

## Digital Competencies of Teachers – Strategies of Training and Attitudes During the Pandemic of COVID

Anusandhan-NDIM's Journal of Business and Management Research

Vol.5, Issue 1

February - 2023

<https://qtanalytics.in/journals/index.php/ANUSANDHAN>

<https://doi.org/10.56411/anusandhan.2023.v5i1.28-38>

**Tiberiu Dughi<sup>1</sup>, Dana Dughi<sup>2</sup>, Henrietta Torkos<sup>3</sup>**

1. Phd, Assoc. Prof. Aurel Vlaicu University of Arad; Arad, Maria Cuntan 11, Romania

2. Phd, Lecturer. Aurel Vlaicu University of Arad; Arad, Maria Cuntan 11, Romania

3. Phd, Lecturer, Aurel Vlaicu University of Arad; Flacăra 1A, Romania

**Abstract:** *The Covid pandemic has created a social situation that teachers had to adapt to, by teaching and learning online. For this, it was necessary to regulate both the legal and methodological framework, as well as the training and development of online learning. At system level, strategies have been developed and teacher training courses have been created in order to develop the digital skills. In this article we present some examples of such measures taken at national and local level. The correlational study presented aimed to investigate the attitudes of 75 teachers towards the use of digital skills in online learning. The tool used was a questionnaire that allowed the collection of factual data about teachers (seniority, age, job, access to digital resources, their use) and data regarding attitudes towards online learning and the use of digital resources. Based on the statistical analysis, a significant correlation was found between age, teaching experience and receptivity, respectively anxiety about the use of digital technology at teachers of more advanced ages. The data obtained can be part of the analysis of the training needs of teachers for the easier integration of digital media in learning.*

### Introduction

The COVID 19 pandemic has highlighted in a very pronounced way the need of teachers to use digital skills in the context of online learning activities. Concerns about online education have not only emerged during the pandemic. For example, E-learning, as an ICT-based activity, is seen as an integral part of a knowledge-based society, as Romania considers itself to be. The use of e-learning is considered a natural knowledge of the evolution of society from the perspective of using digital techniques, with its determinations at social and economic level. (Popa, Dănilă, 2010) The authors already highlighted the transition from the simple use of information technologies in learning to a complex model of learning in the university environment based on

accessing web resources, on computer-mediated communication, including automatic responses, on access through portals of institutional resources and processes. Another study conducted in 2010 highlighted the need to adjust learning content, assessment methods, school infrastructure and, last but not least, teacher training strategy for the use of ICT. (Istrate, 2010)

An explanatory model of the paradigm shift on the use of ICT in education is that of Puentedura - SAMR - substitution, augmentation, modification, redefinition. (Puentedura, 2006) In his perspective, at the first level - substitution, technology is just a tool that replaces a framework without bringing about functional changes.

At the augmentation level, functional changes are already taking place, but the role of technology substitute is maintained. The two are the level of improvement. Only by moving on, to the level of modification and redefinition, we can talk about transformation. Thus, the change involves the use of technology in the sense of redesign task, and at the level of redefining technology allows the creation of unaffordable learning situations outside of technology. (Hamilton, Rosenberg, Ackaoglu, 2016; Romrell, Kidder, Wood, 2014; Wahyuni et al., 2020; Cardullo, Wilson, Zygoris-Coe, 2018)

The explanations offered by this model have some limitations that are important to keep in mind. Thus, several challenges are mentioned (Hamilton, Rosenberg, Ackaoglu, 2016): the absence of context - the model does not take into account the limitations of technical equipment or access to technology; rigid structure - the model proposes levels of implementation of technology which are progressive, hierarchical, the transition from one level to another, or the learning process is much more flexible, with customized situations; product or process - the model focuses on the product rather than the process - even if the learning is designed with goals in mind, the process is what determines or not the achievement of goals. Given these limitations of the model, the idea of using it to integrate technology into learning rather than to adapt learning to technology is highlighted.

To the SAMR model, is added the TPACK model (Technological Pedagogical Content Knowledge) in the analysis and explanation of the efficient ways of using digital technology by teachers (Schmidt et al., 2009; Yang, 2018; Elliot, 2018;

Drummond, Sweeney, 2017; , 2014). This model is extended by adding context composition. Mishra (2019) argues that *“teachers' success depends not so much on their knowledge of T, P, C and its overlaps, but rather on knowledge of the context. This allows us to go beyond seeing teachers as curriculum designers in their classrooms, but rather as entrepreneurs - knowing how their organization works and how the levers of power and influence can bring about lasting change.”*

By summarizing these explanatory principles, we can see the need to train teachers in skills that allow the use of digital technology adapted to the educational context. This requires knowledge and specialized systems in the field of digital technologies, pedagogical skills and use of digital technology, also receptive attitudes towards the insertion of digital technology in the educational process.

### **Programs for the development of digital skills for teachers in Romania**

As in the other Member States of the European Union, in Romania, the "COVID 19" crisis has reconfigured educational practices from the "face to face" interaction to the online environment. The Ministry of Education and Research together with the Romanian Government on October 26, 2020 launched the process of elaborating the Strategy on digitalization of education in Romania 2021 - 2027, called SMART.Edu –a concept focused on the following key concepts: Modern, Accessible School, based on Resources and Digital technologies, project subject to public consultation between December 18, 2020 - February 15, 2021.

The challenges faced by educational institutions in our country were related to: lack of predictability; heterogeneous school network, with a strong digital division between schools; insufficiently developed digital skills for the efficient organization of the teaching process in the online environment; reduced access to technology and reduced internet connectivity; reduced opportunities for families to provide support to the beneficiaries of education, the pupils, to participate in online lessons. (p. 8) These data are added to the information obtained through the focus groups within the Analysis “Integration of technologies in the Romanian educational system” (November 2018). Teachers mention that they rarely use technology in teaching, and when they do, they limit themselves to presentations designed with the help of a video projector. Most students do not have access to a computer or mobile device during class, and when this happens it is almost exclusively during IT classes. 9 out of 10 students from the mentioned focus groups do not know another way to reach information than the one in which they use a certain search engine. Also, most teachers do not encourage the use of resources available on the internet by students, nor do they systematically present reliable online resources (virtual libraries, educational platforms, online magazines, etc.). (p.18)

Regarding the directions of action proposed in the SMART.Edu project, they cover the following areas of interest (p. 11):

- Development of digital skills of pupils and students;
- School curriculum for emerging

jobs and trades;

- Lifelong digital education;
- Initial and continuous training of teachers in the matter of digital education;
- Digital technological infrastructure and resources;
- Connectivity;
- Creation of Open Educational Resources (OER);
- Cyber security, data protection, online security and IT ethics.

These directions of action can be also found in the in-service teacher training programs. For example, the Ministry of Education, together with Aurel Vlaicu University of Arad, tefan cel Mare University of Suceava and University of Piteti, developed the European-funded project ETIC: Early and Inclusive and Quality Early Education, with a target group of 2600 teachers. Within the project, two training programs are carried out, one of which is oriented towards the training of educational resource developers - Curricular resources for early education. The purpose of this program is to develop the skills of teachers in pre-university education (preschool and before preschool) in terms of developing products / documents / curricular tools (textbooks, other teaching aids, including in digital format for preschool / before preschool education) to update technological and curricular support of training in relation to the evolution of theories on teaching, learning and assessment at an early age.

The program develops students the ability to create products / documents / curricular tools in digital format, adapted to the learning needs of children at early ages.

Of the three modules of the program, one is related to digitization: The use of ICT / multimedia elements in the development of products / documents of curricular tools specific to early education. The topics developed in this module are: The impact of the use of technology on cognitive and socio-emotional development of preschoolers and Digitalization in the development of products / documents / curricular tools at an early age. The themes were developed starting from the framing theory. Education, socialization and care are considered as conceptual filters to address early education and technology integration. In relation to these frameworks, digital working materials specific to early education were identified and created. (Rad, Dughi, Bala , 2020)

At the level of initial training in the curriculum of those specific programs that were designed to train teachers, school subjects are provided, that aim to develop digital skills for use both in curricular and extracurricular activities (Herlo et al., 2020; Torkos, Egerău, 2020). Thus, in the teacher training program there is the subject Computer Assisted Training which has as objectives: developing an integrative vision on informational teaching and its methods, acquiring the knowledge and skills necessary for a future teacher in using and integrating ICT in learning situations, designing the act didactic through the prism of ICT and E-learning tools as well as the manifestation of a responsible and positive attitude towards the use of IT in the teaching profession.

The master's degree programs in the field of Educational Sciences, have included subjects through which

digital skills are developed in teachers. For example, the following competencies are developed through E-learning subject:

**Cognitive:** The ability to understand, analyze, synthesize and evaluate the notions of e-learning and the use of a specific language, appropriate to virtual learning ability to explain and value the notions in education sciences that are related to E-learning.

**Functional** - actional: Developing the ability to apply and transfer knowledge in order to creatively develop E-learning applications development of the communication component - face to face and at distance (virtual), supported by IT instruments, in order to consolidate the didactic / educational and managerial one stimulating E-learning and IT-based creativity by adapting the requirements of transformative learning to technological possibilities.

**Attitudinal** - Adaptability to the evolution of communication and information technology and the acquisition of an adequate, positive, full of initiative behavior, related to its use in educational situations or the continuous training of teachers, various courses are organized and offered by the Arad Teaching Staff House ([www.ccdar.ro](http://www.ccdar.ro)). The analysis of the competencies included in these programs, highlight the fact that both technical aspects of the use of digital technology and the motivational aspects of the use of these technologies in the learning process are addressed. The courses are aimed at teachers, from various schooling cycles and training skills, in designing learning activities with integrated digital technology and



creative and ethical attitudes towards the use of ICT in learning. Thus, a program entitled motivation for learning with technology aims at the following skills: effective integration of ICT tools in the teaching process, regardless of the subject taught, development of teaching design documents (learning units, lesson plans) integrating ICT tools creating and implementing learning and assessment situations using ICT tools. Other programs, also include elements of e-learning or are related to social networks: advanced training in information and communication technology with the skills of creating lessons and tests and uploading them on e-Learning platforms, respectively the use of social networks for teaching purposes. Communication, already defined as a fundamental competence of teachers, is also developed from a digital perspective, through the training program Initiation in WEB2.0 - WEB3.0. Teachers are trained in the use of virtual space, to accumulate, transmit and interpret knowledge, generate ideas through the use of Web 2.0 - Web 3.0 tools, to be used by those interested, intensive communication, internationally, with people interested in a particular topic and the ability to critically verify information, found everywhere and at any time. Specifically, online learning, with the design of learning and assessment, is addressed in the program using the Moodle platform in teaching. Teachers can benefit from training programs, not only for the development of the school learning process, but also from programs that develop administrative skills. For example, the program using Microsoft excel in the development of school documents aims to train the ability to use the operations and functions of the excel program, that

complements the multitude of digital resources for the formation of these administrative skills.

### **About the study**

In order to adapt the training offered for teachers in the field of digital technology, we consider it important to identify attitudes towards digital resources and their use in online learning. The conditions that favor the use of ICT in the learning process were also highlighted in studies that identified them as determinants of ICT integration in school. A study conducted in Germany, on a group of 372 teachers, aimed to build a tool for assessing ICT competence beliefs. Six dimensions of this concept were thus identified: Information and data literacy, communication and collaboration, digital content creation, safety and security, problem solving, and analyzing and reflecting (Rubach, Lazarides, 2021). The same study highlighted a significant correlation between the gender of teachers, the student-centered teaching style and the level of use of ICT. Another study highlighted the link between perceived self-efficacy in the use of digital tools, information assessment strategies, digital skills already formed and the use of ICT in the learning process. (Hatlevik, 2017) In deciding to use ICT in learning, in addition to personal factors related to teachers, objective factors such as school infrastructure, access to digital resources and school policies on the use of ICT in learning are taken into account. (Couple Roblin et al., 2018).

The study conducted in Portugal (Dias-Trinidade, Ferreira, 2018) used a tool for assessing digital proficiency level of teachers, called DigCompEdu CheckIn, created by

EU Science Hub and validated on the Portuguese population. The professional competencies of the teachers are evaluated, including the area of digital resources and technologies with the items of professional collaboration, respectively management, protecting and sharing. The skills of learners are mentioned "facilitating learners' digital skills with actively engaging learners, information and media literacy, communication, responsible use and problem solving." The assessment tool used proved to be very effective in identifying the evolution of teachers from literacy to digital fluency.

In the context of the pandemic, all levels of education have shifted from face-to-face learning to online learning. If some studies focused on students' reaction to online learning (Maier, 2021; Gonzalez-Ramirez et al., 2021; Adnan, Anwar, 2020), in this study we focus on teachers' reactions. They depended on their abilities and availability to use digital technology. Thus, the following categories of teachers could be observed: those who were already familiar with the use of digital technology in learning and switched very easily to online work, those who had less developed digital skills, but were willing to learn quickly and to adapt to the new conditions and those who did not have skills and had a low availability to work online. As expected, the existence of digital skills has ensured a better use of information technology in teaching, especially in the format of online learning.

### **Objectives of the study**

One of the main objectives of the study was to find out how digital learning and teaching is considered in middle schools and high schools

among teachers from Romania.

The secondary objective of the study was to find out the openness of teachers, regarding the use of digital tools in their daily activities.

### **Hypothesis of the research**

The hypothesis of the study was formulated as it follows:

There is a statistically significant positive correlation between the age, teaching experience, receptivity and anxiety level of teachers and the use of digital technology in the teaching learning process.

### **Methodology**

#### ***Research instruments***

The research of the present article was based on the method of survey. The main instrument used was the questionnaire. This instrument was applied, with the purpose of collecting data regarding the opinions, knowledge and experiences of teachers from middle school level and high school level, on the concepts of digital learning.

This tool was developed by the authors, and was applied, with the purpose of collecting data regarding the opinions, knowledge and experiences of teachers from Arad County, Romania, regarding the concepts of digital teaching and learning and the use of multimedia tools.

The questionnaire was based on personal and identifying information of the teachers that have participated in the study, educational experience, gender, age, the environment in which they profess and the specialization they have, and also their knowledge and attitude on the digital learning, and skills that can be developed, in order

to motivate better adaptation to its instruments and preparation of the lessons.

The items were elaborated maintaining the same structure of the objectives, using different scales. The first items refer to the familiarity with the concepts. The questionnaire ends with questions related to limitations. We wanted to offer a realistic image on the availability of the teachers to overcome in organizing digital learning lessons in class or during special educational situations, such as online learning.

Of the 20 items of the questionnaire, 4 represent identification variables, 16 items give teachers the opportunity to select answer options or to fill in short answers, giving the possibility to perform a clear and relevant statistical analysis.

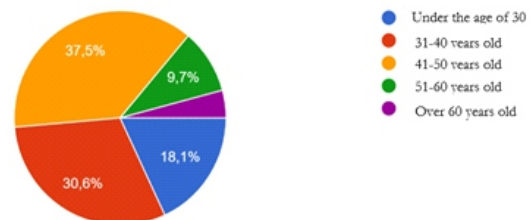
### Research sample

There was a convenience sample, where participants were selected based on naturally occurring groups. Also, there were limitations of the study, regarding the fact that the subject is still new in Romanian literature. Also, in terms of statistical relevance of the data that was gathered, the research utilized convenience sampling technique, as the purpose of this investigation is explorative. The total number of 75 participants was consecutively selected according to the order of appearance, when completing the online questionnaire, that was shared on social media platforms, according to the convenient accessibility principle.

Out of the total number of surveyed teachers, 56,7% carry out their instructive-educational activity at high school level, and 43,3% at middle school level.

Compared to the age category of the teachers who participated to the present study, there was a significant variation:

- 18,1% of teachers are under the age of 30
- 30,6% are aged between 31-40 years
- 37,5% are ages between 41-50 years
- 9,7% between 51-60 years and
- A very small percent of the respondents, over the age of 60.



Distribution of participants by the school level they engage in scholarly activities

Within all participants, a percent of 56,7% teachers are working in middle-school, and 43,3% work in high-schools. A number of 2 answers could not be taken into consideration, because of some technical issues regarding the completion of the questionnaire.

As for the question that refers to the seniority in education, it was found that 15 teachers who completed the questionnaire have less than 5 years old in the educational field, an even number have the final degree in education, 11 have second teaching degree, and 31 teachers have first teaching degree.

### Research findings

The collected data was introduced as quantitative data in the SPSS

statistical program, in order to analyze and conclude on the results. There were used both parametric and non-parametric statistical tests in order to get to the results. Correlations were analyzed between the extent of digital tool use and between several pre-established variables. Also, correlations were analyzed between the age and experience of teachers and the way in which they use digital tools in order to develop several competencies of students and also to have a clear image on how it affects the instructive educational process.

There have been noticed a moderate negative correlation between the age of the participants and the enthusiasm level regarding digital teaching and learning. The results show that those teachers that are older in age, do not tend to be less enthusiastic about teaching in the digital era, using multimedia instruments during the instructional process, only in a moderate perspective.

		Age	Level of enthusiasm
Age	Pearson Correlation	1	-0.07
	Sig. (2-tailed)		0.557
	N	72	72
Level of enthusiasm	Pearson Correlation	-0.07	1
	Sig. (2-tailed)	0.557	
	N	72	72

**Table No. 1. Table containing Pearson's correlation between teachers' age and level of enthusiasm for online learning**

The answers show the openness of teachers to adapt curricular contents to digital teaching. This prove that education in completion with the

digital instruments, can be slightly adapted to various teaching-learning situations by teachers of all age.

Another important correlation that has to be analyzed, is the level of anxiety in preparing and holding lessons and the school teaching level of teachers. The answers are represented in the following table:

Independent Samples Test

---

		Levine's Test for Equality of Variances		t-test for Equality of Means		95% Confidence Interval of the Difference				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
TotalOECComp	Equal variances assumed	7,605	,011	8,920	31	,000	6,089	,683	4,697	7,491
	Equal variances not assumed			9,433	26,991	,000	6,079	,646	4,762	7,416

---

**Table No. 2. Table representing independent sample T test between the school level (middle school/high school) and the level of anxiety they encounter in preparing and holding lessons during online classes**

There is a strong positive correlation between the two variables, meaning that as the school level grows, teachers have a bigger level of anxiety in preparing and holding digital learning lessons. This could be because of the level of their own preparation in the ICT field or because of the belief that students that are higher at age level, could be at a higher level at using digital technologies too.

**Conclusions**

The present article, through its theoretical frame and its practical outcome, brings an insight on the situation of digital learning and the use of all its involved tools, in order to create practical yes qualitative teaching and learning situations. The theoretical frame presents the most valuable and recent studies that were



made regarding the use of ICT in the educational field, during special educational times, such as pandemics. It also highlights some of the most important trials of the Romanian educational system in creating valuable tools that could help teachers at all levels in using ICT during online classes. The present study is different from all those presented before, because of the approach that places the teacher and its needs in the light. The practical part, presents a study that creates a connection between the theoretical frame and the research that has the teacher in the focus. The overall results show the importance of introducing preparing classes for teachers, so they can feel secure in choosing the right tools in the organization and teaching process of digital learning. Deepening within the other phenomena studies, that show the same results or similar ones to those presented in this study, appear the possibility to achieve through holistic exploration, a training of the valences of digital learning. One of the most genuine preoccupations of the human community and of the educational systems throughout the world, is to create adaptable members of the society, through education, and this can be possible through the correct training of those who are responsible for education: teachers.

### References

1. Adnan, M., & Anwar, K. (2020). Online Learning amid the COVID-19 Pandemic: Students' Perspectives. *Online Submission*, 2(1), 45-51.
2. Cardullo, V. M., Wilson, N. S., & Zygouris-Coe, V. I. (2018). Enhanced student engagement through active learning and emerging technologies. In *Student engagement and participation: Concepts, methodologies, tools, and applications* (pp. 399-417). IGI Global.
3. Dias-Trindade, S.; Ferreira, A. G., (2020), Digital teaching skills: DigCompEdu CheckIn as an evolution process from literacy to digital fluency. *ICONO14*, v. 18, n. 2, <https://www.researchgate.net/publication/342601981>
4. Drummond, A., & Sweeney, T. (2017). Can an objective measure of technological pedagogical content knowledge (TPACK) supplement existing TPACK measures?. *British Journal of Educational Technology*, 48(4), 928-939.
5. Elliott, P. S. (2018). Practice what we teach: Using the TPACK framework to connect professional development and academic programs and processes. *College and University*, 93(4), 16-24.
6. Gonzalez-Ramirez, J., Mulqueen, K., Zealand, R., Silverstein, S., Mulqueen, C., & BuShell, S. (2021). Emergency Online Learning: College Students' Perceptions During the COVID-19 Pandemic. *College Student Journal*, 55(1), 29-46.
7. Hamilton, E.R., Rosenberg, J.M. & Akcaoglu, M. The Substitution Augmentation Modification Redefinition (SAMR) Model: a Critical Review and Suggestions for its Use. *TechTrends* 60, 433-441 (2016). <https://doi.org/10.1007/s11528-016-0091-y>
8. Hatlevik, O.E., (2017) Examining the Relationship between Teachers' Self-Efficacy, their Digital Competence, Strategies to Evaluate Information, and use of ICT at School, *Scandinavian Journal of Educational Research*, 61:5, 555-567, DOI: [10.1080/00313831.2016.1172501](https://doi.org/10.1080/00313831.2016.1172501)
9. Herlo, D., Egerău, A., Dughi, T., Balaş, E., Bran, C., Roman, A., (2020), *Devenire în profesorat*, Editura Presa Universitară Clujeană, Cluj-Napoca
10. Istrate, O., (2010) Efecte și rezultate ale utilizării TIC în educație. În: Vlada, M. (coord.) *Conferința Națională de Învățământ Virtual*. București: Editura Universității din București. (15) (PDF) *Learning Through Projects in Virtual Environments Designed for Adult Training*. Available from: [https://www.researchgate.net/publication/255568975\\_Learning\\_Through\\_Projects\\_in\\_Virtual\\_Environments\\_Designed\\_for\\_Adult\\_Training](https://www.researchgate.net/publication/255568975_Learning_Through_Projects_in_Virtual_Environments_Designed_for_Adult_Training)

- [accessed Nov 22 2021].
11. Maier, R., (2021), The participatory behaviour and the students' adaptability in the online environment during the pandemic, *Brain*, vol. 12, no. 2, (2021), ISSN: 2 0 6 7 - 3 9 5 7 , D O I : <http://doi.org/10.18662/brain/12.2/195> pp. 112-121,
  12. Mishra, P., (2019) Considering Contextual Knowledge: The TPACK Diagram Gets an Upgrade, *Journal of Digital Learning in Teacher Education*, 35:2, 76-78, DOI: [10.1080/21532974.2019.1588611](https://doi.org/10.1080/21532974.2019.1588611)
  13. Pareja Roblin, N., Tondeur, J., Voogt, J., Bruggeman, B., Mathieu, G., van Braak, J., (2018), Practical considerations informing teachers' technology integration decisions: The case of tablet PCs. *Technology, Pedagogy and Education*, 27 (2), pp. 165-181, [10.1080/1475939X.2017.1414714](https://doi.org/10.1080/1475939X.2017.1414714)
  14. Popa, L. & Danila, A. (2010). Using E-learning in Romanian Knowledge Based Society, in Proc. of The 7th WSEAS International Conference on Engineering Education (EDUCATION 10), Corfu Island, Greece, (pp. 137 - 142). (15) (PDF) Web Based Service for Collaborative Authoring Learning using Grid Portal. Available from: [https://www.researchgate.net/publication/220029067\\_Web\\_Based\\_Service\\_for\\_Collaborative\\_Authoring\\_Learning\\_using\\_Grid\\_Portal](https://www.researchgate.net/publication/220029067_Web_Based_Service_for_Collaborative_Authoring_Learning_using_Grid_Portal) [accessed Nov 22 2021].
  15. Puente d u r a , R . ( 2 0 0 6 ) . Transformation, technology, and education [Blog post]. Retrieved from <http://hippassus.com/resources/tte/>.
  16. Puente d u r a , R . R . ( 2 0 1 4 ) . SAMR and TPCK: A hands-on approach to classroom practice. Hipassus. En ligne: <http://www.hippassus.com/rrpweblog/archives/2012/09/03/BuildingUponSAMR.pdf>.
  17. Rad, D., Dughî, T., Balas, E., (2020), Framingul sau importanța cadrelor în analiza utilității integrării tehnologiei în educația timpurie, din perspectiva asistenței comunitare în volumul *Vulnerabilități în asistența socială* Coord. Maria Alina Breaz, Presa Universitară Clujeană, Cluj Napoca, pp. 95-109
  18. Rad, D., Dughî, T., Roman, A., Egerău, A., Ignat, S., Balaș, E., Rad, G., (2021), The need for autonomy, denial and self-distraction frustration in the pandemic context, in *Vulnerabilities In Social Assistance*, coord. Breaz Alina, Editura Presa Universitară Clujeană, Cluj-Napoca, pp. 131-143
  19. Romrell, D., Kidder, L. & Wood, E. (2014). The SAMR Model as a Framework for Evaluating mLearning. *Online Learning Journal*, 18(2), Retrieved November 22, 2021 from <https://www.learntechlib.org/p/183753/>.
  20. Rubach, C., Lazarides, R., (2021), Addressing 21st-century digital skills in schools – Development and validation of an instrument to measure teachers' basic ICT competence beliefs, *Computers in Human Behavior*, Volume 118, 106636, ISSN 0747-5632, <https://doi.org/10.1016/j.chb.2020.106636>.
  21. Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2009). Technological pedagogical content knowledge (TPACK) the development and validation of an assessment instrument for preservice teachers. *Journal of research on Technology in Education*, 42(2), 123-149.
  22. Torkos, H., & Egerau, A. M. (2020). The Use of Informational Technologies in the Outdoor Educational Activities in Times of Special Educational Situations. *Revista Romaneasca pentru Educatie Multidimensionala*, 12(3), 107-124.
  23. Yang, C. (2018). Research on the mixed teaching mode of tpack in software testing course. *Recent Patents on Computer Science*, 11(4), 302-311.
  24. <https://www.edu.ro/etichete/proiect-etice>
  25. <https://www.smart.edu.ro/>
- Tiberiu Dughî is associate professor at the Faculty of Sciences of Education, Psychology and Social Sciences, Aurel Vlaicu University of Arad, Romania. He holds a specialization in Psychology (PhD) and Socio-Psychology of the Family (MD). He has been an expert in research in over 10 projects funded by the European Union and the Ministry of Education. His research and applied interests include: Educational Psychology, Personality Psychology, Professional and Vocational Counseling. He is co-author of 10 books and 48 articles published at international conferences or in specialized journals. He is psychologist supervisor in

educational psychology and member of the Association of Psychologist in Romania and Association of Psychologists in Belgium.

Dana Dughi is university lecturer at the "Aurel Vlaicu" University of Arad with disciplines in the field of communication and teaching of Romanian language and literature. She also holds a special psycho-pedagogy license, a Master in Educational Management and PhD in Philology. She is trainer and Feuerstein therapist, member of COPSI. Her professional concerns focus on continuing education of teachers. She worked as a trainer in five projects funded by the Ministry of Education in collaboration with CCD Arad and ISJ Arad. She participated in over 10 conferences and published three books and 10 articles in conferences or in specialized publications.

Torkos Henrietta, PhD, University lecturer at University of Aurel Vlaicu from Arad, with a PhD in Educational Sciences, specialized in Outdoor Education. Finished bachelor studies in Economics and Educational Sciences, got Masters Degrees both in Actual Tendencies in Romanian literature and Educational Policies. The main fields of interest in research and writing are education and outdoor education. She finished studies in Norway on education and outdoor learning strategies, also on classroom management. In the present, she works as a university lecturer, holding lectures in pedagogy and psycho-pedagogy specialties.