

ASSESSMENT OF DISTANCE LEARNING FOR ONLINE COLLEGE OF AGRICULTURE STUDENTS DURING THE COVID-19 CRISIS**Samar Shawaqfeh¹, Radi A. Tarawneh² and Khaled Al-Najjar^{3*}****Original Article**

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Abstract

To ensure that educational knowledge is well delivered, education strategies have been changed to be online rather than in the field due to the COVID-19 pandemic. Therefore, this study was conducted to evaluate online education systems during a pandemic in Jordan. Electronic forms were distributed via students' emails to 559 students at the Faculty of Agriculture, Jerash University to study readiness, behavior, and obstacles of distance education through the students' impressions. A total of 1073 online surveys were analyzed using program SAS (2012) to determine the effects of gender, age of students, specialization, and academic year on distance education. The results of the study showed a significant difference between total scores for readiness, behavior, and obstacles of distance education. The age of the students also had a significant effect on distance education in general and within the status of readiness, behavior, and distance education obstacles. Where it was found that the higher the student's age by one year from the average age, the higher his general acceptance, readiness, and behavior towards distance education with percentages (0.12 ± 0.06) , (0.17 ± 0.06) , and $(0.40 \pm 0.14)\%$ respectively, while obstacles decreased by $(0.22 \pm 0.004)\%$. The study concluded that age students of above (27.18 ± 0.25) years played a positive role during the COVID-19 crisis in distance education.

Keywords: Distance Education, COVID-19 Crisis, University Students, Jordan.

The spread of the COVID-19 pandemic around the world has directly changed educational systems and research studies. Many educational institutes had to close after the confirmed spread of COVID-19 in most countries (WHO, 2020). Education for 290.5 million students has been disrupted due to the spread of COVID-19 (UNESCO, 2020). Teras et al (2020) demonstrated the importance of using technology after the COVID-19 pandemic to find educational methods adapted to the new era. So universities have had to move towards online distance learning systems to continue education despite COVID-19 (Radwan & Radwan, 2020) and search for the best distance learning strategies to implement (Utomo, 2020).

Postgraduate students and their research activities have been affected during the closure of educational institutions, which will affect their chances of entering into an excellent professional environment (Burgess and Sievertsen, 2020). Different educational institutions should start making use of online applications and platforms in distance education to ensure that all students have a similar learning opportunity with minimum discrepancies (Mustafa, 2020). Pandemic has alerted higher education institutions to the need to upgrade their educational strategies to deliver knowledge and skills outside a traditional classroom. Thus, educational institutions must take advantage of the distance learning resources available online

to overcome challenges that have come with closure (Toquero, 2020).

Despite the development of online distance learning and its use to enhance agricultural education, the challenge has been to implement strategies for undergraduate education (Raut and Sharma, 2009). Consequently, there must be a new plan and strategies designed to provide an educational level with high-quality knowledge and skills.

This study is necessary because transition from field of traditional education to distance education via the internet is relatively new, so this study may be of interest to many educational institutions, its results can be used in strategic planning of College of Agriculture. Therefore, objectives were to assess distance learning experience of online agriculture students focused on assessing agricultural science students' readiness, behavior, and obstacles towards online distance learning during the COVID-19 pandemic.

Material and Methods

Study Questions

This study was conducted at the Faculty of Agriculture, Jerash University, Jordan, and will answer several questions associated with the experience of shifting towards online distance learning:

- Were the students ready to adapt to distance learning?
- What is the behavior of the students to distance learning?
- What are the obstacles facing online distance learning?

Methodology

An online survey was conducted in November 2020. The study sample included students from all agricultural sciences disciplines (plant production and protection, animal production and protection, nutrition and food sciences, agricultural economics and extension) of both sexes, and the four bachelor's levels at the College of Agriculture, Jerash University, Jordan. A valid survey questionnaire was

excerpted from a publication with slight modifications (Shawaqfeh et al., 2020). A questionnaire was reviewed content for validation of the survey questions according to the Likert-5 scale (McLeod, 2019). The questionnaire consists of three main areas namely students' readiness, behavior, and obstacles to online learning as follows: Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1). The total scores for readiness, behavior, and obstacles were the averages of nine, twenty-four, and Thirteen questions, respectively. An online survey questionnaire was sent to 559 students through emails, and 358 students answered the questionnaire within a specified period.

Statistical analysis

All data were collected, reviewed, and edited using Microsoft Excel and were analyzed using program SAS (2012). Total score data for distance education were analyzed to determine academic year, specialization, sex of students, status and age of students according to the following fixed model (1):

$$Y_{ijklm} = \mu + R_i + S_j + X_k + ST_l + (ST \times R)_{li} + (ST \times S)_{lj} + (ST \times X)_{lk} + \beta(A) + e_{ijklm}$$

Y_{ijklm} is a total score for distance education through the students' impressions of m^{th} observation belonging to the effect factors of i^{th} academic year (1st, 2nd, 3rd, and 4th). Specialization j^{th} (1=Agriculture Economics, 2=Plant Production & Protection, 3=Nutrition and Food Sciences, 4=Animal Production & Protection). Sex of students k^{th} (male, female) and l^{th} of status (1=readiness, 2=behavior, 3=obstacles). μ is the overall mean effects of the total score of distance education. Fixed effects: academic year, specialization, sex of students, status as symbolized (R_i, S_j, X_k, ST_l) . $(ST \times R)_{li} + (ST \times S)_{lj} + (ST \times X)_{lk}$ is the interaction of the status with academic year, specialization, sex of students. β is the regression coefficient for the total score of distance education on (A) age of students, and e_{ijklm} = random error term

associated with the Y_{ijklm} observations with zero mean and variance $I\sigma^2e$.

Data of total score for distance education within readiness, behavior, and obstacles were analyzed to determine the academic year, specialization, sex of students, and age of students according to the following main fixed model (2):

$$Y_{ijkl} = \mu + R_i + S_j + X_k + \beta(A) + e_{ijkl}$$

Y_{ijkl} is a readiness, behavior, or obstacle for distance education through the students'

impressions of l^{th} observation. All symbols are explained in the model (1). Duncan's multiple range tests were used to detect differences between the means of effects (Duncan, 1955).

Results

Table (1) shows that the differences between readiness, behavior, and obstacles were highly statistically significant ($P < 0.01$), and the effect of students' age was significant on the total scores ($P < 0.05$) and on readiness, behavior, and obstacles ($P < 0.01$) of the distance learning.

Table 1. Variance analysis of some factors that affect the total score, readiness, behavior, and obstacles of distance learning during the COVID-19 crisis.				
Model 1 (Total Score)				
SOV	DF	MS	Pr > F	
Sex of students	1	183.71	0.3563	
Specialization	3	264.46	0.2989	
Academic year	3	446.46	0.1025	
Status	2	87642.04	<.0001	
Sex of students × Status	2	124.82	0.5608	
Specialization × Status	6	117.41	0.7746	
Academic year × Status	6	383.12	0.1007	
Age of students	1	902.18	0.0411	
Residual	1048	215.69		
Model 2 (Readiness, Behavior, and Obstacles)				
SOV	DF	MS		
		Readiness	Behavior	Obstacles
Sex of students	1	2.85	649.99	13.61
Specialization	3	86.78	318.38	32.74
Academic year	3	99.541	840.55	146.46
Age of students	1	628.41**	3463.99**	1013.01**
Residual	349	69.87	446.00	121.06
**: $P < 0.01$; Coefficient of variation: 29.36, 26.88, 26.86, 27.24 for total score, and readiness, behavior, and obstacles, respectively. Status: readiness, behavior, or obstacles.				

The effects of sex of students, specialization, and academic year, were not significant on the total scores and readiness, behavior, and obstacles for distance learning. In addition, differences between students' sex, specialization, and academic year within each of readiness, behavior, and obstacles were homogeneity (Table 1).

Table 2. The least-square means for some of the factors that influence the total score, readiness, behavior, and obstacles of distance learning during the COVID-19 crisis.

Model 1 (Total Score)					
Factors		No.	LSM	SE	
Overall mean		1073	34.90	4.17	
Status	Readiness	358	30.81c	1.21	
	Behavior	357	77.04a	1.22	
	Obstacles	358	40.11b	1.21	
Sex	Male	845	49.90	0.62	
	Female	228	48.74	1.18	
University Specialization	1 st	111	50.51	1.50	
	2 nd	485	49.87	0.87	
	3 rd	384	49.99	0.75	
	4 th	93	46.91	1.65	
Academic year	First	279	50.07	0.98	
	Second	305	47.71	1.01	
	Third	270	50.50	1.07	
	Fourth	219	49.00	1.16	
Age of students			0.12	0.06	
Model 2 (Readiness, Behavior, and Obstacles)					
Factors		Readiness		Behavior	Obstacles
		No.	Least Square Means±Standard Error		
Overall mean		358	2.72±23.95	6.88±59.86	3.58±44.53
Sex	Male	282	30.85±0.61	78.47±1.57	0.81±40.39
	Female	76	30.59±1.16	74.67±2.95	1.53±40.94
University Specialization	1 st	37	32.03±1.48a	77.46±3.74	42.03±1.94
	2 nd	162	31.27±0.86a	78.17±2.18	40.20±1.13
	3 rd	128	31.26±0.74a	78.36±1.87	0.97±40.35
	4 th	31	28.35±1.64b	72.28±4.13	2.15±40.10
Academic year	First	93	31.03±0.97	77.20±2.45	1.28±41.98
	Second	102	29.23±0.99	72.48±2.51	1.30±41.42
	Third	90	31.52±1.06	79.60±2.66	1.38±40.37
	Fourth	73	31.11±1.15	77.20±2.45	1.5±138.90
Age of students			0.17±0.06	0.40±0.14	-0.22±0.004
Average of students' age: 27.18±0.24, 27.18±0.43, 27.16±0.41, 27.18±0.42 for total score, and readiness, behavior, and obstacles, respectively. 1 st : Agriculture Economics; 2 nd : Plant Production & Protection; 3 rd : Nutrition and Food Sciences; 4 th : Animal Production & Protection.					

Table 2 shows mean values of total scores, and readiness, behavior, and obstacles scores, which were (34.90 ± 4.17) , (23.95 ± 2.72) , (59.86 ± 6.88) , and (44.53 ± 3.58) , respectively. Students' behaviors towards distance learning achieved the highest scores. The averages of the total scores, readiness, behavior, and obstacles were similar between males and females. The Animal Production and Protection Department scored the lowest overall scores compared to other disciplines and was less prepared for distance learning, while overall scores were similar across disciplines for both behavior and obstacles. Third-year students generally had a higher score than other academic years and were higher in distance learning behavior, while overall scores were similar across academic years for both readiness and obstacles.

The regression coefficients for student age on total scores, readiness, behavior, and obstacles were (0.12 ± 0.06) , (0.17 ± 0.06) , (0.40 ± 0.14) , and (-0.22 ± 0.004) , respectively, for distance learning (Table 2). The regression coefficients were significant and indicated that the higher the student's age by one year from the average student ages (27.18 years), the higher the total distance learning scores, the degree of readiness and behavior, and the lower the obstacles by 12%, 17%, 0.40 and 22%, respectively.

Discussion

The results indicated that 70.90% of students had no previous experience with online learning systems. The percentage of students who did ready for distance learning was 53.22%. The percentage of students who showed good behavior with distance learning was 49.88%. The percentage of students who did not get obstacles to distance learning was 31.49%. This can be explained by college students' good knowledge of basic computer skills. The readiness of learners can be developed by changing and reconfiguring curriculum objectives to keep pace with new learning technologies (Cahapay, 2020). Thapa et al.

(2020) stated that online learning negatively affected practical fieldwork that could not be possible in online classrooms. Filcher and Miller Greg (2000) distinguished between student communication with instructors and student motivation between levels of academic achievement. Studies have reported that students' achievement scores were higher in online classes compared to the in-class learning system (Sowan and Idhail, 2014) while other studies reported undergraduate students' preference for in-class learning compared to the online learning system (Kemp and Grieve, 2014).

The significant influence of students' age can be explained by the university's admission policy. Which attracts students of different age groups including employees in government and private jobs. The analysis revealed an interesting variation in responses for all domains, with students reporting better Behaviors and fewer obstacles. There were no sexual effects on any of the survey cases. Likewise, academic majors, as well as university level, were not different in all three statuses (readiness, behavior, and obstacles). These results can be explained by the fact that all departments have the same distance learning tools, platforms, and assessment models, with a good network that improves the quality of services provided for educational purposes.

This study identified the reality of students during the epidemic closure and areas for improving distance learning. The results indicated satisfactory readiness, Positive behavior, and acceptable awareness of obstacles among students. Accordingly, the educational platform should be modernized and students' capabilities should be improved to benefit from it through training courses. These results may be used for further planning and quality improvement of distance learning.

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