Perceptions of Hail University students of the interaction degree in distance learning based on virtual classrooms

تصورات طلبة جامعة حائل لدرجة التفاعل في التعلم عن بعد القائم على الفصول الافتراضية

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الملخص:

تجربة التعلم عن بعد هي تجربة جديدة في جامعة حائل. تستكشف هذه الدراسة تصورات طلبة جامعة حائل لدرجة التفاعل في التعلم عن بعد القائم على الفصول الافتراضية لستة أنواع من التفاعلات (تفاعل المتعلم مع المعلم، تفاعل المتعلم مع المحتوى، تفاعل المتعلم مع المتعلمين، تفاعل المتعلم مع النظام التكنولوجي، تفاعل المتعلم مع الواجهة الرسومية، تفاعل المتعلم مع موظفي وحدات الجامعة وإداراتها) من خلال مسح كمي للبيانات التي جمعت من 676 طالبا وطالبة من كافة المستويات والتخصصات خلال العام الدراسي 2020/2021. تشير نتائج الدراسة إلى أن درجة تقدير الطلاب والطالبات من كافة المستويات والتخصصات لعمليات التفاعل مرتفعة، وقد كان هناك اختلاف في الردود بناء على الجنس.

الكلمات المفتاحية: التعلم عن بعد، أنواع التفاعل، درجة التفاعل، تصورات، درجة.

Abstract:

The distance learning experience is a new experience at the University of Hail. This study explores students' perceptions of Hail University of the degree of interaction in distance learning based on virtual classrooms of six types of interactions (learner interaction with instructor, learner interaction with content, learner interaction with learners, learner interaction with the technological system, learner interaction with the graphical interface and learner interaction with the staff of the university units and administration. The study is done using the quantitative survey, where the study was conducted on 676 students of all levels and specializations during the academic year 2020/2021. The results of the study indicate that the degree of evaluation that made by male and female students from all levels and disciplines in connection with interactions is high. There was a difference in responses based on gender.

Keywords: Students, Types of interaction, Distance learning, Interaction degree, Perceptions.

Introduction

The due disease caused by the latest coronavirus led Hail University as other universities all over the world to stop face-to-face learning indefinitely and use distance learning as an alternative depending on Blackboard system as a central resource for learning management system.

The blackboard system provides tools that help to build a rich educational experience, create virtual classrooms, and participate in discussion forums, allowing more interaction between the learner, teacher and the community of learners as well. Through the blackboard, students can access and interact with content. All of this I done using electronic technology, which means that students interact with the technology system and the graphical interface of Black Broad

These interactions provide distant students with an almost real learning experience similar to that found in the traditional learning environment, as it supports their learning, and increases their academic achievement as evidenced by learning theories such as: social constructivism theory which described learning as a social process that occurs through social interaction, dialogue and negotiation between learners (Crane, 1996). In addition to the Connectivism Learning Theory, which indicated that the interaction does not only occur with humans, but also between humans, technological tools and content. This interaction is not necessarily to occur face-to-face, but rather through time and space (Wang et al., 2014)

The researchers studied the interaction in the context of distance learning Moore (1989) was the first to distinguish between three types of interaction: the interaction of learner with the content, the interaction of learner with the instructor and the interaction of the learner with his colleagues.

Moore developed the term transactional distance, to describe the interaction gap that exists in distance education due to geographical distance. The psychological and interactional gap between the learner and content, teacher and colleagues can be determined through the distance of the perceived transactions. Moore presumed that the distance of the transactions is inversely proportional to the interaction, so the greater the distance of the perceived transactions, the less interaction there will be, and vice versa (Reyes, 2013).

Hillman and Gunawardena (1994) followed Moore, who added the interaction between the learner and the graphical interface and then Bouhnik and Marcus (2006) described a fifth type, which is the interactions of the learner with the technological system.

Alhaj Hussein (2021) added the interaction between the learner and employees of the university's units and departments because it helps in supporting students'

learning and helping them to deal with the technical and psychological problems, they face.

Despite the importance of interaction in distance learning, few studies have searched about its degree, including the Mash et al. (2006) study that tried to uncover the extent of interaction in using Virtual ITV (Learning environment VLE and Interactive TV) techniques. The study took place in the Faculty of Sciences, five focus- group interviews were held with students and lecturers to assess the perceived quality of student- lecturer/ student -student interactions. All students were invited to complete a questionnaire at the end of each unit to assess their perceptions of interaction. Interaction was greatly appreciated by students and lecturers participating in distance learning programs using either VLE or ITE. Students rated courses by using both techniques as moderately interactive.

Gavrilis et al. (2020) examined the three dimensions of Moore's transactional distance theory and their relationship to student satisfaction, through a quantitative survey of data collected from 115 graduate students from Hellenic Open University (HOU). The results indicated that students perceived low levels of transactional distance between teacher and student, student and content and between students themselves. Moreover, male students perceived lower levels of transactional distance between teacher and student, content and students themselves compared to females.

Bolliger and Halupa (2018) explored students' perceptions of engagement, transactional distance, and outcomes in online courses. Data were collected from students enrolled in online courses at three private universities in the United States. Six hundred and sixty-seven students completed the revised transactional distance scale developed by Paul, Swart, Zhang, and MacLeod, completed a modified version of the Dixson Scale for Online Student Engagement. The results indicated that students achieved a relatively high level of engagement, and a moderate level of transactional distance. Respondents showed statistically positive results in satisfaction, progress and learning. There were significant differences in the responses based on gender and university status.

This study has come to explore the perceptions of University of Hail students of the degree of interaction in distance learning of six types of interactions which enriches theoretical literature on the subject especially since previous studies have studied the three types that relate to Moore Theory only. This study assists the designers and implementers of distance learning programmes in shaping an understanding of interacting parties in the context of distance learning, creating and triggering interaction as a means of achieving learning goals and improving performance especially with increased reliance on e-learning and anticipating the orientation of educational institutions towards compact post-pandemic education.

Methodology
Purpose and Research Questions

As shown by the theoretical framework and review of the literature, the process of interaction is decisive in distance learning in order to raise academic achievement and increase student's satisfaction. The distance learning experience is a new experience at the University of Hail. In this study, researcher try to determine the perceived degree of interaction by students of the University of Hail for the six types of interaction.

This is done by answering the following questions:

1-What are the students' perceptions of Hail University of the degree of their interaction with the six interaction aspects that relate to the distance learning (learner interaction with instructor, learner interaction with content, learner interaction with learners, learner interaction with the technological system, learner interaction with the graphical interface and learner interaction with the staff of the university units and administration)?

2-Does the degree of students' interaction with the six aspects of distance learning differ according to gender, specialization and level?

Educational Context

The University of Hail is a traditional university in which students attend to the campus, come to it full time, and have the opportunity to communicate with colleagues and socialize with teachers and university employees face to face.

During Corona pandemic, the university converted to a distance learning system, in the middle of the second semester of the academic year 2019/2020 through the creation of virtual classes on the Blackboard platform, where the lectures were given simultaneously according to their scheduled dates in the official schedules, and were documented automatically through the system.

The University of Hail has made a great efforts to empower the distance learning process as it held training workshops and provided teachers and students with videos and instructional publications to deal with the blackboard platform, and technical support teams for teachers and students were formed to address the adventitious and technical problems.

The university developed the electronic services that are provided to the students, successively, and established Electronic academic guidance program in the first semester of the year 2020/2021 through which students can communicate with the academic advisor to ask questions and submit complaints and suggestions as well. The platform also allows students to submit requests to implement several registration procedures, such as: adding and deleting courses, opening a closed section, and increasing the number of registered hours.

The university provided electronic library services to students, so that they could access the digital library for the purpose of research and homework. Student communication with university's units and other departments such as: heads of departments and others, was through mobile phone and text messages using WhatsApp.

In connection with evaluations, Students did the university's requirements material examinations distanly, while they did the mid-term exams and the final exams for other subjects in the university campus.

Research Strategy

The quantitative research approach was used to measure the level of perceived interaction among Hail University students for six types of interactions (learner- content, learner- teacher, learner- learners, learner- system, learner- the graphical interface, learner- employees of the university units and departments). specifically the descriptive analytical approach was chosen to investigate whether there was a difference in the level of interaction due to sex, level and field of specialization.

Study population and study sample:

The study population consisted of male and female students from the University of Hail from all levels and all specialization. The study sample consisted of 676 students, selected randomly during the academic year 2020/2021.

Survey Tool

In order to collect the data A questionnaire was designed by reviewing previous articles and research on interactions in distance learning. consisting of two main sections. The first section included questions related to the demographic characteristics of the respondents, namely gender (Male, Female), level of studies: (BA, Postgraduate) Specialization: (health, science, humanity).

The second section included questions on The six dimensions of interaction in distance learning (learner - teacher interaction, learner- learner interaction, learner– content interaction, learner - technology system interaction, learner- interface interaction, and learner - staff of university's units and administration interaction).

More specifically, there were six questions related to the student - teacher Interaction, four questions related to the student – content interaction, three questions related to the student - learner Interaction, three questions related to the student – technology system interaction, five questions related to the student – interface interaction, and four questions related to the student – staff of university's units and administration interaction. All questions were closed and a five-point Likert scale was used (Always, frequently, Sometimes, rarely, very rarely).

The data collection process took place in January 2021, after obtaining the approval of the University Research Ethics Committee. The participants were informed of the purpose of the study; Participation was voluntary and anonymous. To analyze the data, the Statistical Package for Social Sciences (SPSS) was used

The Psychometric characteristic of the study tool
- Validity of the scale
The signs of validity were extracted in using several ways, namely:

1.Logical Validity:
The scale was shown to five arbitrators who have a PhD in education's techniques and technology, curricula and teaching, measurement and assessment this is to evaluate the validity of the paragraphs of the questionnaire, the linguistic integrity, and the clarity of the paragraphs. Some paragraphs have been amended and others have been added and deleted based on the arbitrators 'suggestions.

2.The validity of the construct:
was found by finding the correlational validity in case of deleting the items and the results were as indicated in Table No (1), where the values show the extent of the contribution of each of the items to the total marks.

- The stability of the scale
The stability of the interaction degree scale in distance learning was verified based on the virtual classes and their six dimensions by the method of internal consistency according to the Cronbach Alpha equation, if its value reached (0.966), which indicates that the scale has high stability connotations, and the stability was also found by the half-segmentation method Corrected according to Spearman Brown's correlation coefficient of (0.93), a value that also indicates that the scale has high stability significance.
Table (2) indicates that the values of the stability coefficients for dimensions ranged between (0.93-0.801), which are high values indicating that the scale has high stability.

Table 1: items values of correlation coefficients in case are deleted

Item	The average of the scale if the item is deleted	Alpha value if the item is deleted
Two-way verbal communication with the lecturer was done easy	97.27	0.965
I had the opportunity of eye contact with the lecturer	98.39	0.968
The lecturer gave me the advice and support I need during the distance learning process	97.30	0.965
The lecturer gave me feedback about my performance in the teaching material	97.45	0.964
I communicated with the lecturer outside of lecture times easily	97.73	0.965
I communicated with the lecturer adequately, continuously and regularly	97.36	0.965
The content was clear to me	97.24	0.964
The content enabled me to improve and develop my information	97.28	0.964
The content helped me to develop and improve my skills	97.37	0.964
It was able to respond to the tests and electronic assignments easily	97.16	0.965
I was able to communicate with my classmates during the distance learning process	97.01	0.965
It was easy to share opinions and ideas with classmates	97.14	0.965
projects and collective classroom homework were done easily	97.19	0.965
Educational and modern technologies were used during the distance learning process well	97.20	0.964

I have benefited of the full potential and advantages of technologies in your distance learning process	97.26	0.964
I communicated with my instructors and classmates through modern communication technologies easily	97.14	0.964
The graphical interface was simple and concise (not crammed with information(	97.40	0.964
The graphical interface allowed me to perform the tasks quickly and easily	97.35	0.964
The graphical interface was attractive and enjoyable	97.49	0.964
The graphical interface allowed me to undo my wrong procedures	97.58	0.964
The graphical interface provided me with the appropriate and immediate feedback	97.48	0.964
I was able to communicate with the employees of the important departments at the university (admission and registration, the Deanship of Student Affairs, Department of Specialization ...) easily through the electronic applications that the university provided to me during the distance learning period.	97.60	0.965
The library provided me with the references and electronic sources I need	97.67	0.965
I was able to complete my transactions distantly as it is in the traditional working	97.48	0.964
I got the necessary technical support to face the problems I encountered during distance learning	97.69	0.965

Table 2: stability coefficients for scale dimensions

Dimension	stability coefficients	
	Internal consistency	Cronbach Alpha
First dimension: learner interaction with instructor	0.844	0.853
Second dimension: learner interaction with content	0.883	0.89
Third dimension: learner interaction with learners	0.801	0.841
Fourth dimension: learner interaction with the technological system	0.837	0.881
Fifth dimension: learner interaction with the graphical interface	0.915	0.931
sixth dimension: learner interaction with the stuff of the university units and administration	0.851	0.868

Results

The first question: What are the students' perceptions of Hail University of the degree of their interaction with the six interaction aspects that relate to the distance learning?

To answer this question, the arithmetic averages and standard deviations for the responses of study sample individuals on the scale's items of the interaction degree in distance learning were extracted based on virtual classes and its six dimensions as shown in Table (3) and Table No (4)

Table 3: The arithmetic averages and standard deviations of the responses of the study sample members to the Items of the scale of interaction degree in distance learning based on virtual classes

N	Item	Arithmetic average	standard deviation	Item rank	Degree of use
1	The process of two-way oral communication with the lecturer was done easily	4.20	1.057	9	high
2	I had the opportunity of eye contact with the lecturer	3.08	1.654	25	middle
3	The lecturer gave me the advice and support I need during the distance learning process	4.17	1.213	11	high
4	The lecturer gave me feedback about my performance in the teaching material	4.02	1.270	16	high
5	I communicated with the lecturer outside of lecture times easily	3.73	1.434	24	high
6	I communicated with the lecturer adequately, continuously and regularly	4.11	1.254	13	high
7	The content was clear to me	4.23	1.159	7	high
8	The content enabled me to improve and develop my information	4.18	1.189	10	high
9	The content helped me to develop and improve my skills	4.10	1.258	14	high
10	It was able to respond to the tests and electronic assignments easily	4.31	1.153	4	high
11	I was able to communicate with my classmates during the distance learning process	4.46	1.066	1	high
12	It was easy to share opinions and ideas with classmates	4.33	1.091	2	high
13	projects and collective classroom homework were done easily	4.28	1.176	5	high
14	Educational and modern technologies were used during the distance learning process well	4.26	1.165	6	high
15	I have benefited of the full potential and advantages of technologies in your distance learning process	4.21	1.215	8	high
16	I communicated with my instructors and classmates through modern communication technologies easily	4.32	1.133	3	high
17	The graphical interface was simple and concise (not crammed with information)	4.07	1.230	15	high
18	The graphical interface allowed me to perform the tasks quickly and easily	4.12	1.218	12	high
19	The graphical interface was attractive and enjoyable	3.97	1.289	19	high
20	The graphical interface allowed me to undo my wrong procedures	3.89	1.282	20	high
21	The graphical interface provided me with the appropriate and immediate feedback	3.99	1.272	18	high
22	I was able to communicate with the employees of the important departments at the university (admission and registration, the Deanship of Student Affairs, Department of Specialization ...) easily through the electronic applications that the university provided to me during the distance learning period.	3.87	1.444	21	high
23	The library provided me with the references and electronic sources I need	3.80	1.479	22	high

24	I was able to complete my transactions distantly as it is in the traditional working	3.99	1.412	17	high
25	I got the necessary technical support to face the problems I encountered during distance learning	3.78	1.509	23	high

Table 4: The arithmetic averages and standard deviations of the responses of the study sample members to the dimensions of the scale of interaction degree in distance learning based on virtual classes

Scale dimensions				
dimension	Arithmetic average	standard deviation	Dimension rank	Degree of use
First dimension: learner interaction with instructor It consists of 6 Items, namely (1-6)	3.88	1.01	5	high
Second dimension: learner interaction with content. It consists of 4 Items, namely (7-10)	4.21	1.03	2	high
Third dimension: learner interaction with learners. It consists of 3 Items, namely(11-13)	4.36	0.97	1	high
Fourth dimension: learner interaction with the technological system. It consists of 3 Items, namely(14-16)	4.01	1.05	3	high
Fifth dimension: learner interaction with the graphical interface. It consists of 5 Items, namely(17-21)	4.01	1.11	4	high
sixth dimension: learner interaction with the stuff of the university units and administration It consists of 4 Items, namely (22-25)	3.86	1.24	6	high
Total Degree	101.47	23.628	high	

The degree of usage is defined as follow :
With regard to the scale items and dimensions, the lowest score (1) and the highest score (5)
The scale was divided into three categories
 1. (1-2.33) Weak degree
 2. (2.34-3.67). Medium degree
 3. (3.68-5) High degree

As table (3) shows, paragraph (11), which states "I was able to communicate with my colleagues during distance learning process," obtained the highest response with an arithmetic mean of (4.46), a standard deviation of (1.066) with a large Degree of use; Paragraph (12) followed, which states "it was easy to exchange opinions and ideas with colleagues" with an arithmetic mean of (4.33) , a standard deviation of (1.091) and a high Degree of use. at the rank before the last item (5) which states "I easily communicated with the teacher outside of lecture times", with an arithmetic mean of (3.73), a standard deviation of (0.481) and a large Degree of use. In last place came paragraph (2), which states: "I had the opportunity to make eye contact with the lecturer with the teacher" with an arithmetic mean of (3.08), a standard deviation of (1.654) and Medium degree of use .
It is worth noting that all the scale paragraphs showed a high level Degree of use of the interaction variable in distance learning based on online classes in the study sample, except for paragraph (2) which stated "I had the opportunity to make eye contact with the lecturer" which obtained a medium degree of use.
As for the scale's dimensions, the arithmetic mean was calculated by finding the sum of the paragraphs that belong to each dimension, then finding the arithmetic mean of this total, then dividing the arithmetic mean by the number of paragraphs that each dimension contains in order to find one rule through which we can compare the dimensions by the order of their frequency.
The dimensions were assessed in the same way as paragraphs were. All six dimensions showed high level of frequency among the members of the study sample.
Third dimension (learner interaction with learners) ranked first, it consisted of 3 paragraphs (11-13), with an arithmetic mean of (4.36) , a standard deviation of (0.97) and a large degree of use; followed by the second dimension (learner interaction with content) which consisted of 4 paragraphs (7-10), With an arithmetic mean of (4.21), a standard deviation of (1.03) and a high degree of use; in third place came the fourth dimension (learner interaction with the technological system) which consists of 3 paragraphs (14-16) with an arithmetic mean of (4.01), a standard deviation of (1.05) and a large degree of use. The fifth dimension (learner interaction with the graphical interface) was next, it consisted of 5 paragraphs (17-21), with an arithmetic mean of (4.01), a standard deviation of (1.11) and a high degree of use; at the rank before the last was the first dimension: the interaction between learner and teacher with an arithmetic mean of (3.88), a standard deviation of (1.01) and a large degree of use; the sixth dimension (learner interaction with the stuff of the university units and administration) took last place, it consisted of 4 paragraphs (22-25), with an arithmetic mean of (3.86), a standard deviation of (1.24) and a large degree of use as well. With regard to the total degree for the scale, the minimum degree was (25) and the highest degree was (125)

The scale was divided into three categories:
1- (25 - 58.33) low level.
2- (58.34 - 91.64) average level.
3- (91.65 - 125) high level.
The average of the responses of the study sample individuals reached (101.47) with a standard deviation of (23.628). This also indicates that the interaction of the sample members in general is of a high level of frequency.

The second question: **Is there a difference in the level of student interaction in distance learning based on online classes due to the variable of gender, specialization, academic level, and the interaction between the variables?**

To answer this question, the numbers of individuals were extracted based on the three demographic variables: Gender, which has two levels (male, female), specialization, which has three levels (humanitarian - scientific - health), the academic degree which has two levels (bachelor's, Postgraduate)

The following table shows the distribution of the numbers of the sample members on the demographic variables.

Table 5: sample members distributed based on demographic variables for the distance learning scale based on online classes

variable	Variable levels	Number
Gender	male	62
	female	613
academic degree	bachelor's	628
	Postgraduate	47
specialization	humanitarian	412
	scientific	201
	health	62

MANOVA was used to find out the effect of the demographic variables on the overall score, and to identify the dimensions of the interaction scale in distance learning based on online classes as the following table shows:

Table 6: Results of multiple analysis of variance (MANOVA) to examine the differences in the interaction scale in distance learning based on online classes due to demographic variables.

variable	Source of Variance	Sum of squares	Degrees of freedom	Average of squares	F value	Statistical significance
Gender	learner interaction with instructor	204.351	1	204.351	5.720	0.017
	learner interaction with content	32.898	1	32.898	1.963	0.162
	learner interaction with learners	19.654	1	19.654	2.375	0.124
	learner interaction with the technological system	36.854	1	36.854	3.749	0.053
	learner interaction with the graphical interface	109.494	1	109.494	3.558	0.060
	learner interaction with the stuff of the university units and administration	48.739	1	48.739	2.032	0.155
	Total Degree	2302.086	1	2302.086	4.209	0.041
Academic level	learner interaction with instructor	13.246	1	13.246	0.371	0.543
	learner interaction with content	3.531	1	3.531	0.211	0.646
	learner interaction with learners	6.591	1	6.591	0.797	0.372
	learner interaction with the technological system	2.004	1	2.004	0.204	0.652
	learner interaction with the graphical interface	0.002	1	0.002	0.000	0.994
	learner interaction with the stuff of the university units and administration	24.845	1	24.845	1.036	0.309
	Total Degree	211.144	1	211.144	0.386	0.535
Specialization	learner interaction with instructor	97.775	2	48.887	1.369	0.255
	learner interaction with content	15.108	2	7.554	0.451	0.637

	learner interaction with learners	20.902	2	10.451	1.263	0.283
	learner interaction with the technological system	15.034	2	7.517	0.765	0.466
	learner interaction with the graphical interface	25.640	2	12.820	0.417	0.659
	learner interaction with the stuff of the university units and administration	41.016	2	20.508	0.855	0.426
	Total Degree	1119.127	2	559.563	1.023	0.360
The error	learner interaction with instructor	23684.307	706	35.349		
	learner interaction with content	11113.123	670	16.586		
	learner interaction with learners	5485.933	670	8.187		
	learner interaction with the technological system	6517.990	670	9.728		
	learner interaction with the graphical interface	20403.736	670	30.453		
	learner interaction with the stuff of the university units and administration	15905.488	670	23.739		
	Total Degree	362633.037	670	541.243		
Total Degree	learner interaction with instructor	24604.287	674			
	learner interaction with content	11491.310	674			
	learner interaction with learners	5688.296	674			
	learner interaction with the technological system	6723.194	674			
	learner interaction with the graphical interface	20944.074	674			
	learner interaction with the stuff of the university units and administration	16503.407	674			
	Total Degree	376274.065	674			

The previous table indicates statistically significant differences at the level of significance (α = 0.05) due to the gender variable (male، female).

The first dimension- learner interaction with instructor: The value of the F test was (5.73), which is a statistically significant value; the level of significance was (0.017) in favor of males, meaning that males interacted more with teachers than did females. where The arithmetic mean of males reached (23.71), while the arithmetic mean of females was (23.27).

The second dimension- learner and content interaction: The value of the F-test was (1.963), which is not statistically significant. The level of significance, which amounted to (0.162), indicates that there is no difference between males and females regarding the degree of interaction with the learning content.

The third dimension- learner interaction with learners: The value of the F test was (2.375), which is not statistically significant. The level of significance, which amounted to (0.124), indicates that there is no difference between males and females regarding the degree of learner- learner interaction.

The fourth dimension learner interaction with the technological system: The value of the F test was (3.749), which is not statistically significant. The level of significance, which reached (0.053), indicates that there is no difference between males and females regarding the degree of interaction with the technological system.

The fifth dimension- learner interaction with the graphical interface: The value of the F-test was (3.558), which is not statistically significant, as indicated by the level of significance, which amounted

to (0.06). That is, there is no difference between males and females with regard to the degree of interaction with the graphic interface.

The sixth dimension- learner interaction with the stuff of the university units and administration: The value of the F test was (2.032), which is not statistically significant, and the level of significance, which amounted to (0.155), indicates that there is no difference between males and females with regard to interaction with employees and administrations of university.

The Total Degree of the scale: The value of the F-test was (4.209), which is statistically significant, and the level of significance was (0.041) in favor of females; meaning that females were more interactive than males on the total score of the distance learning scale based on online classes.

Secondly, the academic level, it has two levels (Bachelor's , Postgraduate) : The first dimension-learner interaction with instructor: The value of the F test was (0.371), which is not statistically significant, as indicated by the level of significance (0.543). That is, there is no difference in the interaction of learners with the teacher attributable to the academic level of the student (BA, Postgraduate).

The second dimension - learner and content interaction: The value of the F-test was (0.211), which is not statistically significant, as indicated by the level of significance (0.646). So there is no difference in learner's interaction with the content due to the student's academic level (Bachelor's, graduate studies).

The third dimension- learner interaction with learners: The value of the F-test was (0.797), which is not statistically significant, as indicated by the level of significance (0.372). That is, there is no difference in the interaction of learners with each other's due to the academic level of the student (Bachelor, Postgraduate).

The fourth dimension learner interaction with the technological system: The value of the F-test was (0.204), which is not statistically significant, as the significance level indicates (0.652). That is, there is no difference in the interaction of the learners with the technological system attributable to the academic level of the student (Bachelor, Postgraduate).

The fifth dimension- learner interaction with the graphical interface: The value of the F test was (0.00), which is a not statistically significant, as indicated by the level of significance (0.994), meaning that there is no difference in the interaction of the learner with the graphic interface due to the academic level of the student (Bachelor, Postgraduate).

The sixth dimension- learner interaction with the stuff of the university units and administration: The value of

the F test was (1.036), which is not statistically significant, as the level of significance reached (0.309), meaning that there is no difference in the interaction of the learner with employees and administrations of university due to the student's academic level (BA, postgraduate studies).

The Total Degree of the scale: The value of the F test was (0.386), which is a non-statistically significant value, as indicated by the level of significance, which amounted to (0.535), meaning that there is no difference in the total score of the scale due to the student's academic level (BA, Postgraduate).

Third: Specialization and it has three levels (health, science, humanity): The first dimension-learner interaction with instructor: The value of the F-test was (1.369), which is not statistically significant, as indicated by the level of significance (0.255). That is, there is no difference in the interaction of the learner with the teacher due to the student's field of specialization (health, science, humanity) The second dimension - learner and content interaction: The value of the F-test was (0.451), which is not statistically significant, as indicated by the level of significance, which amounted to (0.637). That is, there is no difference in the learners' interaction with the content due to the student's field of specialization (humanitarian, scientific, health).

The third dimension- learner interaction with learners: The value of the F test was (1.263), which is a non-statistically significant value, as indicated by the level of significance (0.283), meaning that there is no difference in the interaction of learners with each other's due to the student's field of specialization (humanitarian, scientific, health).

The fourth dimension learner interaction with the technological system: The value of the F test was (0.765), which is a non-statistically significant value, as indicated by the level of significance, which amounted to (0.466), meaning that there is no difference in the interaction of learners with the technological system due to the student's field of specialization (humanitarian, scientific, health).

The fifth dimension- learner interaction with the graphical interface: The value of the F test was (0.417), which is a non-statistically significant value, as indicated by the level of significance, which amounted to (0.659), meaning that there is no difference in the interaction of learners with the graphical interface due to the student's field of specialization (humanitarian, scientific, health).

The sixth dimension- learner interaction with the stuff of the university units and administration: The value of the F test was (0.855), which is not statistically significant, as indicated by the level of significance(0.426), meaning that there is no difference in the degree of interaction of the learner with the

employees and administration of the university due to the student's field of specialization (humanitarian, scientific, health).

The Total Degree of the scale: The value of the F test was (1.023), which is a non-statistically significant value, and the level of significance, which amounted to (0.36), indicate that there is no difference in the total score of the scale attributable to the student's field of specialization (humanitarian, scientific, health).

The previous results indicate that there are no differences in the level of students' interaction with (teacher, content, learners, technology system, graphic interface, and university employees and administrations) as students showed a high level of interaction according to their gender (males, females) and their academic level (Bachelor, Studies. Supreme), and their specializations (humanitarian, scientific, health).

Discussion
The results of the descriptive statistical analysis indicate that the students have interacted with the teacher, content, other learners, the technological system, the graphic interface, and the employees and administration of the university to a large degree, and this may be due to several reasons, including: the close follow-up and strict instructions from the university administration on taking advantage of all the features of the platform of Blackboard to activate online classes, discussion forums, the easy access to all educational material content in their various forms (syllabus, book, PowerPoint presentations, and activities). In addition to the designated assessments in their various forms (tests, assignments, presentations, and activities), Daily reports on the communication between teachers and students (awareness messages, e-mail conversations, direct contact, and instant messages) were presented, and the challenges and difficulties students face in the distance learning process were explored and technical support was provided to all students.

The results of this study are consistent with the results of the study of both (Bolliger & Halupa, 2018) and (Gavrilis et al., 2020); which indicated a decrease in the distance of transactions between the learner and each of teacher, other learners and the content, which means that there is a great interaction between all of them according to Moore's transactional distance theory.

The results of this study differed with the study results of (Mash et al., 2006) which was conducted at Stellenbosch University, were students rated their interactions as moderate. This may be due to the different educational technologies used in distance education, as Stellenbosch University relied on virtual learning environment VLE and Interactive TV) while the University of Hail adopted the Blackboard program, not to mention the difference in the

characteristics of students and lecturers between the two universities.

The third dimension (the interaction of the learners with each other's) obtained the highest level of frequency, because students used to form groups on programs such as: WhatsApp, Snapchat and Telegram, and communicated through them comfortably and at their convenient times, while usually teachers and university employees may set specific times for communication**.**

The sixth dimension (interaction of learners with the employees and administrations of university) got the lowest level of interaction, this reflects the students' lack of need to communicate with them especially with the full access students have to technical support from teachers.

It is worth noting that all the paragraphs of the scale showed a high level of interaction, with the exception of Paragraph (2), stating, "I had the opportunity to make eye contact with the lecturer," which obtained an average degree of use. This is due to some restrictions that might be hard to overcome from both teachers and students, such as adhering to a decent appearance, in particular, headscarves for females, and formal dressing for males; accordingly, relying on verbal communication only provides more comfort and freedom for lecturers and students. In addition, opening the video consumes a lot of the Internet, which constitutes another obstacle that limits the ability of visual communication between the lecturer and the students, especially since many students depend on a limited internet package, and they live in distance villages where the Internet networks are weak.

The study did not find any differences in the degree of male versus female interaction with the six dimensions, with the exception of interaction with teachers, which was in favor of males. This finding was in agreement with the results of the study of (Gavrilis et al., 2020); in which male students perceived lower levels of distance of the transactions between teacher and student.

On the other hand, the results of the two studies differed in the degree of male and female' interaction with the content, Where the study of (Gavrilis et al., 2020) showed statistically significant difference in the interaction between students and content in favor of females, while the results of this study did not show any differences between males and females in the level of interaction with the content. This may be due to the fact that the study sample in (Gavrilis et al., 2019) study was limited to graduate students. or to the different educational environments, or difference in personal characteristics between the study samples

However, the overall score of the scale showed that females were more interactive than males, and this may be attributed to several reasons, including:

females spend longer periods at home than males do, so they have more time to conduct various interactions; this may be due also to what some studies' results showed (Ku & Chang, 2011) that female learners have higher motivations, and that they also have greater self-efficacy and self-regulated learning than male learners. in addition to that The study of (Alghamdia et al., 2020) indicated that in online classes males have a sense of lower ability to effectively regulate their behaviors and resist distractions during learning, and that they have a higher digital distraction rate, The study of (Chyung, 2007 ; Wu & Cheng, 2018) revealed that in distance learning environments, female students have a greater ability to improve their performance and self-efficacy compared to male students, In addition female students are generally independent learners and confident of themselves when participating academically and might easily outperform their male counterparts through distance learning.

The results showed no differences in the interaction of students from different academic levels (bachelor's, graduate studies), and their specializations (humanitarian, scientific, and health). This reflects the familiarity of all students of all levels and specializations with the distance learning process, especially since it is the second year in which the university applies this experience with the continuation of the pandemic; not to mention that distance learning relieves students of some pressures, such as: going to the university campus, commitment to university hours, overcrowding in classrooms, and the awkwardness of face to face discussions, Which makes students feel more comfortable and increases their interaction.

Conclusions

The purpose of this study was to explore students' of Hail University perceptions about the level of their interaction with the six interaction dimensions for distance learning, and the extent to which these perceptions are affected by the gender, academic level, and specialization's variables. The results of the study showed that all students of both genders and from all academic levels and specialization interacted with the teacher, the content, the other learners, the technological system, the graphic interface, and the employees and administration of the university to a large extent. The interaction of the learner's dimension with the learners, ranked first in terms of frequency, and the interaction of learners with the employees and administration of the university' dimension ranked last.

Declarations

Conflict of interest: The authors have no relevant financial or non-financial interests to disclose. The authors declare no conflict of interest.

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