Migration Letters

Volume: 20, No: S11(2023), pp. 629-651

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)

www.migrationletters.com

The Reality of Distance Education in the Kingdom of Saudi Arabia During the COVID-19 Pandemic in Light of the Analysis of the Twitter Big Data

Dr. Jameelah Faleh Al-Mutiri[1], Dr. Awatef Ibrahim Al-Saqri[2]

Abstract

This study aimed to describe the reality of emergency distance education in the Kingdom of Saudi Arabia from the point of view of the users of the hashtag #distance_education since the start of the Covid-19 pandemic. It seeks to identify the factors affecting its reality, and the participants' feelings towards it through using the descriptive research method in a case study. It covers the hashtag #distance_education on Twitter since the start of the COVID-19 pandemic. It ends in the first semester of the 2020–2021 academic year. This was done by retrieving the tweets in #distance_education hashtag in Twitter and analyzing them as documents by using Python as a programming language. The results show that during the pandemic, tweets in the #distance_education hashtag on Twitter focused on the continuity of education, taking into account social responsibility as well as rehabilitation and technological realization. It also shows the forefront of the social factor in the influence, followed by the technological factor, then the health factor, and finally the economic factor. It concluded that the neutral opinion prevailed in that periods and categories of the study.

Keywords: *Blackboard, school closure, Twitter, hashtag, Distance Learning, Big Data, Virtual Community.*

1. Introduction

The conditions of human societies have changed according to the industrial revolutions throughout history, starting with the first industrial revolution in the middle of the eighteenth century with a discovery that enabled societies to use engines and machines instead of humans to make things, and ending with a fourth digital revolution that necessarily creates a digital world and includes various forms of the causes of life changes. As an example, artificial intelligence is the idea of making a machine think like a human using machine learning or human-directed learning, provided that this is done through algorithms and relevant data first.

This digital revolution amplified data in a different way than in the past, prompting IBM to state in one of its analyses in 2012 that 90% of the world's data had been generated in the previous two years. More data have been created in the history of the human race, and

[1] PhD in Foundation of Education Department of Foundation of Education, College of Education, Qassim University, Email: dr.jameelah9@gmail.com

[2] Professor of Foundation of Education Department of Foundation of Education, College of Education, Qassim University, Email: sakrie@qu.edu.sa

10 times more data are generated every two years (EMC, 2014). Only 1% were studied (Henke, 2016). In 2020, each person will generate 1.7 megabytes of data per second (DOMO, 2017), which will be 2.5 million bytes of data per day if the same frequency continues (Lackey, 2019). Most of this data will originate from Google and virtual communities (Stephens-Davidowitz, 2017), and will continue to grow, never to be small again (Vaitheeswaran & Arockiam, 2014).

The digital traces and the resulting big data, which individuals leave behind after meeting virtually, constitute, according to Abbas and Riah (2018), a "living archive" that could represent rich material to be used in human and social research, as well as other sources. Recently, interest in virtual communities has spread widely, attracting the attention of scholars from a variety of disciplines, among which virtual community research has its relations with education as one of them (Ellis, Oldridge, & Vasconcelos, 2004), despite the fact that the actual beginning of the emergence of these communities was due to education needs since the middle of the 1980s (Abbas & Riah, 2018), and its growth and development is gradual based on educational needs and necessities (Almutairi, 2016).

At the present time, for example, with the transformation of the traditional education system into remote education in an emergency, these communities have become an effective means for their users to exchange views on this transformation in education. Twitter is regarded as an influential community in educational interaction due to the knowledge it carries and the skills and values it transmits, in terms of being an environment for the messages that educators send to recipients and carrying ideas and values in its content to influence them and then improve and reform the current educational reality (Alharthy, 2016).

As the educational transition from one medium to another, as occurred in the COVID-19 crisis, is not always smooth, most educational institutions were forced into urgent transformations without adequate opportunities to design a new educational method (Henriksen, Creely, & Henderson, 2020), and with the requirement for most institutions' education to transform most of its activities to be remote. For some, this has come as a shift in focus to curricula that already have a good remote presence. For others, such as applied medical specialties, the transition presented a challenge in that it required cultural and technological adaptations that could have been planned over a much longer period, but these institutions were forced to implement changes quickly to accomplish the educational mission despite the disruption (Sandars, Correia, Dankbaar, de Jong, Goh, Hege, Masters, Oh, Patel, Premkumar, Webb, & Pusic, 2020).

Many of the previous studies that were conducted during the current crisis period (COVID-19) concluded that educational institutions are facing great challenges in their own systems, whether at the levels of planning and implementation or even at the level of evaluation (Ibrahim & Aburawi, 2020; Oyaba & Saleh, 2020; Pinar & Dönel, 2020; Whalen, 2020; Alea, Fabrea, Roldan, & Farooqi, 2020; Wotto, 2020; Bisaria, 2020). In an attempt to remedy this, Alashwal (2020) proposed six useful principles to improve the impact of distance education in Higher Education after a phenomenological study of the sudden change in education, including differentiated teaching with a focus on building students' knowledge and skills to improve their performance and ensure mastery of the electronic course. In a cross-continental study to reach a global view that narrates the general vision and reflections of the educational landscape from a total of 31 countries all over the world, the current practices of distance education in emergencies are different from the actually planned practices (Bozkurt, Jung, Xiao, Vladimirschi, Schuwer, Egorov, & Rodes, 2020). However, studies by Hoq (2020), Pinar and Dönel (2020), and Abdulrahim and Mabrouk (2020) revealed positive attitudes toward distance education. They indicated its distinction compared to traditional learning. In addition to what was concluded by Basilaia and Kvavadze (2020), the rapid transition to the form of distance education succeeded. The experience gained can be used in the future, in the post-pandemic period. In light of this, it became necessary for the educational researcher to

study the case of distance education in the light of analyzing big data for some segments of the virtual community as a source for it.

2. Research problem

Education institutions need to seize the opportunity to enhance their existing distance education practices in response to the COVID-19 pandemic, by making classrooms responsive to the needs of changing times (Toquero, 2020). In this way, big data in the field of education can be used to support the educational system. Its techniques provide reviews of existing academic performance (Drigas & Leliopoulos, 2014). This is because educational institutions, as indicated by Raopn & Baglodi (2018), did not use this new generation of data and did not apply their techniques to classify and extract large educational data sets to the fullest extent. However, it is available in other fields in an unprecedented way. As Ghallab, Mohsen, and Ali (2020) showed, the method of analyzing Arab opinions as one of the methods of processing big data was used by researchers in the fields of business, economics, sociology, and various digital fields. However, education was one of the least scientific fields in which it was addressed. This was attributed to the lack of computer computational capabilities, tools, and human resources (Raopn & Baglodi, 2018). Therefore, this study sought to answer the following questions:

2.1. How was distance education in the Kingdom of Saudi Arabia from the point of view of the participants in the hashtag #distance_learning during the COVID-19 pandemic crisis?

2.2. What are the factors affecting the reality of distance education in the Kingdom of Saudi Arabia from the point of view of the participants in the hashtag #distance_learning during the COVID-19 pandemic crisis?

2.3. What do the participants think about distance education in the Kingdom of Saudi Arabia as expressed in the hashtag #distance_learning over time during the COVID-19 pandemic crisis?

3. Objectives

In light of the previous questions, the study sought to achieve the following objectives:

3.1. Describe the reality of distance education in the Kingdom of Saudi Arabia from the point of view of the participants in the hashtag #distance_learning during the COVID-19 pandemic crisis.

3.2. Examine the factors affecting the reality of distance education in the Kingdom of Saudi Arabia from the point of view of the participants in the hashtag #distance_learning during the COVID-19 pandemic crisis.

3.3. Diagnose the participants' opinions about distance education in the Kingdom of Saudi Arabia in the hashtag over time during the COVID-19 pandemic crisis.

4. Methodology

The descriptive research method was used in the case study. It requires a research practice that includes investigating a specific contemporary phenomenon in its natural context (Coe, Waring, Hedges, & Arthur, (2017). It marks distance education in the Kingdom of Saudi Arabia during a specific period of time as an emergency for education during the COVID-19 pandemic. It includes the community participating in it. The analysis of the big data will be completed in two methods: descriptive and diagnostic (exploratory)

(Riahi & Riahi, 2018) of tweet text. It is based on a perspective that sees text analysis as particularly useful for information retrieval and extraction, pattern recognition, opinion assessment, and predictive analysis (Marr, 2015). It fits with the research objectives.

To collect the data, the researchers used the documentation tool represented by the participants' tweets on Twitter during the two time-bound study periods as a means of written communication for personal and official purposes (Abuallam, 2014). They are primary documents written down directly by the party concerned with collecting and publishing their information. This type of document as a source is mentioned by Kandilji and Al-Samarrai (2009, p. 327) as it is highly accurate. According to what Cope and Kalantzis (2015) concluded, the scientific method in big data is to collect information through an integrated practical search in the records of everything that happened and analyze it retrospectively. The researchers were able to do that using the Python programming language, in agreement with Power (2013), as a tool for collecting and analyzing data, previously archived as documents.

5. Reliability

The researchers took some measures while applying this study to achieve reliability, including:

5.1. Obtaining a Twitter academic researcher license to retrieve data

5.2. Classifying the type of factor influencing the answer to the second question. It was done by a researcher and a research assistant for each mechanism, with the analysis repeated twice over different time periods; To achieve conformity (emphasis) that aims to "reach the same interpretations of the meanings and connotations that the first researcher reached" (AlabdulKarim, 2012, p. 79).

5.3. The accuracy of the support vector machine (SVM) classifier used to provide the answer to the third question. It shows an average of 93% in the General Education category, 87% in Higher Education, and 82% in the general opinion.

5.4. The results of the study are presented in a graphic way, not in the researchers' concepts.

5.5. Use of specialists in computer science to review the steps and results and provide feedback in this regard.

6. Study participants

With the emergence of big data, a new model for research has emerged in which the researcher only needs the required information and knowledge without direct access to the samples to be studied (Jin, Wah, Cheng, & Wang, 2015). This is consistent with what the researchers indicated to the virtual community in terms of being perceived through its digital effects, as the data in it is present without direct access to the study population and without questioning them. They were represented in this study to achieve the three primary objectives concerning participating in the #distance_learning hashtag in the two specific time periods of the study: the 2020 summer semester as a first period and the second period 2020-2021 first semester, in which switching to distance education began.

7. Data collection

Big data has been classified in the related literature into two forms: structured data arranged in its own structures and other unstructured data that cannot be easily stored and indexed in traditional formats or databases, which includes social media posts, including

tweets. The researchers need Twitter posts to be organized according to a special structure to fit research purposes (Marr, 2015). The archived tweets were retrieved from Twitter as data for this study according to specific criteria to set limits as follows:

7.1 Determining the Saudi cities and governorates in the code to retrieve the tweets from the participants' accounts. They are represented in the manner shown in Table 1.

Table 1 The Saudi cities and governorates entered with the code

Administrative region	Cities and provinces entered with the code
Riyadh	Riyadh, Almuzahimiyah, Alsulayyil, Afif, Alzulfi, Shaqra, Hotat Bani Tamim, Alaflaj, Wadi Aldawasir, Almajmaah, Aldawadmi, Alkharj, Alquwaiyah, Aldiriyah.
Medina	Medina, Almahd, Alula, Yanbu, Alhanakiya, Khaybar, Badr.
Makkah	Makkah Almukarramah, Jeddah, Alqunfudhah, Taif, Khulais, Rabigh, Turbah, Rania, Alkhurma, Aljumum, Adham, Maysan, Almawiyah, Alardiyat, Bahrah, Allaith.
Eastern	Dammam, Alqatif, Hafar Albatin, Aljubail, Alahsa, Alkhafji, Abqaiq, Alnairyah, Ras Tanura.
Qassim	Alrass, Buraydah, Unaizah, Albukayriyah, Almithnab, Alasyah, Albadai, Alnabhaniyah.
Asir	Alnamas, Bisha, Khamis Mushait, Abha, Dhahran Aljanoub, Muhayil Asir, Sarat Abidah, Tathleeth, Rijal Almaa, Balqarn, Bariq, Ahad Rufaidah, Almajardah
Tabuk	Tabuk, Daba, Taima, Alwajh
Hail	Hail, Alhaet, Baqaa
Jizan	Jazan, Atoul, Alarda, Ahad Almasrha, Aldaer, Damad, Aldarb, Baish, Abuarish, Samtah, Sebia
Al-Baha	Albaha, Baljurashi, Almakhwah, Qilwa.
Northern Borders	Rafha, Arar, Turaif
Al-Jouf	Dumat Aljandal, Tabarjal, Sakaka, Alqurayyat
Najran	Najran, Sharurah.

Specifying the geographical area: Kingdom of Saudi Arabia

7.1.1. Defining the keyword: #distance_education

7.1.2. Determining the time range for tweets: [older date - newer date]

7.1.3. Determining the historical period: Summer semester from 14/6/2020 to 20/8/2020; the first semester from 30/8/2020 to 11/12/2020

7.1.4. The Gregorian calendar was adopted to comply with Twitter's policy. It was limited to December, 11 because the remaining period of December coincides with the end-of-semester exam period: face-to-face attendance.

7.1.5. Determining the language of writing: Arabic.

7.1.6. Extracting the identification number of the tweets (ID) to exclude the repeated items and not to save them automatically, provided that they include the user name, the explicit or default identifier, the number of followers, the location, the

tweet link, the time of the tweet, the text of the tweet, the number of likes, the number of retweets, and replies.

The identification of cities and governorates was done, then the geographical location, because some users do not allow access to the geographical location accurately or do not give accurate data in their personal profiles. As an attempt by the researchers to adjust more accuracy to the limits of the study, cities and governorates were written in detail, then the country as a whole in more than one defining format.

8. Data statistics

The archived tweets were retrieved for the case study without adjusting the geographical boundaries of the Kingdom of Saudi Arabia, to show them in total during the two specified study periods. It was previously mentioned that some users may be within the specified geographical area, but it was not allowed to provide location data. Then, the number of tweets shared during the two specified periods was counted, with the geographical borders of the Kingdom of Saudi Arabia being adjusted. The statistics for the two cases are shown in Table 2:

Table 2 Statistical data of the study participants

No.	Period	The number of tweets without setting the geographical borders of the Kingdom of Saudi Arabia	The number of tweets with setting the geographical borders of the Kingdom of Saudi Arabia
1.	14/6/2020*	28887	3880
2.	20/8/2020*	63030	16222
Total		91917	20102

*Taken from the academic calendar of the Saudi Ministry of Education

As shown in Table 2, the researchers used tweets written from accounts that made it possible to know their geographical location, and excluded from them the tweets of everyone who participated in the hashtag and whose location was blocked; to set the geographical borders of the Kingdom of Saudi Arabia, and thus get accurate results.

9. Study data criteria:

After retrieving and saving the tweets, they were initially manually examined to identify their characteristics so that the data could be analyzed to achieve the study's objectives. In light of this, the researchers divided the tweets into two time periods and three categories according to a common characteristic of the username to get accurate results. Accordingly, a file was classified and saved for each category as follows:

- General education category: It includes all accounts of official institutions in General Education, such as schools, supervision offices, education departments, and the account of the Ministry of Education (General). This category was limited through an automated command to create a list of data according to the keywords of the username [kindergarten, primary, intermediate, secondary] in a separate file.

- Higher Education category: It includes all accounts of official institutions in Higher Education, such as universities and their affiliated deanships and departments, in addition to the account of the Ministry of Education (Higher Education). This category was limited by an automated command to create a list of data according to the keywords of the username [a university, the university, a college, the college, affairs, KKUx, KKU,

technology, a deanship, the deanship, Ministry of Education, training department, an institute, the institute] in a separate file.

- Public opinion category: through an automated command to create a list of data according to the keywords [newspaper, news, urgent, Okaz, channel, SPA, Saudi hashtag] in a separate file.

After collecting the tweets and dividing them according to categories, some keywords were identified to save these categories in their own lists, as previously mentioned. After classifying and saving the files automatically for each category, they were reviewed manually to delete what was included automatically but did not belong there. The error that was dealt with at most in the General Education and Higher Education categories because they share some keywords. Then, a repetition test was conducted in the study files for the three categories. It was found that there were repeated values in the two categories of Higher Education and General Education, which were all removed. As for the public opinion category, it was not clear from the test that there were repeated values in it.

10. Distribution of participants:

The study participants were classified based on a number of variables as follows:

A- Study participants according to the number of accounts in each category:

Table 3 The participants in the study according to the number of accounts in each category

Category	No. of accounts
Higher Education	51
General Education	1388
Public opinion	66
Total	1505

Table 3 shows that the General Education category, which consisted of (1388) participants, is the most, followed by the two categories of public opinion and Higher Education, with (66) participants in the former and (51) participants in the latter. This is due to the fact that the number of official General Education institutions is many times higher than the number of Higher Education institutions. However, they are limited accounts according to the number of socially active institutions, including those accessible via the Internet. In the total number of participating accounts, it became clear that they amounted to (1505) participating accounts.

B- Participants in the study according to the number of tweets in each period:

Table 4 The participants in the study according to the number of tweets in each period

Category	First period	Second period	Total
Higher Education	91	513	604
General Education	105	7176	7281
Public opinion	112	503	615
Total	308	7994	8500

Table 4 shows that the General Education category is the most participating in the hashtag with (7281) participation tweets, followed by the public opinion and Higher Education categories with participation tweets in the first of which reached (615) and in the second

(604). As for the total number of tweets shared, it became clear from Table 4 that they reached (8,500) tweets. The researchers believe that the arrangement of the number of participating tweets for the categories from highest to lowest is directly proportional to the arrangement of the number of participants' accounts for the two categories of Higher Education and public opinion. As for the General Education category, it turns out that the accounts participating in it are active in the hashtag.

11. Answering the research questions:

To achieve the main objective, the study followed the following steps:

1. How was distance education in the Kingdom of Saudi Arabia from the point of view of the participants in the hashtag #distance_learning during the COVID-19 pandemic crisis?

Data pre-processing is one of the most important steps in text analysis and classification systems, as specific words are the basic units that are passed to the subsequent processing stages. This step improves the quality of the data and thus enhances the efficiency and accuracy of the mining process, which includes extracting important information from a huge amount of information by following certain mechanisms (Qamar & Alassaf, 2020). The answer to this question was obtained by extracting the word cloud and the most frequent hashtag with the specified study tag. The word cloud was considered an effective summarization technique that highlights the important words in the text and indicates the importance and frequency of these words depending on their size in the cloud (Kumar, Morstatter, & Liu, 2014).

The Natural Language Toolkit (NLTK) was used to do pre-processing to get the word cloud:

- Splitting the tag words (replacing the _ sign between words with a blank space)
- Replacing the username with a blank space
- Converting links (www. or https://) to a blank space
- Using a hashtag sign (#) instead of the word itself in particular, the most frequent hashtags in the word cloud were confined and displayed to show words in the cloud that were originally hashtags.
- Removing punctuation and normalizing tweets by default.
- Checking to see if the word is in the dictionary (it contains two letters)
- Removing numbers, English letters, and single meaningless letters
- Removing stop words (Bonzanini, 2016)
- Storing the output in a new "clean text" column for each category.
- Splitting the dataset into the three periods and creating a word cloud for each period in each category.
- Creating the word cloud for the two periods in each category. The hashtags were also extracted from the original "tweetTEXT."

2. What are the factors affecting the reality of distance education in the Kingdom of Saudi Arabia from the point of view of the participants in the hashtag #distance_learning during the COVID-19 pandemic crisis?

The study found the factors affecting the reality of distance education in the Kingdom of Saudi Arabia, from the point of view of the participants in marking distance education during the COVID-19 pandemic crisis, with two different mechanisms:

By taking the first 30 tweets from each historical time period for each of the study categories and manually analyzing the content based on the factor that affected it and the tweet's content. This brings the total number of tweets manually analyzed to 180. The use of this mechanism aimed to study the impact of the historical dimension on the factors, the sudden shift to distance education in the summer semester, and preparation and readiness in the first semester that followed.

- By taking the most liked tweets, retweets, and responses for each category of the study, then filtering the content and taking the tweets that participated in the fifty likes, retweets, and responses, we can analyze the content manually in light of the factor influencing it according to the content of the tweet. In this method, the number of tweets for each category differed because of the difference in consensus among the participants. The use of this mechanism was in accordance with the policy of default applications and their users in that the most influential is the most agreed-upon and unanimous.

According to the content of the posts in the hashtag, the classification of the type of factor was done by a researcher and a research assistant for each mechanism, with the analysis being repeated twice over different time periods. This is to achieve conformity (emphasis), which aims to "reach the same interpretations of the meanings and connotations that the first researcher reached" (Alabdulkarim, 2012, p. 79). Based on the content of the tweets, the following classification was made:

- The technological factor: explicit and implicit references in the text to the use of technological means in education
- Social factor: explicit and implicit references in the text that expressed a change in the structure of society, as well as explicit and implicit references in the text that expressed the values, attitudes, ideas, and knowledge of society towards distance education.
- The health factor: clear and hidden signs of the COVID-19 pandemic and how it affects the health of people in the community.
- The economic factor: explicit and implicit signs of support, material savings, or price inflation

In the classification of factors, the researchers did not mention the political factor or the environmental factor for the lack of relevant content, considering that the Royal Order to convert education to distance education, or its continuity, was taken from the perspective of a social factor that brought about a change in the structure of society. In addition, references were made to easing traffic congestion or the poor quality of some school buildings as an educational institution with regard to the content of the tweets.

3. What do the participants think about distance education in the Kingdom of Saudi Arabia as expressed in the hashtag #distance_learning over time during the COVID-19 pandemic crisis?

The answer to this question is eliminating the content of scattered or distracted tweets, which reduced the number of tweets processed with this goal in each category and period. Part of the data was filtered through a linguistic dictionary of words in terms of their positive and negative connotations (Kumar et al., 2014), followed by applying the same pre-processing as was applied in the first objective measures, and storing the output in a new "clean text" column for each category and period.

After that, the supervised machine learning approach was applied as one of the most used in research (Ghallab et al., 2020), which originally needed external help. The data set is divided into two parts: the training data set and the test data set. The support vector machine (SVM) algorithm is trained on training data that requires the input of the tweets' attributes and emotional fingerprints. The result is a training model to be used in classification or prediction on the test data set, in which the resulting training model is

used to predict the emotional fingerprints of the test group, that is, the classification of the opinions about the text, whether they are positive, negative, or neutral (Alobaidi, 2019).

12. Study results and discussion:

12.1. Results related to the first question

How was distance education in the Kingdom of Saudi Arabia from the point of view of the participants in the hashtag #distance_learning during the COVID-19 pandemic crisis?

In order to answer this question, the tweets were extracted from each period. The most common words in aggregate in the form of a word cloud; the other tags associated with the hashtag #distance_education were limited to indicating the words within the cloud that are due to a tag in their origin or in large part, as previously explained in the procedures for answering this question. The results are as follows:

A. First period:

Figure 1 The most frequent words in the first period

General Education Category

Higher Education Category

Public Opinion Category

Figure 2 The most frequent hashtags in the first period

General Education Category

Higher Education Category

Public Opinion Category

Due to the cloud of the most frequently used words and hashtags, and by referring to the content of the tweets during this period, it became clear that they expressed the general education institutions' preparations for the "new academic" semester: 2021, return with caution. The consensus is that "we are all responsible" by calling for diligence to take precautionary measures and referring to mechanisms for returning to school through the Madrasati platform and the virtual kindergarten for early childhood. It indicated ways to access and use them via smart devices. The official accounts also announced the dates and mechanisms for handing over textbooks to the parents of students. As for Higher Education, despite the continuity of the pandemic, education in its institutions returned with caution in the summer semester through virtual classes under the concern of social responsibility: "We are all responsible." The continuity of the distance educational process was monitored on a weekly basis with statistics.

For its part, the public opinion category dealt with the task of informing about the Ministry of Education's mechanisms in the new academic year with the continuation of caution against the COVID-19 pandemic during this period. It instructed the Madrasati platform to serve as an electronic intermediary between the learning parties in order to begin teaching online. It also conveyed the concern of families about private school fees, the cost of electronic devices, and Internet connections for families in general receiving social security benefits. These families receive financial support from the government of the Kingdom of Saudi Arabia, estimated at SAR 1,000 for each student in the General Education stages.

B. Second period

Figure 4 The most frequent hashtags in the second period

General Education Category | Higher Education Category | Public Opinion Category

It is clear from Figure 1 and Figure 2 for the General Education category that the preparations for the start of a new academic year were in place, as social anxiety did not appear from the pandemic as a health effect nor from technology as a main condition for the continuity of learning. General Education institutions demonstrated their patriotism by commemorating Saudi National Day and International Teacher Day. It activated the Madrasati competition and organised all in its media files. With the continuity of the pandemic, distance education in Higher Education institutions in the Kingdom of Saudi Arabia continued with a cautious return to proceed with the realisation of the Saudi Vision 2030, according to the directives of university presidents to control the safe return of academic courses according to the nature of the courses, whether applied or theoretical. They prepared academic programs to suit the conditions of the pandemic and a safe return, with a weekly follow-up of the educational process. This was supported by the media and communication centres in Saudi universities through their official channels to keep abreast of what is happening in terms of following up the education process. They activated official events through their channels and virtual classes, the most important of which was the National Day. Although the transformation of distance education was imminent, Higher Education institutions sought quality and academic accreditation. The pandemic or the transformation of distance education did not affect their goals.

The public opinion category also declared at the start of the second period the Royal Order to continue distance education during the semester as a COVID-19 pandemic prevention in general education, higher education, and technical training institutions, provided that the exams are conducted face-to-face in accordance with the applicable controls. Following the success of the experiment, the Kingdom of Saudi Arabia considered distance education as a strategic choice for the future. The Madrasati platform and IEN channels operated in order to ensure the continuity of the educational process.

Totally, for the two periods, it is clear in the category of General Education for the two historical periods that awareness and technological qualification emerged from the various accounts of this category, most of which dealt with posts that include the guide for the Madrasati platform addressed to students and parents. Some of them also included guides for using the platform. Some tweets were directed to parents at the beginning of the school year, explaining how to distribute books to them in schools according to a special schedule while adhering to precautionary measures. As for the second period, the educational concern for the continuity of education became clearer than the previous one, as "everyone's efforts came together to challenge the difficulties with vigour and determination." "We continue to give; we continue in distance education via the Madrasati platform," noting that "the role of parents is closely linked." Concerning the success of the distance learning process, a good educational environment was provided for students, based on cooperation with the school and continuous follow-up of the children to achieve positive and effective participation in the educational process. "Distance education created a conscious generation that possesses the elements of self-education, digital intelligence skills, and development." "Continuous education requires us to support our children in acquiring the skills that will support them in their education, and distance learning is proof that the learning process does not stop at certain limits and that learning is continuous and fruitful, even if it is remote."

For the category of Higher Education, the results of the first period highlighted the follow-up of the educational process during the summer semester. The official account posts provided weekly data showing the progress of the educational process during it. In addition, there was a report on the progress of the electronic final exams and evaluation processes for the summer semester, together with the learning system and the statistics of the educational hours that the summer semester students benefited from through the virtual classes and the discussion boards. It also provided statistics on technical support operations for beneficiaries. As for the second period, despite the cautious return, different Higher Education institutions paid attention to the university’s relationship with society and the realization of Saudi Vision 2030. Jouf University published its community initiatives, including celebrating the National Day, and presented a package of programs, scientific and cultural competitions, and community contributions to celebrate this precious occasion. It also celebrated International Children's Day by organizing a number of scientific activities and holding the second conference to enhance the role of Saudi women in community development. It also announced, via the Deanship of Community Service and Continuing Education, many scientific and training programs to serve all segments of society. These programs benefited more than 1,000 individuals. Additionally, College of Dentistry clinics provided services for various groups of society, reaching nearly 51,000 beneficiaries. It also launched the community e-education initiative on modern technologies, electronic transactions, and computer fields.

As for the first period of public opinion, it focused on the study mechanism during the new academic year. It indicated that the Ministry of Education had adopted training school leaders and supervisors to use the tools on the Madrasati platform. It began by nominating teachers to work in the evening to record study materials on television for all levels to be used in remote education. In addition to coordinating with the Takaful Foundation for families registered in Social Security to provide devices for their children to follow up on studies and to ensure full readiness to receive the new academic year and

deal with all circumstances. In the second period, the public opinion category reported on the statements of the Minister of Education and the Ministry's decisions regarding the manner and mechanism for continuing education in the school year during the COVID-19 pandemic. It was reported that male and female teachers were approved to attend remotely with their students in virtual classes, with their attendance at school one day a week at the very least, in coordination with the school administration. The Education Office may make exceptions for cases that are difficult to come to school. It also determined the working hours of the administrative staff in schools and the time of classes for all stages during the first seven weeks. After that, the Ministry of Education began evaluating the educational process after five weeks of the first semester had passed to consider the extent to which distance education would continue through the Madrasati platform for the remainder of the first semester or the return to face-to-face study. Based on the evaluation, the educational process was proceeding better than planned. Ninety-seven percent of the teachers participated in the educational process remotely, and more than 90% of the male and female students attended the virtual classes. The ministerial evaluation of the educational process continued through the platform on a weekly basis. Accordingly, it was approved that exams for the year's work be conducted for the first semester through "Madrasati," with distance education continuing for the remainder of the first semester in General Education, Higher Education and technical training. At the end of the semester, the accounts published a statement from the General Education Spokesman that "the tests will be remote, and the attendance tests remain an option according to three conditions. We thank the teachers for their efforts during the pandemic."

All in all, the report of the efforts of the Ministry of Education in the Kingdom of Saudi Arabia (2020) issued by the Arab Bureau of Education for the Gulf States (2020) clarified the options for enabling teaching and learning in General Education schools. It is expected that 70–80% of the total students will study for the academic year 2021 AH through the Madrasati platform and 20–30% through IEN virtual channels. The Ministry prepared to follow up on the continuity of the educational process with reports, dashboards, and the number of channel views. In order to meet the expected challenges, various means were provided to ensure the continuity and flexibility of all students' access to education, such as the Madrasati platform, the virtual kindergarten, IEN satellite channels, and IEN lessons. The Ministry of Education also confirmed the existence of the necessary capabilities to obtain the means of education through community services provided by official bodies such as the Digital Empowerment Initiative provided by Takaful, support to facilitate the distance education process by the Ministry of Human Resources and Social Development, and certain packages to facilitate access to internet networks by the Ministry of Communications and Information Technology.

The National E-Learning Index Report (National Center for E-Learning, 2020), applied in the fourth quarter of 2019, also showed that 100% of Higher Education universities have a department or deanship for e-learning at a distance. They are interested in developing faculty members and support staff. They offer programs for continuous professional development, and 81 % of them repeat them every semester. In addition, 95% of these universities seek to identify the challenges and difficulties facing all target groups by measuring the impact of electronic distance education on faculty members, students, systems, and support to improve it. It indicated the support it needs in various elements, the highest of which was tools and technology, financing, and training. The directive issued by the Ministry of Higher Education seek to activate distance education as much as possible in Resolution No. 81447 dated March 13 2020.

As for the mechanisms of learning and education and ways to access them, in the report by Mann, Schwabe, Fraser, Fülöp, and Ansah (2020), students indicated that the educational resources that were used to support the academic experience during the inability to attend school were educational packages, educational television channels, and

distance e-learning provided by the same teachers who teach students, as well as distance e-learning provided by private tutors. A reasonable number of students were able to follow the explanation of all or most of the curricula. Access to the Internet was an important issue that was repeated in all stages of the study, as technical resources formed a strong trend in all stages of the study. The possibility of accessing the Internet in general and the ability of the available network to meet the needs of e-learning emerged as a recurring theme among the participants, including the possibility of accessing the Internet from schools and homes alike (National Center for E-Learning, 2020).

These results explain the conclusions of some previous studies that there is a positive activation in the use of educational platforms in light of the COVID-19 pandemic (Alshahrani & Alshehri, 2022; Alshamrani, 2022; Aliraqi, Alotaibi, & Alosaimi, 2021; Alobthani, 2021), in addition to what was concluded by Hariri (2021). Artificial intelligence applications and e-learning systems were used as aids to the learning process in Saudi universities during the ban period. Alshammari and Alshammari (2020) showed that faculty members at the University of Hail were able to master digital teaching skills via Blackboard at a high level. The sample agreed that the use of digital evaluation via Blackboard is not honest to a great extent and does not measure learning outcomes effectively. Regarding the examination mechanism in particular, Alsubaie (2020) presented a moderate degree of approval towards the reality of the use of electronic evaluation by faculty members at Prince Sattam bin Abdulaziz University in light of the COVID-19 pandemic. Omar and Alyoussef (2020) also showed that there is a high degree of satisfaction from the point of view of students at King Faisal University regarding the use of the electronic evaluation. The satisfaction of male students with the reality of their employment is higher than that of female students. The satisfaction of students in humanities colleges is higher than that of students in scientific colleges. Furthermore, Alshamrani (2022) concluded that as a tool for evaluating postgraduate students, there is an alternative evaluation based on performance tasks and open-ended questions.

12.2. Results related to the second question:

What are the factors affecting the reality of distance education in the Kingdom of Saudi Arabia from the point of view of the participants in the hashtag #distance_learning during the COVID-19 pandemic crisis?

To answer this question, we looked at how people used the hashtag #distance_education during the COVID-19 pandemic crisis to talk about the reality of distance education in the Kingdom of Saudi Arabia. Based on the historical period and type of category, we found the following:

According to historical data, the factors influencing the reality of distance education in the Kingdom of Saudi Arabia as seen by participants in the hashtag #distance_learning during the COVID-19 pandemic crisis are as follows:

The average percentage of the factors influencing the reality of distance education in the Kingdom of Saudi Arabia was calculated from the point of view of the participants in the hashtag #distance_learning during the COVID-19 pandemic crisis in the two historical study periods to come up with an overall presentation of it in each period as a whole. The results are as follows:

Table 5 The average of the factors affecting the reality of distance education in the Kingdom of Saudi Arabia, from the point of view of the participants in the hashtag #distance_education, in the total of the two periods

Factors	Average for first period	Average for second period	Average
Social	51.97 %	38.8 %	45.38 %
Technology	32.83 %	31.3 %	32.07 %

Health	11.53 %	24.9 %	18.22 %
Economic	3.43 %	4.93 %	4.18 %

B- The factors affecting the reality of distance education in the Kingdom of Saudi Arabia from the point of view of the participants in the hashtag #distance_learning during the COVID-19 pandemic crisis, according to the type of category:

The average percentages for each influencing factor in each category of the study were calculated, and then the average percentages for the influencing factors were calculated as follows:

Table 6 The average of the factors affecting the reality of distance education in the Kingdom of Saudi Arabia, from the point of view of the participants in the hashtag #distance_learning in the study categories and their totality

Factors	General Education	Higher Education	Public Opinion	Average
Social	66.67%	50 %	44%	53.55 %
Technology	27.78%	30.76 %	30%	29.51 %
Health	5.56%	19.23 %	18%	14.26 %
Economic	0%	0 %	8%	2.67 %

It is clear from Tables 5 and 6 concerning factors affecting the reality of distance education in the Kingdom of Saudi Arabia from the point of view of the participants in the #distance_learning hashtag in the average of the two periods and the three categories that the social factor is the most influential in both mechanisms. The measures to impose social distancing and its consequences have had the greatest impact on the progress of the educational process by bringing about a sudden change in the pattern of education commensurate with the need to adhere to social responsibility in the face of the COVID-19 virus, which led to school closures. As for the system of values, beliefs, standards, and norms that define the individual's way of life, roles, and responsibilities, in the case under study, the pandemic introduced several changes in the individual's way of life. For example, distance education replaced the traditional educational pattern. Distance education necessarily required different roles and responsibilities, so staff became facilitators of learning, and the learner is the focus of the educational process based on the principle of self-learning. Families played pivotal roles that were not the same in the traditional education pattern before that. The primacy of the social factor in influence despite the importance of the technological factor indicates that society's culture towards extraneous variables (alternatives) is what determines its continuity and adoption. The primacy of the influence of this factor in distance education is not explicitly expressed in any of the field literature reviewed by the researchers. However, this is more implicitly evident in the historical origin of distance education given the time discrepancy between Phillips' announcement in 1728 and the Pittman program in 1840. It was not accepted and approved until after the demand for it increased (Almutairi, 2022).

After the technological factor during the pandemic, this particular factor has had the most impact on the distance education scene throughout its history, as was explained in its historical origin. Education, in its origin, is the product and supplier of technology, but it leads to learning of different types and objectives. As a result, it is necessary to develop educational technologies capable of keeping up with non-scientific technologies in order to establish real learning.

These two factors were followed by the health factor, which in turn was the engine of the paradigm shift in the pattern of education globally during the period under study. However, its late ranking after the social and technological factors indicates a somewhat

low level of health anxiety among the study population. This is a good indicator that was reflected in the results of the third objective of this study. Public opinion shared that #The_Kingdom with its leadership and people always proves to the world its strength, distinction, and progress at all levels. With the generous support of the wise leadership for this important sector, the #Ministry_of_Education reflected this distinction through its cadres of countrymen in continuing education without stopping for one day, in light of the #Corona_pandemic.

In the least influential of these factors, the economic factor's occupation of the last rank is consistent with what was stated in the Saudi Digitization Report (Trend, 2020) that 86.8% of households have the Internet, and 92% of them own smart phones, except for computers (57%) and tablets (34%), and that 93% of the total population are Internet users. Therefore, ways to enable students and their teachers in General Education and Higher Education to access education and learning are already available. The economy of families did not significantly affect the course of the education process during the period under study, except for some posts, including that #distance_education revives computer sales. The price increase reaches 20%. Tweeters and parents see the need for the Ministry of Education to intervene to reconsider private school fees after adopting a distance education study plan for the first few weeks of next year.

These results support what was stated by the local studies applied in the Kingdom of Saudi Arabia. At the level of the technological factor in General Education, the study of Abuababa (2021) concluded with a high evaluation of the level of communication and the technology used. However, the results of the Almufiz study (2020) in identifying the level of technical readiness of General Education schools applying the Future Gate platform came in third place with a medium approval degree. The challenges that Alobthani (2021) concluded focused on technical problems and internet outages, or the limited availability of high-speed Internet and the occurrence of some technical malfunctions of the platform and insufficient technical support, as concluded by Alshahrani and Alshehri (2022). In Higher Education, the Saed initiative has influenced enabling faculty members to use the learning management system (Blackboard) and increased their motivation towards using it (Altuwaijri, Alsaadoun, & Alkhawaja, 2020). The use of distance education strategies by faculty members at Jouf University was moderate, along with their skill in using distance education tools in the educational process (Aldaghmi, 2021). In international studies, the study of Ibrahim and Aburawi (2020) showed the impact of this factor in the presence of technical obstacles. Many Arab universities cannot keep up with the speed of technological developments in the field of education. Oyaba and Saleh (2020) showed the impact of this factor and its problems in the failure of 60% of students to enter the electronic platforms.

As for the social factor, its impact on education was partly due to the exchange of roles between the teacher and the family. The parents did not accept the idea that the teacher is only a facilitator of learning and that the pivotal role is based on the student with follow-up from his family according to the principle of self-learning, as "the evaluation of the experiment was based on the teacher's level being moderate" (Abuababa, 2021). In light of this, Hoq (2020) emphasised the importance of integrating e-learning into the education system, which shifts teachers' responsibilities from distributing learning materials to providing stimuli for students. Globally, Bozkurt et al. (2020) endorsed this, as they concluded that there are supportive communities and mechanisms in which parents bear a heavy burden for regular daily or professional duties and emerging educational roles, and that all parties suffer from trauma, stress, and anxiety to varying degrees, which necessitates care, affection, and sympathy educationally.

It may also be shown in the absence of a good educational attitude, such as a lack of self-discipline (Bao, 2020; Bisaria, 2020). However, the role of the family as one of the institutions of social control, as indicated by Almahjan (2022), remains effective in reducing the phenomenon of cheating among students during their distance learning, in

order to overcome the challenge of evaluating student learning, concluded by Alobthani (2021). It may also be the lack of appropriate learning materials, or good virtual learning environments. (Bao, 2020; Bisaria, 2020) The study of Oyaba and Saleh (2020) also concluded that the student should make an additional effort to learn. On the part of the teacher, length of experience in teaching and specialization were closely related to readiness for distance education (Alea et al., 2020). Teachers also re-perceived distance learning in a new way, and adapted tasks to the new format of lessons (Basilaia & Kvavadze, 2020). In addition, the university administration does not encourage the use of distance education because they believe that direct education is better (Ibrahim and Aburawi, 2020).

In the economic factor, the studies of Ibrahim and Aburawi (2020) and Oyaba and Saleh (2020) indicated some financial obstacles that faced the distance education experience during the pandemic. They include the lack of financial allocations for distance education purposes, the low economic level of some students, and the high material cost of distance education. However, Bisaria's study (2020) reported that this experience reduced the need for travel, was inexpensive, and provided flexibility in timing. On the teacher's side, the study of Alia, Fabrea, Roldan, and Farooqi (2020) showed that the geographical location of teachers is closely related to their readiness for distance education, due to the fact that the level of services and readiness in urban areas is better than in remote areas.

12.3. Results related to the third question:

What do the participants think about distance education in the Kingdom of Saudi Arabia as expressed in the hashtag #distance_learning over time during the COVID-19 pandemic crisis?

In order to answer this question, the participants' opinions towards distance education in the Kingdom of Saudi Arabia were defined in the hashtag over time during the COVID-19 pandemic crisis. According to the type of category (General Education / Higher Education / public opinion), and according to the historical period (first period and second period), negative, neutral, and positive, in which the percentages for each opinion in each category and each historical period were calculated and graphically represented in two independent forms, the results are as follows:

Table 7 The percentages of participants' opinions score towards distance education in the Kingdom of Saudi Arabia over time during the COVID-19 pandemic crisis

Period	Percentage of positive opinions	Percentage of neutral opinions	Percentage of negative opinions	Categories	Percentage of positive opinions	Percentage of neutral opinions	Percentage of negative opinions
First	26.76%	63.05%	10.18%	Higher Education	27.70%	66.33%	5.90%
Second	35.54%	56.98%	7.47%	General Education	46.12%	49.19%	4.60%
				Public opinion	19.38%	74.35%	6.25%

It is clear from Table 7 that the neutral opinion predominates in the #distance_education hashtag. There was a lack of negative opinion towards this different experience. The positive opinion was between the other two opinions. Despite the conclusions of the study of Samuel, Ali, Rahman, Esawi, and Samuel (2020) about the growth of fear views and negative opinions among the participants on Twitter. For the first period, the negative opinion increased compared to the second period for economic reasons, including private

school fees and inflation in the prices of electronic devices, except for the main health reason (COVID-19) and some other technical reasons such as poor internet connection for some. For the second period, the positive opinion towards education increased compared to the first period, the negative opinion decreased, and the neutral opinion was more likely. This is due to the clarity of the distance education policy resulting from the readiness and willingness to provide educational means and resources to go through the different educational experiences, as concluded by the study of Alsayed and Sayyaf (2021).

As for the opinion of the participants about distance education in the Kingdom of Saudi Arabia over time during the COVID-19 pandemic crisis, according to the type of category, General Education was the most positive among the three categories. This is due to the success stories achieved by teachers in distance education and the commitment of school employees and their eagerness to achieve the desired educational goals, together with the continuous support of education departments and offices. In addition, professional learning communities were activated to share technological experiences through hashtags, which support Power's (2013) argument that Twitter promotes the formation of shared knowledge and that teachers facilitate the sharing of ideas outside the classroom through it, as well as students' acceptance of the distance education experience. The participations in this category, in their entirety, expressed the readiness of schools and the willingness of their employees to answer the inquiries of students and their parents, and the students' gratitude for the success of their distance learning experience and overcoming challenges thanks to the school's cooperation with the family, in addition to the institutional efforts made and the employment of virtual laboratories in education. This experience was done remotely, through which students were enabled to apply experiments as if they were in the laboratory in reality, in addition to active cooperation between teachers in exchanging technological knowledge to build methods and strategies for distance education and evaluation.

The category of Higher Education was less positive than General Education, but more negative. This could be due to the fact that, despite higher education's policy and prior readiness to adopt some electronic courses for study programs, With the pandemic and the conversion of large numbers of students to the e-learning system, it was found that the servers of the electronic systems used were insufficient compared to the number of students. Some institutions of Higher Education were directed to address the problem in terms of a media statement saying that #Saudi_Electronic_University provides the educational platform "Blackboard" and allocates a technical support unit for all Saudi universities around the clock. Therefore, the university rector directed to add a new server to the single-entry portal to increase the capacity of users. A direct link to the Blackboard system was also activated.

As for the public opinion category, it was the most negative. This is due to the nature of this category's participation in transmitting educational developments and news, thus seeking public satisfaction and conveying its voice, which is required by its media function.

These results are supported by the report by Mann et al. (2020), when participants were asked to estimate the effectiveness of their strategy for the continuity of distance education compared to what students usually learn in schools, and the responses from Saudi Arabia were among the most positive of all countries. In the National Center for E-Learning Report (National Center for E-Learning, 2020), students, faculty, and staff also reported largely positive experiences and perceptions of the distance education experience.

The results of the positive opinion explain what was found locally by Abuabaya (2021): that the distance education experience in primary schools in Riyadh in light of the COVID-19 pandemic was successful from the point of view of parents and to a high

degree. This is because the level of organizational, human, and technical readiness of General Education schools is generally high (Almufiz, 2020). Pinar and Dönel's (2020) study confirms students' positive attitudes towards distance education and how it aids in the possibility of repetition and strengthening of learning. Students expressed their feelings as if they were in school, and they had the opportunity to ask questions and receive answers immediately. In addition, the study by Basilaia and Kvavadze (2020) concluded that the rapid transition to distance education was successful.

These results also explain, at the level of Higher Education locally, what Alsayed and Sayyaf (2021) reached with a high degree: the distance education policy in the universities of the Kingdom of Saudi Arabia is clear. The conclusions of Alenzi's study (2020) indicate a positive opinion towards the reality of distance education and electronic courses in light of the challenges of the COVID-19 pandemic from the point of view of students, faculty members, and parents of students. The study of Hoq (2020) showed positive opinions of the majority of teachers as well. In addition, Abdulrahim and Mabrouk (2020) confirm that digital learning during the pandemic was unique, contributed to improving learning outcomes for students, and that technological systems improve productivity and develop the learning environment. At the global level, these results explain what Oyaba and Saleh (2020) concluded: there is an adaptation to the crisis and an acceptable readiness for distance learning.

13. Study limitations:

1. One of the most important determinants of the current study is that its topic (distance education) is a contemporary social phenomenon to which a large proportion of Saudi society has adapted, regardless of their characteristics and educational roles: learners, teachers, staff, and parents. Thus, the results of the three questions in describing reality may not provide a significant addition to the reader in terms of the fact that one lived the experience in the present, but writing about it and describing it at present remains more accurate than its historical narration after the passage of time.

2. The results of this study are also determined by the text of the tweets written by the categories of participants according to the time limits and predetermined categories. Therefore, the results obtained may not provide the in-depth knowledge that the reader hopes to describe about reality.

14. Study recommendations:

According to the results of the study, the following recommendations are presented:

1. That the Ministry of Education in the Kingdom of Saudi Arabia work to continue developing the Madrasati platform for General Education, and to establish a separate electronic platform for Saudi Higher Education, with high technical capabilities for both platforms, according to international specifications that allow building a continuous educational platform for each learner, and make this data available to those concerned as an evaluation body for education and training, to enable them to study it and benefit from its results.

2. Involving the various institutions of society in developing the methodology for distance education is intended to inculcate their social values implicitly by enabling access to these institutions through official electronic channels, with the cooperation of the relevant Saudi authorities and ministries.

3. It is important to improve educational factors on a methodological, cultural, professional, and technical level in order to make distance education work the way we

want it to. The Ministry of Education in the Kingdom of Saudi Arabia is responsible for planning and following up on these programs.

4. The Saudi Ministry of Education should adopt the idea of dispensing with linking students' self-evaluation and identifying their weaknesses and strengths to crucial degrees that affect their academic future and contenting themselves with setting them merely to measure the level with the aim of reinforcement and feedback. This results in a sense of self-censorship and good digital citizenship.

5. The Ministry of Education should give full authority to teaching staff in general and in higher education. Traditional assessment methods and methods that focus on the cognitive side should be replaced with skillful and creative assessments of students, and they should be approved based on how well they do in school.

6. It is vital to provide educational mechanisms that help present educational content in an attractive manner for students. To ensure their mental presence, this can be done by providing the Saudi Ministry of Education with the profession of a specialised educational designer as an assistant to the teacher.

7. The Saudi Ministry of Education should let the learners decide on a good schedule for the school day so that there is less stress on the family.

8. Instilling a culture of "student learning is his responsibility" in accordance with the principle of self-learning on which distance education is based through community awareness campaigns based on educational institutions in Saudi society, both formal and informal, with the support and sponsorship of the Ministry of Education

9. That the administrations of educational regions in the Kingdom of Saudi Arabia work to form special educational committees to follow up on the developments of technology, research how to benefit from it in distance education, and direct the output to the Ministry of Education with proposed procedural mechanisms.

10. The Ministry of Education, in cooperation with the competent authorities, should hold training programs for its human cadres to aim at empowering them in the field of educational big data and benefiting from its analyses locally and globally.

11. The Ministry of Education should motivate its employees to acquire computer-based computational skills and take advantage of the huge data available on the Saudi Open Data Platform and others in pursuit of development in Saudi education by arranging moral and material incentives for competitions aimed at empowering them in this field.

References

Abbas, F. & Riah, R. (2018). Virtual interaction towards the concept approach in the light of virtual communities. Journal of Cultural Dialogue, 8(1), 37-83.

Abdulrahim, H., & Mabrouk, F. (2020). COVID-19 and the digital transformation of Saudi Higher Education. Asian Journal of Distance Education, 15(1), 291-306.

Abuababa, A. I. (2021). Evaluation of the Kingdom of Saudi Arabia's experience in distance education in light of the COVID-19 pandemic from the parents' point of view. Journal of the Islamic University for Psychological and Educational Studies, 29(3), 231-261.

Abuallam, R. M. (2014). Research Methods in Psychological and Educational Sciences, 9th ed. Universities Publishing House.

Alabdulkarim, R. H. (2012). Qualitative research in education. King Saud University Scientific publishing and printing press.

Alashwal, M. (2020). Assessing online teaching in higher education amid the COVID-19 pandemic: A case study from Saudi Arabia. Consciens conference on science and society USA, 68-72.

Aldaghmi, M. E. (2021). The extent to which faculty members at Jouf University applied distance learning strategies during the COVID-19 pandemic, using the Blackboard as a model. Journal of the Association of Arab Universities for Research in Higher Education, 41(1), 1-15.

Alenzi, A. M. (2020). The reality of distance education and electronic courses in light of the global challenges of the new COVID-19 pandemic on Northern Border University students from the point of view of faculty members, students and parents. Journal of Educational Sciences, 6(1), 217-255.

Alharthy, F. (2016). Educational discourse on social networking sites: A critical analytical study. Journal of the Faculty of Education in Educational Sciences, Ain Shams University, 40(1), 8-18.

Alia, L. A., Fabrea, M. F., Roldan, R. D. A., & Farooqi, A. Z. (2020). Teachers' Covid-19 awareness, distance learning education experiences and perceptions towards institutional readiness and challenges. International Journal of Learning, Teaching and Educational Research, 19(6), 127-144.

Aliraqi, R. M., Alotaibi, N. S. & Alosaimi, S. M. (2021). Electronic educational platforms in Saudi universities and their role in confronting the COVID-19 pandemic between reality and hope, a future vision. The Educational Journal of the Faculty of Education, Sohag University, 86(6), 987-1050.

Almahjan, A. N. (2022). The role of the family as one of the institutions of social control in reducing the phenomenon of cheating among students during their distance learning. Arab Journal of Educational and Psychological Sciences, 6(25), 49-78.

Almufiz, K. A. (2020). The readiness of the schools implementing the Future Gate platform for digital transformation in response to the COVID-19 pandemic in the Kingdom of Saudi Arabia. Journal of Educational Sciences, 6(1), 183-216.

Almutairi, J. F. (2016). Virtual societies and their role in developing moral values from the point of view of Qassim University female students. [unpublished master's thesis] Qassim University.

Almutairi, J. F. (2022). A future vision of distance education in the light of big data analysis for some segments of the virtual community. [unpublished PhD dissertation] Qassim University.

Alobaidi, R. Z. (2019). Opinion analysis of Arabic twitter tweets using support vector machine. Master's Thesis, University of Mosul.

Alobthani, F. O. (2021). General Education in the time of the COVID-19 pandemic: Madrasati Platform. Scientific Journal of King Faisal University, 22(2), 316-324.

Alsayed, A. A. & Sayyaf, A. M. (2021). The experience of the Kingdom of Saudi Arabia Saudi Arabia in the use of distance education to face the challenges of education in light of the COVID-19 pandemic crisis: Analytical and evaluation study. [Special issue]. Journal of the Islamic University of Educational and Social Sciences, 135-181.

Alshahrani, H. A. & Alshahrani, S. A. (2022). The reality of using the Madrasati platform from the viewpoint of secondary school teachers in Asir region. Journal of Young Researchers, Sohag University, (11), 122-150.

Alshammari, F. F., & Issa, A. (2020). The level of mastery of the faculty members at the University of Hail with the skills of digital teaching and the obstacles to that in light of the COVID-19 pandemic crisis from their point of view. Journal of Educational Sciences, 6(1), 257-293.

Alshamrani, S. M. (2022). Attitudes of postgraduate students at the Department of Psychology at Umm Al-Qura University about distance education: A qualitative study. Al-Qolzum Journal of Educational, Psychological and Linguistic Studies, (6), 149-166.

Alsubaie, A. M. (2020). The extent to which faculty members at Prince Sattam bin Abdulaziz University use electronic evaluation in light of the COVID-19 pandemic. Journal of Educational Sciences, 6 (1), 89-124.

Altuwaijri, O. M., Alsaadoun, I. A., & Alkhawaja, A. M. (2020). Evaluating the student assistant initiative "Saed" in overcoming the obstacle of faculty members using the Blackboard in

emergency education during the COVID-19 pandemic. Journal of Educational Sciences, 6(1), 127-150.

Arab Bureau of Education for the Gulf States. (2020). Efforts of the Ministry of Education in the Kingdom of Saudi Arabia in light of the COVID-19 pandemic.

Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. Human Behavior and Emerging Technologies, 2(2), 113-115. https://doi.org/10.1002/hbe2.191

Basilaia, G., & Kvavadze, D. (2020). Transition to online education in schools during a SARS-CoV-2 coronavirus (COVID-19) pandemic in Georgia. Pedagogical Research, 5(4), 1-9.

Bisaria, C. (2020). Perception of students towards online education during COVID-19 crisis. Alochana Chakra Journal, IX (V), 4328- 4337.

Bonzanini, M. (2016). Mastering social media mining with Python. Packt Publishing Ltd.

Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., & Rodes, V. (2020). A global outlook to the interruption of education due to COVID-19 Pandemic: Navigating in a time of uncertainty and crisis. Asian Journal of Distance Education, 15(1), 1-126.

Coe, R., Waring, M., Hedges, LV & Arthur, J. (2017). Research methods and methodology in education, 2nd ed. London: Sage.

Cope, B., & Kalantzis, M. (2015). Interpreting evidence-of-learning: Educational research in the era of big data. Open Review of Educational Research, 2(1), 218-239.

DOMO. (2017). Data Never Sleeps 6.0. https://www.domo.com/assets/downloads/18_domo_data-never-sleeps-6+verticals.pdf

Drigas, A. S., & Leliopoulos, P. (2014). The use of big data in education. International Journal of Computer Science Issues (IJCSI), 11(5), 58.

Ellis, D., Oldridge, R., & Vasconcelos, A. (2004). Community and virtual community. Annual review of information science and technology, 38(1), 145-186.

EMC. (2014). The digital universe of opportunities: Rich data and the increasing value of the internet of things. https://www.emc.com/leadership/digital-universe/2014iview/executive-summary.htm

Ghallab, A., Mohsen, A., & Ali, Y. (2020). Arabic sentiment analysis: A Systematic Literature Review. Applied Computational Intelligence and Soft Computing, 2020, 1-21.

Hariri, H. H. (2021). A suggested proposal for using artificial intelligence to support education in universities in the Kingdom of Saudi Arabia to confront the COVID-19 pandemic in light of benefiting from the experience of China [special issue], Journal of the Islamic University of Educational and Social Sciences, 320-363.

Henke, N. (2016). Does your data have a purpose? (4). McKinsey Quarterly

Henriksen, D., Creely, E., & Henderson, M. (2020). Folk pedagogies for teacher transitions: Approaches to synchronous online learning in the Wake of COVID-19. Journal of Technology and Teacher Education, 28(2), 201-209.

Hoq, M. Z. (2020). E-learning during the period of pandemic (COVID-19) in the Kingdom of Saudi Arabia: An empirical study. American Journal of Educational Research, 8(7), 457-464.

IBM (2012). What is big data? Bringing big data to the Enterprise. Retrieved on 12/ 8/ 2020 from; https://www.ibm.com/products/software

Ibrahim, A. & Aburawi, N. (2020). Obstacles to distance education at the university from the point of view of faculty members. Journal of Studies in Humanities and Social Sciences, 3(4), 259-294.

Jin, X., Wah, B. W., Cheng, X., & Wang, Y. (2015). Significance and challenges of big data research. Big Data Research, 2(2), 59-64.

Kandilji, A. & Al-Samarrai, I. (2009). Quantitative and qualitative research. Yazouri House.

Kumar, S., Morstatter, F., & Liu, H. (2014). Twitter data analytics. New York: Springer.

Lackey, D. (2019). How Much Data Do We Create Every Day? The Mind-Blowing Stats Everyone Should Read. https://blazon.online/data-marketing/how-much-data-do-we-create-every-day-the-mind-blowing-stats-everyone-should-read/

Mann, A., Schwabe, M., Fraser, P., Fülöp, G. & Ansah, G. A. (2020). How the COVID-19 pandemic is changing education: A perspective from inside in Saudi Arabia. Organization for Economic Cooperation and Development

Marr, B. (2015). Big data: Using SMART big data, analytics and metrics to make better decisions and improve performance. John Wiley & Sons.

National Center for E-Learning. (2020). The state of e-learning in Saudi Arabia Higher Education. National Center for E-Learning

Omar, M., & Alyoussef, I. Y. (2020). The reality of employing electronic evaluation at King Faisal University during the COVID 19 pandemic. Journal of Educational Sciences, 6(1), 151-181.

Oyaba, S. & Saleh, A. (2020). Evaluation of the distance education experience in light of the COVID-19 pandemic from the point of view of students: A case study at the University of Ghardaïa, Algeria. Journal of Studies in the Humanities and Social Sciences, 3 (3), 133-157.

Pınar, M. A., & Dönel A, G. (2020). The opinions of secondary school students about giving science courses with distance education during the Covid-19 pandemic. Journal of Current Researches on Social Sciences, 10(2), 461-486.

Power, K. A. (2013). Professional Learning on Twitter: A content analysis of professional learning conversations among self-organized groups of educators. Master's thesis, the University of Windsor.

Qamar, A. M., & Alassaf, M. (2020). Improving sentiment analysis of Arabic Tweets by One-Way ANOVA. Journal of King Saud University-Computer and Information Sciences. From; https://www.sciencedirect.com/science/article/pii/S1319157820305176

Raopn, A. & Baglodi, K. (2018). Role of big data in education sector: A review. International Journal of Advances in Science Engineering and Technology, 6 (1), 1-3.

Riahi, Y., & Riahi, S. (2018). Big data and big data analytics: Concepts, types and technologies. International Journal of Research and Engineering, 5(9), 524-528.

Samuel, J., Ali, G. G., Rahman, M., Esawi, E., & Samuel, Y. (2020). Covid-19 public sentiment insights and machine learning for tweets classification. Information, 11(6), 314.

Sandars, J., Correia, R., Dankbaar, M., de Jong, P., Goh, P. S., Hege, I., Masters, K., Oh, S. Y., Patel, R., Premkumar, K., Webb, A., Pusic, M. (2020). Twelve tips for rapidly migrating to online learning during the COVID-19 pandemic. MedEdPublish, 9, 1-14.

Stephens-Davidowitz, S. (2017). Everybody lies: Big data, new data, and what the internet can tell us about who we really are. Dey Street Books

Toquero, C. M. (2020). Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. Pedagogical Research, 5(4), 1-5.

Trend. (2020). Saudi Digitization Report. https://trenddc.com/report/2020/

Vaitheeswaran, G., & Arockiam, L. (2014). Big Data for Education in Students' Perspective. International Journal of Computer Applications, 975- 8887, 11-17.

Whalen, J. (2020). Should teachers be trained in emergency remote teaching? Lessons learned from the COVID-19 pandemic. Journal of Technology and Teacher Education, 28(2), 189-199.

Wotto, M. (2020). The Future of high education distance learning in Canada, the United States, and France: Insights from before COVID-19 secondary data analysis. Journal of Educational Technology Systems, 49(2), 262-281.

Yacci, M. (2000). Interactivity demystified: A structural definition for distance education and intelligent computer-based instruction. Educational Technology, 40(4), 5-16.