

## 1. Supplementary Materials S1

### 1.1 Students' survey

#### 1. Biographical data

1. Age:
  - a) 18 to less than 22
  - b) 22 to less than 27
  - c) 27 to less than 32
  - d) 32+
2. Gender:
  - a) Male
  - b) Female
3. University:
  - a) HBKU (Hamad Bin Khalifa University)
  - b) Qatar University (QU)
  - c) CCQ (Community College of Qatar)
4. Year of studying:
  - a) First year
  - b) Second year
  - c) Third year
  - d) Fourth year +
5. Education level:
  - a) Diploma
  - b) Bachelor's level
  - c) Postgraduate level (master's)
  - d) Postgraduate level (Ph.D.)
6. What college do you study at?  
(.....)
7. Are you currently a full-time employee?
  - a) Yes
  - b) No
8. What type of attendance do you prefer after the pandemic?
  - a) Physically (in-person)
  - b) Virtually (online class)
  - c) Combination of both

#### 2. Educational platform

1. Have you taken any online classes before the pandemic?
  - a. Yes
  - b. No
2. How do you prefer the learning process to be after the pandemic?
  - a. Face-to-face (class sessions take place 100% in the classroom)
  - b. Hybrid (online and face-to-face instruction are integrated)
  - c. Online (all instruction, interaction, and activities take place online)
3. What was (or still is) the platform most used by you in online education?
  - a. Microsoft Teams
  - b. Zoom app
  - c. Google Meet
  - d. WebEx
  - e. Other

4. Have you heard about immersive technologies and the metaverse?

a) Yes

b) No

3. Digital tools and related support						
No.	Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	The e-learning platform is easy to use					
2	I was able to access the online material quickly					
3	I could attend the online lecture without any interruption					
4	I received sufficient training to use the online platform					
5	The college offered sufficient technical support for the used platform					
6	I am satisfied with the technology and software I used in online learning					
7	I want online classes to be part of the learning process after the pandemic					
4. Learning sphere and examination methods						
No.	Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	The online materials were ready in time during the emergency transition					
2	The online materials provided were comprehensive					
3	I am satisfied with the online examination method during online education					
4	Online (live) class are more effective than recorded classes					
5	E-learning contents are varied including video lessons, worksheets, textbooks, and assessments					
6	I lose my focus during the online classes					
7	I feel exhausted related to online classes					
8	I do not have a favorable environment to study at home					
9	If I were to select between online and presential learning, I would choose online					
5. Resilience						
No.	Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	I am satisfied with the online discussion with my teachers					
2	I spent less time in studying during online education					
3	I am satisfied with teamwork engagement while studying online					
4	I was capable to adjust to online education					
6. Online classes perception						
No.	Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	I find online classes interesting and useful					
2	I am satisfied with the online interactions with my classmates					
3	I learn better through online classes					
4	I believe online classes will aid the learning process during and after the pandemic					

## 1.2 Educators' survey

### 1. Biographical data

1. Age:
  - a) 25 to less than 30
  - b) 30 to less than 40
  - c) 40 to less than 50
  - d) 50 to less than 60
  - e) 60+
2. Gender:
  - a) Male
  - b) Female
3. What is your educational institution?
  - a) HBKU (Hamad Bin Khalifa University)
  - b) QU (Qatar university)
  - c) CCQ (Community College of Qatar)
4. What is the level of education you are teaching now?
  - a) Diploma
  - b) Bachelor's level
  - c) Postgraduate level (master's)
  - d) Postgraduate level (Ph.D.)
  - e) Postgraduate level (both master's and Ph.D.)
  - f) More than one level
5. What is the college that you teach at?  
(.....)
6. Professional teaching experience:
  - a) Less than 5 years
  - b) 5 to less than 10 years
  - c) 10 to less than 15 years
  - d) 15 to less than 20 years
  - e) 20 years +
7. What type of attendance do you prefer after the pandemic:
  - a) Physically (in-person)
  - b) Virtually (online class)
  - c) Combination of both

### 2. Educational platform

1. Did you give any online classes, seminars, or conferences before the pandemic?
  - a) Yes
  - b) No
2. How do you prefer the learning process to be after the pandemic?
  - a) Face-to-face (class sessions take place 100% in the classroom)
  - b) Hybrid (online and face-to-face instruction are integrated)
  - c) Online (all instruction, interaction, and activities take place online)
3. What is the platform you use most in online classes?
  - a) Microsoft Teams
  - b) Zoom app
  - c) Google Meet

- d) WebEx
- e) Other (...)

4. Have you heard about immersive technologies and the metaverse?

- a) Yes
- b) No

2. Digital tools and related support						
No.	Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	E-learning platform improves the learning processes					
2	I am satisfied with the used platform					
3	I could deliver online lecture without any interruption					
4	The education institution offered sufficient technical support					
5	I received sufficient training to use the e-learning platform					
6	I want the online classes to be part of the learning process after the pandemic					
7	Technologies helped in the teaching and learning process and improved educational competency during the pandemic					
4. Learning sphere and examination methods						
No.	Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	I have not needed to provide any new learning material for the online-based class					
2	The online materials provided are comprehensive					
3	I am satisfied with the online examination method					
4	Despite the challenges of remote teaching, I was able to teach my students effectively					
5	I was able to understand students' thoughts, desires, and fears					
6	I am satisfied with the online discussion with the students during the lectures					
7	I spent less time in online-based classes than in face-to-face classes					
5. Resilience						
No.	Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

1	I was able to adapt my teaching to the conditions of online teaching while upholding my usual standards of quality					
2	I adapt quickly to new developments					
3	I can convert challenges into opportunities and build up my experiences					
4	I can tolerate high levels of ambiguity and uncertainty about situations					

#### 6. Online classes perception

No.	Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	I find online classes interesting and useful					
2	I am satisfied with the online interactions with my students					
3	I believe the students learn better through online classes					
4	I believe online classes will aid the learning process during and after the pandemic					

## 2. Supplementary Materials S2

### 2.1 Reliability

In research involving multi-items scales, the Cronbach's alpha test is a widely applied method to determine the reliability of the scale as it helps to determine whether all items are measuring the same factor (De Vellis, 1991). In addition to the above, in order to measure the internal consistency of a survey instrument involving multi-item scales, it is essential to conduct a reliability test (Churchill, 1979). The term reliability refers to how well a test measures what it is supposed to measure (De Vellis, 1991). In this regard, the Cronbach's alpha test, also referred to as the coefficient alpha, is commonly used to measure the reliability or internal consistency of a dataset. Hence, in this study, this test was used to determine whether the scales used are reliable. Acceptable values of the Cronbach's alpha range between 0.70 and 0.95, although, as Tavakol and Dennick (2011) note, low values could mean insufficient questions, poor levels of inter-relation between items, or heterogeneous constructs. The basic rationale behind using this test is that the Cronbach's alpha ensures that the data being evaluated are reliable and effective for answering the research questions.

### 2.2 Students' survey

Table S1 shows the values of the Cronbach's alpha test for the students' survey. The overall reliability score was obtained at 0.884, which suggests a high internal consistency (Pallant, 2007). Indeed, according to Nunnally (1978), a value of alpha ( $\alpha$ ) equivalent to 0.70 and above shows that the items of a scale can be deemed reliable. With respect to the in this research, the reliability score of the student's survey ' sections ranged between 0.720 to 0.895, which strongly suggests that this survey instrument is reliable to measure the variables in this study.

Table S1: Internal consistency: Cronbach's alpha for students' survey.

Sections	No. of Items	Cronbach's Alpha
Digital tools and related support	7	0.720
Learning sphere and examination methods	9	0.731
Resilience	4	0.759
Online class perception	4	0.895
Overall	24	0.884

### 2.3 Validity

A validity coefficient is a gauge of how strong (or weak) the "usefulness" factor is; it provides the strength of that relationship between test results and criterion variables (Nunnally, 1978). In general, validity coefficients range from (0 to .50), where 0 is a weak validity and 0.50 is moderate validity. The possible range of the validity coefficient is the same as other correlation coefficients (0 to 1), and so, in general, validity coefficients tend not to be that strong; this means that other tests are usually required. The tendency towards consistency found in repeated measurements of the same phenomenon is referred to as reliability (Carmines & Zeller, 1979). Thus, the researcher may be sure of the validity and reliability of the survey.

Table S2 shows the inter-construct correlation validity for the section of digital tools and related support (seven items) for the students' survey; all correlation coefficients were significant with p-values < 0.05, ranging between (0.372) and (0.598). The alpha would not increase by more than 0.720 if any items were deleted.

Table S2. Inter-construct correlation validity for the section of digital tools and related support for the students' survey.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item: Total Correlation	Cronbach's Alpha if Item Deleted
The e-learning platform is easy to use	21.93	11.651	0.438	0.661
I was able to access the online material quickly	21.90	12.093	0.360	0.676
I could attend the online lecture without any interruption	22.47	11.223	0.372	0.699
I received sufficient training to use the online platform	22.83	9.523	0.518	0.627
The college offered sufficient technical support for the used platform	22.33	10.299	0.598	0.616

I am satisfied with the technology and software I used in online learning	22.23	10.185	0.533	0.627
I want online classes to be part of the learning process after the pandemic	22.70	10.286	0.376	0.716

Table S3 shows the inter-construct correlation validity for the section of the learning sphere and examination methods (nine items) for the students' survey; all correlation coefficients were significant with p-values < 0.05, ranging between (0.361) and (0.543). The alpha would not increase by more than 0.731 if any of the nine items were deleted.

Table S3. Inter-construct correlation validity for the section of the learning sphere and examination methods for the students' survey

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item: Total Correlation	Cronbach's Alpha if Item Deleted
The online materials were ready in time during the emergency transition	24.83	17.109	0.384	0.730
The online materials provided were comprehensive	24.87	13.568	0.361	0.724
I am satisfied with the online examination method during online education	25.27	12.202	0.445	0.718
Online (live) class are more effective than recorded classes	24.90	14.093	0.388	0.720
E-learning contents are varied including video lessons, worksheets, textbooks, and assessments	24.77	15.978	0.427	0.726
I lose my focus during the online classes (reversed item)	26.80	12.510	0.427	0.721
I feel exhausted related to online classes (reversed item)	26.43	12.185	0.543	0.716
I do not have a favorable environment to study at home (reversed item)	26.17	13.868	0.429	0.715
If I were to select between online and presential learning, I would choose online	26.10	12.921	0.532	0.717

Table S4 shows the inter-construct correlation validity for the section of resilience (four items) for the students' survey; all correlation coefficients were significant with p-values < 0.05, ranging between (0.459) and (0.699). The alpha would not increase by more than 0.759 if any of the four items were deleted.

Table S4. Inter-construct correlation validity for the section of resilience for the students' survey.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item: Total Correlation	Cronbach's Alpha if Item Deleted
I am satisfied with the online discussion with my teachers	9.87	5.775	0.529	0.720
I spent less time studying during online education	10.03	6.171	0.459	0.758
I am satisfied with teamwork engagement while studying online	10.30	5.183	0.699	0.617
I was capable to adjust to online education	9.70	6.700	0.580	0.703

Table S5 shows the inter-construct correlation validity for the section of online class perception (four items) for the students' survey; all correlation coefficients were significant with p-values < 0.05, ranging between (0.658) and (0.864). The alpha would not increase by more than 0.895 if any of the four items were deleted.

Table S5. Inter-construct correlation validity for the section of online class perception for the students' survey.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item: Total Correlation	Cronbach's Alpha if Item Deleted
I find online classes interesting and useful	9.50	7.707	0.806	0.850
I am satisfied with the online interactions with my classmates	9.93	7.237	0.864	0.827
I learn better through online classes	10.10	7.748	0.748	0.872
I believe online classes will aid the learning process during and after the pandemic	9.27	8.616	0.658	0.902

## 2.4 Educators' survey

Table S6 shows the values of the Cronbach's alpha test. The overall reliability score for the educators' survey was obtained at 0.901, which suggests a high internal consistency (Pallant, 2007); the reliability score of the educators' survey ranged between 0.702 and 0.863, which strongly suggests that this survey instrument was reliable in measuring the variables in this study.

Table S6: Internal consistency: Cronbach's alpha for educators' survey.

Sections	No. of Items	Cronbach's Alpha
Digital tools and related support	7	0.808
Learning sphere and examination methods	7	0.702
Resilience	4	0.710
Online classes perception	4	0.863
Overall	22	0.901

## 2.5 Validity



Table S7 shows the inter-construct correlation validity for the section of digital tools and related support (seven items) for the educators' survey; all correlation coefficients were significant with p-values < 0.05, ranging between (0.401) and (0.667). The alpha would not increase by more than 0.808 if any items were deleted.

Table S7. Inter-construct correlation validity for the section of digital tools and related support for the educators' survey.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item: Total Correlation	Cronbach's Alpha if Item Deleted
1. E-learning platform improves the learning processes	23.2889	14.972	0.667	0.759
2. I am satisfied with the used platform	23.0667	16.557	0.649	0.769
3. I could deliver online lectures without any interruption	23.1333	16.926	0.482	0.793
4. The education institution offered sufficient technical support	22.7000	17.920	0.510	0.792
5. I received sufficient training to use the e-learning platform	23.1111	17.291	0.401	0.806
6. I wish online classes to be part of the learning process after the pandemic	23.7111	14.657	0.532	0.791
7. Technologies helped in the teaching and learning process and improved educational competency during the pandemic	23.2556	14.619	0.642	0.763

Table S8 shows the inter-construct correlation validity for the section of the learning sphere and examination methods (seven items) for the educators' survey; all correlation coefficients were significant with p-values < 0.05, ranging between (0.372) and (0.556). The alpha would not increase by more than 0.702 if any of the seven items were deleted.

Table S8. Inter-construct correlation validity for the section of the learning sphere and examination methods for the educators' survey.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item: Total Correlation	Cronbach's Alpha if Item Deleted
1. I have not needed to provide any new learning material for the online-based class	19.7000	14.954	0.470	0.688
2. The online materials provided are comprehensive	18.9889	14.438	0.485	0.633
3. I am satisfied with the online examination method	20.0222	13.528	0.374	0.662
4. Despite the challenges of remote teaching, I was able to teach my students effectively	18.7333	15.007	0.494	0.638
5. I was able to understand students' thoughts, desires, and fears	19.3000	13.516	0.556	0.610
6. I am satisfied with online discussions with the students during the lectures	19.4222	13.752	0.425	0.644
7. I spent less time in online-based classes than in face-to-face classes	19.9000	14.743	0.372	0.689

Table S9 shows the inter-construct correlation validity for the section of resilience (four items) for the educators' survey; all correlation coefficients were significant with p-values < 0.05, ranging between (0.314) and (0.609). The alpha would not increase by more than 0.710 if any of the four items were deleted.

Table S9. Inter-construct correlation validity for the section of resilience for the educators' survey.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item: Total Correlation	Cronbach's Alpha if Item Deleted
1. I was able to adapt my teaching to the conditions of online teaching while upholding my usual standards of quality	12.1667	2.972	0.314	0.702
2. I adapted quickly to new developments	11.9333	2.422	0.609	0.518
3. I could convert challenges into opportunities and build up my experiences	11.9889	2.663	0.589	0.548
4. I could tolerate high levels of ambiguity and uncertainty about situations	12.3111	2.419	0.397	0.675

Table S10 shows the inter-construct correlation validity for the section of online classes perception (four items) for the educators' survey; all correlation coefficients were significant with p-values < 0.05, ranging between (0.701) and (0.769). The alpha would not increase by more than 0.863 if any of the four items were deleted.

Table S10. Inter-construct correlation validity for the section of online class perception for the educators' survey.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item: Total Correlation	Cronbach's Alpha if Item Deleted
1. I find online classes interesting and useful	9.0000	7.618	0.769	0.804
2. I am satisfied with the online interactions with my students	9.4444	7.126	0.674	0.845
3. I believe the students learn better through online classes	10.1222	7.816	0.701	0.830
4. I believe online classes will aid the learning process during and after the pandemic	9.0667	7.479	0.716	0.823

### 3. Supplementary Materials S3

#### 3.1 The demographic characteristics of the respondents.

Table S11. The demographic characteristics of the study sample (n=660).

		n	%
Gender	Male	192	29.1
	Female	468	70.9
Age	18 to less than 22	311	47.1
	22 to less than 27	157	23.8
	27 to less than 32	87	13.2
	32+	105	15.9
University	HBKU (Hamad Bin Khalifa University)	53	8.0
	Qatar University (QU)	447	67.7
	CCQ (Community College of Qatar)	160	24.2
Year of studying	First year	222	33.6
	Second year	148	22.4
	Third year	126	19.1
	Fourth year+	164	24.8
Education level	Bachelor's level	429	65.0
	Diploma	137	20.8
	Postgraduate master's level	51	7.7
	Postgraduate Ph.D. level	43	6.5
What college do you study at?	College of Engineering	124	18.8
	College of Arts and Science	113	17.1
	College of Humanities and Social Sciences	78	11.8
	College of Business and Economics	71	10.8
	College of Education	46	7.0
	College of Health and Life Sciences	41	6.2
	College of Sharia and Islamic Studies	36	5.5
	College of Law	21	3.2
	College of Medicine and Pharmacy	19	2.9
	College of Computer Science	13	2.0
	Other	98	14.8

Table S12. The demographic characteristics for the educator sample (n=103).

		n	%
Gender	Male	72	69.9
	Female	31	30.1
Age	25 to less than 30	5	4.9
	30 to less than 40	20	19.4
	40 to less than 50	41	39.8
	50 to less than 60	30	29.1
	60+	7	6.8
Educational institution	HBKU (Hamad Bin Khalifa University)	15	14.6
	Qatar University (QU)	70	68.0
	CCQ (Community College of Qatar)	18	17.5
Education	Diploma	2	1.9
	Bachelor's level	33	32.0
	Postgraduate Level (master's)	12	11.7
	Postgraduate Level (Ph.D.)	11	10.7
	Postgraduate Level (both master's and Ph.D.)	27	26.2
	More than one level	18	17.5
College	College of Engineering	12	11.7

	College of Arts and Science	12	11.7
	College of Humanities and Social Sciences	14	13.6
	College of Business and Economics	14	13.6
	College of Education	12	11.7
	College of Health and Life Sciences	6	5.8
	College of Medicine and Pharmacy	8	7.8
	College of Law	10	9.7
	College of Computer Science	6	5.8
	Other	9	8.7