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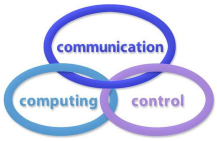

CCC Publications

The role of E-Learning generated by the COVID-19 epidemic in higher education

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Abstract

As key players in our society, universities have a special responsibility for sustainable development. As institutions of education, research, and services, universities are key players in the sustainable development of society and the economy. With the health crisis caused by Covid-19, it was necessary to introduce digitalized teaching. We could even say that Covid-19 is an accelerator for students' and teachers' acceptance of digital technologies in teaching. In many universities, there is still some impotence on how distance or short-term university teaching can take place. In the European higher education area, there has long been a commitment to greater digitalization of teaching under the keyword e-learning, so we set out to analyze these issues in the Romanian university environment. The results show that substantial efforts have been made, but these efforts must be continued to be successful and to reach a sustainable university.

Keywords: e-Learning, TAM, university sustainability.

1 Introduction

As institutions of education, research, and services, universities are key players in the sustainable development of society and the economy. University sustainability must be the dynamic contribution of all advanced teaching organizations in the development of environmental protection policies. A sustainable academia is the university that, in addition to the governmental participation, donates

to the fortification of the environment by adjusting the learning curricula to the environmental requirements, respectively, by the improvement of the methodical knowledge, because of the educational and investigate, respectively, research activities. The way in which the present humanity mechanism, by increasing the manufacture and consumption of goods and facilities, is not feasible and will have a damaging consequence in the extended run. This characteristic has presently produced powerful apprehension in university, but also at the flat of decision makers concerning sustainability. The UN has established and issued the 2030 Agenda for Sustainable Development Goals, which includes 17 key goals, including the goal of developing education so that universities become more sustainable. The 17 Sustainable Development Goals have been designed to increase awareness of the various facets of sustainability, drawing explicit goals that contain an accomplishment strategy for a extensive series of social, environmental, and technological subjects, from reducing deficiency, health for all, infrastructure progress, education, gender equality, maintainable use of oceans, energy, water, and sanitation. All 17 goals can be connected to engineering and individually request engineering to accomplish their goal [32]. With the digitalization of higher education, the fourth goal of the UN Sustainable Development Agenda, computer scientists and engineers have a special role to play in the efficient use of (recorded) data for process optimization, IT, resource saving programming, renewable energy, energy transition, energy, efficient production, electronic waste disposal, recycling, the role of decision based on IT, etc. Thus, new study programs need to be developed in an agile, flexible, and targeted manner. Furthermore, courses should promote personal, ethical, social, and methodological skills more than ever before. Practical, technical, and interdisciplinary teaching content or partnerships with companies are more important than ever in training, especially in the field of engineering. Ready in this way, tomorrow's engineers can better meet the challenges of the digital world of work for decision markets [13], [14], [15], [19]. The future as a location for technology and innovation depends in particular on the successful and timely digitalization of business, research, and teaching. The digital revolution in the education involves the engrossment of sustainable management, in demand to adjust to the fluctuation's compulsory by new technologies, will play an important role in supporting decision [13], [14], [15], [19]. In current periods, universities have been informed of a set of significant changes, encouraged by technological and social tendencies concerning digitalization. Like all revolutions, digitalization involves a powerful change in all segments. Presently, the implementation of technologies by academes is connected to a paradigm change, in which technology is considered as a multifaceted and interrelated environment that allows digital learning through transformation and plays the role of decision-maker [13], [15], [19]. In this way, the attention is further absorbed on the student and the necessity for technology. In this framework, digitalization is a stipulation in higher education organizations, able to attract more and better students, to improve the teaching materials used in courses, and the teaching procedure in over-all. New technologies such as artificial intelligence, big data, Moodle platforms [13], [15], [19] also allow better monitoring and help to identify barriers and decrease the hazard of dropping out of university. However, the hesitancy to appreciate and take benefit of prospects to change to this digital environment persists. The digital revolution in the worldwide higher education business is the forthcoming approach to sustainable teaching management [22], [24]. The world we live in is shifting at a fast pace, and anything we explain and in what way we teach is also growing quickly. In current years, universities around the world take knowledgeable fast variations with influence, which have remained influenced by technological development and the social tendencies of digitalization. Like all other innovative variations, the digital revolution includes powerful change/rearrangement. Robust variations in the socioeconomic-educational system follow-on from the globalized economy have led to fluctuations in impulsion, particularly in universities, such as the normal of instruction, value, regionalization, and computer-generated and self-governing education. These factors in the field of instruction communally encourage transcontinental teaching. The wide spread of global teaching has fundamentally inclined academies to form their education and growth instruments, transfer, and constant perfection. Universities may no longer be dependent on traditional systems of education to face the challenges posed by the phenomenon of globalization. Virtual learning is becoming increasingly significant for schools among the 2019 pandemic [7]. It is imperative to cover the serious situation of computer-generated learning beyond the IT tool and instrumentalization [5], [9]. Consequently, academies need to discover how they might balance people with e-learning

to safeguard teamwork and participation. Virtual learning technology has grown at an astonishing rate and its use, especially in transcontinental academies, has converted additional common. This phenomenon has particularly affected training approaches and their transfer. Therefore, this article highlights the impact of digitalization on institutional management and performance, respectively, investigating factors that influence the digital transformation during the Covid-19 pandemic, which led to the transition to e-learning [6], [7], [12], [18], [27]. The novelty and the main contribution are the examination of the situation for Romanian universities because we identify this goal in the existing literature and we consider it to be very important to analyze the acceptance of new theology because it can be decisive for the future. Moreover, automation and digitalization can have a significant positive effect on the well-being [13]. To achieve our objectives, we make a short examination of the literature on the digitalization in the university environment, the acceptance of technology, and the relationship with the sustainability and the university to identify al main goals and et and we present the result of our study.

2 Digitalization in the university environment

Technological progress, the increasing national and international interdependence of companies and the liberalization of the markets lead to problems in almost all areas of the economy, which are characterized, among other things, by increasing dynamics, interconnectedness, and increasing opacity. The handling and management of such complex economic situations with ever-shorter decision cycles is one of the essential requirements for the management of the future [20], [21], [25], [27]. At the same time, the importance of the "information" factor as one of the main determinants of problem-solving and decision making has steadily increased in recent years. The worldwide and constantly growing spread of information and communication technologies in many areas of human life and the emergence of a new employment sector "information" industrial information age. This also and especially applies to the microeconomic, business administration area. "Information" is more and more frequently referred to here as an independent production factor, and information technology can serve as a "strategic weapon" for more efficient and effective use of existing and for the development of future universities potentials and thus for the attainment of operative and strategic competitive advantages. Digitalization has now reached all areas of work in universities and penetrates the fields of research and teaching, as well as their administrative processes, and helps to make decisions [13], [15], [19]. Digitalization in universities is associated with various potentials and expectations, but at the same time with uncertainties and fears. Learning in Internet-supported teaching-learning scenarios is not isolated, it is not lonely learning. Rather, the shared use of the learning platform, the collaboration with the learning group, the virtual exchange with the tutor or the lecturer represent an important social component. Digitalization determines the public discourse in and for educational institutions, as well as internal discussions in the universities about their further development. However, there are many myths about what is addressed or meant by digitalization, such as that the media per se would improve the learning of students [26]. The universities themselves have created realities, for example through their e-learning activities. Since then, perspectives relating to digitalization have also opened, which, on the one hand, are rooted in their technical, organizational and didactic possibilities, but on the other hand, also ask about forms of their study and research in universities. All discussions are flanked by developments in education and science policy, with research and funding programs or university policy or strategic objectives using terms such as e-learning, media, or digitalization in their various forms. However, their novelty is not necessarily reflected in new concepts, reorganized processes, or in a completely changed practice of academic teaching and research. Rather, digitalization appears as a postulate. Therefore, it is essential to also disclose narratives in connection with the concept of digitalization for science and practice. All these aspects are discussed with the necessary productive-critical distance. In short, digitalization should allow universities to conduct research, teaching, and administration at a higher quality and more professional level [20], [31]. In fact, a variety of visions, strategies, and implementation concepts for the “digital university” have been and are being developed and lived in universities. Innovations are perceived innovations with benefits, so it is initially unclear who the beneficiaries are. In this respect, the concern is legitimate

to shed light on e-learning, what is new about it, and what daily teaching-learning problems can be solved with it. However, when it comes to educational innovations such as this, it takes a surprisingly long time to find one player in this research. At best, it becomes active when it comes to checking an innovation in school, university, or further education, as a kind of "research afterwards". Everyone wants to be innovative these days: companies, political parties, the cultural program, university management, etc. Ultimately, those affected decide whether something new is also suitable for everyday use. When it comes to research into learning and teaching, whether with or without new media, things look rather bleak in terms of both suitability for everyday use and innovative strength. The special structural needs, challenges, and implementation potential are very different for different areas of the university [30]. As a cross-cutting issue, digitalization is becoming more widespread in all areas of the university, offering new opportunities in teaching, research, and communication, but at the same time presenting new challenges to teachers and students. E-learning has come through a decade of growth, decline, experimentation, transfer, excitement, and disillusionment. Irrespective of public perception, the political and economic trends and their reflection in the media, over the course of this decade universities have been increasingly dependent on reacting inventively to new challenges in teaching and learning. Many institutions used the possibilities of information and communication technologies. In this way, efforts were made to face up to the changing teaching framework conditions and the changed demands of various stakeholders inside and outside the universities [4], [5], [6], [9]. According to Ehlers (2018) [10], a key factor of the future university are greater participation in education, increased diversity in life situations, digitalization, and student needs. Although Ehlers (2018) [10] sees the strongest factors, on the one hand, in the growing importance of education in society and, on the other hand, in digitalization, another equally important factor is the needs of students as part of the digitalization project. The reason for this is the assumption that students' needs will be a significant part of shaping their profile [27]. Classically, the term Decision Support System (DSS) is defined as a computer-aided planning and information system that prepares or supports the preparation of decisions at management levels but does not make the decision itself. Against the background of rapid development in IT and the widespread spread of the Internet, this definition seems to be outdated in many cases, since a large number of decision support systems nowadays make not only strategic but also operative decisions. The development of the digital university is a demanding and complex task. It is too narrow a view if digitalization is seen only in standardized mass-produced mechanization of teaching and learning processes and also does not include aspects of permeability, personalization, effectiveness, lifelong learning, labor market requirements, educational partnerships, and innovation [2], [3], [4]. Finally, the "student-centric" factor is the application of the well-known client-centered strategy [11]. This benefits from greater transparency and improved communication and interaction options on digital platforms [16], [21], [27].

3 Accepting technology in the university environment

The term e-learning has its origins in the 1980s, and subsequent, the outline of the primary computer-assisted jobs, which led to the replacement of handheld computers and typewriters with computers, so to speak. Employees have been trained in new software applications (e.g., operating systems, text programs, and databases) through traditional employee training courses and - and this remained new - through small education programs that have been installed on a computer unit by software workers. These tools remained initially modest didactic manuscripts, which were processed in the following years using illustrations and animations. The outline of such e-courses firstly shaped a persevering misperception around the potentials of this new category of skill. For many educational specialists, legislators, and software producers, this technology has been considered a miracle tool. It should help to reduce (staffing) prices in the teaching segment and open novel delivery networks for education contributions. For example, traditional academies were anticipated to expand into numerous categories of academies, most of which remained virtual organizations, such as worldwide groups, systems, and virtual academies. From a didactic point of view, nothing less than better learning has spread. Consequently, specific procedures of likeness, response, creation, communication, and relationship should be stimulated only through the use of the media, which in particular promotes

the acquisition of knowledge. E-learning could do this, e.g. it has only partially met the euphoric expectations so far, or expectations should have been revised because they are excessive. This shows that providers of virtual higher education offerings or online courses face subjects such as employer acceptance and dropout tolls fairly additional intensely than providers of traditional educational offerings.

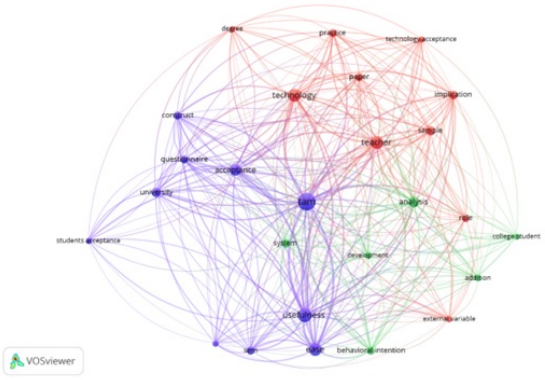

Figure 1: The relationship about TAM and the sustainability of universities

It is difficult to discover an explanation of the term e-learning in the literature. On the one hand, this can be traced back to the circumstance that the concept of e-learning has become recognized to define e-learning approaches, but it still requests to be avowed alongside numerous other designations and attempts at arrangement [12], [21], [27]. It doesn't matter if it is computer-based learning, computer-assisted teaching, computer-mediated learning, or computer-assisted learning: most of these are comparable concepts that cannot be straight distinguished from each other. The first systematic debates around e-learning occurred in the late 1990s; at the equivalent period, they encouraged the primary methodical efforts at providing a characterization. Originally, the effort was concerned with concerning the practical potentials of dispensing the learning content, e.g., satellite learning, CD-ROM learning, interactive television, or videotape learning. The essential element of the description of the setting of concept is the education as a intermediary of the education provided for the student. An explanation of the education condition does not take place in the primary efforts of characterization, nor ensures the debate about the importance of the student in the education situation: that of an asset and the learning scenario with creative recipients or that of the passive observer [17]. It is now understood that e-learning should be understood as a common term for all categories of media-supported learning. What they have in common is that the learning process is considered a key factor in achieving individual learning goals. However, the term does not specify the content of what is to be learned but refers to the technological means used. This leaves an overly rigid technological focus. According to this agreement, e-learning includes accepted forms of learning both online and offline (for example, learning without internet support). Thus, we can emphasize that e-learning always means dealing with electronic media. However, this method of learning can only be successful if you can work and learn with technology as a tool without much cognitive effort. Technology should not be at the heart of the learning situation but the learning offer. Therefore, it should be irrelevant to the learner if they access the network-based or locally stored information systems. To make this possible, software developers have now made available learning systems, many of which are difficult to monitor.

4 Research framework and results

The technology acceptance model was developed by Davis (1986) [8] as part of his dissertation and is an adaptation of action theory. The model was developed to predict the acceptance of technical systems. According to the Fishbein-Ajzen theories (1977) [1], the technology acceptance model is intended as a direct predictor of behavior (acceptance). The purpose articulates a person's intention to usage the technical system in question in the future. The aim is, in turn, determined by two

perceptive issues: perceived benefit and the perceived ability to use the system under consideration. Davis defines the impact of third outside variables in the model as project structures that take an impact only on cognitive variables. Figure 2 shows the model.

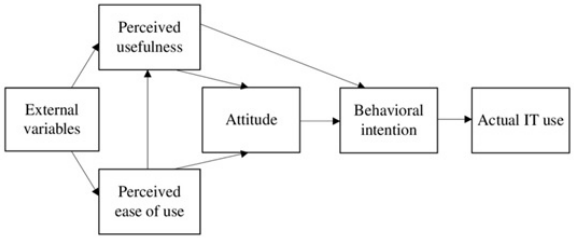

Figure 2: Davis' technology acceptance model

In acceptance research, it is the best operationalized and the empirical model most generally verified to elucidate the acceptance of technical structures [17], [23], [28], [29]. A September 2021 Web of Science Index query returned 1,302 citations for the two introductory articles. A questionnaire was designed based on the literature and subsequently sent to students to obtain an x-ray of the status and challenges they face in the full adoption of e-learning. Specifically, the questions are about perceived usefulness and perceived ease of use. The first section deals with the personal information of faculty members that reflects their field and experience. The second section focuses on the level of use of e-learning. Pilot-tested surveys were selectively distributed to students for a first opinion. The purpose of the pilot testing of these surveys was double: to observe the reliability of the survey items and to confirm that the respondents could easily comprehend the substances in the survey. Care has been taken to safeguard that construction, linguistic and clearness are at a satisfactory level. These surveys were disseminated directly to students at ten universities using a non-likely sampling approach. Data were collected from these students, who remained all scholars, who came from diverse universities, different academic years, men and women. The answers to the questions in the technology acceptance model and the items in the subjective norm were recorded using a five-point Likert scale, analogous to the original questions: 1 = 'total disagreement' to 5 = "total agreement". The 36 items include the perceptions and barriers to the availability of learning resources, material comprehension, learning attitudes, ease of access, delivery methods, and interaction patterns. In this study, the perceptions were obtained from the learning/experience they experienced, both in terms of models of interaction with lecturers, interactions with other students, the availability of support facilities, including Internet networks, and the availability of teaching materials in the e-learning system. In a structured way, this perception implies indicators of perceived use and ease of use. This study used quantitative data collection methods to empirically examine and highlight factors that had a greater influence on user behavior. A nonprobable sample was adopted, which is commonly used in higher education [33]. The study was used to target respondents who were teachers or students in universities and also used the resources of e-learning systems offered by their universities. Data were collected using a survey, which was conducted using the CAWI (computer-assisted web interview) technique. A link to the electronic surveys was distributed to individual students from Romanian universities through the university's email system. These were distributed between January and February 2022. In total, 1875 completed questionnaires were received. Structural Equation Modeling (SEM) was used to process the data from the developed model. The use of SEM will deliver more precise estimations as it delivers a simultaneous level of examination for both the structural model and the provided measurements. Moreover, SEM offers a supplementary comprehensive method to test hypotheses around observed and latent variables. SEM is the most common approach to measuring the level of acceptance of information technology by users. E-learning learning in this study refers to the entire distance learning that uses the Internet and hardware to provide subjects or materials from teachers to students. All interactions, both synchronous and asynchronous, are performed through the media. More and more research is enjoying the TAM model, which is widely used to predict the acceptance of any new technology. We used TAM for the similar predictive validity that it showed in previous studies in a similar context. Our investigation model is grounded on the study of variables that affect the acceptance of the e-learning system using

the extended TAM model. The starting point of the research is the observation that e-learning has become an essential part of education. We are primarily talking about companies that offer a wide range of e-learning programs for their employees, for example, through newly established corporate universities as well as universities that integrate new technologies into their teaching institutions. At the same time, it should be noted that e-learning offers face acceptance problems much more frequently than traditional face-to-face offers. The growing number of students who use e-learning willingly face a large number of people who are critical and negative about multimedia courses. This means that e-learning is facing the problem of being the fastest growing sector of technology-based education, on the one hand, on the other hand, it can only partially reach its target group. This raises the question of the factors that influence the acceptance of e-learning and what the consequences for the successful implementation of e-learning. The characteristics of the sample show that 67.04% of those sampled were from the category of undergraduate students, 32.64% master's students, and a percentage of 0.32% doctoral students. We also note that 58.99% of respondents fall into the age category of 18-25 years and a percentage of 6.77% are over 45 years. All 1885 were students at a public or private university. Exploratory investigations were carried out to inspect the validity of the proposed variables and to contrast the preliminary reliability of the scales. Factor analysis to confirm the magnitudes obtained in the investigative study and to permit the abolition of the established scales. It also facilitates the confirmation of the psychometric properties of the factors that are part of the model. Correspondingly, the causal investigation contrasts the planned structural relationships. A first step before examining and testing the hypotheses was an investigative examination of the validity and reliability of the variables. The validity of a element is the grade to which one element varies from the other established elements. Validity can be measured by examining the main elements with Kaiser Varimax rotation; see Table 1.

Table 1: Test KMO & Bartlett

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.946
Bartlett's Test of Sphericity	Approx. Chi-Square	15296.343
	df	66
	Sig.	.000

As can be seen from the results obtained based on the Kaiser-Meyer-Olkin & Bartlett test, our elements fall within the recommended range of 0.8 to 1, which indicates that the sampling is adequate. Also, to test the reliability of the elements, we performed the reliability test, and the results confirm this time that the sample is adequate.

Table 2: The reliability test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.923	.929	12

The factor load is practically the correlation coefficient for the variable and the factor. The factor load illustrates the variance elucidated by the elements for that specific factor. In the structural equations (SEM) method, as a general regulation, the factor load of 0.7 or higher value indicates that the issue extracts a satisfactory variation from those elements. The outcomes we found are beyond 0.7 so we can consider them adequate. Composite reliability (sometimes called construction reliability) is a measure of the interior constancy of measure elements, just like Cronbach's alpha. It can be considered equal to the total value of the variation of the real score in relation to the total variation of the scale score, and the recommendation is that its value be greater than or equal to 0.7, and this condition is met by the elements of our model. And last but not least for the variation test we chose the average extracted variance (AVE), which is a value of the quantity of variance that is taken by a hypothesis in link to the amount of variance due to dimension mistake and the optional values are superior to or equivalent to 0.5 and this indicator being met. Thus, we can consider our elements to be able to continue our analysis. Correlations superior to 0.3 remained statistically significant at 0.01. In our correlation matrix, most correlations among elements were significant at 0.01, with values greater than or equivalent to 0.3. Completely, we complete an initial examination of the reliability of

the dimension scale of our model using Cronbach's alpha, the most widely used indicator for this type of analysis. This coefficient covers values between 0 and 1. In our study, the Cronbach's alpha for each of the 12 variables is greater than or equal to the threshold of 0.7, above which the reliability is considered acceptable. The Cronbach's alpha coefficient with values above 0.900, which indicates that the instrument can be considered reliable and consistent internal. Following the determination of the reliability, correlations, and validation tests that showed that the elements are adequate, we proceeded to the next step in which we analyzed the degree of fit and the adequacy of the model. The indices that we used were: Chi square, for which a value less than 3 is considered a good match; GFI (good match) ranges from 0 (bad match) to 1 (perfect match) recommend a value 0.8; AGFI (adjusted goodness-matching), with an acceptable value greater than or equal to 0.8; NFI (standard match index) with values between 0 and 1 but a value above 0.8 is recommended; The IFC (Comparative match index) fluctuates between 0 and 1, and the RMSEA (root-average pattern error) matches well between 0.05 and 0.08 (. To determine the fit and suitability of the model, the analysis was performed using IBM SPSS AMOS 26 Graphics. Following the analysis of the model fit indices, it is observed that it is suitable, as shown in the table below:

Table 3: Model matching indices

Indicator	**Recommended Values**	**Obtained Values**
Chi square	< 3.00	2.943
GFI	> 0.90	0.911
AGFI	> 0.80	0.848
NFI	> 0.80	0.901
CFI	> 0.90	0.934
RMSEA	< 0.10	0.061

As noted in all preliminary tests or within an appropriate and acceptable range, we moved on to the last stage in which we analyzed the estimates based on path analysis (path coefficient) to validate or reject the assumptions made earlier. The results of the analysis are presented in the table below. As can be seen from the 21 hypotheses, 5 were rejected due to a higher value of P of 0.001 which indicates that there is no influence between variables or that the influence is insignificant.

Table 4: Hypothesis Validation

	Path coefficient	**P**	**Validation**
Ability to use → Perceived ease of use	.391	***	Accepted
Course content and design → Perceived ease of use	.262	***	Accepted
Instructor contribution → Perceived ease of use	.051	***	Accepted
Previous experience in E-learning → Perceived ease of use	.022	.025	Rejected
The quality of the E-learning system → The perceived ease of use	.089	***	Accepted
Ability to use → Perceived utility	.075	***	Accepted
Course content and design → Perceived utility	.499	***	Accepted
Instructor contribution → Perceived utility	.003	.851	Rejected
Previous experience in E-learning → Perceived utility	.029	.003	Rejected
E-learning system quality → Perceived utility	.011	.487	Rejected
Perceived ease of use → Perceived utility	.377	***	Accepted
Perceived utility → Satisfaction and personal development	.679	***	Accepted
Perceived utility → Attitude towards the use	.493	***	Accepted
Perceived ease of use → Satisfaction and personal development	.199	***	Accepted
Perceived ease of use → Attitude towards the use	.304	***	Accepted
Perceived utility → Behavioral intent to use	.248	***	Accepted
Perceived ease of use → Behavioral intent to use	.022	.305	Rejected
Satisfaction and personal development ⋄ Behavioral intention to use	.498	***	Accepted
Attitude towards use → Behavioral intention to use	.264	***	Accepted
Behavioral intent to use → Actual use	.268	***	Accepted
Behavioral intent to use → Academic performance	.497	***	Accepted

However, the results of this investigation show that the less central elements that determine the use of e-learning resources by students in academies are the ability of students, course content, satisfaction and personal development and attitude toward the use. While elements such as the contributions of the instructors, the content of the course, and the design are shown to most influence the behavior of

students in the use of e-learning resources in Romanian universities. More research is needed on the use of e-learning resources. This can be attributed to the continuous and fast growth of technology requirement and the unremitting expansions in the domain of education. In the present situation, the supplementary issues included in the model are supported using TAM. Furthermore, this investigation can be measured as added value to the present literature in the field by examining the elements that additional have an impact the use of e-learning resources by instructors-students, who are offered by their academies to expand their education developments at anytime and anywhere. Based on the outcomes of the study, a deeper understanding of outside elements between instructors and students was enabled, in addition to offering evidence for academic managers, designers, system developers, and related professionals. Although technology is used to an effective grade in Romania and its higher education institutions, more devotion needs to be rewarded to the issues that production a pertinent role in helping the use of e-learning systems by students to supplementary improve their performance and effectiveness among students and instructors correspondingly to accomplish sustainability purposes. It can be noted that the results of the examination provide a deeper understanding of the field and important elements that encourage the use of learning resources by instructors-students in Romanian academies.

5 Conclusion

As technology advances at a rapid pace, further progress will be made in the field of e-learning, but it is important to remember that e-learning also has limitations. On the one hand, one has to judge an e-learning environment according to its didactic concept and certainly not only according to its technical feasibility, which depends on the creators of the respective programs. In addition, the learner is still usually the same person as in classical learning methods. When there is a lack of motivation, interest, or desire to make an effort, e-learning will not be able to work wonders. Furthermore, the constant flexibility and availability of learning programs tempt people to put in additional learning effort and possibly overwhelm them. The study succeeded in showing that the acceptance of e-learning can be explained as a function of personal determinants (e-learning). This finding now allows the development of promising intervention measures for e-learning. If it is possible to influence one or more predictors, then acceptance will change as well. What implications can be derived from this research for future research? First of all, this paper is the first careful examination of the subject of accepting e-learning in Romanian universities. By approaching the technology acceptance model, new perspectives can be derived for the field of research acceptance of e-learning. Therefore, the article should be understood as a starting point for future research. The acceptance investigation of e-learning was conducted in the context of this research using two systems. On the one hand, technology that supports e-learning has been analyzed from the perspective of students. A conscious decision has been made not to further differentiate the type of use of e-learning, for example, on different types of platforms or software used. Therefore, the way in which the respondents use the system in detail and to what extent the different types of use influence the acceptance of e-learning remain unanswered. As a result, the purpose of further investigation is to conduct a more detailed analysis of the different types of e-learning used.

Author contributions

The authors contributed equally to this work.

Conflict of interest

The authors declare no conflict of interest.

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