedback about their mistakes. On the other hand, the instructor can monitor the student's progress. A sample of a screenshot in Fig. 4 from Business Statistics class illustrates online homework and instructor monitoring student progress.

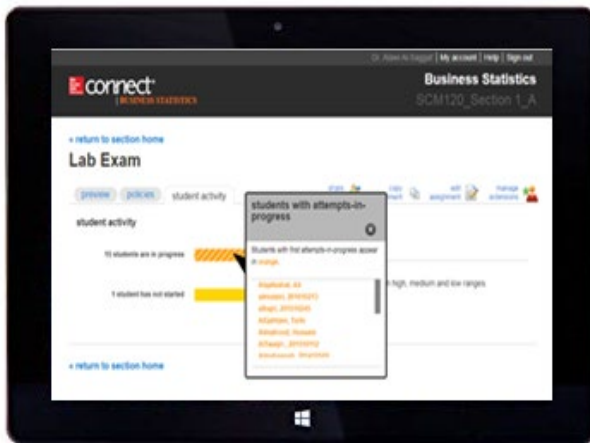


Fig. 4: Instructor Monitoring and Grading

### 3 INSTRUCTIONAL TECHNOLOGY MODEL EVALUATION

#### 3.1 Methodology

A 5-item survey questionnaire with answers to the 5-point Likert scale was used to assess the adopted instructional technology on the Business Statistics students' learning motivation and engagement. The questionnaire statements were based on the previous literature [6] and the teaching and learning center of the KFUPM-DAD instructional technology procedure award. The questionnaire was divided into 1) demographic details of the respondents, 2) the student experience with instructional technology in the Business Administration (BA) department programs, and 3) students' perspectives and advantages of adopting the current instructional technology in business statistics in learning, motivation, and engagement.

A five-point Likert scale (strongly agree = 5; agree =4; Neutral=3; disagree=2; strongly disagree = 1) was used to measure the level of student satisfaction with the questionnaire statements. Different instructional technology tools ranging from traditional to modern technologies have been used in business statistics and other courses in the business administration department are listed in the first two parts of the questionnaire. The participation in this study was from three programs human resource, safety technology, and supply chain management in the business administration department at Dammam Community College, who take a Business Statistics course in the first semester (181) of the academic year 2018/2019. A volunteer from the academic coordinator's office visited the business statistics classes and administrated the survey in the 15th week of semester 181. The survey was anonymous and students were not forced to answer every question. Out of the 59 students in these three programs, 39 responses were received.

#### 3.2 Results and discussion

*Demographic information:* Table 1 presents the breakdown of demographic information responses. Of the 39 Business Statistics course in the BA department respondents, 3 (8%) were supply chain management, 16 (41%) were safety technology, and 20 (51%) were human resources. In terms of responses' academic level, the majority of them were seniors 27 (69%) and juniors 12 (31%).

**Table 1:** Demographic Information of the responses

	<i>No.</i>	<i>Percentage (out of 39)</i>
Supply Chain Management	3	8%
Safety Technology	16	41%
Human Resource	20	51%
Junior	12	31%
Senior	27	69%

*Students' experience with the instructional technology:* In the first part of the survey, the questionnaire was to quantify the students' experience with 8-different types of instructional technologies used in the business statistics course in semester 181 and the other courses in the BA department programs. Table 2 provides comparisons between the mean scores of 8-instructional technologies perceived by students in teaching business statistics and the other courses at the BA department. From Table 2, students have perceived that the traditional instructional technology methods are used as teaching methods in their courses in the BA department program while the current instructional technology methods in teaching business statistics course were more modern using advanced technology Tablet-PC for curriculum presentation, provide online teaching materials, interactive communication among the students and between teacher and students.

**Table 2:** Comparisons between instructional technologies in teaching

Instruction technology tool	Other courses(mean)	Business statistics course (mean)
Multimedia presentations	3.2	4.0
PowerPoint presentations	4.3	2.2
Blackboard presentations	4.1	2.1
Tablet-PC presentations	1.8	4.8
Online teaching materials	3.4	4.7
Computer software	3.7	4.7
Interactive communication	3.7	4.5
Online Monitoring and grading	3.3	4.5

*Students' perspective and advantages of the instructional technology in Business Statistics:* Table 3 provides a summary of student's perspectives on the adoption of the current instructional technology in business statistics. The mean scores of all concerns in this part are above 4, which indicates that the students perceived that the DCC may be shaped if the current instructional technology used in all courses, Tablet-PC plays a major role in presenting and delivering the Business Statistics curriculum, Business Statistics uses the latest technology in teaching, and the students save more time with the current instructional technology

**Table 3:** Students' perspective on instructional Technology

Student perspective	Mean
My College will be shaped	4.4
Tablet-PC plays a major key role	4.6
Instructor now using the latest technology	4.4
I can save more time in learning	4.6
My knowledge is more holistic	4.4

Table 4 shows the mean scores of students' advantages of instructional technology used in Business Statistics course. The findings reveal enhance the motivation and engagement in and outside the Business Statistics classes as the main advantages of instruc-

tional technology, course material is comprehensive and accessible at anytime and anywhere receive great advantages of instructional technology by students perceived. Furthermore, the interactive communication among the students and between instructor and students is another great advantage of instructional technology used in Business Statistics by students perceived which is the most effective measures of teaching and learning process.

**Table 4:** Students advantages of adoption instructional technology on Business Statistics

Student advantages	Mean
The course material is accessible as needed at any time	4.4
The course material is comprehensive	4.5
The material is presented in a very clear way	4.5
The assignments and their solutions easy to access and understand	4.7
Easy to communicate and interact with the instructor	4.6
Easy to communicate and interact with other students taking the same course	4.5
Made me very interested in the course and encouraged me to learn more	4.2
Enhanced my learning of the course	4.4
Enhanced me how I participate in the course	4.6

*Faculty attitude on Instructional Technology:* In the mid of semester 171, a workshop was conducted for the DCC faculty to share the experience of the adoption of instructional technology in teaching and learning. At the end of the workshop, a survey questionnaire was distributed to the attendance to measure their attitude toward the instructional technology. Table 5 shows the findings of the faculty survey which reveals the DCC faculty are extremely positive and motivated to use the instructional technology.

**Table 5:** Faculty attitude on Instructional Technology

	Mean
I like my students to learn using a Tablet PC.	4.6
I will feel comfortable using a Tablet PC in the classroom.	4.5
By using Tablet-PC, lesson preparation take long time.	3.0
Working with a Tablet PC will make me very nervous.	2.6
I think that the Tablet PCs are easy to use	4.5
I think utilizing a Tablet PC needs enough training.	3.5
It's hard to find ways to use the Tablet PC in my classroom.	2.6
I will be motivated to use Tablet PC if I own one	4.5

## 4 CONCLUSION

Business Statistics is important for Business Administration and other sciences and social programs students to understand and analyze the data. Teaching business statistics using traditional technology methods such as PowerPoint presentations is more challenging. This paper presents an instructional technology for teaching a Business Statistics course at DCC which enhances the level of student motivation and engagement through increased interactive lessons and communication. We developed an advanced



instructional technology to foster good teaching and effective learning for Business Statistics students using Tablet-PC, and OLMS technology tools. The effectiveness of instructional technology in Business Statistics has been measured by quantitative surveys which demonstrated improvements in the student's motivation and engagement levels.

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#### References

1. T. Elizabeth, R. Brich: Integration of Interactive Instructional Technology in the Teaching Credential Program: A Case Study., 2013.
2. M. Prensky,: Digital Natives, Digital Immigrants Part 1, Horiz., 2001.
3. M. Bickham et al.,: Learning in the 21st Century : Teaching Today's Students on Their Terms, Int. Educ. Advis. Board, 2008.
4. M. Weimer,: research: evidence that learner-centered approaches work, in Learner-Centered Teaching : Five Key Changes to Practice, 2015.
5. C. R. H. Kimberly N. LaPrairie,: Redefining instructional technology: a contemporary approach, Int. J. Instr. Technol. DISTANCE Learn., 15(2), 3–9(2018).
6. P. C. Lee, S. Sun, R. Law, and A. H. Lee,: Educational technology in hospitality management programs: adoption and expectations, J. Teach. Travel Tour., 2016.
7. G. Gutiérrez-Carreón, T. Daradoumis, and J. Jorba,: Integrating learning services in the cloud: An approach that benefits both systems and learning, Educ. Technol. Soc., 2015.
8. H. A. Saber,: Using maple, maple 3D graphics, and tablet PC to teach calculus II and III," in 2016 13th Learning and Technology Conference, L and T 2016, 2016.
9. Y. Ikeda and T. Ueda,: Cost-effective digital campus with tablet PC, educational cloud service and open e-learning contents, in IEEE Region 10 Annual International Conference, Proceedings/TENCON, 2017.
10. L. Ramkalawon and A. Bhoola,: Using tablet PC in the teaching and learning of secondary mathematics: A case of a girl's class in Mauritius, in Proceedings of 2016 SAI Computing Conference, SAI 2016, 2016.
11. B. A. C. Dean,: How does the use of the Tablet PC contribute to teaching and learning goals in the secondary classroom?, 2015.
12. P. Balan and V. Kalavally,: Enhancing student motivation in process control via interactive learning tools, in Proceedings - 2012 IEEE 4th International Conference on Technology for Education, T4E 2012, 2012.
13. E. Petkari,: Student Management Teams as a Means of Communication and Learning Experience Satisfaction, Procedia - Soc. Behav. Sci., 2015.
14. <https://www.easyclass.com/>.

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