PressAcademia
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GBRC
ISBN 978-605-06192-7-0

PressAcademia Procedia YEAR 2023 VOLUME 17

9th Global Business Research Congress, June 15, 2023, Istanbul.

DIGITAL ERA FOR UNIVERSITIES: SOON OR FAR

DOI: 10.17261/Pressacademia.2023.1752
PAP- V.17-2023(7)-p.46-52

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To cite this document
Eskinat, A., Teker, S. (2023). Digital era for universities: soon or far. PressAcademia Procedia (PAP), 17, 46-52.
Permanent link to this document: http://doi.org/10.17261/Pressacademia.2023.1752

ABSTRACT

Purpose- Over the Covid-19 crises, most universities keep increasing the use of hybrid model at various levels in all disciplines in their education system forced by the market demand. This paper reviews the evolution of university generations from university 1.0 to university 4.0 using a historical point of view. This paper intends to clarify whether digital era for universities, namely University 5.0, is soon or far advocating that a large number of completely digital universities may breakout and reach everywhere in the world with no barriers of language, time and locations, and competing with local and traditional universities in all sense after year 2030.

Methodology- The study employs an online survey via convenience sampling based on quantitative research method. Employers/Managers, Academics and formal University Students were selected as three target population group located all around Turkiye. The aim was to test the 5 hypotheses of this study to clarify the time of digital era for universities.

Findings- The analysis reveals that the 5 hypotheses are accepted and seen as valid. The empirical results show a significant difference between the gender variable and the importance given to digital education. Moreover, there was a significant difference in the mean scores of the significance of digitalization and the importance given to digital education based on education level variable. Then, there were differences in the significance of digitalization and the importance given to digital education concerning the social status variable in the collected data. Notably, a linear and significant relationship was revealed between the importance given to digital education by participants and the importance they attributed to digitalization. Furthermore, a linear and significant relationship was found between the importance given to digital education and the importance given to university education. Under these circumstances, the results reveal that digital education is concerned as a fact of digital era and higher education institutions are not immune of this transformation.

Conclusion- Based upon the analysis, it can be concluded that the traditional university system will be evolved into a digital university system in a not-too-distant future. In other words, traditional prestigious universities are expected to continue whereas digital universities appear as destructive competitors. For this reason, it may be argued that universities will increase to provide hybrid model education depending on the market demand until 2030, whereby it will be applied at different rates in education disciplines, such as of medicine, engineering, social sciences and many others. After 2030 traditional universities will continue to use blended learning whereas digital higher education institutions will start their inevitable growth.

Keywords: Digital era, digital universities, hybrid education, university 5.0, virtual education.
JEL Codes: A20, I23, I29

1. INTRODUCTION

Higher education institutions have been recently forced to deliver education services in new ways and operate in a global marketplace. Therefore, universities must rethink and redesign how they provide access to their courses anywhere and at any time. Indeed, higher education institutions have not only to fulfill the increasing digitalized expectations of the Generation Z students but also be ready for the forthcoming storm of the Generation Alpha. Regarding these reasons, most universities keep increasing the use of hybrid model at various levels in all disciplines in their education system forced by the market demand, especially with the Covid-19 crises.

Since the Medieval age, higher education concept and the evaluation of its main actors' universities are highly discussed. The first-generation University 1.0 initiated as information transfer centers in the 11th Century. Later, the second-generation University 2.0 appeared as information transfer and research centers in the 19th Century. 1970s brought the third-generation University 3.0 as information transfer, research and application (university-industry) centers. Then, the fourth-generation University 4.0 flourished as a digitalized university depending on the technological and social innovations under the storm of digital transformation age of the 2000s. The aim of this paper is to provide a sight forward to the upcoming fifth-generation University 5.0 with its foreseen rise by the 2030s named as digital university targeting all world as a single market and providing all-education services in a translocal and transtemporal form globally.

With some pioneer universities such as State University of New York (SUNY), University of Phoenix and University of London, a number of higher education institutions entered into global online higher education sector. Moreover, companies such as Coursera, Udacity and EdX have been offering degrees in all levels as well as certificate programs. Recently, many prestigious innovations also appeared in the global news. For instance, Stanford University in the US opened its digital classroom to facilitate the current distance education system (Hadhazy, 2021). Facebook, rebranded as Meta, has announced that it will open 10 digital university campuses across the United States (Greener, 2021) as the model of a digital university. Therefore, University 5.0 is to be implemented I the near future with the support of leading digital companies (Gurieva et al., 2019). Furthermore, China Communication University has opened its digital campus by partnering with search engine Baidu's metaverse platform XiRang (Qin, 2022). University of Miami also announced its entry into the field of metaverse (Terr, 2022).

Specifically, all these developments happened in a very short period of time expressing the new rules of the game. Today, it may be strongly argued that universities are forced to provide hybrid education over the following years. This is also in line with the perception and demand of generation Z. This transitional period may be identified as the period for University 4.0. Then, the successors such as generation Alpha and Beta and their irresistible digital transformation may reshape the higher education, that is a university fully digital.

Covid-19 has demonstrated the significance of interpersonal and social interactions, for which higher education can provide both physical and digital space (Sabzalieva et al., 2021). Indeed, the digital university in its translocal and transtemporal nature could be understood as an expansion of the concept of the university, embodied and projected through strong links across different locations, times, and temporalities, so it is not reflected digital connections as a kind of outreach from the university campus to the community of the world (Sheail, 2018). A digital university, in other words University 5.0 is able to employ academic staff from the all around the world and provide higher education to anywhere of the world being very efficient as well as effective in global competitive market of 21st Century.

This paper intends to examine the proposition of digital era for universities is soon or far. For this reason a research survey was conducted over 3 different groups namely university students, academics and employers/managers of 346 participants with a questionnaire designed on 4 main dimensions of questions in a composite approach to clarify the 5 hypotheses of this study. The paper is organized as follows. The next section provides data and methodology. The following section covers findings. The final section includes the concluding remarks.

2. DATA AND METHODOLOGY

An online survey was conducted between the dates 19th and 25th January 2023 towards 2017 people. The study has taken "Employers/Managers", "Academics" and "formal University Students" as target population and they were located in geographically dispersed areas all around Turkiye. The designed questionnaire composed by 42 questions divided into four groups as signification of digitalization, importance given to higher education, understanding Generation Z's perspective on embracing digital technologies and importance given to digital education. The questionnaire received a return by the respondents of 346 people from 46 and 2 cities in Turkey and TRNC respectively consisted by 106 university students, 83 academics and 157 employers /managers via convenience sampling to reach the accurate data in a time constraint and as the units are easiest to access. Within the scope of the research 5-point Likert Scale was used. The aim was to test the 5 hypotheses of this study towards digital education era for universities.

3. FINDINGS

Descriptive statistics are presented in Table 1. As a result of the studies and surveys, in the light of the data analyzed through the SPSS program; as the numerical data show normal distribution, parametric tests were applied.

Table 1: Descriptive Statistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	180	52,0	52,0	52,0
	Female	166	48,0	48,0	100,0
Age	17-22	29	8,4	8,4	8,4
	23-27	68	19,7	19,7	28,0
	28-35	50	14,5	14,5	42,5
	36-45	86	24,9	24,9	67,3
	45+	113	32,7	32,7	100,0
Position	University student	106	30,6	30,6	30,6
	Academic	83	24,0	24,0	54,6
	Employer/Manager	157	45,4	45,4	100,0
Sector	Academic	189	54,6	54,6	54,6
	Services sector	117	33,8	33,8	88,4
	Manufacturing sector	40	11,6	11,6	100,0
Education	University student	106	30,6	30,6	30,6
	Secondary school	3	0,9	0,9	31,5
	High school	30	8,7	8,7	40,2
	Two-year degree	6	1,7	1,7	41,9
	Undergraduate degree	88	25,4	25,4	67,3
	Master's degree	37	10,7	10,7	78,0
	Doctorate	76	22,0	22,0	100,0
How long have you been working?	1-5 years	27	7,8	11,3	11,3
	6-10 years	64	18,5	26,7	37,9
	10 years+	149	43,1	62,1	100,0

	Total	240	69,4	100,0
	Missing System	106	30,6	
Total		346	100,0	

Table 2.: Cronbach's Alpha Test Table Data Applied to Data

	Cronbach's Alpha	Cronbach's Alpha based on standardized items	Number of items
Applied to All Data	,832	,958	47
Signification of Digitalization	,882	,897	10
Importance Given to Higher Education	,894	,899	10
Understanding Generation Z's Perspective on Embracing Digital Technologies	,913	,915	10
Importance Given to Digital Education	,934	,934	12

According to the results of the Cronbach's Alpha reliability test applied to the demographic data of the participants, as well as the data on Signification of Digitalization, Importance given to Higher Education, Understanding Generation Z's perspective on embracing Digital Technologies, and Importance given to Digital Education, it was found that the items with a Cronbach Alpha coefficient higher than 0.70 were internally consistent and measured the same construct. (Cronbach's Alpha = 0.832, >0.70). The Cronbach's Alpha test results for the scale related to Signification of Digitalization indicated that the items with a Cronbach Alpha coefficient higher than 0.70 were internally consistent and measured the same construct. (Cronbach's Alpha = 0.882, >0.70). The Cronbach's Alpha test results for the scale related to Importance given to Higher Education revealed that the items with a Cronbach Alpha coefficient higher than 0.70 were internally consistent and measured the same construct. (Cronbach's Alpha = 0.894, >0.70). According to the Cronbach's Alpha test results for the scale related to Understanding Generation Z's perspective on embracing Digital Technologies , the items with a Cronbach Alpha coefficient higher than 0.70 were internally consistent and measured the same construct. (Cronbach's Alpha = 0.913, >0.70). The Cronbach's Alpha test results for the scale related to Importance given to Digital Education indicated that the items with a Cronbach Alpha coefficient higher than 0.70 were internally consistent and measured the same construct. (Cronbach's Alpha = 0.934, >0.70).

During the data analysis, a new composite variable was created by calculating the average scores of the scale items, and the statistical tests were conducted using the weighted data. Normal distribution of Likert-type scale scores is not a common assumption; therefore, tests for skewness and kurtosis were conducted. If the data fell within the range of +1.5 to -1.5 (Tabachnick & Fidell, 2013), +1.0 to -1.0 (Hair et al., 2014), or +2.0 to -2.0 (George, 2011), it was considered to be approximately normally distributed.

Table 3: Importance given to digital education normal distribution test table

Tests of Normality	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
digitaleducation	,064	1375	,000

a. Lilliefors Significance Correction

The mean scores of the Importance Given to Digital Education scale were taken, the data was weighted, and a normal distribution test was performed with the gender variable. It was determined that the test result did not show a normal distribution as expected. (P<.05 , P= .000). However, since the normal distribution in Likert-type scale scores is not a generally observed condition, skewness and kurtosis values were checked (skewness= -,858 , kurtosis= 2.030), and because a value between -2 +2 was observed, it was assumed that the data showed a normal distribution based on the source cited above.

Hypothesis 1: There is a difference among gender groups regarding digital education importance

Table 4: Gender and Importance Given to Digital Education Independent Groups T-Test

Group Statistics

	GENDER	N	Mean	Std. Deviation	Std. Error Mean
Digital Education	MALE	392	3,9177	,76165	,03847
	FEMALE	416	4,0512	,77475	,03797

Table 5: Independent Groups T-Test Continuation Table

t	2,469
p	,014

According to the results of the independent groups t-test for the Hypothesis 4, there is a significant difference between the gender variable and the means of importance given to digital education. (p<.05 p= .014, t= 2,469). In this case, the Hypothesis 4 is accepted and seen as valid.

Hypothesis 2: There is a difference among education groups regarding digital education importance

Table 6: Levels of education and importance given to digital education One-Way Anova Test

ANOVA			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		74,186	6	12,364	20,695	,000
	Linear Term	Unweighted	,944	1	,944	1,580	,209
		Weighted	50,162	1	50,162	83,959	,000
		Deviation	24,024	5	4,805	8,042	,000
Within Groups			737,259	1234	,597		
Total			811,444	1240			

According to the results of the One Way Anova Test conducted for the Hypothesis 2; It has been determined that there is a significant difference between the education level of participants and the importance they attach to digital education (p<.05 p=.000).

Bonferroni test was conducted as a Post-Hoc test to determine between which groups the difference was. According to this test result; The importance given to digital education by secondary school graduates is lower than those of participants with other education levels. (P<.05)

Effect Size=Partial Eta Square = x= 74,186/811,444 = 0.091

The education level variable explains 91% of the variance in the importance given to digital education.

Since the normal distribution test has the same main variable and the same results as the Table 3, even though the normal distribution test table was not written, it was tested that the test variables were normally distributed and it was accepted that the normal distribution was due to the reasons stated in the Table 3. In this case, the Hypothesis 5 is accepted and seen as valid.

Hypothesis 3: There is a difference among social status groups regarding digital education importance

Table 7: Social status and Importance given to digital education one-way Anova test

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		61,528	2	30,764	50,787	,000
	Linear Term	Unweighted	6,665	1	6,665	11,004	,001
		Weighted	3,872	1	3,872	6,392	,012
		Deviation	57,656	1	57,656	95,182	,000
Within Groups			749,916	1238	,606		
Total			811,444	1240			

According to the One-Way Anova Test Result for the Hypothesis 3; it was determined that there is a significant difference between the Education Levels of the participants and the importance they attach to digital education. (p<.05, p=.000).

Bonferroni test was conducted as a Post-Hoc test to determine between which groups the difference existed. According to this test result; Academics give importance to digital education less than employers and students (p<.05, p= ,000).

Effect Size=Partial Eta Square = x= 61,528/811,444 = 0.075

The social status variable explains 75% of the variance in the importance given to digital education.

Since the normal distribution test has the same main variable and the same results as the Table 3, even though the normal distribution test table was not written, it was tested that the test variables were normally distributed and it was accepted that the normal distribution was due to the reasons stated in the Table 3. In this case, the Hypothesis 3 is accepted and seen as valid.

Table 8: Significance of digitalization and digital education importance normal distribution tests

Tests of Normality

Tests of Normality	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
Digital Education	,064	1375	,000
Digital Importance	,074	1375	,000

a.Lilliefors Significance Correction

The averages of the signification of digitalization and the importance given to university education scale scores were taken and a normal distribution test was performed. It was determined that the test result did not show a normal distribution as expected. (P<.05 , P= .000). However, since the normal distribution in Likert-type scale scores is not a generally observed situation, skewness and kurtosis values were checked (skewness= -,868 , kurtosis= 2.376), and because a value between -2 +2 was observed, it was assumed that the data showed a normal distribution based on the source cited above.

Hypothesis 4: There is a correlation between significance of digitalization and digital education importance

Table 9: Importance given to digital education and signification of digitalization Pearson Correlation Analysis

Correlations		Digitalization	Digital Education
Digital	Pearson Correlation	1	,699**
	Sig. (2-tailed)		,000
	N	1375	1375
Digjitaledu	Pearson Correlation	,699**	1
	Sig. (2-tailed)	,000	
	N	1375	1375

**. Correlation is significant at the 0.01 level (2-tailed).

According to the results of the Pearson Correlation Test conducted for the Hypothesis 7, it was determined that there was a positive and highly significant relationship between the signification of digitalization and the importance scores given to digital education (r=.699 , p<.05, p= .000). In this case, the Hypothesis 4 is accepted and seen as valid.

Table 10: Higher education importance and digital education importance normal distribution tests

Tests of NOrmality	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
Digital Education	,064	1375	,000
Higher Education	,086	1375	,000

a. Lilliefors Significance Correction

The averages of the signification of digitalization and the importance given to university education scale scores were taken and a normal distribution test was performed. It was determined that the test result did not show a normal distribution as expected. (P<.05 , P= .000). However, since the normal distribution in Likert-type scale scores is not a generally observed situation, skewness and kurtosis values were checked (skewness= -,768 , kurtosis= 1,356), and because a value between -2 +2 was observed, it was assumed that the data showed a normal distribution based on the source cited above.

Hypothesis 5: There is a correlation between higher education importance and digital education importance

Table 11: Importance given to digital education and importance given to higher education Pearson Correlation Analysis

Correlations		Digital Education	Higher Education
Digital Education	Pearson Correlation	1	,615**
	Sig. (2-tailed)		,000
	N	1242	1242
Higher Education	Pearson Correlation	,615**	1
	Sig. (2-tailed)	,000	
	N	1242	1242

***. Correlation is significant at the 0.01 level (2-tailed).*

According to the results of the Pearson Correlation test conducted for the Hypothesis 5; it was determined that there is a positive and highly significant relationship between the importance scores given to digital education and the importance given to higher education (r= .615 , p< .05, p= ,000). In this case, the Hypothesis 8 is accepted and seen as valid.

To conclude, Cronbach's Alpha Reliability analysis was conducted for each sub-category and the overall data, revealing the reliability of the test data. The average scores obtained from the 5-point Likert Scale, which assessed the importance of Digital Education, the importance of Higher Education, and the significance of digitalization, were categorized into three separate headings. The data were weighted, and the relevant hypothesis tests were applied to the sub-categories. Based on the test results, it was found that 7 out of 8 hypotheses were accepted as valid, while one hypothesis was rejected.

Regarding the tests conducted with the gender variable in the collected data, it was predicted that there would be a significant difference between the gender variable and the importance given to digital education.

Concerning the tests conducted with the education level variable in the collected data, it was found that there was a significant difference in the mean scores of the significance of digitalization and the importance given to digital education based on education level. The results indicated that secondary school graduates assigned lower importance to digital education and digitalization compared to participants with other education levels, such as high school, university students, associate degree holders, undergraduate degree holders, master's degree holders, and doctorate holders.

Regarding the tests performed with the social status variable in the collected data, it was observed that there are differences in the significance of digitalization and the importance given to digital education. Specifically, the significance of digitalization among academic participants was found to be lower than that of senior managers, while the level of importance given to digital education by academics was lower compared to employers and students.

Based on the data obtained, two different test results were obtained regarding the average scores of the importance given to digital education. These test results revealed a linear and significant relationship between the importance given to digital education by participants and the importance they attributed to digitalization. Furthermore, a linear and significant relationship was found between the importance given to digital education and the importance given to university education.

4. CONCLUSION

Over time, students will be attracted to those universities that are embracing the digital age on their terms and anticipating evolution. They may even prefer these universities because of time and place flexibilities in terms of their future need for complementary career improvements or new professions after their graduations.

It may be argued that the trend towards digital transformation in higher education in the last 20 years has gained a serious momentum especially during the Covid-19 period. In this sense, it should be expected that the traditional university system will be forced to evolve into a digital university system in a not-too-distant future. In other words, traditional prestigious universities are expected to continue whereas digital universities appear as destructive competitors. On the other side, digital technologies such as virtual reality, augmented reality, blockchain, web 3.0 and finally preliminary steps of metaverse have been running fast and higher education system needs to assimilate this storm in the near following years of the 21st Century. Indeed, digitalization is the reality of Industry 4.0 era and universities have been digitalized increasingly in the light of University 4.0 concept.

As a result of this study, it is seen that there is a linear and significant relationship between the importance given to digital education by participants and the importance they attach to digitalization. Besides, there is a linear and significant relationship between the importance given to digital education and the importance given to university education. Under these circumstances, it may be argued that universities will increase to provide hybrid model education depending on the market demand until 2030, whereby it will be applied at different rates in education disciplines, such as of medicine, engineering, social sciences and many others. After 2030 traditional universities will continue to use blended learning whereas digital higher education institutions will start their inevitable growth. Finally, this paper advocates completely digital universities named as University 5.0 and it may become an inevitable era in higher education after 2030.

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