Students' Engagement and Active Participation During the Pandemic

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The mobility constraints due to the coronavirus COVID19 disease forced the universities to go online. Although online learning is familiar to students, online teaching and learning during the pandemic is something else. First of all, is like distance education when online teaching and learning is the only option. Extant research shows many disadvantages of exclusive online learning, such as lack of attention, decreased motivation, boredom, mental stress, and fatigue. Nevertheless, after two years of teaching and learning from home, teachers and students had time to adapt. This research is exploring the perceptions of students as regards online school with a focus on engagement and learning autonomy. A research model has been developed, analyzing the main factors that influence the students, engagement, and active participation. The model has been tested on a sample of 326 university students in autumn 2021. The results show that the best way to keep students engaged is to stimulate communication with the teacher and other students and to adapt online courses to be interactive, attractive, and motivating.
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1 Introduction

The mobility constraints due to the coronavirus COVID19 disease forced the universities to go online. Although online learning is familiar to students, online teaching and learning during the pandemic is something else. First of all, it is similar to distance education when online teaching and learning is the only option.

Numerous studies and researches - focusing on the issue of online education - have been developed theories, models, standards, and evaluation criteria regarding the design of online courses and the quality of online teaching, especially during the pandemic. Most of the findings indicated that the effectiveness of online teaching and learning results from careful didactical design and planning [21].

McCarthy, Glassburn & Dennis [30] sustain that effective online teaching is influenced by three categories of factors: personal qualities, pedagogical beliefs, and macro and institutional factors. Each teacher used the available resources differently, taking into account both their needs and students' ones.

On the other hand, several pieces of research illustrate many disadvantages of exclusive online learning: lack of attention, decreased motivation, boredom, mental stress, and fatigue - in the online environment it is more difficult for the teacher to notice the differences between the students and to anticipate their cognitive and emotional needs, also the assessment process is more difficult [2, 11, 19, 26, 27, 36, 40].

Nevertheless, distance education during the pandemic is challenging the universities [1, 3]. Online education creates opportunities for the provision of e-learning materials as well as for the development of specific teaching and learning skills, including digital skills and self-efficacy in using the technology [9, 12, 41], to develop new pedagogical methods and to increase creativity, opportunities for teacher training programs [35], opportunities for increasing the visibility, promotion and sustainability of Universities, in a competitive higher education market.

After two years of teaching and learning from home, teachers and students found time to identify ways to answer to the challenges of the educational crisis and to adapt to the new

educational settings. In this respect, the sudden change provoked by the pandemic is triggering innovation and change in the teaching methods and style. In turn, this may change the students' perceptions of the online school and increase their motivation and engagement [11, 38].

This research is exploring the perceptions of students as regards online school. A research model has been developed that analyzes the extent to which the teaching and evaluation quality, communication with the teacher and with other students, and the quality of online activities, influence the students, engagement and active participation.

A secondary objective of this research is to explore the contribution of those factors to the development of learning autonomy. The model has been tested on a sample of 326 university students from Valahia University of Targoviste in autumn 2021.

The rest of the paper is organized as follows. The next section presents the theoretical background and model conceptualization. In section 3, the method and model testing results are presented and discussed. The paper ends with a conclusion in section 4.

2 Background and conceptualization

2.1 Related work

According to Soria and Stebleton [34], academic engagement refers to the interaction with the school and participation in class discussions with new ideas from different courses and insightful questions.

The study of Daumiller et al. [11] found that teachers' attitudes towards the sudden shift to online school have a positive influence on the engagement and students' perception of the teaching quality.

Tulaskar & Turunen [38] analyzed the engagement during the emergency remote learning in Finland and India. They found that the effectiveness of remote education is influenced by the teaching methods, interactivity, and technical issues. They suggested that institutions should incorporate technological innovations for advancing the teaching methods and have the logistics needed in future emergencies.

Academic engagement represents a complex, multifaceted concept that refers to the extent to which students use their internal and external resources in learning processes.

Studies that have addressed this construct [4, 5, 17, 24] identified three dimensions of engagement that work together: cognitive, emotional, and behavioral engagement. Cognitive engagement refers to the perception and evaluation of the course content, as relevant and important; emotional engagement assumes the students' affective attitudes toward teachers, colleagues, or to the courses in general, and behavioral engagement refers to the actual involvement of the students in course activities and tasks [8].

According to Kahu et al. [25], student engagement is "the student's emotional, behavioral and cognitive connection to their study" which has a direct influence on academic success and achievement.

The student's engagement is related to academic success also in the online environment [29, 31]. Martin & Bolliger [29] confirmed that engagement represents an important condition in online learning that can increase student satisfaction, providing positive learning experiences for students: stimulating active learning, collaborative workgroups, reflection, and discussion.

The findings of a recent study [15] indicate that the successful engagement of the students in online education was influenced by several psychosocial factors: the community of colleagues, involved teachers, self-confidence, self-efficacy, and course design. Also, time management and organizational skills are important in learning engagement behavior.

In the field of Educational Sciences, autonomy is a common concept, especially correlated with *lifelong learning skills*. First used by Henri Holec in 1981, this term is associated with different meanings - as *a personal human trait* or as *an educational movement* - being considered either as *a means* or as *a goal* in education (or even both) [21]. Holec appreciated that autonomy is the "ability to take control of one's learning"; Dickinson [13] considers that autonomy is "a situation in which the

learner is fully responsible for all decisions related to his/her learning and their implementation". In this approach, learner autonomy is the ability to control personal learning experiences and take responsibility for their learning, at their own pace and using their strategies.

Among the essential characteristics associated with autonomous learning, Candy [10] identified many attributes associated with autonomy in learning: methodical, disciplined, logical, analytical, reflective, self-aware, motivated, curious, flexible, independent, responsible, persistent, adventurous, creative, self-efficacy and self-confident, skilled in seeking information and learning style, self-assessment, etc.

According to Tassinari [37], the components of learner autonomy are:

- a cognitive and metacognitive component (that include cognitive and metacognitive knowledge, awareness, and students' beliefs);
- an effective and a motivational component (feelings, emotions, will, motivation);
- an action-oriented component (skills, learning behaviors, decisions);
- a social component (learning and negotiating learning with partners, teachers, counselors).

An essential condition of learner autonomy is the ability to activate an interaction and a balance between those dimensions in different learning contexts and situations [37].

2.2 Research model and hypotheses

In this study, the following latent variables are considered: quality of teaching, quality of the evaluation, communication, quality of online activities, and students' engagement.

The quality of online teaching is related to the suitability of methods, adaptation of content, and adaptation of assignments to online learning. The quality of feedback and evaluation refers to the evaluation of assignments and the feedback provided by teachers.

Teachers should communicate with students and find ways to stimulate collaboration and communication between students by promoting collaborative learning tasks [9].

H1. Quality of teaching has a positive effect on communication (QT → COM).

The teaching quality impacts all online activities, including seminars, projects, group work, and individual study. Teachers should adapt their teaching methods to make online courses attractive, motivating, and interesting for students [12, 32].

Therefore, we hypothesized that:

H2. Quality of teaching has a positive effect on the quality of online activities (QT → QA).

Teachers should ensure a fair evaluation and provide feedback on students' questions and assignments. The quality of feedback and evaluation impacts the quality of all online activities, including seminars, projects, group work, and individual study [9, 14].

H3. Quality of evaluation has a positive effect on communication (QE → COM).

H4. Quality of evaluation has a positive effect on the quality of online activities (QE → QA).

Interacting with the teacher and with other students is very important during the pandemic when students are isolated and learning from home [12]. Therefore, communication is a key factor for keeping online activities interactive and motivating [7].

H5. Communication has a positive effect on the quality of online activities (COM → QA).

Communication with the teacher and with other students stimulates and maintains students' interest [39].

H6. Communication has a positive effect on students' engagement (COM → SE).

Online activities that are interactive, attractive, and motivating, stimulate students' engagement [38].

Therefore, we hypothesized that:

H7. The quality of online activities has a positive effect on students' engagement (QA → SE)

The research model that includes four factors is presented in Figure 1.

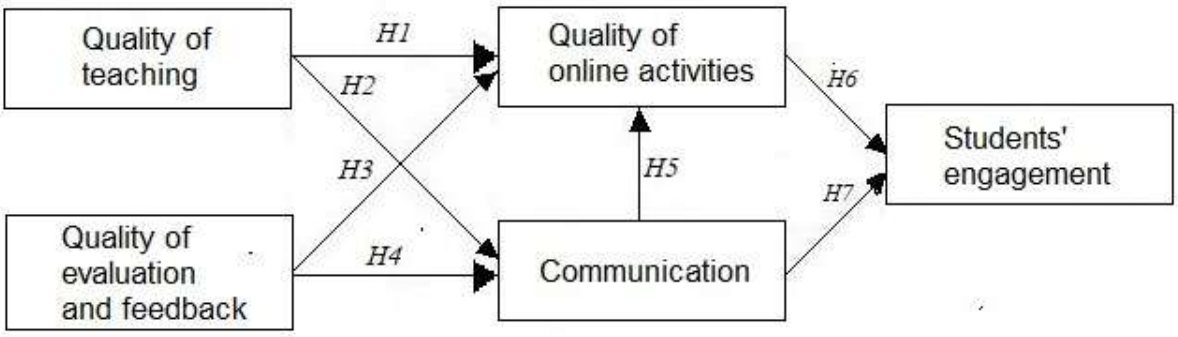

Fig. 1. The Research model

The relationships established between the five factors (figure 1) illustrate the seven hypotheses that are tested in this study.

Table 1 presents the operationalization of the constructs and a single-item measure (AL) that refers to the autonomy in learning.

Table 1. Constructs and items

QT	QT1	Teaching methods are suitable for online school
	QT2	The content is adapted to online presentation
	QT3	Students' assignments received are adapted to online learning
QE	QE1	The evaluation during online school is fair
	QE2	The feedback provided by teachers is formative
COM	COM1	The online school stimulates communication with teachers
	COM2	The online school stimulates communication with colleagues
QA	QA1	Online activities are attractive
	QA2	Online activities stimulate the learning motivation
	QA3	Online activities are interactive
SE	SE1	The involvement of students in online activities is high
	SE2	The active presence of students at online activities is high
AL	AL	Online teaching develops learning autonomy

The autonomy in learning represents an important variable in higher education, and according to Reeve et al. [33], the teachers have a central role in developing students' autonomy; they can support them and motivate them to learn effectively, by creating a learning environment that supports independent assumption and responsibility for one's learning. In online learning, autonomy is a key competence, related to academic success.

As a secondary objective of this study, it is envisaged to explore the extent to which the aforementioned variables are contributing to the development of learning autonomy.

3 Results

3.1 Method

To assess the proposed model, a two-steps structural equation modeling (SEM) approach. First, the measurement model was evaluated to test its validity and reliability. The convergent and discriminant validity have been examined based on the recommendations from the literature [20]. Second, the structural model was evaluated to test the hypotheses and the overall fit between the model and the data. The SEM estimation procedure was the maximum likelihood.

Based on the recommendations from the literature [20, 23], the following goodness-of-fit

measures were used: chi-square ($\chi 2$), normed chi-square ($\chi 2$/df), comparative fit index (CFI), goodness-of-fit index (GFI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA).

The model was analyzed with Lisrel 9.3 for Windows, using a covariance matrix as input and maximum likelihood estimation method.

Additionally, a multiple linear regression has been performed by regressing the dependent variable AL (learning autonomy) on the variables QT, QE, COM, QA, and SE.

3.2 Model estimation results

The descriptive statistics, item loadings, and items' reliability are presented in Table 2. All item loadings are statistically significant (*t*-values > 1.96) with values over the threshold of 0.6 and.

The item reliability (R^2) values are above the threshold of 0.50. The composite reliability (CR) values range from 0.763 to 0.875, above the minimum level of 0.70, indicating adequate reliability. The values of the average variance extracted (AVE) are above the minimum level of 0.50, ranging from 0.616 to 0.840, confirming the convergent validity of constructs.

Table 2. Descriptive statistics and loadings

Factor	Alpha	Item	Mean	SD	Loading	R^2
Quality of teaching (QT)	0.813	QT1	4.40	0.86	0.80	0.62
		QT2	4.39	0.94	0.86	0.74
		QT3	4.30	0.98	0.79	0.62
Quality of evaluation (QE)	0.757	QE1	3.90	1.73	0.79	0.90
		QE2	4.10	1.69	0.78	0.83
Communication (COM)	0.831	COM1	4.27	1.73	0.90	0.79
		COM2	4.10	1.69	0.80	0.66
Quality of online activities (QA)	0.872	QA1	4.06	1.12	0.95	0.66
		QA2	3.70	1.29	0.76	0.76
		QA3	3.93	1.13	0.81	0.68
Students' engagement (PD)	0.836	SE1	3.71	1.34	0.89	0.79
		SE2	3.93	1.22	0.87	0.76
Autonomy in learning	-	AL	3.79	1.24	-	-

The reliability of constructs (Cronbach's alpha) is good, ranging from 0.757 to 0.872.

The discriminant validity of the model has been analyzed following the Fornell and Larcker [16] squared correlation test. The results in Table 3 show that, with one exception, the square root of the AVE is greater than the correlations between constructs, which means an acceptable discriminant validity.

Table 3. Results of convergent and discriminant validity

	CR	AVE	QT	QE	COM	QA	SE
QT	0.858	0.668	**0.817**				
QE	0.763	0.616	0.710	**0.785**			
COM	0.840	0.725	0.763	0.809	**0.837**		
QA	0.875	0.700	0.601	0.721	0.835	**0.851**	
SE	0.849	0.740	0.583	0.622	0.764	0.766	**0.860**

Note: The bold diagonal numbers represent the square root of AVE

A structural equation modeling (SEM) approach was carried on to test the fit between the research model and the data. The model estimation results are presented in Figure 2.

The fit of the structural model with the data is also good, as shown by the GOF indices: $\chi 2$=67.987, df=29, p=0.0024, $\chi 2$/df=2.344, CFI=0.970, GFI=0.936, SRMR=0.0379, RMSEA=0.046.

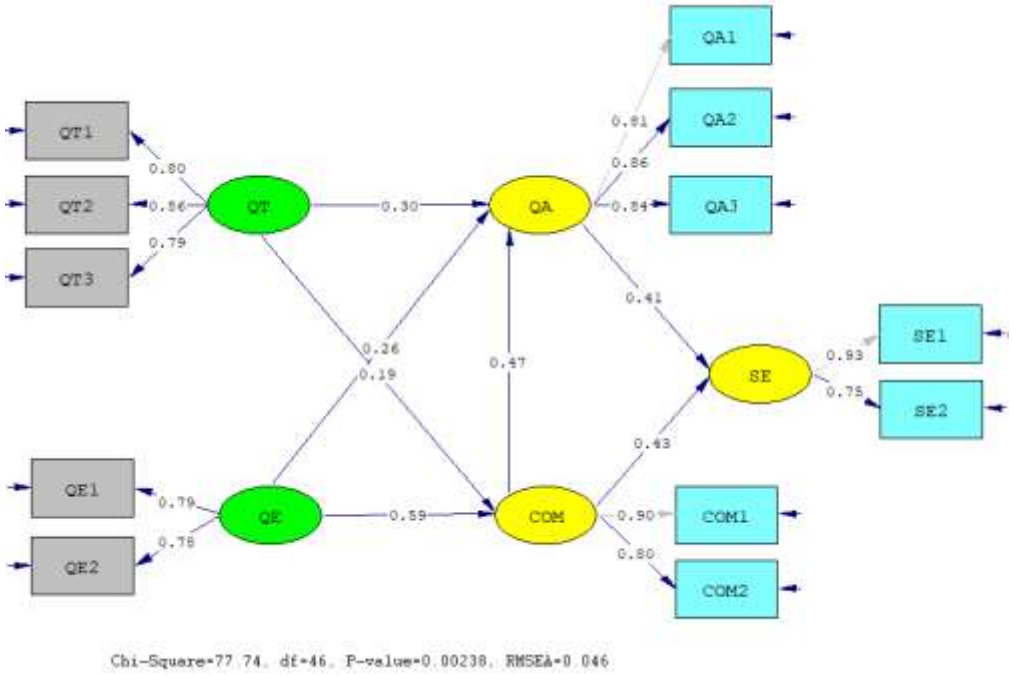

Fig. 2. Model estimation results

The results show that all hypotheses are supported, as follows: H1 (β=0.30, p=0.000), H2 (β=0.19, p=0.037), H3 (β=0.26, p=0.002), H4 (β=0.59, p=0.000), H5 (β=0.47, p=0.000), H6 (β=0.41, p=0.000), and H7 (β=0.43, p=0.000). The quality of teaching (QT) and quality of evaluation (QE) have a direct effect on the quality of online activities (QA) as well as an indirect effect which is mediated by communication.

Communication and quality of online activities have a quasi-similar direct effect on students' engagement (SE). Communication has also an indirect effect on SE which is mediated by QA.

The model explains 82.8% variance in the quality of online activities, 53.3% in communication, and 64.8% in the students' engagement.

3.3 Regression analysis results

Since all latent variables are unidimensional and have convergent validity, it is possible to average the items and use the resulting means as single-item measures [6]. The mean values of latent variables are presented in Table 4.

Table 4. Construct mean values

Variable	Mean	SD
mQT	4.36	0.81
mQE	4.00	0.98
mCOM	3.51	1.28
mQA	3.89	1.06
mENG	3.83	1.18

A step-wise regression with backward elimination has been carried on. After the first iteration, QT and QE were non-significant and were eliminated.

The regression analysis results are presented in Table 5. Multiple correlation (R=0.813) for regression is significantly different from zero, F (3,322) = 207.26, p = 0.000. The adjusted R^2 value indicates that 65.56% of the variability in SE is predicted by the independent variables.

Table 5. Regression analysis results (N=326)

Variable	Coefficient	Standard err	t-value	p-value
intercept	-0.022	0.161	-0.135	0.893
mCOM	0.101	0.048	2.130	0.034
mQA	0.743	0.059	12.564	0.000
mENG	0.146	0.048	3.034	0.003
R^2=0.659, Adjusted R^2=0.656, F(3,322)=207.26, p=0.000				

All predictors are significant at the p<0.05 level. The most important predictor is the quality of online activities (β=0.743, p=0.000), then the engagement and active participation (β=0.146, p=0.003).

3.3 Discussion

The results of the study show that in an online environment the teacher must focus on effective communication and must train his or her full potential to create valuable educational contexts in which students can develop their learning autonomy, being actively engaged in their own vocational training process.

In terms of *quality of teaching* (QT), it can be seen a positive effect on *communication* (COM). By definition, teaching involves communication (verbal, nonverbal, paraverbal). Interactive courses, in which students communicate ideas, debate different points of view, propose solutions and support arguments, stimulate creativity, critical thinking, students' ability to reflect, create opportunities for authentic communication and learning.

The *quality of teaching* (QT) has a positive effect on the *quality of online activities* (QA). Effective teaching generates learning. A good pedagogue capitalizes on his/her knowledge and skills, proper ways for creating contexts that generate formative experiences. What is taught becomes relevant if the teacher uses appropriate methods to transmit knowledge and stimulate the emotional and motivational processes that support learning. Also, a safe and stimulating emotional climate is very important for students to be attracted and determined to actively participate in their education. In the online environment, we do not find all the levers that the teacher has in the face-to-face format. The efficiency of online teaching depends on the ability of the teacher to combine his teaching skills with the students' needs.

It is well-known that teaching is a science, but also an art. The teacher who teaches effectively does so in any environment (including the online one) if he or she has developed digital skills, adaptability, and creativity, but also abilities to turn the challenges of online education into opportunities for personal and professional development for himself/herself and students.

The *quality of evaluation* and *feedback* (QE) has a positive effect on *communication* (COM).

In didactic communication, feedback has a major role, both for students and teachers. The feedback ensures the regulation of the communication process. In its absence, it can be discussed just by one-way communication. The correct, prompt, concrete, verbal, and/or nonverbal and formative feedback ensures the good understanding and reception of the message, its adaptation to the particularities of the receiver, flexibility of roles, and satisfaction of the communication partners.

The *quality of evaluation* (QE) has a positive effect on the *quality of online activities* (QA).

According to Dumulescu, Pop-Păcurar & Necula [14], the immediate feedback provided in multiple manners is one of the useful aspects of online learning.

Communication (COM) has a positive effect on the *quality of online activities* (QA).

Among the variables that can be controlled by the teacher in the online environment, there can be mentioned: planning the course, focusing on student's needs, anticipating possible problems, rethinking and adapting courses to the particularities of the new educational environment, and using all the means of communication with students. Interactive teaching and formative feedback can turn online teaching into an effective activity that generates learning.

Communication (COM) has a positive effect on *students' engagement* (SE). According to Farrell & Brunton [15], the effective engagement of the students in online education is influenced by several psychosocial factors: the community of colleagues, involved teachers, self-confidence, self-efficacy, and course design. Effective communication with teacher and colleagues generates cognitive, emotional, and behavioral engagement. Didactic communication and the content of the courses that respond to the cognitive needs of the student, the relationship and collaboration with colleagues, the attitudes and behaviors of involvement in educational tasks, are correlated with his or her commitment to learning.

The *quality of online activities* (QA) has a positive effect on *students' engagement* (SE)

The quality of teaching in an online environment must be interactive, interesting, motivating, and the teacher must have the ability to solve, in real-time, the problems that may arise. Thus, teaching experience, psycho-pedagogical skills, creativity, and formative feedback can turn online teaching into an effective activity that generates learning.

There are several limitations of this work. First, there is an inherent limitation of this exploratory study, as regards the variables included in the model and the operationalization of constructs. Second, the sample of the research is from only one university.

5. Conclusion

This study contributes to a better understanding of the factors that influence the students' engagement and active participation in learning during the pandemic. In fact, the entire period-imposed improvements of online teaching in higher education, and, according to Gallagher & Palmer [18], greater use of online education in this era is needed even beyond the requirements of the pandemic.

As mentioned also by Dumulescu, Pop-Păcurar & Necula [14], such results show that the effectiveness of university teaching in the post-digital era is strongly connected with the ability to create cognitive-transferable learning experiences, emotionally safe learning environments, while promoting an active autonomy-focused approach for self-regulated learning.

Little [22] argues that autonomy is a psychological relationship of the learner with the learning process and content, a capacity for detachment, critical reflection, decision making, and independent action. Thus, in a pandemic or post-pandemic context, students' autonomy in learning and deep commitment are competencies that ensure academic success. Teachers need to create the right context and facilitate the development of those skills.

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