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**E-TEACHING FOR GEOGRAPHY AT UNIVERSITY SOME
SOLUTIONS FOR THE CHALLENGE**

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Abstract

The COVID-19 pandemic challenged the activities within university in a variety of ways, but this health and overall societal crisis compelled the educational system to prove its resilience. Both students and professors had to learn new methods and strategies or adapt the old ones to make e-teaching efficient. What are the most appropriate materials to be used during e-teaching? How should online teaching be organised? How can one stimulate communication and interaction during online classes? These are just some of the questions we asked ourselves? This research stems from the issues faced by professors and university students during online classes and teaching procedures. Its aim is to investigate online teaching from the point of view of geography university students. To do so, we devised a survey for different categories of students from the Faculty of Geography in Babeș-Bolyai University, in Cluj-Napoca, Romania. This tool helped us collect several data on: the written and visual means used by professors (.doc, .docx, .pdf, PowerPoint documents, photographs, maps, animation and documentary films, etc.) and their usage during online teaching; professor speeches and organization of e-teaching (training models, teaching methods and procedures); factors influencing attention retention; communication and interaction with students; support means provided to students in order to learn content; note taking during online classes. At the end of this article, several suggestions for improving online university teaching were proposed.

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Keywords: COVID-19, digital pedagogy, e-learning, online lectures, students' perceptions



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1. Introduction

The COVID-19 pandemic has led to a faster and stronger process of digitalisation in universities, emphasising the need to develop a digital pedagogy so that e-teaching and e-learning address students' and professors' needs (Alturise, 2020; Hamann et al., 2020; Kessler et al., 2020). Online university education provides connectivity and inclusiveness. However, the latter is questioned in the case of vulnerable and disadvantaged groups (Douat, 2020). It also offers opportunities of reinventing and adapting pedagogical approaches (Zhu, 2020), although some studies on educational activities in university showed less satisfactory results of e-teaching compared to the ones of traditional teaching. For instance, some underline that e-teaching may be characterised by less interactivity or none (Mulla et al., 2020), inefficiency and issues of academic integrity (Mukhtar et al., 2020), not to mention losses of the students' sense of community (Anderi et al., 2020).

Students' feedback is crucial for the improvement of e-teaching (Gewin, 2020). Kessler et al. (2020) point out that also learning research is necessary to improve remote teaching and used resources, as well as for ensuring overall quality enhancement of online education. For instance, Edelhauser and Lupu-Dima (2020) conclude that professors' approach of e-teaching is paramount for student satisfaction. This approach could be informed by students' feedback. In Romania, recent research offers recommendations for quality online geographical education in university (Dulamă & Ilovan, 2020; Dulamă et al., 2021; Ilovan, 2020). To sum up, literature underlines that our attitudes towards e-teaching will change and e-learning will impact learning styles and teaching styles, changing them too (Ilovan, 2020).

For the purpose of our research, we underline that e-teaching was correlated with the cognitive theory of multimedia learning (CTML), where meaningful connections are created by learners, between words and images, thus enabling more in depth learning than they could have achieved only with words or images (Mayer, 2009). E-teaching is a very good context for multimedia learning, where learners' mental representations are built using both words (oral and written) and various types of static or dynamic images (Mayer, 2005). CTML works with three assumptions. The first is the dual-channel assumption stating that the working memory has two types of channels: auditory and visual. This assumption is based on two theories: the theory of the working memory (Baddeley, 1986) and the dual coding theory (Clark & Paivio, 1991). The second is the limited capacity assumption which is based on the cognitive load theory (Sweller, 1994). This assumption points out to the limited capacity of each subsystem of the working memory. Finally, the third assumption, called the active processing, suggests that learners can construct knowledge in ways which are meaningful if their attention focuses on material that is relevant, which they integrate with their prior knowledge and organise in coherent mental structures (Mayer, 1996, 1999; for a more in-depth discussion, also Sorden, 2013).

2. Problem Statement

Professors have adapted the online teaching according to the content and features of the discipline, to the digital competence, the didactic and psycho-pedagogical competence, the available resources (temporal, material, devices, etc.). During the adaptation process to e-teaching, on the Microsoft Teams

platform, each professor has identified and applied several didactic strategies in order to obtain the expected efficiency. Discussions with students revealed that they preferred certain methods of online teaching. The problem which generated this research was the difference itself between the beliefs and perceptions of professors and students regarding the efficiency of online teaching methods.

3. Research Questions

In this research, we plan to answer several questions: What are the most appropriate materials that should be used during e-teaching? How could professors organise e-teaching better? How could communication and interaction be stimulated during online classes?

4. Purpose of the Study

The purpose of this study is to investigate e-teaching from the point of view of the students in the Faculty of Geography, Babeș-Bolyai University, Cluj-Napoca, Romania, mainly based on university courses and excluding seminars and labs which have other characteristics. The students' perceptions regarding the importance of several e-teaching aspects were analysed and added to interpretation from a didactic, psychological and pedagogical perspective, considering the specific issues that Geography as a scientific field and Geography Didactics imply, but without comparing it to traditional (face-to-face) teaching.

5. Research Methods

Data collection and processing. Data regarding e-teaching were collected through the survey method, using a self-made questionnaire as research tool. It contained 33 behaviours of the professor which could have occurred during online teaching. The importance of these behaviours was assessed by the students with the help of a 1 to 5-point Likert scale. For each behaviour, a weighted average or mean (*m*) was computed. Furthermore, all the behaviours were thematically grouped, and, in certain situations, they were ranked according to their importance from the students' perspective.

Participants. All participants come from Babeș-Bolyai University, from all specialisations and years of study at the Bachelor's level, from Faculty of Geography (see Table 1). Respondents represent approximately one fifth of the total number of students enrolled at the respective level.

Table 1. Information about participants

Specialisation	Year of study						Total	
	1		2		3		no.	%
	no.	%	no.	%	no.	%		
Territorial Planning	20	50	8	20	12	30	40	34.78
Geography of Tourism	6	19.35	13	41.94	12	38.71	31	26.96
Geography	12	48	6	24	7	28	25	21.74
Hydrology and Meteorology	3	27.27	6	54.55	2	18.18	11	9.57
Cartography	5	62.5	2	25	1	12.5	8	6.96
Total	46	40	35	30.43	34	29.57	115	100

6. Findings

During online teaching on the Microsoft Teams platform, professors used both written support and visual materials from their own computer, and also other materials, instantly downloaded from the Internet. Throughout the questionnaire, we tried to identify which kind of materials were considered important for the students in the online teaching at this Faculty of Geography and which were students' preferences regarding the usage of these materials by their professors.

Using written support. In Table 2, it can be observed that 55% of students awarded 1-2 points for the moments when the professor lectured or explained the contents without a written support – this being the least preferred manner of teaching and thus ranked lowest ($m = 2.35$). Considering the situations when the professor used a written support (.doc, .pdf, .ppt file), most students (70%) awarded 4-5 points to those moments when the professor used some ideas written on a slide, that were developed afterwards ($m = 3.90$). Although the scores are quite close, next-in-rank were those situations when professors used slides with text that contain all lectured and explained essential information ($m = 3.82$), text in .pdf files while lecturing and explaining ($m = 3.71$), and text in .doc files which the professor highlighted while lecturing and explaining ($m = 3.37$). These results confirm Mayer's cognitive theory of multimedia learning (Mayer, 2009), presented in the introduction section.

Table 2. Opinions on using written support in online teaching

Opinions on using written support in online teaching	No. of students that awarded points					Average (m)
	1	2	3	4	5	
The professor lectures or explains without written support	42	22	31	9	11	2.35
The professor uses a text in a .doc file and highlights information while lecturing or explaining	14	15	27	32	27	3.37
The professor uses a text in a .pdf file and highlights information while lecturing or explaining	6	10	33	28	38	3.71
During the presentation based on written support, the professor asks questions	6	9	26	35	39	3.80
The professor uses as written support text on slides that contains all lectured and explained essential information	0	18	29	24	44	3.82
The professor uses as a support, some ideas written on a slide, that are being developed afterwards	3	12	19	41	40	3.90

Using visual materials. Table 3 shows students' opinions on using visual materials in online teaching. Results revealed that, for geographers, the most important visual material is the map ($m = 4.38$).

When investigating the usage of visual materials, we started from the premise that, for a better understanding of different aspects illustrated within the visual materials, students need to be guided by the professors who should use the mouse to indicate elements and explain. Solely for the photos, we have taken into account the situation when they are used for their illustrative function or to exemplify the explained aspects. Results confirmed this hypothesis because more than 76% of the students considered this didactic procedure important and very important for them. The ranking of the results confirms the ascertainment that we made during the activities with our students based on these materials. Thus, they need professor's guidance in order to decode geographical aspects represented on maps ($m = 4.38$),

schematic drawings ($m = 4.25$), photos ($m = 4.31$), and charts ($m = 4.17$). The fact that students do not require descriptions of the chart contents could be attributed to the fact that the respective content is the easiest to understand compared to the other visual materials. The students have considered that for them is also important ($m = 3.95$) that, during online teaching, the professor searches for visual materials on the Internet in order to clarify and deepen certain unknown aspects and to address unforeseen ones. For 58% of the students, what is also important and very important is the fact that the professor asks questions during the presentation of a static visual material (photo, map, chart, schematic drawing, block chart, profile, etc.).

Regarding the usage of dynamic visual materials (animated films or documentaries), 72% of the students considered important and very important that the professor asked questions after watching these materials ($m = 3.90$). A lower importance was given to individual watching, without professor's intervention ($m = 3.46$), to the professor's explanations of the film content while students were watching it ($m = 3.13$). Although while using static materials, students appreciate the questions asked by the professor ($m = 3.54$), in the case of films, neither professor's interruptions nor asking questions are welcomed by students ($m = 2.61$), 50% of them considering this kind of behaviour less important or not at all. The key difference, among others, between using static and dynamic visual materials consists in the soundtrack of the animated films and documentaries which provides most of the necessary information to understand what is happening,

Table 3. Opinions on using visual materials in online teaching

Opinions on using visual materials in online teaching	No. of students that awarded points					Average (m)
	1	2	3	4	5	
When using a map, the professor describes the visible essential aspects, uses the mouse to indicate elements and explains	6	2	10	21	76	4.38
When using a schematic drawing, the professor describes the visible essential aspects, uses the mouse to indicate elements and explains	7	1	13	29	65	4.25
When using a photo, the professor describes the visible essential aspects, uses the mouse to indicate elements and explains	8	0	12	23	72	4.31
The professor uses photos in order to exemplify the explained aspects	5	4	13	22	71	4.30
When using a chart, the professor describes the visible essential aspects, uses the mouse to indicate elements and explains	6	5	16	25	63	4.17
During online teaching, the professor searches on the Internet visual materials in order to clarify and deepen certain unknown aspects and addresses the unforeseen ones	4	10	26	23	52	3.95
During the presentation of a static visual material, the professor asks questions	15	8	25	34	33	3.54
After watching an animated film or a documentary, the professor asks questions	7	9	16	39	44	3.90
While watching an animated film or a documentary, the professor lets students watch it by themselves	15	13	23	32	32	3.46
While watching an animated film or a documentary, the professor explains what is seen on screen	19	20	26	27	23	3.13
While watching an animated film or a documentary, the professor interrupts it to ask questions regarding the observed aspects	36	22	25	15	17	2.61

Didactic methodology used in online teaching. For 69% of the students is important and very important that professors use different didactic methods and procedures/techniques in online teaching ($m = 4.04$) (Table 4). Regarding the professor centred methods of teaching, students appreciate most about the situations when the professor describes and explains the essential aspects from the visual materials, using the mouse to indicate elements ($m = 4.17 - 4.38$) (Table 3) and when the professor shows them how to solve certain problems/tasks ($m = 4.07$) (Table 4). Lower scores were associated with the situations when the professor lectures or explains something based on written text ($m = 3.37 - 3.90$) or without a written support ($m = 2.35$) (Table 2).

With respect to the methods that involve students during online teaching, what they appreciate the most is conversation after watching animated films or documentaries ($m = 3.90$) and conversation during the presentation of static visual materials ($m = 3.54$). What they tend to resent is conversation while watching films ($m = 2.61$) (Table 3) and writing in chat questions that the professor expects them to answer, also in chat ($m = 2.79$) (Table 4). Regarding the practical activities, 67% of the students consider important and very important that, after showing a working procedure, the professor should save time for solving individually certain tasks, then each of them to give a presentation with the results ($m = 3.84$).

For students is also important that, after solving tasks and giving an oral or written presentation of the results, the professor provides immediate feedback, on the platform, which is received by all students ($m = 3.93$) (Table 4). Although the platform enables organising activities in groups, during the online ones, students' opinions differ as to the effectiveness of solving tasks in groups (in breakout rooms) and presenting them to all their colleagues; thus, for 17%, these are unimportant and less important, while for 46% of them, these behaviours are not only important but also very important ($m = 3.20$) (Table 4).

The didactic speech of the professor. We asked students to assess the importance of the professor observing the following pedagogical rules when lecturing, in order to facilitate a better and higher understanding degree in the online teaching process, rules which are similar to those in the traditional (face-to-face) teaching. Despite that fact that the students could have assessed as unimportant or less important the following the aspects mentioned within the questionnaire, results revealed that, for most of them, these are important and very important. For students, the fact that the professor makes connections between theory and reality by giving examples and using case studies is very important ($m = 4.28$), as well as explaining specific terminology ($m = 4.25$), or repeating certain information in case they ask for it or in case of technical problems ($m = 4.23$); students appreciate it when the professor talks slowly so they can follow and understand explanations while taking notes ($m = 3.97$), when the professor repeats certain information for making sure that they have understood ($m = 3.93$), and when the professor changes the speed/rhythm and the tone of his or her speech in order to emphasise some important aspects and to avoid monotony ($m = 3.75$) (Table 4). 70% of the students have awarded 1-2 points for the situation when the professor talks fast in order to explain the whole content ($m = 2.10$), which shows that students do not find this procedure/technique appropriate in online teaching (Table 3).

Taking notes and providing support materials. We have noticed that the students appreciate when the professor talks slowly, and they can also take notes ($m = 3.97$) or when the professor suggests or asks them to take notes ($m = 3.47$). 76% of the students consider important and very important the fact that, after each online course, tasks that they have to solve are uploaded on the platform, indicating the

deadline for completion ($m = 4.28$) and 74% of them consider important and very important that after each online course, support materials that were used during online teaching are uploaded on the platform.

Table 4. Opinions on didactic methodology, communication and interaction with students in online teaching

Opinions on didactic methodology, communication and interaction with students in online teaching	No. of students that awarded points					Average (m)
	1	2	3	4	5	
During online teaching, the professor uses different didactic methods and procedures/techniques	1	8	27	28	51	4.04
During online teaching, the professor makes connections between theory and reality by giving examples and using case studies	1	9	14	24	67	4.28
During online teaching, the professor explains specific terminology	1	8	13	32	61	4.25
During online teaching, the professor repeats certain information in case we ask for it or in case of technical problems	6	4	15	23	67	4.23
During practical activities, the professor shows us how to solve certain problems/tasks	0	13	19	30	53	4.07
During online teaching, the professor talks slowly for us to follow and understand explanations while taking notes	7	8	23	21	56	3.97
During online teaching, the professor repeats certain information to make sure that we have understood	8	6	22	26	53	3.96
After solving tasks and giving an oral or written presentation of the results, the professor provides immediate feedback, on the platform, which is received by all students	7	5	29	22	52	3.93
During practical activities, after showing us the right procedure, the professor saves time for solving individually certain tasks, then each of us is giving a presentation with the results	4	12	21	39	39	3.84
During online teaching, the professor changes the speed/rhythm and the tone of the speech in order to accentuate some important aspects and to avoid monotony	10	10	20	34	41	3.75
During e-teaching, the professor suggests or asks us to take notes	5	21	33	27	29	3.47
During online teaching, the professor organises activities in small groups (in breakout rooms) and we solve different tasks, then we present them to our colleagues	26	10	26	21	32	3.20
During online teaching, the professor writes in the chat questions that each of us has to answer, also in chat	32	18	28	16	21	2.79
During online teaching, the professor talks fast in order to explain the whole content	52	29	15	8	11	2.10
After each online course, support materials that were used during e-teaching are uploaded on the platform	9	7	13	18	68	4.12
After each online course, tasks that we have to solve are uploaded on the platform, indicating the deadline for completion	7	4	16	11	77	4.28

7. Conclusion

Because attending lectures is optional, students can be divided into three categories: those who attend irrespective of the circumstances (both intrinsic and extrinsic motivation), those who attend only if they are interested in the contents (intrinsic motivation), and those who do not attend. Depending on these situations, professors should adapt their lectures and discourse: make them challenging and interesting for as many students as possible, thus stimulating their intrinsic motivation; for instance, by integrating short

problem situations or case studies, questions that requires more thinking, and use diverse activating techniques (Dulamă, 2002, 2008, 2010a, 2010b). Our research confirms that students are aware of and appreciate teaching where the professor focuses on students' information processing with their working memory (explaining terms, slow rhythm of speech, repeating certain information, etc.) in order to maintain that information into the long-term memory (Mayer, 2010)

References

- Alturise, F. (2020). Difficulties in teaching online with blackboard learn effects of the COVID-19 pandemic in the Western Branch Colleges of Qassim University. *International Journal of Advanced Computer Science and Applications*, 11(5), 74-81.
- Anderi, E., Sherman, L., Saymuah, S., Ayers, E., & Kromrei, H. T. (2020). Learning communities engage medical students: A COVID-19 virtual conversation series. *Cureus*, 12(8), e9593.
- Baddeley, A. D. (1986). *Working Memory*. Oxford University Press.
- Clark, J. M., & Paivio, A. (1991). Dual coding theory and education. *Educational Psychology Review*, 3, 149-210.
- Douat, E. (2020). In student residences during lockdown, disabled students coping with distance learning are left on the sidelines. *Alter-European Journal of Disability Research*, 14(3), 236-246.
- Dulamă, M. E. (2002). *Prelegerea - între tradițional și inovator* [The lecture – between traditional and innovative]. In Bernat, S.-E., & Chiș V. (coord.), *Cooperare și interdisciplinaritate în învățământul universitar* [Cooperation and Interdisciplinarity in University Education] (pp. 149-159). Editura Presa Universitară Clujeană.
- Dulamă, M. E. (2008). *Metodologii didactice activizante. Teorie și practică* [Activating Didactic Methodologies. Theory and Practice]. Cluj-Napoca: Clusium.
- Dulamă, M. E. (2010a). *Considerații metodologice asupra cursului universitar interactiv* [Methodological considerations about the interactive university lecture]. In Voiculescu, F. (coord.), *Ghid metodologic de pedagogie universitară* [Methodological Guide of University Pedagogy] (pp. 125-152). Editura Aeterminates.
- Dulamă, M. E. (2010b). *Considerații metodologice asupra seminarului universitar* [Methodological considerations about the university seminar]. In Voiculescu, F. (coord.), *Ghid metodologic de pedagogie universitară* [Methodological Guide of University Pedagogy] (pp. 153-194). Editura Aeterminates.
- Dulamă, M. E., & Ilovan, O. -R. (2020). Online university education during the COVID-19 pandemic. How efficient are the adapted instruction models? *Journal of Educational Sciences & Psychology*, 10(2), 92-111.
- Dulamă, M. E., Vereș, S., Magdaș, I., & Ilovan, O.-R. (2021). Using animation films in formal activities at Natural Sciences during the COVID-19 pandemic. Instruction problems and models. *Journal of Educational Sciences & Psychology*, 11(1), 49-65.
- Edelhauser, E., & Lupu-Dima, L. (2020). Is Romania prepared for eLearning during the COVID-19 pandemic? *Sustainability*, 12(13), 5438.
- Gewin, V. (2020). Into the digital classroom. Five tips for moving teaching online as COVID-19 takes hold. *Nature* 580, 7802, 295-296.
- Hamann, K., Glazier, R. A., Wilson, B. M., & Pollock, P. H. (2020). Online teaching, student success, and retention in political science courses. *European Political Science*.
- Ilovan, O.-R. (2020). Feedforward for university geographical online education during the COVID-19 pandemic. In Vlada, M., Albeanu, G., Adăscăliței, A., & Popovici, M. (Eds.), *Proceedings of the 15th International Conference on Virtual Learning* (76-85). Editura Universității.
- Kessler, A., Barnes, S., Rajagopal, K., Rankin, J., Pouchak, L., Silis, M., & Esser, W. (2020). Saving a semester of learning: MIT's emergency transition to online instruction. *Information and Learning Sciences*.

- Mayer, R. E. (1996). Learning strategies for making sense out of expository text: The SOI model foregrounding three cognitive processes in knowledge construction. *Educational Psychology Review*, 8, 357-71.
- Mayer, R. E. (1999). Research-based principles for the design of instructional messages: The case of multimedia explanations. *Document Design*, 1, 7-20.
- Mayer, R. E. (2005). Introduction to multimedia learning. In Mayer, R. E. (Ed.), *The Cambridge Handbook of Multimedia Learning*. Cambridge University Press.
- Mayer, R. E. (2009). *Multimedia Learning* (2nd ed). Cambridge University Press.
- Mayer, R. E. (2010). Applying the science of learning to medical education. *Medical Education*, 44, 543-549.
- Mukhtar, K., Javed, K., Arooj, M., & Sethi, A. (2020). Advantages, limitations and recommendations for online learning during COVID-19 pandemic era. *Pakistan Journal of Medical Sciences*, 36(4), SI, 27-31.
- Mulla, Z. D., Osland-Paton, V., Rodriguez, M. A., Vazquez, E., & Plavsic, S. K. (2020). Novel Coronavirus, novel faculty development programs: Rapid transition to eLearning during the pandemic. *Journal of Perinatal Medicine*, 48(5), 446-449.
- Sorden, S. D. (2013). The cognitive theory of multimedia learning. In Irby, B., Brown, G., Lara-Alecio, T., & Jackson, S. (Ed.), *The Handbook of Educational Theories* (pp. 155-169). Charlotte, North Carolina: Information Age Publishing, Inc.
- Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. *Learning and Instruction*, 4, 295-312.
- Zhu, T. (2020). Empirical research on the application of online teaching in Chinese colleges and universities under the situation of novel Coronavirus pneumonia prevention and control. *International Journal of Emerging Technologies in Learning*, 15(11), 119-136.