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Online Learning in Higher Education – Learners' Perceptions, Interaction, Flexibility and Challenges

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The current study explores preservice teachers' engagement in online learning. A total of 653 students from two Arab teacher-training colleges in Israel answered an attitude questionnaire focusing on four significant aspects of online learning: participants' perceptions; interactions with online learning; learning flexibility; and challenges of online learning. Inferential statistics methods were employed, mainly MANOVA analysis and the Structural Equation Modelling approach model (SEM). Results indicate the participants' readiness to learn online, showing positive perceptions towards online learning and highlighting the method's flexibility, even though several challenges are still impeding the learning process. The study also shows that the participants' perceptions, the method's flexibility and learning challenges, in addition to the learners' demographic variables, could affect the learners' interaction with online learning. The study results could help in understanding the associations between the perceptions of and experiences with online learning, specifically students' online interaction. Future research could examine other aspects relating to students' interaction with online learning and the relationship of online learning with the learners' properties and the method's characteristics.

Keywords: pre-service teachers, learning interaction, online learning, higher education, flexibility

INTRODUCTION

The emergence of COVID-19 in early 2020 presented multifaceted challenges on a global scale, profoundly affecting sectors such as education and tertiary learning institutions (Cramarenco, et al., 2023). This global challenge ushered in significant shifts in education, necessitating quick adjustments to the emerging situation. Faced with worldwide restrictions, there was a rapid transition to digital learning methods to ensure uninterrupted education. In the today's educational landscape, the significance of

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online learning in higher education is incontrovertible, driven by advancements in technology and changing educational needs.

As restrictions begin to ease, higher educational institutions are embracing blended learning methods, aiming for a durable and forward-thinking instructional approach (Aldhaen, 2022). These adaptable institutions are keen to determine how the digital teaching proficiencies developed during the pandemic can be integrated into future educational models (Cramarenco, et.al., 2023).

Students' perceptions and views on online instruction, including its advantages, drawbacks, and associated challenges, play a crucial role in their pivotal in determining their readiness to integrate technology and adapt their learning methods and form their educational practices.

Several research have explored students' experiences and perceptions towards online learning (Curelaru, et. al., 2022; Zapata-Cuervo, et.al., 2023; Van Wart, et.al., 2020). However, most of them mainly focus on students' perceptions and examines it without relating to other variables that influence these perceptions such as the participant's interactions with online learning, learning flexibility and challenges of online learning.

This study focuses on the perceptions of preservice teachers, from two Arab teacher-training colleges in Israel, towards online learning. It specifically explores their point of view on aspects such as interaction, flexibility, and challenges encountered in online environments. Additionally, the research investigates how participants' demographic factors could influence these perceptions.

The results of the current research could assist in enhancing deepened knowledge of how to facilitate the transition of preservice teachers to online learning. By understanding the importance of interactivity in online learning, educational institutions can focus on enhancing interactive components in their courses to boost student satisfaction and learning outcomes. To summarize, this research contributes to the broader understanding of online learning in higher education, offering pivotal insights that can steer institutions and policymakers towards in enhancing the quality and effectiveness of online learning in higher.

Theoretical background

Student Perceptions of and Engagement in Online Learning

Research shows that students' perceptions of online learning differ; Some studies indicated positive perceptions (Mahdy & Sayed, 2022; Majadly & Nikritin, 2022; Nikou, 2022; Olbata et al., 2022; Riastuti, et. al., 2022) whereas others indicated negative perceptions (Curelaru, 2022; Jackson et al., 2022; Zizka & Probst, 2022), or a preference toward in-person learning rather than online learning (Mahdy & Sayed, 2022; Yau et al., 2022).

Flexibility in online learning, in terms of time, place and easy access, plays an important role in shaping students' perceptions. Flexibility could lead to increased satisfaction (Piramanayagam et al., 2024) and might assist in addressing diverse needs

of students (Nalaka, 2023) and supporting self-regulated effort (Turan et al., 2022). However, according to Jackson et al. (2022) and Yeung (2022), a heavier workload and increased number of assignments assigned in online courses are factors that can cause emotional distress and increase students' negative perception of online courses in contrast to in-person learning.

Other studies investigated the relationship between students' perceptions of online learning and their interactions with lecturers and fellow students. The relationship between perceptions of online learning and interaction with lecturers is usually described as negative (Adnan, 2020). Students report reduced participation in the lesson, asking fewer questions than during in-person classes, and collaboration between students is lower, resulting in negative perceptions of online learning (Tamsukhin, et. Al., 2023; Conrad, 2022; Laili & Qads, 2021). Additionally, students report that the option to turn off the camera during online learning negatively affects the interaction between the students, and even leads to a sense of loneliness (Castelli & Sarvary 2021; Oliveira et al., 2021).

Benefits and Challenges of Online Learning

Studies show several advantages to online learning such as providing high-quality instruction to a large population (Schrum et al., 2015), offering flexible learning time and place, and enabling comfortable access to valuable resources such as multimedia and databases (Allen & Seaman, 2011). Nevertheless, the ability to maximize the potential of online learning is often hindered by the physical separation between instructors and students. Online learning requires instructors to rely heavily on verbal communication and limited use of facial expressions or body language, thus restricting effective communication with students (Zeichner & Zilka, 2016). Therefore, students may become bored or feel lonely, which may lead to course dropouts. Students are faced with developing a set of self-regulation skills that would enable them to tackle challenging situations and manage information in a digital environment (Greene et al., 2014). The skills required to develop and master strategies like the autonomous and independent learning needed for online courses are challenging to acquire in a short amount of time.

Studies showed that students found many challenges in online learning. The most significant of these include the quality of the student's internet connection and the availability of technology required to participate in online learning classes such as computers, tablets, and smartphones (Chandrasiri & Weerakoon, 2022). Other challenges students faced included maintaining academic integrity (Bdair, 2021) and the quality of lecturer feedback. Students claimed that the feedback from in-person courses was better than that from online courses (Siah, et. Al., 2022; Vikas & Mathur, 2022). However, students exhibited a favorable outlook toward the adaptable nature of online learning. Advantages included flexibility in choosing the learning environment, mobility, and handing in assignments in some studies (Garris & Fleck, 2022; Li, 2022; Penrod, et. Al., 2022).

Interactivity in Online Learning

One factor that attracts and retains students in online courses and programs is interactivity, which plays a central role in creating an environment that encourages the exchange of information (Wang et al, 2022; Ke & Kwak, 2013). High levels of interactivity may increase students' motivation, improve their learning outcomes, and lead to greater satisfaction than in less interactive learning environments (Espasa & Meneses, 2010). Studies have shown that insufficient interaction experience may negatively affect the learning process and students' satisfaction (Croxton, 2014). Although the literature asserts the importance of interaction in the learning process, promoting interaction in online courses is still challenging, specifically regarding interpersonal interaction, (Awad et al, 2022; Mehall, 2020; Heng & Sol, 2021). Anderson (2003) defined three types of interactions: student-student, student-instructor, and student-content. *Student-student interaction* occurs when students are highly engaged in the learning process through discussion with peers, debate, role-play, team projects or other collaborative activities. According to Salmon (2013), this type of interaction allows students to co-construct knowledge and meaning together rather than relying on the instructor's knowledge. *Student-instructor interaction* is a key foundation of online learning and a primary variable in student satisfaction and persistence (Kauffman, 2015). Research studies (Mahle, 2011; Park & Choi, 2009) have shown that a one-to-one student-instructor interaction in online courses improves students' satisfaction, achievement, and motivation. The instructor's timely comments and continuous feedback give students a sense of stability and integration into the online learning environment and assist them in meaningful relationship building. *Student-content interaction* refers to the extent that the content is unstructured, adaptable, and rich with activities that could utilize a range of technologies and enhance non-traditional learning and, therefore, engage students' interest in the course contents. An additional factor found to predict student satisfaction with online learning is content designed to promote student interaction (Ke & Xie, 2009). It is important to note, the students' demographic variables such as gender, ethnicity, class, and financial aid may also influence the extent of students' interaction with online learning (Lau & Shaikh, 2012).

To summarize, based on the previous literature, this study aims to examine students' engagement in online learning by examining their agreement or disagreement with various statements relating to essential issues of the online learning process.

The research questions that guided the study were:

1) What are students' perceptions of online learning, and how do students evaluate its effectiveness?
2) Do and how demographic variables, gender and year of academic study, influence students' perceptions, interactions, flexibility, and challenges in online learning?
3) To what extent can the following variables: perceptions flexibility, challenges, and background variables explain directly and indirectly the degree of interaction in online learning. as presented in the proposed model below?

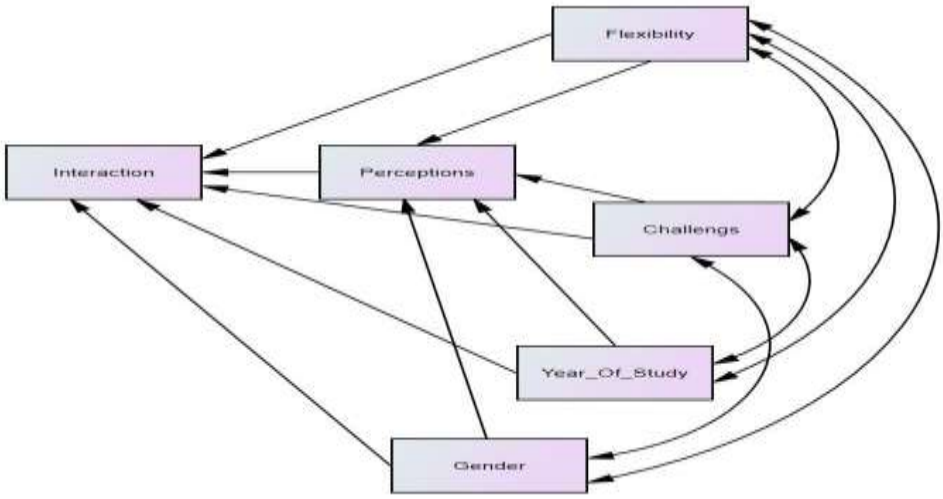

Figure 1
The summarize

METHOD

Participants

The participants were recruited via email posts from a variety of teaching colleges in Israel that had moved to online study due to restrictions resulting from the COVID-19 pandemic. The sample included 606 students, 72 males (11.88%) and 534 females (88.11%). Participants came from different years of their degree as follows: 287 first-year students (44.84%), 180 second-year students (28.12%), 107 third-year students (16.71%), and 66 fourth-year students (10.31%). The average age of the participants was 27 (SD=7).

Data collection tool

To measure the students' engagement in online learning, a Likert-type questionnaire was developed to examine several aspects of online learning. The questionnaire is based on the following questionnaires (Birbal et al, 2018; Tzivinikou et al, 2021) and contains the following main variables:

1. Perceptions toward online learning (9 items; Cronbach Alapha 0.951). Items examined aspects related to attitudes and perceptions. For example, the item: "Online learning strengthens my motivation to learn".

2. Interaction in online learning (7 items; Cronbach Alapha 0.903). The items investigated interaction in three different dimensions: between learners, learner-lecturer, and learner-content. For example, the item: “I interact and listen to others (my students) sufficiently during online learning”.

3. Online learning flexibility (4 Items; Cronbach Alapha 0.878). The items examined aspects related to time, place and easy access. For example, the item "Online learning provides the flexibility to learn from wherever suits me".

4. Online learning challenges. The items examined aspects related to resources, (6 Items; Cronbach Alapha (0.828). For example, the item: "It is difficult to access the study materials."

In addition, the questionnaire contains a section for the student demographic data. The students were required to assess their agreement to each item on a scale of 1-6 where 1- represents completely oppose and 6 – completely agree.

The measures were translated into Arabic and validated through a pilot study of 20 students from various academic institutions. After reviewing the feedback and making further adjustments, the final questionnaire was compiled and sent digitally to students of education in teacher-training colleges.

We received approval from the Institutional Review Boards (IRBs) of the participating colleges before commencing data collection. Following the receipt of IRB confirmation, students were invited to participate in the survey. Participation was entirely voluntary, with students retaining the right to opt out at any stage.

Data Analysis

The data was analysed by using descriptive statistics such as mean and standard deviations. Inferential statistics was applied also focusing on t-test, Pearson correlation, Manova. Additionally, the SEM analysis was performed to explore to what extent the data fit the proposed model.

To note, the number of participants could differ through the analysis stages depending on the missing values of the specific variable.

FINDINGS

To address the first research question, we computed bivariate correlations between perceptions toward online learning and the other variables we measured. Positive perceptions regarding online learning were significantly positively associated with interaction in learning processes (r=.740; p<.001) and flexibility in online learning (r=.789; p<.001). There was also a significant association between online learning and flexibility (r=.722; p<.001) (see Table 1).

Table 1
Correlation between research variables (N=653)

	Perceptions	Interaction	Challenges
Perceptions	----------		
Interaction	.740		
	(<.001)	--------	
Challenges	-.742	-.708	
	(<.001)	(<.001)	---------
Flexibility	.789	.722	-.685
	(<.001)	(<.001)	(<.001)

Challenges in online learning were inversely associated with positive perceptions regarding online learning (r=-.742; p<.001), interaction in learning processes (r=-.708; p<.001) and flexibility in online learning (r=-.685; p<.001).

Next, we examined the role of sociodemographic factors. There was an inverse association between years of study for the degree and positive perceptions regarding online learning (r=-.161; p<.001), interaction in online learning processes (r=-.169; p<.001) and flexibility in online learning (r =-.121; p=.002; see Table 2). There was a positive relationship between years of study and challenges (r=.171; p<.001).

Table 2
Relationship between age and years of academic study and the research variables (N=633)

	Age	Year of study
Perceptions	.011	-.161
	(.803)	(<.001)
Interaction	-.024	-.169
	(.591)	(<.001)
Challenges	-.026	.171
	(.553)	(<.001)
Flexibility	-.081	-.121
	(.067)	(.002)

Next, differences between male and female participants were examined (see Table 3). There was a significant difference in perceptions towards online learning between male and female respondents ($t_{(604)}$=-2.35; p=.007; Cohen's D = .338) with the females' attitudes more positive (M =4.93; SD=1.19) than those of males (M =4.51; SD=1.42). A significant difference was found in the interaction in online learning processes between males and females ($t_{(604)}$=-2.27; p=.023; Cohen's D = .285) where females had more positive attitudes (M =5.24; SD=.84) than males (m=4.99; SD=.94).

There is also a significant difference in the challenges of online learning processes between male and female respondents ($t_{(604)}$= 2.73; p=.006; Cohen's D = .343) where males experienced greater challenges (M =1.79; SD=1.38) than females (M = 1.38; SD=1.18).

No significant difference was found in flexibility between the two genders.

Table 3
Means, standard deviations and t-test results for comparison by gender (N1=534; N2=72)

	Males (n=72)		Females (n=534)				
	Mean	SD	Mean	SD	$t_{(604)}$	p	Cohen's D
Perceptions	4.51	1.42	4.93	1.19	-2.35	.007	.338
Interaction	4.99	.94	5.24	.84	-2.27	.023	.285
Challenges	1.79	1.32	1.38	1.18	2.73	.006	.343
Flexibility	5.01	1.01	5.18	1.00	-1.28	.201	.161

Next, differences by academic year were explored. A significant difference was found in perceptions ($F_{(3,636)}$=8.27; p<.001; Eta^2=.038), with first-year respondents' level (*M*=5.14; SD=1.05) significantly higher than second-year respondents' level (*M* =4.67; SD=1.32) and fourth-year respondents' level (*M* =4.52; SD=1.25). The third year (*M* =5.24; SD=.82) is significantly higher than the fourth year, (explained variance R^2 = 4.5%).

There is a significant difference in the interactions ($F_{(3,636)}$=9.95; p<.001; Eta^2=.045), where first-year respondents' level (*M* =5.38; SD=.70) is significantly higher than second-year respondents' level (*M* =5.07; SD=.98) and fourth-year respondents' level (*M* =4.86; SD=.87). Third year (*M* =5.24; SD=.82) is significantly higher than fourth year, explained variance R^2 = 4.5%.

Also, a significant difference in challenges ($F_{(3,636)}$=8.08; p<.001; Eta^2=.037) was found, where fourth-year respondents' level (*M* =1.85; SD=1.31) is significantly higher than first-year respondents' level (*M* =1.18; SD=1.09), explained variance R^2 = 3.7%.

There is a significant difference in flexibility ($F_{(3,636)}$=5.85; p<.001; Eta^2=.027), where first-year respondents' level (*M* =5.32; SD=.87) is significantly higher than fourth-year respondents' level (*M* =4.90; SD=1.11), explained variance R^2 = 2.7%.

Table 4
Differences in the research variables by year of study (N=640)

	1st year (N=287)		2nd year (N=180)		3rd year (N=107)		4th year (N=66)		$F_{(3,636)}$ (η^2)	p
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Perceptions	5.14^{a}	1.05	4.67^{b}	1.32	4.82^{ab}	1.25	4.52^{b}	1.29	8.27 .038	<.001
Interaction	5.38^{a}	.70	5.07^{bc}	.98	5.24^{ab}	.82	4.86^{c}	.87	9.95 .045	<.001
Challenges	1.18^{b}	1.09	1.58^{ab}	1.24	1.49^{ab}	1.19	1.85^{a}	1.31	8.08 .037	<.001
Flexibility	5.32^{a}	.87	4.98^{ab}	1.07	5.16^{ab}	1.14	4.90^{b}	1.11	5.85 .027	<.001

Structural Equation Modeling (SEM model)

We used SEM to evaluate the fit of our theoretical model to the data. The outcome variable of interest we selected was the degree of students' interaction in online learning. Our model involved perceived challenges, flexibility, and advantages of online

learning as well as the student's year of study, a path analysis was employed using the AMOS software.

In determining the model fit, we found the χ^2 (Chi-square) test to be significant ($F_{(12,1675)}$=8.27; p<.001; Eta^2=.019; Wilk's=.943). However, as is recommended in studies with large samples and complex models (i.e., with many variables; Hu & Bentler, 1999), we used the ratio χ^2/df to neutralize the sensitivity to type 1 error, where a χ^2/df ratio of under 2 indicates a good fit. The proposed model had a good fit to the data (χ^2 = 2.23, df=1, p=.14, NFI =.999, RMSEA = .044, CFI= .999. See Figure 1 and Table 5 for the proposed theoretical model – specifically, the direct and indirect effects of perception, flexibility and challenge on interaction in online learning.

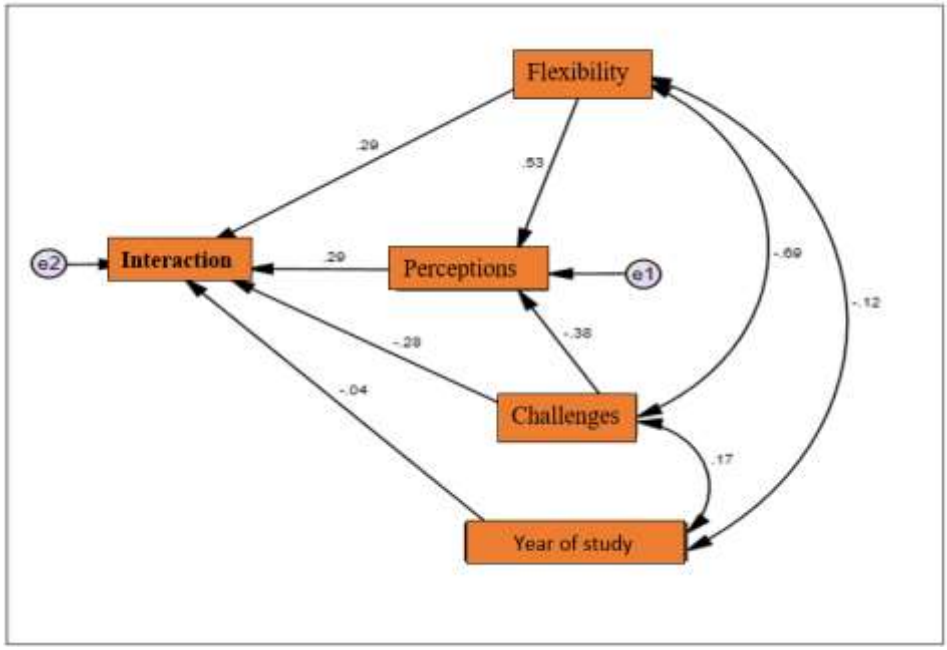

Figure 2
Proposed theoretical model

Table 5
The direct and indirect effects of perception, flexibility and challenge on interaction in online learning

Independent variable	Dependent variable	Direct effect (P)	Indirect effect (P)	Confidence interval	General effect (P)
Challenges	Perception of teaching	-.387 (<.001)			
Flexibility	Perception of teaching	.637 (<.001)			
Year of study	Interaction	-.032 (.116)			
Perception of teaching	Interaction	.202 (<.001)			
Challenges	Interaction	-.200 (<.001)	-0.78 (.002)	-.04; -.115	-278 (<.001)
Flexibility	Interaction	.244 (<.001)	.129 (.002)	.071; .186	.373 (<.001)

DISCUSSION

The current study aims to explore students' attitudes towards online learning. Students were asked to express their agreement/disagreement to different statements that examined their perceptions, interaction, flexibility, and challenges of online learning. Particular emphasis was given to examining interaction and how it is affected by the other variables. The discussions below cover the main points highlighted in the research questions.

The Students' Point of View and Assessment of Online Learning Processes

The data in Table 3 shows that students, both male and females, reported positive perceptions towards online learning to a high degree, as documented by their affirmative responses to various statements such as "Online learning provides rich educational content" and "Online learning increases the possibility of improving my education." This shows that students viewed online learning processes as beneficial to progress in academic achievement. Students responded positively to statements comparing online learning to traditional face-to-face learning: "The practice of online learning has made my attitude towards online learning a positive one" and "Online learning is a successful practical alternative to frontal/face-to-face learning." Furthermore, students responded positively to the statement, "I support the college devoting a large part to online teaching."

These responses are consistent with recent studies (Almajali et al., 2022; Marandu et al., 2022) that indicated students' positive perceptions of online learning. Baber's study (2020) showed that student perceptions of online learning were positive, and that the online learning framework increased their level of motivation and satisfaction, which contradicted other studies that reported negative perceptions towards online learning among college-level students (Aguilera-Hermida, 2020; Coman et al., 2020; Serhan, 2020). Therefore, it is difficult to point out a consensus regarding students' perceptions of online learning. Hence, it is worth investigating the contributing factors in the learning experience that shape participants' perceptions.

The study revealed that students experience the flexibility of online learning as a central factor that affects their perceptions of online learning and the degree of their interaction in the learning process. The flexibility of online learning allows students to learn when and where it is convenient and at a pace that is appropriate for them, and the average scores were particularly high in the statements referring to those factors. These results support other research studies in the literature (Haningsih & Rohmi, 2022; Singh et al., 2022) that reported on the tremendous potential inherent in the time-place-pace flexibility of online learning. In Serhan's study (2020), students indicated flexibility as an essential advantage of online learning. According to Singh et al. (2022), online learning provides flexibility to students in higher education and reduces stress from unexpected events.

Nevertheless, the study showed that the students still experienced challenges related to online learning, such as diminished concentration and focus and distraction due to external factors, including fatigue, boredom, loneliness, organization, and time management. However, the average score of student responses to the challenges was relatively low, indicating that these difficulties do not constitute a serious obstacle to meaningful learning. The challenges to online learning discussed in this study also appeared in studies by Aguilera-Hermida (2020), Moodley (2022), and Waterhouse et al., (2022).

The respondents reported a high degree of interaction, both overall and also at different levels – i.e., between the learners themselves, learner-lecturer interaction, and learner-content interaction. To some extent, these findings were inconsistent with prior studies (Aguilera-Hermida, 2020; Kaufmann & Vallade, 2020) that found learners experienced great difficulties in interacting on online platforms. Specifically, these studies reported that students did not interact to a great degree and concluded that reduced interaction increased the students' feelings of loneliness and their preference for face-to-face meetings over online learning. To our knowledge, the high level of interaction identified in the current study may indicate that students hold positive attitudes toward online learning based on perceptions of increased flexibility as an encouraging factor that outweighs the challenges involved. In addition, colleges provided increased orientation and training during and since the COVID-19 pandemic, which may have allowed them to acquire technological skills and cultivate digital literacy to a greater degree than participants in prior studies. Presumably, having more advanced technological skills or strategies and a greater sense of self-efficacy about online learning enabled students and lecturers to interact to a greater degree in online learning.

Demographic Differences and Their Place in Online Learning Processes

Gender

The current study found no differences between male and female respondents in their perception of flexibility allowed by online learning. However, significant differences were found between genders regarding general attitudes about online learning, with females reporting more positive perceptions. Female respondents also reported fewer challenges than males, as well as a higher degree of interaction. These findings replicate

some previous studies that found female students to engage more in online learning and to find more intrinsic value in online learning (Korlat et al., 2021; Rovai & Baker, 2005), though some studies found no gender differences (Almaleki et al., 2021; Cole et al., 2014).

The findings that women are more active online learners may reflect broader cultural changes occurring recently in Arab society; more and more women are pursuing and acquiring advanced education and finding greater academic success, especially in the field of education and teaching, which has historically been a female-dominated field in Arab society (Zuhur, 2003).

Study Year

Participants also differed based on their number of years of education or time spent in their program. On average, first-year students reported more positive attitudes, greater engagement/more interaction, and increased perceptions of flexibility than third- and fourth-year students. Furthermore, first-year students reported fewer challenges compared to advanced students. These findings conflict with previous studies that found that senior students perform better (Li & Che, 2022) or found no differences (Cole et al., 2014). One explanation may be that more junior students may have more desire to succeed and avoid failure than senior students (Vispoel & Austin, 1995). Perhaps, senior students' workload and burnout may adversely affect their perceptions of online learning and their degree of interaction.

The SEM Model

The second question aimed to test the theoretical model for predicting the *interaction* of students in online learning, based on the challenges, flexibility, and perceptions regarding online learning and also based on the students' year of study. The diagram in Figure 1 shows that online interaction is influenced by the three main variables: flexibility, perceptions, and challenges, as well as by students' years of study. Evidently, other background variables, such as gender, age and specialization, appear to be unrelated.

The model shows that the effect of the variables' perceptions and 'flexibility' was positive, while the effect of the two variables' challenges', and the background variable' year of study' was negative. All the involved variables affected online interaction directly. While the 'perceptions' variable affected the interaction only directly, the other involved variables – challenges, flexibility and school year - also had indirect effects.

The strength of the three main effects was quite similar and was significantly greater than the main effect of a year of study. We note that between each pair of the variables: flexibility, challenges, and year of study there was a bidirectional association (i.e., flexibility affects challenges and vice versa).

The model demonstrates that:

- Perceptions of online learning affects online interaction;
- Perceptions of flexibility in the online learning process has a positive effect on students' online interaction;
- The challenges in online learning have a negative effect on online interaction; and
- The year of study has a negative effect on the degree of interaction.

Many studies have examined attitudes/perceptions as central and final outcomes of the online learning process as well as various factors that influence experiences of online learning (Azhar, 2022; Manasse & Rostworowski, 2022). However, relatively limited research has investigated online interaction as an outcome variable (Baber, 2020).

CONCLUSIONS

The research offers a evaluation of online learning in higher education, highlighting how student perceptions, engagement, and the challenges encountered shape the educational experience. This synthesis underscores the critical interplay between the flexibility of online courses and student interaction, pointing out that overcoming obstacles can significantly enhance engagement and satisfaction.

Future studies are encouraged investigate the influence of demographic factors on learning outcomes and to develop adaptive strategies that cater to diverse needs. By prioritizing flexibility and interactivity, educational institutions can create a more inclusive and effective online learning environment. Further research into the dynamics of online interaction and demographic impacts will be pivotal in refining and enhancing the quality of online learning.

THE LIMITATIONS OF THE RESEARCH

This study exhibits several limitations. Firstly, the sample is restricted to students from only two colleges, limiting the generalizability of the results to the wider student population in higher education. This selection may not fully capture the diversity of experiences, backgrounds, and perspectives present across different institutions. Additionally, as with many studies in this field, there exists the potential for response bias, where participants might provide answers, they perceive as expected or socially acceptable rather than their true feelings or behaviors. Furthermore, the study's design, primarily quantitative, may not capture the depth and nuance of students' experiences and perceptions of online learning. Future research could benefit from incorporating a broader, more diverse sample and employing mixed methods to enrich the understanding of online learning's complexities and its varied impacts on students from different demographic and educational backgrounds.

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