ONLINE EDUCATION CHALLENGES IN THE NEW ERA OF GLOBALIZATION

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Abstract: The modern society is in a continuous development, thus governed by globalization and digitalization, those two concepts becoming ubiquitous among each of us. Once the technological evolution and the pandemic caused by the COVID-19 virus had happened, each domain of activity tended to approach dome kind of digitalization. This article aims to present the challenges that took place in the educational system once the online education took place over the traditional technique of learning and teaching. Even thought, the online education started from some time ago, once the pandemic struck, all the states on the globe, despite of the economic situation or capabilities, had to implement any kind of online education in order to maintain the evolution and development of the youth, especially. Therefore, within this article it's going to be analyzed the impact of adopting this method of e-learning, the challenges and the changes that appeared in 2020 on the scholar population from 27 states of European Union.

Keywords: online education, globalization, challenges, impact, evolution, European Union
JEL: C38, C46, I21, I24, I25, O11, O12.

1. Introduction

Globalization has two fundamental directional tendencies, more precisely: expanding of global connectedness and increasing of global consciousness. Moreover, nation-states, world politics, individuals, and humanity are the four points of reference for globalization Digital economy, e-commerce, and digitalization may be seen as effects of globalization, characterized by incessant change. According to Veith and Savin (2019) this concept represents an ecosystem who transforms the main value chains and made it possible to satisfy all the demands of the customers.

In Romania, the evolution of the educational system has been touched by the continuous changes in the political and administrative systems, as well as the technological evolution and the changes in the user's behaviors. Thereby we can look at the educational system at it as a cybernetic system influenced by the environment in which all its activities are carried out. Moreover, we can't analyze and diagnose this complex adaptive system without taking account of the impact produced by the politic, technological, social, economic, legal, and ethical factors.

The technological evolution, globalization and the advent of computers took place rapidly in the current Fourth Industrial Revolution, so the society had to adapt quickly on the necessity of learning how to operate those entirely new machines. The increasing necessity made all the educational institutions introduce in teaching disciplines more and more classes based on informatics and coding programs.

Currently, to maintain the competitiveness at a global level, the educational institutions embody major use of communication and information technologies in the curriculum, in order to provide the pupils many options of online learning. Withal, many educational institutions choose to deploy a blended learning approach on this event, based on combining the traditional way of teaching and learning where the entire lecture is explained by a teacher using online resources. This kind of approach is very popular because it offers pupils the opportunity of learning faster through a very wide range of resources. As the pressure of offering more e-learning options continuously increases it is much more important to consider pupil's and student's attitude and opinion on the fact of switching from the traditional way to the online teaching methods. According to Moldovan et al. (2011), education has always been a preoccupation of the governments all over the world even though the systems differ from a country to another.

The COVID-19 pandemic represents a very important event that didn't influenced only the economic environment, but it influenced citizens and their normal life (Veith and Dogaru, 2020). This pandemic caused a very interesting change for the educational institutions especially. Even though e-learning was a very well-known practice for some of them, many others had a very hard time. But, in order to protect the human life and the access to education it was necessary to issue quick strategic decisions so that the traditional learning and teaching method to be switched in online. These changes had a significant impact on education, pupils, students, teachers, researchers and for the governmental, microeconomic, and macroeconomic sector. This article aims to present the challenges that took place in the educational system once the online education took place over the traditional technique of learning and teaching.

2. Literature review

According to Stewart (1996), globalization refers to the gradual broadening and strengthening of global ties that began after World War II and have now reached a point where almost no one is completely unaffected by events occurring outside their own country, and where international constraints are increasingly limiting independent national action. Many facets of development and policy are influenced by globalization. One of the most important implications of globalization at the moment is represented by the topic of this article, meaning the education, precisely the online education or e-learning.

The educational system as well as the teaching and learning methods are affected by the globalization and the expansion of creative economy. Since the Sars-Cov-2 virus has impinging worldwide, every country must fight to defeat the pandemic, but until this will happen every country have to maintain all the activities on a waterline.

The education sector in Europe and Central Asia has been as affected as in the other continents because of the COVID-19 epidemic, yet on these continents has been occurred closures of school in twenty nations and closures of pre-school in nineteen countries. This impacted a total of 49.8 million students, ranging in age from pre-kindergarten to upper secondary school, who had an extremely interrupted last school term. The epidemic has worsened the region's existing educational and social disparities. Children from poor families, children from rural areas with lower infrastructure, children from ethno-linguistic minorities, disabled children, foreigner and immigrant children, children in conflict with law, out-of-school adolescents, and boys and girls otherwise faced by poor circumstances or violent homes faced significant barriers to full participation in learning and education and experienced lower education and social opportunities. Schools are a place for social and emotional development, social engagement, and social support in addition to academic learning. Children's learning has been disrupted, as has access to school meals, well-being support, and referrals to essential health and social services. Teachers, school administrators, school personnel, and decision-makers at the national and regional level have a huge challenge. Failure to meet this challenge would have long-term social and economic consequences for children, teenagers, families, regions, and societies. (United Nations Children's Fund (UNICEF), 2020)

The pandemic has accelerated a global trend, very well-known now, meaning the online education or e-learning. This kind of education is defined by Joshua Stern as the education that happens over the Internet, not in a classroom, yet wherever you are because it's a distance learning method. This technique is based on virtual classrooms and classes where every activity is scheduled and announced and where the pupil or students can interact with their teachers, write on a whiteboard, access every educational resource, chat with his classmates and teachers, send assignments, take tests and quizzes, or consult the gradebook.

Currently, according to Toader et al. (2021) online education presents strengths and opportunities as well as weaknesses and threats. From the perspective of the strengths and opportunities, online education promotes a very flexible program, a very easy access to resources, quick feedback, monetary savings, lasting acclimatization to new circumstances, re-evaluation of certain skills, emphasis on pedagogical abilities and creates time management and organizational skills. From the perspective of the weaknesses and threats, online education promotes more

time spent in front of technological devices, a smaller visible communication between professors and pupils, dependence on Internet signal, electricity, and the quality of the equipment used for Internet connection. As an overall result of using the online education, the lesser developed countries, as Romania is, have been extremely affected from the economic point of view. Moreover, weak interaction between pupils, students, and teachers, less students and pupils with access to Internet or a computer, early leavers, and limited digital competences of the students as well as the teachers or parents, will evolve in a few generations of unprepared, undeveloped and introvert working class.

3. Research methodology

Scientific knowledge in any sphere of human activity requires a comprehensive and careful quantitative study of the phenomena that are the subject of the inquiry, independent of the nature and complexity of the actual aims pursued.

In order to present the impact of adopting the online education instead of keeping the traditional education in the less developed countries like Romania, it will be used 27 observations which represents the 27 sates of the European Union, including Romania, in 2020. Using the datasets provided by Eurostat, I have previously processed the 27 states and the 5 indicators using Microsoft Excel and then I have used RStudio to analyze them (Appendix 1).

The first indicator is EL or Early leavers from education and training by sex which measures the proportion of people aged 18 to 24 with a minimum of a lower secondary education who did not participate in any type of education or training in the four weeks leading up to the poll.

The second indicator is TEA or Tertiary educational attainment by sex which measures the proportion of people aged 25 to 34 who have finished tertiary education, such as university, higher technical institution, master's degree, etc.

The third indicator is YPEE or Young people neither in employment nor in education and training which measures the proportion of people aged 15 to 24 who are unemployed or inactive and who have not received any education and training in the four weeks prior the survey.

The fourth indicator is APL or Adult participation in learning by sex which measures the percentage of adults aged 25 to 64 who said they had formal or non-formal education or training in the four weeks before the poll.

The fifth indicator is ERRG or Employment rates of recent graduates which measures the employment rates of people aged 24 to 34 who are employed, who completed at least upper secondary education and who did not receive an education or training in the four weeks prior to the survey.

The most appropriate tools for identifying causal structures, detecting certain trends and configurations on the set of investigated data, and obtaining simplified representations of very complicated information are data analysis methods and procedures. For this study, it will be presented the technique of descriptive statistics and the analysis of the main components.

Descriptive statistic is a method included in the preliminary analysis of the data and are used to provide details about the distributions of the variables. Measures of central tendency like mean, median and mode, measures of fluctuation around the mean like standard deviation and

variance, measures of deviation from normality like skewness and kurtosis, information about the dispersion of the distribution like the maximum value, minimum value and range, and information about the consistency or measurement errors. (George and Mallery, 2016)

According to Ruxanda (2013) the principal component analysis is a multidimensional analysis approach that seeks to find new variables, called principal components, that are described as linear combinations of the original set of variables and have the most variability. The main components are abstract vector factors involved that are defined as linear combinations of the original data and have two fundamental properties: they are mutually independent two by two, and the sum of the squares of the coefficients that describe the linear combination relating to a main component equals the unit and the first main component is a standardized linear combination with the maximum variant, and the second main component is a line.

The primary components have a variety of fascinating qualities that stem from their description and are crucial to comprehending their nature and substance. One feature is that each primary component's variance is maximal and equal to its own covariance matrix value. The primary component's second quality is that they are uncorrelated two by two.

4. Results and discussions

The first analysis is the descriptive statistics method which shows the five indicators previously explained and the mean, standard deviation, median, minimum value, maximum value, range, skewness, and kurtosis. As we can see, Romania has the following values for the indicators: 15.6% for EL, 24.9% for TEA, 14.8% for YPEE, 1% for APL and 76.7% for ERRG (Appendix 2).

The EL indicator has the maximum level of 16% and the minimum level of 2.2%. This means that Romania has many early leavers from the education and training programs while using the online education. The mean of this indicator is 8.64% and the median is 8.1% which shows that the small numbers of early leavers is possible in countries that have the capabilities of implementing a very good online education method.

The TEA indicator has the maximum level of 60.6% and the minimum level of 24.9%. This means that Romania has the smallest tertiary educational attainment of all the countries.

The YPEE indicator has the maximum level of 19.0% and the minimum level of 4.5%. This means that Romania has many young people neither in employment nor in education and training, but it is not classified as the most affected country in this situation.

The APL indicator has the maximum level of 28.6% and the minimum level of 1%. This shows that Romania has the least number of adults participation in learning.

The ERRG indicator has the maximum level of 92% and the minimum level of 54.9%. The mean of this indicator is 79.51% and the median is 80.55% which shows that even though Romania has the smallest tertiary educational attainment, the employment rates of recent graduate classify this country on an increasing trend.

Before using the principal components analysis, I decided to calculate the correlation matrix.

Figure 1: Correlation matrix
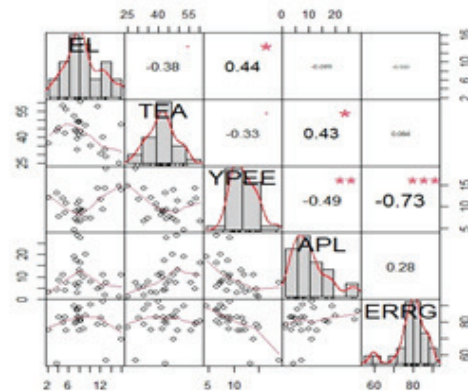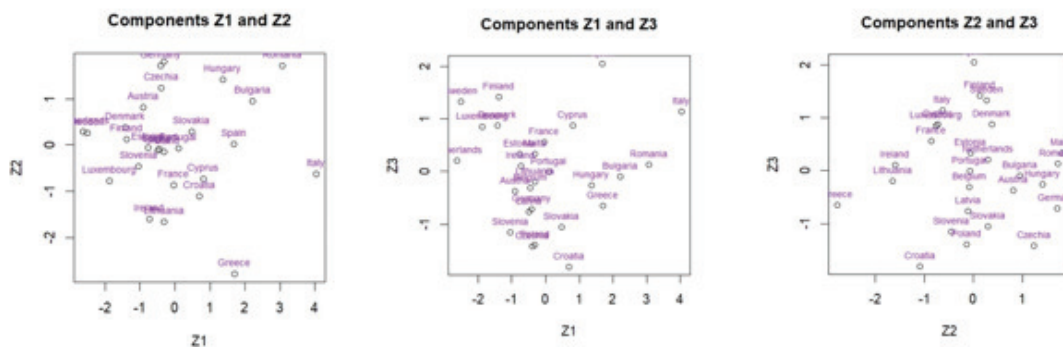

Source: Authors' own research results

As we can see analyzing the first figure, on the right side it is showed the correlation between the indicators. The EL indicator and the YPEE indicator are strongly correlated (0.44), which explains that the great number of young people neither in employment nor in education is based on the early leavers who prefer to choose other activities than learning or evolving themselves in the economic sector. The second strong positive correlation is between TEA and APL (0.43), which shows that adults included in the APL analysis and TEA just finished their tertiary education. The third strong, but negative correlation is between YPEE and ERRG (-0.73).

The second analysis is the principal components analysis, and the first step is represented by the selection of the principal component's number which were chosen using three criteria: Kaiser, Slope or Scree Plot and Variation Percentage (Appendix 3).

As we can see, there are three principal components. The first one has the YPEE indicator, and we will refer to it as young people neither in employment nor in education and training. The second one has the EL and ERRG indicators, and we will refer to it as early leavers and employment rates.

The third one has the APL indicators, and we will refer to it as adult participation in learning.

Figure 2: Components plots

Source: Authors' own research results

Analyzing the second figure we can see the bonds between the observations and the principal components. In the first case, Romania presents almost the stronger direct correlation with the young people neither in employment nor in education and training component and the early leavers and employment rates component, which means that Romania is almost the last country in this top because of the higher values registered. In the second case, Romania presents a strong direct correlation as well with the young people neither in employment nor in education and training component and the adult participation in learning component, which shows that adults are more interested in learning than the younger generation. The third case shows that Romania is weakly correlated with the early leavers and employment rates component and the adult participation in learning component, which means that younger generation is becoming more uninterested in learning even though the online education is more innovative.

5. Conclusions

In conclusion, Romania in the era of globalization, digitalization, and online education experience major drawbacks, which shows that neither the society, nor the educational system is prepared for this event. Thereby, Romania needs to show more interest in investing in the online learning platforms and educational system. Moreover, Romania must invest more time in order to improve the recruitment rate of the younger generation especially. Without raising the interest of the younger generation in education Romania will experience a very unpleasant event like uneducated population, undeveloped education, and unprepared society for working sector.

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Appendix 1

Table 1: Original data base

COUNTRY	EL	TEA	YPEE	APL	ERRG
Belgium	8.1	48.5	9.2	7.4	82.9
Bulgaria	12.8	33.0	14.4	1.6	78.7
Czechia	7.6	33.0	6.6	5.5	87.3
Denmark	9.3	47.1	7.4	20.0	83.6
Germany	10.1	35.1	7.3	7.7	90.5
Estonia	7.5	43.1	8.9	17.1	79.8
Ireland	5.0	58.4	12.0	11.0	79.5
Greece	3.8	43.7	13.2	4.1	54.9
Spain	16.0	47.4	13.9	11.0	69.6
France	8.0	49.4	11.4	13.0	74.9
Croatia	2.2	36.6	12.2	3.2	75.2
Italy	13.1	28.9	19.0	7.2	56.8
Cyprus	11.5	57.8	14.4	4.7	78.6
Latvia	7.2	44.2	7.1	6.6	79.1
Lithuania	5.6	56.2	10.8	7.2	74.5
Luxembourg	8.2	60.6	6.6	16.3	80.5
Hungary	12.1	30.7	11.7	5.1	82.2
Malta	12.6	40.1	9.3	11.0	92.0
Netherlands	7.0	52.3	4.5	18.8	89.3
Austria	8.1	41.4	8.0	11.7	88.4
Poland	5.4	42.4	8.6	3.7	82.7
Portugal	8.9	41.9	9.1	10.0	75.7
Romania	15.6	24.9	14.8	1.0	76.7
Slovenia	4.1	45.4	7.7	8.4	82.8
Slovakia	7.6	39.0	10.7	2.8	82.8
Finland	8.2	43.8	9.3	27.3	81.5
Sweden	7.7	49.2	6.5	28.6	86.4

Source: Data provided by Eurostat

```
getwd()
setwd("C:/Users/TheBlondeSalad/Desktop")
library(readxl)
date<- read_excel("data.xlsx")
date
d<-date[,2:6]
View(d)
summary(d)
library(psych)
describe(d)
install.packages("corrplot")
library(corrplot)
corelation<-cor(d)
corelation
corrplot(corelation, method='number', type="upper")
library(ggplot2)
ggplot(date,aes(x=EL,y=TEA))+ geom_point(shape=16,size=4,col="red")+geom_text(label=date$COUNTRY,vjust=0,hjust=0,size=4)
ggplot(date,aes(x=TEA,y=YPEE))+ geom_point(shape=16,size=4,col="red")+geom_text(labe
```

```
l=date$COUNTRY,vjust=0,hjust=0,size=4)
    ggplot(date,aes(x=YPEE,y=APL))+ geom_point(shape=16,size=4,col="red")+geom_text(labe
l=date$COUNTRY,vjust=0,hjust=0,size=4)
    ggplot(date,aes(x=APL,y=ERRG))+ geom_point(shape=16,size=4,col="red")+geom_text(lab
el=date$COUNTRY,vjust=0,hjust=0,size=4)
    library(PerformanceAnalytics)
    chart.Correlation(d,histogram=TRUE,pch=19)
    date_std=scale(date[,2:6],scale=TRUE)
    View(date_std)
    date_std
    observation_name=date[1]
    observation_name
    pca=princomp(date_std, cor=TRUE)
    pca
    sdev=pca$sdev
    valprop=sdev*sdev
    procentA=valprop*100/5
    procentC=cumsum(procentA)
    V=zapsmall(data.frame(valprop,procentA,procentC))
    V
    valprop
    scree_plot=prcomp(date_std)
    plot(scree_plot,type="l",main="Scree_plot",col="pink")
    abline(v=3.5)
    c=zapsmall(pca$loadings)
    c
    write.table(zapsmall(pca$loadings),"prop.vectors.txt")
    e=eigen(cov(date_std))
    e$values
    e$vectors
    d=zapsmall(pca$scores[,1:3])
    d2=cbind(d,observation_name)
    d2
    date_std
    corFact = zapsmall(cor(date_std,d[,1:3]))
    corFact
    colnames(corFact)=c("Z1","Z2","Z3")
    library(corrplot)
    corrplot(corFact,method="circle")
    cerc = seq(0,2*pi,length=100)
    plot(cos(cerc),sin(cerc),type="l",col="pink",xlab="Z1",ylab="Z2")
```

```
text(corFact[,1],corFact[,2],rownames(corFact),col="red",cex=0.7)
abline(v=0)
abline(h=0)
cerc = seq(0,2*pi,length=100)
plot(cos(cerc),sin(cerc),type="l",col="pink",xlab="Z1",ylab="Z3")
text(corFact[,1],corFact[,3],rownames(corFact),col="red",cex=0.7)
abline(v=0)
abline(h=0)
plot(d2[,1],d2[,2],main="Components Z1 and Z2",xlab="Z1",ylab="Z2")
text(d2[,1],d2[,2],labels=d2[,4],col="purple",pos=3,cex=0.7)
plot(d2[,2],d2[,3],main="Components Z2 and Z3",xlab="Z2",ylab="Z3")
text(d2[,2],d2[,3],labels=d2[,4],col="purple",pos=3,cex=0.7)
plot(d2[,1],d2[,3],main="Components Z1 and Z3",xlab="Z1",ylab="Z3")
text(d2[,1],d2[,3],labels=d2[,4],col="purple",pos=3,cex=0.7)
df=data.frame(d2)
biplot(df[,1:2], pca$loadings[,1:2], cex=c(0.7,0.8))
biplot(df[,2:3], pca$loadings[,2:3], cex=c(0.7,0.8))
```

Appendix 2

Table 2: Descriptive statistics

	vars	n	mean	sd	median	trimmed	mad	min	max	range	skew	kurtosis	se
EL	1	27	8.64	3.44	8.1	8.51	2.97	2.2	16.0	13.8	0.39	-0.48	0.66
TEA	2	27	43.49	9.17	43.7	43.53	8.15	24.9	60.6	35.7	-0.02	-0.71	1.76
YPEE	3	27	10.17	3.31	9.3	9.99	3.26	4.5	19.0	14.5	0.62	-0.13	0.64
APL	4	27	10.07	7.25	7.7	9.28	5.34	1.0	28.6	27.6	1.04	0.32	1.39
ERRG	5	27	79.51	8.64	80.5	80.55	5.63	54.9	92.0	37.1	-1.27	1.69	1.66

Source: Authors' own research results

Appendix 3

Table 3: Kaiser criteria

```
Call:
princomp(x = date_std, cor = TRUE)

Standard deviations:
   Comp.1    Comp.2    Comp.3    Comp.4    Comp.5
1.5418369 1.0756843 0.9364467 0.6755993 0.3636965

 5  variables and  27 observations.
```
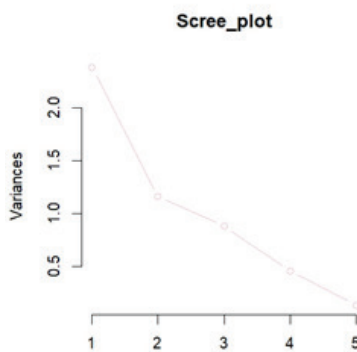
Source: Authors' own research results

Table 4: Slope criteria

	valprop	procentA	procentC
Comp.1	2.37726	47.54522	47.54522
Comp.2	1.15710	23.14194	70.68716
Comp.3	0.87693	17.53865	88.22581
Comp.4	0.45643	9.12869	97.35450
Comp.5	0.13228	2.64550	100.00000

Source: Authors' own research results

Figure 2: Scree plot

Source: Authors' own research results