

## **Effectiveness of using Distance Learning Applications and their Impact on Achieving Sustainable Development in Saudi Arabian Universities**

Miesam Fawzi Motiar Al azam<sup>1</sup>

### **Abstract**

*The current study aimed to determine effectiveness of using distance learning applications and their impact on achieving sustainable development in universities in Saudi Arabia. The research relied on the descriptive analytical approach, with a sample consisting of (300) faculty members from Saudi universities, specifically Hail University and Jouf University. The results indicated that the level of effectiveness of using distance learning applications in Saudi Arabian universities was moderate. Similarly, the level of achieving sustainable development in these universities was also found to be moderate. Moreover, there is a statistically significant positive impact of using distance learning applications in achieving sustainable development. The study recommends the necessity of raising awareness about universities' potential to achieve sustainable development by enhancing activation of distance learning application services.*

**Keywords:** *Distance education applications, sustainable development, Saudi Arabian Universities.*

### **Introduction**

Information and communications technology over the past two decades has occupied a major position in all areas of life in major developed countries. At our present time, technology is the primary driver of economic, educational, and political growth, which is reflected positively in on structure of society. Furthermore, technology changes the behavior of society members, and it creates new mechanisms of interaction that were not used before, which contributed to emergence of societies with new patterns of interaction that relies heavily on knowledge, digital technology, and distance education (Qassas, 2022).

Distance education has significant importance at the present time, as it has provided educational opportunities for a large number of students, regardless of distances and personal circumstances they have. Moreover, it contributes to achieving equality in educational opportunities, by providing educational opportunities for those who have difficulty enrolling in traditional education because of the various hindrances that students and faculty members face as well, such as geographical location and other difficulties (Ben Aichi, 2021; Al-Ayed & Al-Tit, 2021).

Consequently, universities should work for creating a technological enabling environment based on philosophy of distance education and its various services, through their educational plans to use information and communications technology in distance education, in order to increase its spread, which forms the basis for building effective

---

<sup>1</sup> Associate Professor, Kindergarten Department, College of Education, University of Hail

strategies that work to achieve sustainable development of education. (Dannenberg & Grapentin, 2016).

Sustainable development of education also requires attention to improve living conditions of all society members, and this must be done without excessive use of natural resources, and focusing on aspects of economic, social, and environmental growth. Education likewise has an essential role in achieving sustainable development of universities, as they are the primary engine for advancement of society (Bahamdan & Al-Deeb, 2022).

Sustainable development has a vital goal that all educational institutions seek to achieve, by intensifying work and achieving a certain level of advancement and continuity. This can be achieved by developing all societal institutions, including universities, in the long term. Development in its comprehensive sense is the process of achieving full employment for the human element, and working to increase income growth rates, reduce unemployment, advance the citizen, and achieve his ambitions within a decent life in accordance with health, educational, and social standards that work for building a good human being who contributes to progress of his country. Sustainable development that works to achieve distance education, or what is called digital development should be based on establishing and creating a highly effective infrastructure, in addition to platforms, digital skills, and applications in various fields (Al-Hasi, 2022).

Furthermore, universities are considered important institutions that play a vital role in achieving sustainable development by including sustainable development concepts in their academic and research programs, motivating students and faculty members to engage in research and projects that contribute to achieving sustainable development. In addition, working to adopt sustainability principles in the management of its facilities and activities, including using renewable energy sources and applying environmental management practices within university campus. Besides, enhancing awareness of environmental and social issues as well as organizing events. In addition to, awareness and voluntary campaigns to achieve this development (Shiel, et al., 2016)

Given this, universities seek to partner with institutions to develop sustainable solutions to environmental, social, and economic challenges. Therefore, this study will shed light on effectiveness of using distance learning applications and their impact on achieving sustainable development in Saudi Arabian Universities (Jouf University / Hail University).

## **Theoretical Framework**

### **Distance Education**

Distance education is considered one of the basic components of contemporary life. It is one of the most important modern education strategies based on using electronic means to maintain constant communication and access to educational materials. Its use began in international educational institutions in the nineteenth century, and it was known as correspondence education at that time (Al-Awaishah, 2021).

The first independent department for correspondence education was established at the University of Chicago in 1892, and so it was the first university in the world to adopt distance education. Students were sent their assignments by mail, then teachers corrected them and sent them back with grades to the students, in addition to controlling inspection (testing) system remotely (Al-Hasi, 2022).

The changes that the world has witnessed recently, such as the emergence of the Covid-19 virus, have put great pressure on various areas of life, the most important of which is education field, and switching to distance education was one of the best solutions during that stage in order to achieve physical distancing during Corona crisis and maintaining

continuity of education, as traditional study method declined and was replaced by distance education, to ensure continuity of education from home ( Badhe & Patil, 2020 ).

Distance education is a type of e-learning modes that provides communication and interaction between the teacher and students remotely in different geographical regions, using training or educational programs, for instance distance conferences, education platforms, computers, television channels, e-mail, and others. One of the most distinguishing features of distance education compared to other educational systems, such as traditional and open education, is flexibility and freedom of choice. It involves liberation from constraints of traditional learning and its obligations, as well as the absence of face-to-face attendance for students in educational institution and relying on individual study of educational resources (Hijazia & Al-Khameesi, 2020; Al-Tit, 2018).

The researcher believes that distance education is of great importance, as it facilitates access to education for wide segments of people, regardless of distances and circumstances, which contributes to expanding access to education and achieving equality in educational opportunities.

There are also various negatives to distance learning, which are student's isolation and deprivation of being on campus, difficulty of providing means and technologies, difficulty of accessing content and academic material, and the students' lack of harmony with diversity of teaching methods in distance education. In addition, difficulty of controlling oversight during implementation of tests and evaluations for distance learning students (Al-Shamalti, 2022).

#### Sustainable Development

Since the term sustainable development was included in Brundtland Commission report in 1987, the term sustainable development has become a major concern for associations concerned with environment, as Brundtland provided a brief definition of the term as, it is the development that works to meet the needs of the present without compromising the ability of future generations to meet their special needs. Particularly, the idea of sustainable development is linked to the more comprehensive idea of environmental modernization, as Marten Hajer believes that environmental modernization, as a process of bringing together several reasonable and attractive lines, is sustainable development rather than limiting growth, preferring prevention over treatment, considering pollution equal to inefficiency, and viewing environmental discipline and economic growth as beneficial to each other (Abdel Fattah, et al., 2020).

Sustainable development is considered a comprehensive model, as it is a model for thinking about future that is concerned with environmental, social and economic considerations with the aim of achieving comprehensive development and improving quality of life. Right to freedom from poverty, right to health, equality, education, security and peace, and right to development, advancement and preservation of environmental resources in the present and future, all of them are rights that have captured everyone's attention in the past decades, in which the idea of sustainable development prevailed, and gained attention of development and environmental work worldwide (Al-Enezi, 2021).

There are three basic dimensions of sustainable development, which are environmental dimension, social dimension and economic dimension, therefore sustainable development requires balanced integration between these dimensions to achieve sustainable development (Al-Ajami, 2020).

Considering importance of education in order to contribute to achieving sustainable development, Global Action Program has established many principles on which education for sustainable development is based (Education Sustainable Development) and they can be summarized as follows: (Olsson, et al., 2022):

- Education for sustainable development helps individuals acquire knowledge, values, skills, and attitudes that enable them to contribute to sustainable development and make good decisions.
- Education for sustainable development involves integrating sustainable development issues into teaching and learning processes, which requires new, innovative and participatory methods that motivate students and enable them to make development decisions.
- Education develops in students' ability to criticize society and identify its positives and negatives. It also seeks to prepare graduates who have ideological awareness and social decisiveness. When students realize that sustainability is considered part of their social and moral responsibility, they will develop a sense of responsibility towards natural world and other creatures, and they will have the ability to facilitate development process and its prosperity, not its depletion and elimination (Tanaka, 2017).

### **Previous Studies**

Al-Ward and Al-Ansi (2023) conducted a study that aimed to know the reality of scientific research in community colleges in the Republic of Yemen, and its role in achieving sustainable development. To achieve the research objectives, the researchers used the descriptive survey method and applied the questionnaire on a sample of (120) faculty members in community colleges, they were chosen intentionally. The research results showed: That the reality of scientific research and its role in sustainable development came to a small degree at the overall level of the tool(questionnaire). The average was (2.53), and the results also showed that there were no statistically significant differences in the role of scientific research in sustainable development from the viewpoint of faculty members in community colleges depending on academic rank.

Harizan (2021) also conducted a study aimed at verifying effectiveness of distance education in promoting positive attitude towards sustainable development and studying effects of hindrances that prevent sustainable development in distance education from attitude towards sustainable development and investigation into mediating effect of innovation in the relationship. Online survey questionnaires were used to collect data from (663) final-year students enrolled in courses offered through distance education mode in selected universities in Malaysia. The study results showed that distance education is effective in promoting a positive attitude towards sustainable development through mediation of innovation, although the hindrances related to distance education appear to have an adverse effect on attitude towards sustainable development, but it does not seem to have any significant impact on innovation.

Al -Khashkhashi and Al-Abadi (2021) conducted a study aimed at identifying reality of distance education in Iraqi universities in light of Corona pandemic from the viewpoint of students and faculty members. The study used descriptive survey method and was applied to a sample consisting of (380) male and female students, and (321) faculty members. The study results showed that the appreciation degree of students and faculty members in Iraqi universities for the reality of distance education considering Corona pandemic was (medium). The results also indicated that there were no statistically significant differences in appreciation degree of degree Faculty members was attributed to the variables (specialization and academic rank).

Xin-Yu, et all. (2021) conducted a study aimed at identifying impact of Covid-19 on achieving the goal of sustainable development: e-learning and educational productivity in the United Nations of America, whereas an integrated model was developed with five dimensions, i.e. learner, design, technology, teacher, and environment. Relevant data were collected from (170) university students. The experimental results of the stepwise multiple regression analysis revealed that learners' attitudes toward the computer,

learners' self-efficacy in using Internet, its usefulness, teachers' response schedules, and teachers' attitudes toward e-learning tend positively and significantly, where it affects students' satisfaction with the Internet, and that learners' anxiety from computer, ease of use, system availability, Internet availability, learning climate, and interactions negatively affect students' satisfaction. These results indicate that developing countries can achieve sustainable development goals by improving learners' satisfaction, and further enhancing implementation of their e-learning practices.

Muhammad (2015) conducted a study aimed to identify sustainable development programs at the Sudan University of Science and Technology and their role, and the hindrances and challenges they face in achieving sustainable development in Sudan. The study sample consisted of deans and departments heads, professors and students of faculties of Sudan University of Science and Technology. The sample consisted of (300) individuals. The researcher relied on a descriptive analytical approach. The results showed that the most prominent sustainable development programs at the Sudan University of Science and Technology that aim to achieve development in Sudan are: Forest science programs, educational programs, and applied research programs. The most significant role of the Sudan University of Science and Technology in achieving sustainable development is: Graduating cadres in various specializations, qualifying professors to work in various stages of education, holding lectures and workshops for members of society and students in spreading family and community culture.

Through reviewing previous studies, the researcher found many studies that agreed and were similar to the current study variables, such as the study of (Harizan, 2021), which studied effectiveness of distance education in promoting the positive attitude towards sustainable development, and the study of (Al-Khashkhashi & Al-Abadi, 2021), which studied reality of distance education in Iraqi universities in light of Corona pandemic from the students' point of view and faculty members. In addition, the study of (Xin-Yu, et al., 2021) which aimed to know impact of Covid-19 on achieving sustainable development's goal: e-learning and educational productivity in the United Nations of America. There are studies differed in some of their variables, such as the study of (Al-Ward & Al-Ansi, 2023) which studied reality of scientific research in community colleges in the Republic of Yemen and its role in achieving sustainable development as well as the study of (Mohammad, 2015) which aimed to identify sustainable development programs at the Sudan University of Science and Technology. The current study was distinguished from previous studies in that it linked important variables, namely effectiveness of using distance education in achieving sustainable development in universities. It is hoped that universities will benefit from the results that have been reached, which has proven effectiveness of using distance education applications.

## **Study Problem**

The current age is witnessing an enormous cognitive and technological revolution in all areas of life, and this is evident in technological inventions, communications revolution, and tremendous rapid developments in scientific knowledge and new discoveries. Consequently, what is known as distance education and its various technological services has become no longer an entertainment option in educational institutions, particularly after proving its success, relying on it, and the positive results it achieved in previous eras in terms of students' achievement, saving time, and effort expended under the teaching system (Moalla, 2022). The use of distance education applications plays a vital role in achieving sustainable development in universities. Therefore, these applications contribute to enhancing awareness of environmental and social issues and provide effective means of exchanging knowledge and experiences through their use. Additionally, applications can be used to manage research and innovation projects associated to sustainable development as well as facilitating communication and

cooperation between students and researchers in this field. the study of (Harizan, 2021) proved that distance education achieves a high positive effectiveness in achieving sustainable development, as stated in the study of (Bahmadan, 2022) which showed that there was a strong causal relationship between distance education and achieving sustainable development in Saudi Arabia.

The study asserted that the strength or weakness of distance education level was reflected information of high-quality human capital, as it is considered the basic entry point in achieving development and achievements at all economic and social levels. Accordingly, universities in Saudi Arabia should be keen to implement important developments to achieve sustainable development for future generations. The study of (Al-Qasimi, 2021) explained importance of developing and increasing investment in educational technology sector as one of the aspects and forms of distance learning, and employing it well, whereas it constitutes an excellent opportunity to advance sustainable development in education and provide improvements in education levels. It is necessary for educational institutions to provide an appropriate enabling environment to activate distance learning, and to create mechanisms for motivating local and foreign investments and supporting this type of learning. Through the researcher's work as a faculty member at the University of Hail and her awareness of the importance of using distance education applications and their impact on education process and their provision of facilities in communicating with the university and members and their dissemination speed of information and speed of obtaining knowledge, it was necessary to know their impact on sustainable development, as stated in the study of (Ihuoma & Raymond, 2021) that through sustainable development, the present is linked to future , and a clear development process is adopted in which economic and social justice prevails and reaches all students alike. In light of this, it was important is to investigate effectiveness of using distance education applications in achieving sustainable development in universities in Saudi Arabia. This is what the current study seeks to achieve and to know the expected impact of adopting these applications on promoting sustainable practices and enhancing awareness of environmental and social issues among members of the university community.

1. What is the level of effectiveness of using distance education applications in universities in Saudi Arabia”?
2. What is the level of achieving sustainable development in universities in Saudi Arabia?
3. Is there a statistically significant impact at the significance level ( $\alpha \leq 0.05$ ) for effectiveness of using distance education applications in achieving sustainable development in universities in Saudi Arabia?
4. Are there statistically significant differences at the significance level ( $\alpha \leq 0.05$ ) in achieving sustainable development in universities in Saudi Arabia, attributed to the variable (Type of application)?

## Study Significance

Theoretical importance of this study is shaped by variables examined, the applications of distance education and sustainable development are among the important variables that should be highlighted and providing theoretical frameworks about these variables as well Revealing variables' impact on each other through previous theoretical literature, that is, identifying impact of using of distance education applications on achieving sustainable development, In addition to Providing information about effectiveness of using distance education applications and their impact on achieving sustainable development in universities in

Applied importance of this study is formed through the results it provided about effectiveness of using distance education applications and their impact in achieving sustainable development and possibility that universities benefit from them in Saudi Arabia, And Universities in Saudi Arabia benefit from the results that have been reached, where they improve quality of their performance with students and with faculty members to develop distance education services, Providing proposals and recommendations that would explain importance of using distance education applications in achieving sustainable development of the university.

## **Methodology**

Population and sampling:

The research population consisted of (3,800) faculty members working in universities in Saudi Arabia for the year (2023). The study sample consisted of faculty members working in universities in Saudi Arabia (University of Hail / University of Al-Jouf), their number is ( 300 ) faculty members and it is a representative sample of the study population, and they were selected randomly.

Table (1): Frequencies and percentages of study variables

Variables	Categories	Frequency	Percentage
Gender	male	120	40%
	female	180	60%
Scientific rank	lecturer	70	23.3 %
	Assistant Professor	90	30 %
	Associate Professor	80	26.7 %
	Professor Dr	60	20 %
Experience	10years and less	130	43.3%
	10years and more	170	56.7%
Application type	Zoom	100	33.3 %
	blackboard	200	66.7%
Total	300	100.0	

### **Instruments**

First instrument: Measure using of distance education applications

To identify the level of using of distance education applications, a scale was built using the following previous studies: (Badhe, et al., 2020), a study by (Harizan, 2021), study by (Makawi, 2023), study by (Qassas, 2022), and a study by (Sabri, 2016). The scale consists of (13) items.

### **Face Validity**

To ensure validity of the study tool, the instrument, the researcher presented it to a group of arbitrators in universities in Saudi Arabia with experience and expertise in educational administration. They numbered (10) arbitrators, to judge the degree of validity of items if they need a certain modification. The relevant items were selected, and amendments were made to them by 80%, whether by rephrasing or by deletion and addition.

### Construction Validity

Construct validity implications were used by finding correlation coefficients between the items and the total score of the scale.

Table (2) Correlation coefficients between items and the dimension as a whole to which they belong

Effectiveness of using distance education applications			
Item number	Correlation coefficient with the instrument as a whole	Item number	Correlation coefficient with the tool as a whole
1	.761**	8	.827**
2	.756**	9	.708**
3	.824**	10	.852**
4	.735**	11	.579**
5	.821**	12	.389**
6	.775**	13	.446**
7	.827**		

It is clear from Table (2) that value of all correlation coefficients is greater than 0.3, and these values indicate tool validity and that it is sufficient for the purposes of the current study.

### Reliability

To ensure the reliability of instrument, the instrument was applied to a group outside the study sample, consisting of (30) faculty members, to calculate reliability coefficient using the internal consistency method according to Cronbach alpha formula. The value of internal consistency coefficient 'Cronbach Alpha' is (0.919), and this value indicates reliability and is sufficient for the purposes of the study.

### Second instrument: Sustainable development scale

For the purpose of identifying level of sustainable development in universities in Saudi Arabia, the scale is built using the following previous studies: (Ajouz & Arqawi, 2019), a study by (Al-Ajami, 2020), a study by (Khattat, 2022), and a study by (Dannenberg & Grapentin, 2016), study by (Shiel, et al., 2016) and study by (Yuniarti, et al. 2019). The scale consisted of four dimensions, which are: (educational dimension, social dimension, economic dimension, and environmental dimension). The scale consisted of (24) items and for each dimension (6) items.

### Face Validity

To ensure validity of instrument, the instrument was presented to a group of arbitrators in universities in Saudi Arabia with experience and expertise in the field of educational administration. They numbered (10) arbitrators, to judge the degree of validity of items, if they need a certain modification. The relevant items were selected, and amendments were made to them by 80%, whether by rephrasing or by deletion and addition.

### Construction validity

Construct validity implications were used by finding correlation coefficients between items and total score of the scale.



Table (4) Correlation coefficients between items and the dimension as a whole to which they belong.

Dimensions	Educational dimension	Social dimension	Economic dimension	Environmental dimension	Sustainable development
Educational	1	.804**	.472**	0.062	.824**
Social	.804**	1	.495**	0.015	.805**
Economic	.472**	.495**	1	0.040	.682**
Environmental	0.062	0.015	0.040	1	.462**
Sustainable	.824**	.805**	.682**	.462**	1

It is clear from Table (4) that the value of all correlation coefficients is greater than 0.3, and these values indicate validity of the tool and that it is sufficient for the purposes of the current study.

#### Reliability

To ensure reliability of instrument, the instrument is applied to a group outside the study sample, consisting of (30) faculty members, to calculate reliability coefficient using internal consistency method according to Cronbach's alpha equation.

Table (5): Cronbach's Alpha internal consistency coefficient

Dimensions	Cronbach's Alpha internal consistency method
Educational dimension	0.904
Social dimension	0.872
Economic dimension	0.859
Environmental dimension	0.963
Sustainable development as a whole	0.904

It was clear from Table (5) that values of internal consistency coefficient 'Cronbach's alpha' ranged (0.859-0.963), and these values indicate reliability and are sufficient according to Al-Ayed et al. (2023).

## Results

Table (6) shows that means ranged between (2.65-3.69), as item No. (11) stated: " By using applications, submitting assignments is easy" came in first place, with an mean of (3.69) and at a "High" level. Item No. (12) stated: 'By using applications, dialogue sharing is broader' ranked last, with an mean of (2.65), at a "Medium" level, as well as the mean of the scale as a whole was (3.39) and at a "Medium" level.

Table (6) Using distance education applications.

Rank	No.	Items	Means	Standard deviation	Level
1	11	By using applications, submitting assignments is easy.	3.69	1.029	High
2	1	Applications provide information relevant	3.68	1.039	High

		to the scientific subject. _			
3	2	Through applications, the material reaches the largest possible number of students.	3.55	0.987	Medium
3	5	Using applications contributes to reducing transportation costs.	3.53	0.974	Medium
5	4	Using applications contributes to enhancing students' technology skills.	3.52	1.021	Medium
6	3	Using applications allows to organize time without having to adhere to a specific schedule.	3.50	0.988	Medium
7	10	By using applications, student data can be obtained easily.	3.49	1.091	Medium
8	7	Using applications motivates improving teaching experience.	3.43	1.102	Medium
9	6	Using applications contributes to developing self-discipline skills.	3.39	1.009	Medium
10	8	Using applications allows students to repeat the lesson when needed.	3.37	1.132	Medium
11	9	Using applications allows obtaining feedback easily.	3.17	1.174	Medium
12	13	Pictures and videos are used, which facilitates understanding scientific material.	3.05	1.022	Medium
13	12	By using applications, dialogue sharing is broader.	2.65	1.170	Medium
		Effectiveness of using distance education applications in Saudi universities.	3.39	0.754	Medium

Table (7) shows that means ranged between (2.97-3.70), where environmental dimension ranked first, with a "High" level, with an mean of (3.70), while economic dimension came in second place, with a "Medium" level, and an mean of (3.51), while social dimension came in last place, with an mean of (2.97), and a "Medium" level. The means of the scale as a whole reached (3.36) and at a "Medium" level

Table (7) Sustainable development scale

Rank	No.	Dimensions	Means	Standard deviation	Level
1	4	Environmental dimension	3.70	1.16	High
2	3	Economic dimension	3.51	0.79	Medium
3	1	Educational dimension	3.21	0.92	Medium
4	2	Social dimension	2.97	0.82	Medium
		Degree of sustainable development as a whole	3.36	0.61	Medium

It is clear from table (8) that simple correlation coefficient between independent variable (Using of distance education applications) with its combined dimensions and dependent variable (Sustainable development) with its combined dimensions reached ( R ) ( 0.684 ), and the coefficient of determination ( R<sup>2</sup> ) was ( 0.468 ), and these results indicate that the independent variable ( Distance education applications ) explained ( 4.6.8 % ), in the percentage of variance in the dependent variable ( Sustainable development), and to determine the regression analysis of variance , through which the total explanatory power of the variables of distance education applications can be known.

Table (8) simple linear regression analysis

Model	R	R <sup>2</sup>	Adjusted Square	R	Std. Error of the Estimate
1	.684	0.468	0.466		0.54962

It is clear from the results of Table (9), that it confirms existence of an impact of distance education applications in achieving sustainable development in universities in Saudi Arabia, because the significant (Sig.) F with its value is (0.00 0) is smaller than (0.05). Therefore, the regression model is appropriate to measure the impact between independent variable and dependent variable.

Table (9) Simple regression analysis

Model 1	Sum of Squares	of d.f	Mean Square	F	Sig.
Regression	79.278	1	79.278	262.437	000.
Residual	90.021	298	0.302		
Total	169.299	299			

Table (10) shows that the independent variable (Distance education applications) has a statistically significant impact on the dependent variable (Sustainable development), as value of (B) reached (0.684), while value of (T) reached (16.200) and level of significance is (0.000), which is less than (0.05). This result indicates that distance education applications have a positive impact in achieving sustainable development in Saudi universities because its significance (Sig) and its value (0.000) is less than (0.05).

Table (10) Regression analysis result

Regression coefficients	Unstandardized Coefficients	Standardized Coefficients		T	Sig*
	B	Std. Error	Beta.		
(Constant)	0.618	0.174		3.552	0.000
Distance education applications	0.828	0.051	0.684	16.200	0.000

\*Statistically significant at significance level ( $\alpha = 0.05$ )

Means and standard deviations for sustainable development in universities in Saudi Arabia were extracted according to the applications used in education, and the table below shows this.

Table (11) Sustainable development in Saudi universities by type of application.

Sustainable development in Saudi universities				
	Variables	Mean	No.	Standard deviation
Applications used in distance education	Zoom	162	3.35	0.64
	Blackboard	138	3.34	0.61

A = mean, SD = standard deviation

Table shows (11) an apparent difference in means and standard deviations in sustainable development in universities in Saudi Arabia according to type of application. For the purpose of identifying the significance of statistical differences between means, T-test was used in Table (12).

Table (12) T-test for impact of applications used in distance education in achieving sustainable development

Source of variance	Degrees of freedom	T	Statistical significance
Application type	298	0.232	0.816

It can be seen from the table (12) that there are no statistically significant differences ( $\alpha \leq 0.05$ ) attributed to the impact of the type of application in achieving sustainable development in universities in Saudi Arabia, with a statistical significance of 0.816.

## Conclusion and Implication

This study examined the impact of using distance education applications in achieving sustainable development in Saudi universities. The research was conducted to obtain the response of faculty members in Saudi universities in terms of their awareness of the topic taking place at the university about the benefit of using distance education applications in achieving sustainable development, and we have achieved The level of effectiveness of

using distance education applications in Saudi universities was moderate, The results showed that level of effectiveness of using distance education applications in universities in Saudi Arabia was medium, and the researcher attributes this result to effectiveness of using distance education applications in the education process, and the awareness of faculty members of efficiency of distance education applications and their role in facilitating education process and providing a number of benefits, such as flexibility in time and location. Additionally, delivering educational materials at any time and from any place, facilitating attendance at conferences and holding meetings. In addition, providing immediate feedback to students through an automated evaluation system or direct interaction with a faculty member. This can also be explained as a result of modernity of using distance education applications in teaching, the level was not high due to the recent use of applications, and faculty members and students still face some challenges in using these applications and their effectiveness, and the result of the current study agreed with the result of the study by ( Al-Khashkhashi , Al-Abadi, 2021 ), which concluded that the degree of appreciation of students and faculty members in Iraqi universities for reality of distance education in light of the Corona pandemic is (medium) , The results showed that the level of achieving sustainable development in universities in Saudi Arabia was medium. The researcher attributes this result to the awareness of universities for importance of achieving sustainable development and keeping pace with current developments in the world and knowing importance of achieving sustainable development at the university. This indicates that there is some progress and achievements in universities to achieve sustainable goals of education, and keenness of universities to achieve such goals as integrating sustainable development concepts into curricula as well as adopting environmental management practices on campus and encouraging research and innovation in the field of sustainable development. Consequently, universities play a vital role in establishing awareness of sustainability issues and environmental, social and economic challenges for students and faculty members. The results of the current study agreed with the study by (Mohammad, 2015), which showed that the most prominent sustainable development programs at the Sudan University of Science and Technology achieved development in Sudan, which are forest science programs, educational programs, and applied research programs, and that the level of sustainable development in Saudi universities was medium. A research methodology based on a survey was used, and it was found that there were positive results with a statistically significant positive effect of using distance education applications in... Achieving sustainable development in Saudi universities, This indicates that there is an impact of using distance education applications in achieving sustainable development in universities in Saudi Arabia. This result may be attributed to effectiveness of applications and distance education in achieving sustainable development because it has contributed to providing educational opportunities for the largest number of students and has provided students with effective access to educational and training resources. Moreover, distance education has also contributed to enhancing the use of technology in education, which in turn has enhanced sustainable development by improving students' skills and preparing them for labor market. The current study agreed with result of the study by (Harizan, 2021), which showed that distance education is effective in promoting a positive attitude towards sustainable development.

The results showed that there are no statistically significant differences attributed to impact of the type of application in achieving sustainable development in universities in Saudi Arabia. This indicates that there is no variation in the applications used in distance education, and this can be explained because all applications have the same effect in achieving sustainable development, in facilitating access to information and providing educational opportunities to the largest category of students. Furthermore, all applications provide the same services, and all seek to provide the same role, which facilitates students' access to distance education, in addition to facilitating attendance at faculty meetings and attendance at conferences. These applications are useful and provide the

same purpose. The current study differed with the result of the study by (Al-Khashkhashy, Al-Abadi, 2021) in that it studied other variables, and the results showed that there were no statistically significant differences in the degree of appreciation of faculty members due to the variables (Specialization and academic rank). Therefore, this study shows the positive impact of using distance education applications. The study recommends the necessity of spreading awareness about the importance of using distance education applications and their role. In overcoming the challenges that may face the education process, and encouraging case studies of successful experiences in using education applications in Saudi universities, in order to increase the activation of distance education application services.

## References

- Abdel Fattah, Marwa, Mohamed, Reham, and Masoud, Abdel Hafeez. (2020). A comparative study of education for sustainable development at the levels of general education in Germany, Austria, and Egypt. *Environmental Sciences Journal. Institute of Environmental Studies and Research - Ain Shams University*. 49(8), 313-371.
- Al Ajami, Khalil. (2020). The role of universities in setting sustainable development goals: The Syrian Virtual University experience <https://www.researchgate.net/publication/339088986> \_ \_
- Al Qasimi, Raeda (2021). The impact of distance learning in achieving sustainable development in the educational process. *Arab Journal of Arts and Human Studies*. 5 (16). 22-32.
- Al-Ansi, Ahmed, Al-Ward, Mounir. (2023). The reality of scientific research in community colleges in the Republic of Yemen and its role in achieving sustainable development, *Ibn Khaldun Journal of Studies and Research*, 3(5). <https://doi.org/10.56989/benkj.v3i5.300>
- Al-Awaisheh, Marwan (2021). The impact of distance education and traditional education on the academic achievement of students in the first three grades in schools in the capital from the point of view of teachers and parents (a comparative study). *Journal of the Faculty of Education - Ain Shams University*. 45(1), 15-53.
- Al-Ayed, Sura I. & Al-Tit, Ahmad (2021). Factors affecting the adoption of blended learning strategy. *International Journal of Data and Network Science*, 5(3): 267–274.
- Al-Ayed, Sura; Al-Tit, Ahmad & Alashjaee, Areej (2023). The Effect of Digital Transformation on Organizational Performance by A Mediating Role of Digital Innovation. *Migration Letters*, 20(7), 380–394.
- Al-Hassi, Areej (2022). Digital transformation in Libyan universities during the Corona pandemic and its relationship to sustainable development. *Scientific Development Journal for Studies and Research*. 3(7), 134-155.
- Al-Hejazia, Omaima and Al-Khamisi, Salama. (2020). Some recent trends and experiences in distance learning in postgraduate university studies. *magazine Culture and Development*, 2 (11), 1-54.
- Al-Khashkhashi , Samir, Al-Abadi, Hamed (2021). The reality of distance education in Iraqi universities in light of the Corona pandemic from the perspective of students and faculty members, published master's thesis, Middle East University.
- Al-Omari, Majed (2019). A proposed vision for the transformation of university administrations towards sustainability in light of the experiences of international universities, the *Specialized International Educational Journal*, 2 (8), 20-52.
- Al-Shamlati, Ikhlas. (2022). The effectiveness of distance learning and blended learning from the perspective of bachelor's students in Jordanian universities (a comparative study). A magister message that is not published. Middle East University, Jordan.
- Al-Tit, Ahmad (2018). Analysis of Absenteeism Phenomenon and Its Relation to Academic Achievement: Applied Study on Students of College of Business and Economics at Qassim University (KSA). *Journal of Administrative and Economic Sciences*, 12(1): 89-129.

- Badhe, P., Badhe, Y. & Patil, K. (2020). Comparison of Distance learning with traditional Classroom in Medical College Students in Covid 19 lockdown period in India. *Future of Medical Education Journal*, 10 (4), 42-45. [https://fmej.mums.ac.ir/article\\_16702.html](https://fmej.mums.ac.ir/article_16702.html).
- Bahamdan, Muhammad and Al-Deeb, Khaled. (2022). The role of education in achieving sustainable development in the Kingdom of Saudi Arabia. *Arab Journal for Scientific Publishing*. 42(2), 168-191.
- Ben Aichi, Ammar (2021). The reality of using the Moodle e -learning platform in light of the (COVID19) pandemic and its impact on the attitudes of Algerian university students from the point of view of students of the Faculty of Economic Sciences at the University of Biskra , *Al-Baheth Journal of Mathematical and Social Sciences* , 4(7), 330-343 .
- Calligrapher, Abdul Wahab (2022). Sustainable development: causes and goals, *Journal of Environment, Sustainable Development and Human Health*, 1(1), 73-86.
- Dannenber, S., & Grapentin, T. (2016). Education for Sustainable Development-Learning for Transformation. The Example of Germany. *Journal of Futures Studies*, 20(3), 7-20.
- Dobi, s. & Ibrahim, M. (2018). AN ANALYSIS OF SUSTAINABLE DEVELOPMENT IN DISTANCE LEARNING EDUCATION. *British Journal of Education, Learning and Development Psychology*. (1), 1. 85-93.
- Harizan, N. (2021). The effectiveness of distance education and barriers to developing a positive attitude toward sustainability: mediation of innovation. *Turkish Online Journal of Distance Education- TOJD* 9(23), 1302-6488.
- Huang, F., Postiglione, G., & Shin, J. (2015). *Mass Higher Education Development in East Asia*. Springer, Singapore.
- Ihuoma, A & Raymond, M. (2021). Empirical Analysis of the Impact of Distance Education on Sustainable Economic Growth in Nigeria. *West African Journal of Open & Flexible Learning*. (10), 1. 10-22.
- Impact of COVID-19 on achieving the goal of sustainable development: E-learning and educational productivity
- Makkawi, Khadija (2023). Distance education: difficulties and challenges: Muhammad Bashar University as a model Add to basket of results, *Dirasat Journal*, 1(12), 716-731.
- Mohamed, Ahmed (2015). The role of universities in achieving sustainable development in Sudan: a case study of the Sudan University of Science and Technology, *Jerash for Research and Studies*, 1 (16), 315-338.
- Mualla, Wael (2022). *Universities and Sustainable Development*, Ministry of Culture, 59(689), 16-31.
- Old, Musa, and Arqawi, Samer (2019). The contribution of higher education institutions to sustainable development through social responsibility, the Second International Arab Conference: Social Responsibility of Universities (Commitment and Legislation), Amman, Jordan.: <https://www.researchgate.net>
- Olsson, D., Icon, N. Gericke, O & Boeve, J. (2022) The effectiveness of education for sustainable development revisited – a longitudinal study on secondary students' action competence for sustainability, *Environmental Education Research*, 3(22), <https://doi.org/10.1080/13504622.2022.2033170>.
- Qassas, Al-Tayeb (2022). Identifying the challenges facing e-learning from the point of view of professors: a case study of the Faculty of Economic, Commercial and Management Sciences - Setif 1, *Al-Basira Center for Research, Consultation and Educational Services*, 2 (22), 197-211.
- Sabri, Maher (2016) The effectiveness of using distance education in developing academic achievement and the trend towards distance education in the educational technology course among general diploma students in the one-year system, *Industrial Education Division*. DOI:10.13140/RG.2.2.25662.69442

- Shiel, C., Filho, W., do Paco, A., & Brandli, L., (2016). Evaluating the engagement of universities in capacity building for sustainable development in local communities. *Eval. Program Plann.* 54, 123–134.
- Tanaka, H. (2017). Current State and future prospects of Education for Sustainable Development (ESD) in Japan. *Educational Studies in Japan: International Yearbook.* (11) 2, 15-28.
- Xin-Yu, W., Guang, L., Summaira M. & Ahsan A. (2021). Impact of COVID-19 on achieving the goal of sustainable development: E-learning and educational productivity <https://doi.org/10.1080/1331677X.2021.1927789> CrossMark LogoCrossMark.
- Yuniarti, Y. S., Hasan, R. & Ali, M. (2019). Competencies of Education for Sustainable Development Related to Mathematics Education in Senior High School. In *Journal of Physics: Conference Series*