

# Students' Attitudes to Online Learning by Means of Zoom in the Period of the COVID-19 Crisis

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## Abstract

This study examined students' attitudes to characteristics of learning in Zoom, attitudes to the quality of teaching in Zoom and ways of learning, about a year after the outbreak of the COVID-19 crisis. The aim of the current study was to examine, What are students' attitudes to the characteristics of learning in Zoom, the quality of teaching in Zoom and ways of learning in Zoom? Facilitators, inhibitors, implications and recommendations were identified. The study is a quantitative one, the questionnaire contained closed questions, and 712 students who study in higher education institutions in Israel participated in the study. The findings showed that most students are satisfied with learning in Zoom, and that there was a significant improvement in the students' attitudes towards learning in Zoom during their studies in the Covid-19 period. It was found that older students have more positive attitudes towards learning in Zoom, and learning disorders are connected to more negative attitudes towards learning in Zoom; however, there was also an improvement in the attitudes of students with learning disorders, during their learning experience in the COVID-19 period.

**Keywords:** information and communication technology (ICT), distance learning, digital environment, Zoom, Zoom fatigue, COVID-19

## 1. Introduction

Even before the COVID-19 crisis, academic institutions began to include online courses in the curriculum (Seaman, Allen, and Seaman 2018; Soffer and Cohen 2019; Zilka, Cohen, and Rahimi 2018; Rahimi, Zilka and Cohen 2019). Researchers (DePietro 2020; Yan 2020) say that the COVID-19 crisis caused exposure to online learning on the largest scale known in human history, and that together with the challenges of the transition to online learning, there are also opportunities to change perceptions of teaching and learning, and to include new ways in the learning and teaching process in higher education. Cohen, Bronshtein, et al. (2020) say that in their opinion the present crisis could be a catalyst for processes that have been taking place in recent years in the use of technology in teaching and learning and in the transition to online learning. Dhawan (2020) says that institutions should utilize the crisis and the necessity for online learning to learn innovative pedagogic approaches and use online learning optimally. The COVID-19 crisis accelerated the process of assimilating online learning in academia, and a transition to full online, mainly synchronous learning began (Cohen, Bronshtein, et al. 2020; Kwong, Mui, and Wong 2020). Technologies such as Zoom enabled the continuation of regular activity through the internet (Wiederhold 2020). Learning in Zoom is synchronous online learning, that is to say, learning in which the lecturers and the students are in a shared digital space and interact (Rahayu 2020).

This study examined students' attitudes to characteristics of learning in Zoom, attitudes to the quality of teaching in Zoom and to the manner of learning, following experience of learning in Zoom in the period of the COVID-19 crisis. The research question was: What are the students' attitudes to the characteristics of learning in Zoom and what are their attitudes to the quality of teaching in Zoom and to ways of learning in Zoom?

Facilitators, inhibitors, implications and recommendations were identified. Experienced students were compared to new students who began their studies in the COVID-19 period; students of different ages were compared; and students with learning disorders were compared to students without learning disorders.

## 2. Online Learning in the COVID-19 Period

Valenta et al. (2001) analyzed literature on the subject of online learning and found that the positive aspects included flexibility and convenience for students, improved interaction with the lecturer and an overall good learning experience. The disadvantages included a reduction in face-to-face interaction, worries about technology and logistics, a heavy

workload and increased costs for the student. Cohen, Bronshtein, et al. (2020) mentioned the flexibility of time management as an advantage of online learning. In addition, it was noted that it is more convenient to watch and listen to online courses than frontal courses. Some students also said that their level of concentration is higher in online courses and that online learning was helpful for learning disorders. Rahayu (2020) researched students' experience of learning in Zoom and found that students expressed a positive attitude to learning in Zoom; however, they still maintained that frontal learning is preferable and enables easier access to learning materials and lecturers. Researchers (Riva, Mantovani, and Wiederhold 2020; Wiederhold 2020) studied "Zoom fatigue" and found that the characteristics of learning in Zoom are different from those of face-to-face lessons. They emphasize that orientation in the two-dimensional space of a Zoom lesson is different from a face-to-face lesson: it is difficult to locate the source of the voice, locate and understand facial expressions, understand interpersonal interactions, make eye-contact, understand messages, and altogether spatial perception is more difficult. Therefore, many people complain of tiredness, problems concentrating, a feeling of pressure and a feeling of blurred boundaries (Zoom fatigue).

### 3. Students With Learning Disorders

In this study we examined whether there were differences between the attitudes of students with learning disorders and students without learning disorders. The *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* (American Psychiatric Association 2013) defines a learning disorder as a neurodevelopmental disorder with a biological basis and cognitive implications affecting learning functions such as reading, reading comprehension, written expression, mathematical calculations and mathematical logic, which is manifested at different levels. Research carried out by Parker and Banerjee (2007) found that students with learning disorders have low exposure to online courses and courses that use technology, and students with learning disorders or ADHD reported discomfort with online communication. In addition, it was found that these students have a low level of comfort in searching for online literature. It was also found that multiple tasks using a computer that necessitate divided and continuous attention are difficult for students with learning disorders or ADHD. Mandelblit (2020) found that students with learning disorders have greater difficulty in distance learning as they need more guidance in learning, have difficulty summoning attention independently, reading for a long time, understanding the material without mediation by the lecturer, expressing themselves in writing, self-managing or coping with a heavy workload and pressure of studies.

Simoncelli and Hinson (2008) recommended developing online courses to suit students

with learning disorders; among the suggestions were technological support, an application with text-to-speech features and training lecturers to adapt online learning for students with learning disorders. Crow (2008) recommends using a screen-reading device, avoiding an italicized font, limiting the use of synchronous tasks based on chat and limiting the use of games and simulations that require high levels of motor skills, avoiding the use of flashing objects on the screen, giving additional time as needed to complete tasks that require interaction between people and the computer, and more.

The aim of the current study was to examine students' attitudes to characteristics of learning in Zoom, attitudes to the quality of teaching in Zoom and manner of learning, following experience of learning in Zoom in the period of the COVID-19 crisis.

Facilitators, inhibitors, implications and recommendations were identified. Experienced students were compared to new students who began their studies in the COVID-19 period; students of different ages were compared; and students with learning disorders were compared with students without learning disorders.

#### 3.1 Research Questions

What are students' attitudes are to the characteristics of learning in Zoom? What are their attitudes to the quality of teaching in Zoom and manner of learning in Zoom?

Will differences be found between the attitudes of students who began their studies in the COVID-19 period and the attitudes of experienced students who began their studies before the COVID-19 period?

Will differences be found between the attitudes of students with learning disorders and students without learning disorders?

What are the factors that encourage continued learning in Zoom after the COVID-19 crisis?

What are the factors that discourage continued learning in Zoom after the COVID-19 crisis?

### 4. Method

The study is a quantitative one. An anonymous closed questionnaire was sent to hundreds of students who chose to fill in the questionnaire or not.

The study received the permission of the Institutional Review Board (IRB).

#### 4.1 Sample

The participants in the study were 712 students who study on academic campuses in Israel. The average age of the sample is 30.1 years ( $SD = 10.27$ ). Table 1 shows the sociodemographic background characteristics of the students in the sample.

Table 1. Sociodemographic background characteristics of the sample ( $N = 712$ )

Variable		%	N
Gender	Male	38.5%	273
	Female	61.5%	437
Diagnosis of learning disorders	No	71.1%	506
	Yes	28.9%	206
Study program	Preacademic program		
	Bachelor's degree – first year	9.0%	64
	Bachelor's degree – second year		
	Bachelor's degree – third year	33.4%	238
	Master's degree	43.5%	310
		11.1%	79
		2.9%	21

29% of the students were diagnosed as having learning disorders. Approximately a third of the students are in the first year of a bachelor's degree (33.4%) and approximately 43% of the students are in the second year of a bachelor's degree.

#### 4.2 Research Tools

A questionnaire on attitudes with closed questions was used. The questionnaire was based on questionnaires that examined the development of online learning among students, such as Cohen, Bronshtein, et al. (2020) and Fox (2020).

**Attitudes to teaching:** Students' attitudes to teaching were measured by means of two statements in the questionnaire: The quality of the lecturers' teaching during distance learning (creating interest, how they taught the subject matter, the structure of the lectures and similar); and operation of technology by the lecturers. The answers are on a Likert-type scale from 1 to 5 where 1 = very poor, 5 = very good. The variable was built from the average of the answers: the higher the score, the more positive the students' attitudes to teaching. In a Cronbach's alpha reliability test the variable's reliability

was found to be  $\alpha = 0.85$  in the current sample.

**Attitudes to learning:** The students' attitudes to learning were measured by means of five statements in the questionnaire: The quality of learning in Zoom, which includes understanding and following the material studied during distance learning; the home learning environment during distance learning (internet, room, chair, lighting etc.); feeling of privacy and comfort (using an internet camera, microphone etc.); recording the lectures is the reason that can justify learning in Zoom; the inconvenience of going to the campus (travel, traffic jams, wasting time, costs) is the reason that can justify learning in Zoom. The answers are on a Likert-type scale from 1 to 5 where 1 = very poor, 5 = very good. The variable was built from the average of the answers: the higher the score, the more positive the students' attitudes to learning in Zoom. In a Cronbach's alpha reliability test the variable's reliability was found to be  $\alpha = 0.83$  in the current sample.

*Attitudes to Characteristics of Learning:* The students' attitudes to characteristics of learning were measured by means of six statements in the questionnaire: I am more concentrated in online learning in Zoom than in learning in class; my learning abilities are manifested optimally in learning in Zoom; online learning in Zoom is learning with less distractions compared to formal learning in class; I miss meeting other students on the campus; online learning does not enable me to fully utilize my scholastic achievements; online learning has a negative effect on my motivation to study. The answers are on a Likert-type scale from 1 to 5, where 1 = strongly disagree, 5 = strongly agree. Statements 11–13 are opposite statements. The variable was built from the average of the answers, where the higher the score, the more positive the students' attitudes to learning in Zoom. In a Cronbach's alpha reliability test the variable's reliability was found to be  $\alpha = 0.90$  in the current sample.

**Manner of learning (willingness for distance learning in the future):** The students' attitudes to the manner of learning were measured by means of two statements in the questionnaire: Do you prefer distance learning through Zoom to learning on campus (please choose the answer that suits you most): Yes, distance learning is preferable to learning on campus; I prefer a combination of distance learning and learning on campus; no, learning on campus is preferable to distance learning; based on my experience, if I had a choice of studies on campus or online studies in Zoom, I would prefer to continue my studies in Zoom; if a decision is made to stop studies by Zoom entirely, and all the students have to go to the campus, I would be prepared to pay an extra NIS 150 (about

\$45) each semester in order to continue to study in a program that is studied entirely in Zoom. The answers are on a Likert-type scale from 1 to 5, where 1 = strongly disagree, 5

= strongly agree. The variable was built from the average of the answers: the higher the score, the more positive the students' attitudes towards distance learning. In a Cronbach's alpha reliability test the variable's reliability was found to be  $\alpha = 0.78$  in the current sample.

**General scale – attitudes towards distance learning:** The general scale of the questionnaire consisted of 15 statements. The answers are on a Likert-type scale from 1 to 5 where 1 = strongly disagree, 5 = strongly agree. Statements 11–13 are opposite statements. The variable was built from the average of the answers: the higher the score, the more positive the students' attitudes towards distance learning in general. In a Cronbach's alpha reliability test the variable's reliability was found to be  $\alpha = 0.94$  in the current sample.

## 5. Findings

In this chapter the students' attitudes towards online learning by means of Zoom in the period of the COVID-19 crisis are presented as follows: attitudes to teaching, attitudes to learning, attitudes to learning characteristics, manners of learning, attitudes and gender, attitudes and learning disorders, attitudes and study programs, attitudes and age, and a model for predicting students' attitudes.

### Attitudes to Teaching

Table 2 below presents theoretical statistics (frequency distribution, average and standard deviation) of the statements in the questionnaire that dealt with the students' attitudes to teaching.

Table 2. Theoretical characteristics of the students' attitudes to teaching (N = 712)

<i>Question</i>	<i>Very poor</i>	<i>Poor</i>	<i>Medium</i>	<i>Good</i>	<i>Very good</i>	<i>M</i>
	%	%	%	%	%	(SD)
In my opinion, the quality of the lecturers' teaching during distance learning (creating interest, how they taught the subject matter, the structure of the lectures and similar) is	3.5%	5.5%	19.9%	28.4%	42.7%	4.01 (1.07)
Use of technology by the lecturers	2.1%	5.6%	18.8%	32.3%	41.2%	4.05 (1.00)

### 5.1 Attitudes Towards Learning

Table 3 below presents theoretical statistics (frequency distribution, average and standard deviation) of the statements in the questionnaire that dealt with the students' attitudes to learning.

Table 3. Theoretical characteristics of the students' attitudes to learning (N = 712)

<i>Question</i>	<i>Very poor</i>	<i>Poor</i>	<i>Medium</i>	<i>Good</i>	<i>Very good</i>	<i>M</i>
	%	%	%	%	%	( <i>SD</i> )
In my opinion, the quality of my learning in Zoom, which includes understanding the material and following the material studied during distance learning is	6.5%	7.7%	14.2%	20.1%	51.5%	4.03 (1.24)
In my opinion, my home learning environment during distance learning (internet, room, chair, lighting etc.) is	4.4%	7.9%	14.2%	18.3%	55.3%	4.12 (1.17)
In my opinion, I have a feeling of privacy and comfort (using a web camera, microphone etc.)	4.8%	9.4%	16.0%	17.1%	52.7%	4.04 (1.22)
In my opinion, recording the lectures is the reason that can justify learning in Zoom	3.8%	2.8%	11.0%	14.3%	68.1%	4.40 (1.04)
In my opinion, the inconvenience of going to the campus (travel, traffic jams, loss of time, costs) is the reason that can justify learning in Zoom	8.2%	4.9%	6.5%	13.9%	66.5%	4.26 (1.26)

### 5.2 Characteristics of Learning

Table 4 below presents theoretical statistics (frequency distribution, average and standard deviation) of the statements in the questionnaire on the students' attitudes to characteristics of learning.

Table 4. Theoretical characteristics of the students' attitudes to characteristics of learning (N = 712)

Question	Strongly disagree %	Disagree %	Agree moderately %	Disagree %	Strongly agree %	M (SD)
I am more concentrated in online learning in Zoom than in learning in class	16.4%	8.0%	16.7%	14.7%	44.1%	3.62 (1.50)
My learning abilities are manifested optimally in learning in Zoom	12.6%	8.0%	15.4%	19.0%	44.9%	3.76 (1.41)
Online learning in Zoom is learning with less distractions compared to frontal learning in class	16.9%	10.0%	12.6%	17.0%	43.5%	3.60 (1.52)
I miss meeting other students on the campus	19.2%	13.9%	25.1%	15.4%	26.3%	3.16 (1.44)
In my opinion, online learning does not enable me to fully utilize my scholastic achievements	46.8%	15.6%	14.3%	11.0%	12.4%	2.27 (1.44)
Online learning has a negative effect on my motivation to learn	53.2%	15.2%	12.6%	7.2%	11.8%	2.09 (1.41)

### 5.3 Manner of Learning

The students were asked whether they prefer distance learning through Zoom to learning on campus. Figure 1 below shows the distribution of the answers (%).

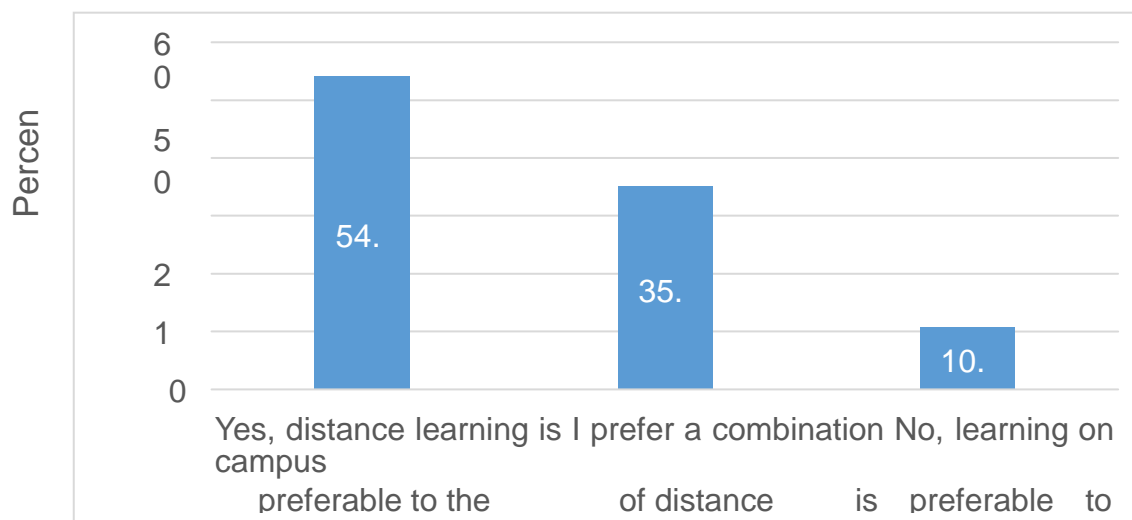


Figure 1. Frequency distribution of preference for distance learning compared to learning on campus

It can be seen that most of the students said they prefer distance learning to learning on campus (approximately 54%). Another third of the sample reported that they prefer a combination of distance learning and learning on campus (35%)

and a minority of the sample (approximately 11% only) preferred learning on campus to distance learning.

Table 5 below presents theoretical statistics (frequency distribution, average and standard deviation) of the statements in the questionnaire that dealt with the students' attitudes to the manner of learning (willingness for distance learning in the future).

Table 5. Theoretical characteristics of the students' attitudes to the manner of learning (N = 712)

<i>Question</i>	<i>Strongly disagree</i> %	<i>Disagree</i> %	<i>Agree moderately</i> %	<i>Agree</i> %	<i>Strongly agree</i> %	<i>M (SD)</i>
Based on my experience, if I could choose between learning on campus or online learning in Zoom, I would prefer to continue my studies in Zoom.	12.0%	5.8%	12.8%	12.7%	56.8%	3.97 (1.41)
If it is decided that studies in Zoom will stop completely, and all students have to go to the campus, I would be prepared to pay an extra NIS 150 each semester in order to continue to study in a program that is studied entirely in Zoom	26.1%	5.6%	12.0%	10.6%	45.6%	3.44 (1.68)

In conclusion, Table 6 below shows theoretical statistics (measures of central tendency and variability) of the parameters of the students' attitudes to the manner of learning, which were derived from the questionnaire.

Table 6. Theoretical characteristics of the main research variables (N = 712)

<i>Variable</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
<i>Attitudes towards teaching in distance learning</i>	4.03	0.97	1.00	5.00
<i>Attitudes towards distance learning</i>	4.16	0.91	1.00	5.00
<i>Attitudes towards characteristics of distance learning</i>	3.57	1.19	1.00	5.00
<i>Manner of learning (willingness for distance learning in the future)</i>	3.70	1.40	1.00	5.00
<i>Attitudes towards distance learning – general scale</i>	3.85	1.00	1.00	5.00

According to the data shown in the table it can be seen that on average students report positive attitudes of a relatively high



level towards teaching in distance learning (average of 4.03 on a scale of 1–5) and positive attitudes of a relatively high level in relation to distance learning in general (average of 4.16 on a scale of 1–5).

The students report positive attitudes of a moderate-high level towards the characteristics of distance learning (average of 3.57 on a scale of 1–5) and positive attitudes of a moderate-high level towards the manner of learning – willingness for distance learning in the future (average of 3.70 on a scale of 1–5).

In general, the students' attitudes to distance learning are positive at a moderate-high level (average of 3.85 on a scale of 1–5).

#### *Students' Attitudes to Online Learning by Means of Zoom in the Period of the COVID- 19 Crisis, According to Background Variables*

##### *5.4 Gender*

To examine the differences between men and women in students' attitudes to online learning by means of Zoom in the period of the COVID-19 crisis, a *t*-test for independent samples was carried out. The findings are presented in the following table.

Table 7. The differences in students' attitudes to online learning according to gender

	Men		Women		<i>t</i>
	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	
Attitudes towards teaching in distance learning	3.91	1.04	4.10	0.89	-2.50*
Attitudes towards distance learning	4.10	0.91	4.21	0.91	-1.45
Attitudes to characteristics of distance learning	3.50	1.18	3.62	1.20	-1.27
Attitudes to the manner of learning	3.70	1.45	3.70	1.37	-0.03

$p < .05^*$ ,  $p < .01^{**}$

It can be seen that significant differences were found between men and women in attitudes to teaching in distance learning ( $t(708) = -2.50$ ,  $p < .05$ ) only. The attitudes of the female students in this parameter were significantly more positive than those of male students.

##### *5.5 Learning Disorders*

To examine the differences between students diagnosed with learning disorders and those who are not in attitudes to online learning by means of Zoom in the period of the

COVID-19 crisis, a *t*-test for independent samples was carried out. The findings are presented in the following table.

Table 8. The differences in the students' attitudes to online learning according to learning disorders

	No learning disorders <u>N = 506</u>		Learning disorders <u>N = 206</u>		<i>t</i>
	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	
Attitudes towards teaching in distance learning	4.15	0.86	3.72	1.14	5.43**
Attitudes towards distance learning	4.24	0.89	3.98	0.95	3.41**
Attitudes to characteristics of distance learning	3.66	1.18	3.36	1.21	3.00**
Attitudes to the manner of learning	3.79	0.96	3.63	1.04	*2.45

$p < .05^*$ ,  $p < .01^{**}$

It can be seen that significant differences were found between students diagnosed with learning disorders and students who are not in attitudes to teaching in distance learning ( $t(710) = 5.43$ ,  $p < .01$ ), attitudes to distance learning ( $t(710) = 3.41$ ,  $p < .01$ ), attitudes to the characteristics of distance learning ( $t(710) = 3.00$ ,  $p < .01$ ) and attitudes to the manner of learning ( $t(710) = 2.54$ ,  $p < .05$ ). The attitudes of students not diagnosed with learning disorders in these parameters were significantly more positive than those of students diagnosed with learning disorders.

#### 5.6 Study Program

To examine the differences in the students' attitudes to online learning by means of Zoom in the period of the COVID-19 crisis according to their program of study a one-way analysis of variance (ANOVA) was carried out. The findings are presented in the following table.

Table 9. The differences in students' attitudes to online learning according to their study program

	Preacademic program  N = 63 M (SD)	Bachelor's degree First year N = 216 M (SD)	Bachelor's degree Second year N = 256  M (SD)	Bachelor's degree Third year N = 74 M (SD)	Master's degree  N = 17 M (SD)	F
Attitudes towards teaching	3.75 (0.91)	4.06 (0.96)	4.05 (0.99)	3.98 (0.99)	4.26 (0.68)	1.73
Attitudes towards distance learning	3.87 (0.75)	4.24 (0.90)	4.19 (0.94)	4.06 (0.94)	4.24 (0.75)	2.42*
Attitudes to characteristics of distance learning	3.07 (0.99)	3.60 (1.19)	3.66 (1.21)	3.56 (1.28)	3.60 (0.90)	3.33*
Attitudes to the manner of learning	2.98 (1.37)	3.79 (1.38)	3.77 (1.41)	3.62 (1.43)	4.09 (1.00)	5.25**

$p < .05^*$ ,  $p < .01^{**}$

In a one-way ANOVA significant differences were found according to the study program in the students' attitudes to distance learning ( $F(4, 711) = 2.42$ ,  $p < .05$ ), the students' attitudes to characteristics of distance learning ( $F(4, 711) = 3.33$ ,  $p < .05$ ) and the students' attitudes to the manner of learning ( $F(4, 711) = 5.25$ ,  $p < .01$ ).

In a subsequent Scheffé test to locate the source of the differences it was found that the attitudes of students studying in a preacademic program are less positive towards distance learning than those of students studying in the first year of a bachelor's degree. It was also found that students studying in a preacademic program have less positive attitudes towards characteristics of distance learning than students studying in the first year or the second year of a bachelor's degree. Finally, it was found that students studying in a preacademic program have less positive attitudes towards the manner of learning than students studying in the first year or the second year of a bachelor's degree.

### 5.6 Age

To examine the correlation between the age of the students and their attitudes to online learning by means of Zoom in the period of the COVID-19 crisis, a Pearson test was carried out. The findings are presented in the following table.

Table 10. Pearson correlation coefficients between the student's age and attitudes towards online learning (N = 626)

	1	2	3	4	5
1. Age	---				
2. Attitudes towards teaching	.27**	---			
3. Attitudes towards distance learning	.22**	.69**	---		
4. Attitudes to characteristics of distance learning	.23**	.66**	.82**	---	
5. Attitudes to the manner of learning	.27**	.56**	.72**	.76**	---

$p < .05^*$ ,  $p < .01^{**}$

It can be seen that there are significant positive connections between the student's age and their attitudes to online learning by means of Zoom in the period of the COVID-19 crisis in all the parameters: the older the student the more positive their attitude to teaching in distance learning, to the characteristics of distance learning and to the manner of learning (willingness for distance learning in the future). In addition, it can be seen that significant positive connections were found between all the parameters of attitudes.

### 5.7 Predictive Models

First, a model was built to predict the general attitudes towards distance learning (the general scale of the questionnaire) by means of the students' sociodemographic background variables.

Table 11. Regression coefficients for predicting students' attitudes towards distance learning (in general)

Predictors	Coefficients				$R^2$
	$\beta$	SE	B	t	
Gender (1 = male)	-0.05	0.08	-0.12	-1.54	
Age	0.28	0.01	0.02	7.09**	0.09
Mother tongue (1 = Hebrew)	-0.01	0.11	-0.02	-0.20	
Degree of religious observance	0.05	0.04	0.06	1.48	
Study program	-0.05	0.04	-0.06	-1.48	
Learning disorder (1 = yes)	-0.09	0.08	-0.21	<b>-2.49*</b>	

$p < .05^*$ ,  $p < .01^{**}$

The regression model for predicting general attitudes towards distance learning was found to be significant ( $F(6, 656) = 11.11$ ,  $p < .01$ ), and the predictive variables add 9% to the explained variance of the students' attitudes towards distance learning. It was found that the variables of age and learning disorders had a significant unique contribution in the model, where older students have more positive attitudes towards distance learning and a diagnosis of a learning disorder is connected to more negative attitudes towards distance learning.

In the next step, a model was built to predict willingness to pay extra to continue distance learning, by means of the students' sociodemographic background variables and the students' attitudes towards distance learning.

Table 12. Regression coefficients for predicting willingness to pay extra to continue distance learning

Predictors	Coefficients				
	$\beta$	SE	B	t	$R^2$
<b>First step</b>					
Gender (1 = male)	0.01	0.13	0.05	0.39	0.07
Age	0.26	0.01	0.04	6.44**	
Mother tongue (1 = Hebrew)	-0.02	0.18	-0.09	-0.51	
Degree of religious observance	0.04	0.07	0.07	1.05	
	-0.05	0.08	-0.10	-1.31	
Study program					
	-0.06	0.14	-0.22	-1.53	
Learning disorder (1 = yes)					
<b>Second step</b>					
Attitudes to teaching towards learning					
	0.06	0.07	0.10	1.35	
Attitudes to characteristics of learning					0.34
	0.20	0.10	0.38	3.65**	
	0.37	0.07	0.53	6.89**	

$p < .01^{**}$

The regression model for predicting willingness to pay extra to continue distance learning was found to be significant ( $F(6, 653) = 49.68$ ,  $p < .01$ ), and the predictive variables add 41% to the explained variance of the students' attitudes towards distance learning.

When the regression coefficients are examined, it can be seen that in the first step, in which sociodemographic background variables are entered into the model, the age variable only had a significant unique contribution in the model: older students are more willing to pay extra to continue distance learning. The age variable adds 7% in the first step of explained variance of willingness to pay extra to continue distance learning.

In the second step, in which the variables of the students' attitudes towards distance learning were entered into the model,

it was found that the students' attitudes towards distance learning (the quality of learning, learning environment, feeling of privacy and comfort, recording lectures, less trouble going to the campus) and towards characteristics of learning (concentration, learning abilities, less distractions, fully utilizing achievements, motivation for learning) had a significant unique contribution in the model. More positive attitudes of the students in these parameters were connected to a high level of willingness to pay extra to continue distance learning. In the second step these variables add 34% to the explained variance of willingness to pay extra to continue distance learning.

In the next stage, a model was built to predict preference for continued distance learning, by means of the students' sociodemographic background variables and the students' attitudes towards distance learning.

Table 13. Regression coefficients for predicting preference for continued distance learning

Predictors	Coefficients				
	$\beta$	SE	B	t	$R^2$
<b>First step</b>					
Gender (1 = male)	-0.06	0.11	-0.20	-1.81	0.10
Age					
Mother tongue (1 = Hebrew)	0.26	0.01	0.03	<b>6.74**</b>	
Degree of religious observance	-0.01	0.15	-0.06	-0.39	
Study program	0.10	0.06	0.16	<b>2.77**</b>	
Learning disorder (1 = yes)	0.01	0.06	0.01	0.27	
	-0.08	0.12	-0.28	<b>-2.35*</b>	
<b>Second step</b>					
Attitudes to teaching	0.02	0.04	0.02	0.65	0.63
Attitudes to learning					
Attitudes to characteristics of learning	0.32	0.06	0.50	<b>8.42**</b>	
	0.52	0.04	0.61	<b>14.20**</b>	

$p < .05^*$ ,  $p < .01^{**}$

The regression model for predicting preference for continued distance learning was found to be significant ( $F(9, 655) = 197.20$ ,  $p < .01$ ), and the predictive variables add 73% to the explained variance of the students' attitudes towards distance learning. When the regression coefficients are examined it can be seen that in the first step, in which the sociodemographic background variables were entered into the model, the variables of age, degree of religiosity and learning disorders had a significant unique contribution in the model, where older students have greater preference for continued distance learning,

a higher degree of religiosity is connected to a higher preference for continued distance learning and a diagnosis of a learning disorder is connected to a low preference for continued distance learning. These variables add 10% in the first step to the explained variance of preference for continued distance learning.

In the second step, where the variables of students' attitudes towards distance learning were entered into the model, it was found that students' attitudes towards distance learning (the quality of learning, learning environment, feeling of privacy and comfort, recording lectures, less trouble going to the campus) and to the characteristics of learning (concentration, learning abilities, less distractions, fully utilizing achievements, motivation for learning), had a significant unique contribution in the model. More positive attitudes of the students in these parameters were connected to a high level of preference for continued distance learning. In the second step these variables add 63% to the explained variance of preference for continued distance learning.

## 6. Discussion

This study examined students' attitudes to online learning by means of Zoom about a year after the outbreak of the COVID-19 crisis. Students' attitudes to the nature of the teaching during the crisis, their attitudes to learning, to the characteristics of learning and to the manner of learning were examined. Facilitators, inhibitors, implications and recommendations were identified.

In general, it can be said that students are satisfied with learning in Zoom. The scores for students' attitudes to teaching in Zoom (table 2, average of 4.01 in a scale of 1–5), and learning in Zoom (table 3, average of 4.03 in a scale of 1–5) were high. In comparison to studies carried out a short time after the outbreak of the COVID-19 crisis, there was a significant increase in students' satisfaction as a consequence of their experience of learning in Zoom.

The regression model for predicting general attitudes towards distance learning (see prediction model) was also found to be significant ( $F(6, 656) = 11.11, p < .01$ ); it was found that the variables of age and learning disorders had a significant unique contribution in the model, and there is a connection between the student's age and more positive attitudes towards distance learning, whereas a diagnosed learning disorder is connected to more negative attitudes towards distance learning.

**Students with and without learning disorders.** The findings show that there are significant differences between students diagnosed with learning disorders and students without learning disorders in attitudes to teaching in Zoom ( $t(710) = 5.43, p < .01$ ), attitudes to learning in Zoom ( $t(710) = 3.41, p < .01$ ), attitudes to the characteristics of learning ( $t(710) = 3.00, p < .01$ ) and attitudes towards the manner of learning ( $t(710) = 2.54, p < .05$ ). The attitudes of students not diagnosed as having learning disorders were significantly more positive in these parameters than those of students diagnosed with learning disorders. However, compared to findings a short time after the outbreak of the COVID-19 crisis (Fox 2020) in a study that examined satisfaction with teaching, the average (on a scale identical to the one in this study, 1–5) received from the answers of students with learning disorders was 2.9, as opposed to an average of 3.72 in this study; in the previous study the average of students without learning disorders was 3.15 whereas in this study it rose to 4.15. Therefore, it can be concluded that online learning creates a change in students' attitudes to this learning. In addition, according to previous studies (Christensen et al. 2008; Rice and Katz 2003; Livingstone and Sefton-Green 2016; Talukdar and Gauri 2011; Voogt and Pelgrum 2005; Wareham et al. 2004; Zilka 2016, 2019) learning in digital environments has a positive influence on the learning process. It gives students a feeling that they have a high level of digital skills. They feel that the digital environment is a partner to building their knowledge, processing and presenting the knowledge and activating reflective metacognitive processes, processes of self-direction, cognitive processes, emotional and differential processes. Students see access to Information and Communications Technology (ICT) as an aim in itself. According to previous studies users of digital environments have needs such as a need for information, locating information, identifying information, quick access to information, environments that contain varied sources of information, data processing programs etc. The digital environment changes their learning, social and cultural environment. The digital environment changes people's ways of behaving, their way of life, how they communicate with others, the degree to which they need information, how they locate information and process information and their patterns of thinking (Carr 2011; Zilka 2016, 2019). Researchers (Cohen, Vincent, et al. 2015; Jan et al. 2016; Johnson et al. 2011; Zilka, Cohen, and Rahimi 2018; Rahimi, Zilka and Cohen 2019) found that the digital environment creates increased motivation among learners, creates scholastic and social engagement and gives rise to fascinating and varied environments. It can be concluded from the findings of this study and those of previous studies that in time students, including students with learning disorders, become increasingly aware of the advantages of the digital learning environment and acquire learning habits that suit this environment.

**Differences between ages.** In this study we found significant positive connections between the students' ages and their attitudes to online learning by means of Zoom in the period of the COVID-19 crisis in all the parameters; the older the student the more positive their attitude to teaching in distance learning, to the characteristics of distance learning and to

the manner of learning (willingness for distance learning in the future). In addition, it can be seen that significant positive connections were found between all the parameters of attitudes. There were similar findings in previous studies (Khat 2015; Simonds and Brock 2014). Simonds and Brock (2014) found that older students preferred asynchronous learning and lectures recorded in advance by the lecturers; they also found that younger students preferred group projects and synchronous, interactive learning to asynchronous learning. Khat (2015) explains older students' preference for online learning in that the practice of self-learning is important to older students (over the age of

24) as they need to combine work, studies and family life and it enables them to integrate studies in their lives without affecting their work or family life.

### **Factors that Facilitate or Inhibit Continued Learning in Zoom After the COVID-19 Crisis**

Students mentioned facilitators such as learning from home; most of the students evaluated their home learning environment highly (table 3, average of 4.12), and their feeling of privacy and comfort highly (table 3, average of 4.04). Most of the students said that recording lectures is a reason that can justify continued learning in Zoom after the COVID-19 crisis (average mark of 4.40). Most of the students said that the trouble of going to the campus is a reason that can justify continuing to learn in Zoom after the end of the COVID-19 crisis (average mark 4.26); most of the students feel that they are more concentrated on learning in Zoom than in face-to-face learning (average 3.62); that their learning ability is manifested optimally in learning in Zoom (3.75); that there are less distractions in online learning in Zoom compared to frontal learning (average 3.60).

However, most of the students felt that they missed meeting other students on campus (average 3.16). These averages support previous studies (Cohen, Bronshtein, et al. 2020; Fox 2020; Rahayu 2020), in which similar facilitators arose, such as the flexibility that online learning enables and time management according to their personal needs, flexibility in real time, flexibility in the pace of learning, and greater comfort in watching and listening, compared to face-to-face learning. Students said that their level of concentration is higher in online learning. El Hammoumi and El Youssfi (2020) researched online learning as a consequence of the COVID-19 crisis and found that one of the inhibitors is a lack of physical meeting on campus, as was found in this study; they recommended encouraging active participation of students online. Researchers (Edwards, Perry, and Janzen 2011; Pittman and Richmond 2008; Robinson and Hullinger 2008; Rovai 2007; Zilka, Cohen, and Rahimi 2018; Rahimi, Zilka and Cohen 2019; Young and Bruce 2011) say that lecturers who encouraged creation of an online learning community and increased the presence in teaching and the social presence caused a reduction in the feeling of physical social distance.

In conclusion, this study shows that most students are satisfied with learning in Zoom and that there was a significant improvement in students' attitudes towards learning in Zoom during their studies in the shadow of COVID-19, a year after the outbreak of the COVID-19 crisis. It was found that older students have more positive attitudes towards learning in Zoom, and learning disorders are connected to more negative attitudes towards distance learning; however, among students with learning disorders there was also an improvement in attitudes during their studies in the shadow of COVID-19.

### **7. Future Research**

Future research on the effectiveness of learning by means of Zoom in higher education could examine parameters such as evaluation of the learners' achievements, the quality of the assignments presented by the students, meeting schedules, whether lecturers manage to teach all the subject matter, the quality of the discussions in Zoom, use of technological tools, use of 21st century skills and similar.

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