

An Extended Study on Motivation and Need for Multimedia Skills Development in the Case of University Staff

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Abstract – University staff has been the most vulnerable actor (or even stakeholder) in the process of the online transition of all the academic activities (education, scientific, communication, internationalization, involvement in the community etc.). University missions has been re-shaped and re-designed considering the new ways (methods and tools) for communication, opinion expressions, dialogue, for scientific argumentations and negotiations, promotion of different results, achievements, events or the university activities. Multimedia competencies have become more valuable and together with the digital creativity has been considered the new “weapon” for creating a new image of the online universities (defining the new online world of the academic environment). In this context, the paper first, presents the specific situation and potential for multimedia competencies development in the case of the seven partners of MUST project: “Multimedia Competencies for University Staff to Empower University - Community Collaborations” (2020-1-RO01-KA203-080399, <https://mustproject.eu/>). The extended study refers to partners from countries as: Romania, Slovenia, Germany, Lithuania, Portugal, Spain, and North Macedonia. The preliminary state of the university staff competencies in the field of multimedia, has been the basis for the survey based on a designed questionnaire development for the training needs development. In the final part of this article the results of the survey are presented together with some comments and conclusions. The achieved knowledge and information from the extended study on motivation and need for multimedia skills development in the case of university staff have been considered for designing the MUST training program structure and content.

Keywords: Multimedia skills and competences, training need, motivation, university staff, survey, questionnaire

I. INTRODUCTION

COVID-19 pandemic has paralyzed the education process, the education institutions all over the Globe. According to the available data provided by UNESCO through the online Global Monitoring of Schools

Closures Caused by COVID-19 (information available at: <https://en.unesco.org/covid19/educationresponse>, access on June 14, 2021) the situation is unimaginable (see Fig. 2):

- 1,579,634,506 affected learners,
- 90,2% of total enrolled learners World-Wide that are affected and
- 191 country-wide closures with education entities close.

Governments, educators and learners are faced with the unprecedented challenge of ensuring that education continues, even whilst pupils, children, students must remain at home for a long period of time. Some extraordinary facts are:

- Till now, there have not been used the indicator number of closed schools to characterize the educational process!
- Till now, there have not been restricted the access to education, culture and art institutions, including libraries and other learning life experiential hubs for such an extended area of the Globe and for such many people!
- We are confronted with a high autonomy in providing teaching and learning activities online, virtually using new technologies!

Instantly:

- Schools, universities were moved (pushed) on-line and thus, they were confronted with a huge knowledge, resources and technology gap (including personal computers/devices and Internet availability for everyone, educational resources available, the information and communication technology, less personal support etc.),
- Teachers and learners’ digital competencies value a lot ... and it was the main condition for continuing studying, having access to education resources, collaborations.

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Crisis period and restrictions have pushed us to socialize and share knowledge, new experiences using virtual tools but there was and is still a lack of collaborative work between teachers/educators in the same or different school/university. Furthermore, there have been manifested a weak collaborative work between academic staff and business actors due to the economic crisis. The main question that arises is:

How will be the education and research processes after the restriction rules will be cancelled? The question has become one with various answers depending on education local conditions and resources, including the ITC infrastructure, capacities, and teaching staff skills (digital skills and creativity in develop online resources, communicating and nurture the virtual communities of learners). The problems are similar for university teaching staff which has been the most vulnerable actor (or even stakeholder) in the process of the education process (the university communication process and also, the scientific communication) transition online.

In the following chapters, there will be briefly presented the specific situation for multimedia training needs of university staff in the case of university partners included in MUST project: “Multimedia Competencies for University Staff to Empower University - Community Collaborations” (2020-1-RO01-KA203-080399, <https://mustproject.eu/>). The preliminary inventory of facts and aspects related to university staff competencies in the field of multimedia, has been the basis for the creation of an extended research (survey based on a designed questionnaire) of the training needs development. In the final part of this article the results of the survey for the training needs development are presented together with some important comments and conclusions.

The knowledge and information collected during the development of the extended study on motivation and need for multimedia skills development in the case of university staff have been considered for designing the MUST training program structure and content.

II. ARGUMENTS FOR MULTIMEDIA SKILLS DEVELOPMENT BASED ON A BRIEF LITERATURE REVIEW

A. Definition and importance of multimedia skills development

Cardillo (2010) defined multimedia information technology integrated learning as words and pictures. The former referred to verbal form, containing printed words and spoken words; and the latter referred to pictorial form, including static pictures (illustrations, coordinate graphs, diagrams, photos maps) and dynamic pictures (animation, films). Multimedia learning referred to learning with words and pictures that multimedia information technology integrated learning could be called dual-code learning or dual-channel learning, i.e., the presentation of multimedia was to present information with words and pictures.

The multimedia information technology integrated instruction information or the presentation of multimedia instruction aimed to assist in learning with the presentation of words and pictures (Geoffrey et al., 2012).

The theories and points of view related to multimedia information technology integrated learning proposed by Assaraf & Orion (2010) are proposed to discuss the methods applying multi-sensory instruction to deal with multimedia information and the teaching design. Deriving theories from multimedia information technology integrated learning, Kim (2011) emphasized three processes of selecting, organizing, and integrating words and pictures for all learning. Selection referred to selecting relative and important information from word and non-word information to be stored in the working memory, organizing such selected word and non-word information for establishing the structure to form two logic situated models, and finally integrating and combining such organized situated models (Varma & Linn, 2012). Since the three processes occurred in the limited working memory, the learning effect would be effectively promoted when a multimedia system could be utilized for designing the process for helping learners be good at operating the memory and preceding the processes of selection, organization, and integration. The multimedia information technology integrated learning theory suggests that receiving information from multiple channels could help learning. However, the multi-form information presentation could enhance learning burden.

Multimedia could eliminate/minimize the disadvantages of the the e-learning (Arkorful & Abaidoo, 2015):

1. E-learning as a method of education makes the learners undergo contemplation, remoteness, as well as lack of interaction or relation. It therefore requires a very strong motivation and time management skills to reduce such effects.

2. With respect to clarifications, explanations, and interpretations, the e-learning method may be less effective than traditional methods of learning. The learning process is much easier face-to-face with instructors or teachers.

3. When it comes to improvement of learner's communication skills, e-learning may have a negative effect. Though learners might have an excellent academic knowledge, they may not possess the needed skills to deliver their acquired knowledge to others.

4. Since tests and assessments in e-learning are frequently supervised by proxy, it may be difficult, if not impossible, to control or regulate activities such as cheating.

5. E-learning may also be subject to piracy, plagiarism, cheating, inadequate selection skills, and inappropriate use of copy and paste.

6. E-learning may negatively impact socialization skills and limit the role of instructors as directors of the educational process.

7. Not all disciplines can effectively use e-learning in education. For instance, scientific fields that require hands-on practical experiences may be more difficult to study through e-learning. Researchers have argued that e-learning is more appropriate in social science and humanities than the fields such as medical science and engineering where there is the need to develop practical skills.

8. E-learning may also lead to congestion or heavy use of some websites. This may bring about unanticipated costs both in time and money.

The multimedia materials could animate and encourage the collaborative learning/working through the created e-learning campuses of different training entities. It is obvious that e-learning involves the use of digital tools for teaching and learning and blended learning is a reality extended use today. It had been recognized by users of e-learning solutions of that multimedia learning materials are excellent ways to create more vibrant and realistic learning experiences and that has been supported by the variety of devices (computers of different types, mobile phones, tablets etc.) that could be used to access different resources or materials!

The new learning experiences are more powerful and more learner-oriented:

- It makes use of technological tools to enable learners' study anytime and anywhere.
- It involves training, delivery of knowledge and feedback through the associated e-learning tools.
- It motivates, stimulates students to interact quick and more effective with each other, exchange, and respect different point of views (animate and nurture the e-learning community).
- It eases communication and improves the relationships that sustain learning.

Despite some challenges discussed above, the literature has sought to explain the role of e-learning and how e-learning has made a strong impact in teaching and learning. Its adoption in some institutions has increased faculty and learner access to information. A rich environment for collaboration among students can improve academic standards (Arkorful & Abaidoo, 2015) but also their feed-back could be of real benefit for training materials improvement.

The overall literature which explains the advantages and disadvantages of e-learning and multimedia use suggests the need for its implementation in higher education for faculty, administrators and students to enjoy the full benefits that come with its adoption and implementation (Arkorful & Abaidoo, 2015).

B. Research studies on multimedia use and impact in education

(Kurzal et al., 2002) describe the development of an adaptive multimedia learning environment that utilizes multimedia presentation techniques in its interface while still providing internet connectivity for

management and delivery purposes. The system supports the WWW as its addressing space but uses the local client areas to store media items that are costly in terms of delivery time. Learning objects that provide frameworks for tasks and other summative assessment activities are stored on a server and delivered when required. The system supports link annotations in its adaptivity and employs an overlay student model with stereotyping when accessing the course content. With such powerful and flexible software, it is possible to organize several creative activities for learners.

The study involved Alien Rescue (Liu et al., 2002), a new media enhanced problem-based learning (PBL) environment for sixth-grade space science, designed to engage sixth-grade students in solving a complex problem and learning about our solar system and processes of scientific inquiry by applying tools, procedures, and knowledge of space science. Beginning with a video presentation, the Alien Rescue curriculum explains that a group of six alien species, each with unique characteristics, have traveled to Earth because their home planets have been destroyed. Students are tasked with the mission of finding a planetary home that can support each alien species, thereby ensuring their survival. To accomplish this goal, students must engage in a variety of problem-solving and information-gathering activities. They must discover the critical scientific characteristics of the planets and moons in our solar system by querying the provided databases and collecting direct observations using simulated probes. New media technologies are employed to immerse students in the interactive experience and create tools for scaffolding.

The study of Liu et al. (2011) examines middle school students' learning and motivation as they engaged in a multimedia enriched problem-based learning (PBL) environment for middle school science. Using a mixed-method design with both quantitative and qualitative data, we investigated the effect of a multimedia environment on sixth graders' science learning, their levels of motivation, and the relationship between students' motivation and their science learning. The analysis of the results showed that: Students significantly increased their science knowledge from pretest to posttest after using the PBL program, they were motivated and enjoyed the experience, and a significant positive relationship was found between students' motivation scores and their post science knowledge scores.

(Duygu et al., 2011) showed the procedure and results of research with the aim of revealing students' opinions about the use of PDAs (Personal Digital Assistant) in a learning environment within the context of multimedia-based applications in Turkey. The procedure was tested on a purposive sample of 17 undergraduate students attending an elective course in computer education and instructional technology. Although the students belonged to the Net Generation, they had quite a few critical remarks concerning the software offered and the way it helped them in the learning process.

Neo and Leow (2014), authors from Malaysia, also study the inclusion of digital multimedia projects in teaching and learning and the influence of digital media on the selection of classroom teaching strategies. In their research project, the authors provided students with relevant content in a conventional learning environment (classroom), and content related to an animation course and its impact on learning. The research follows from Gagnes' learning theory (as supported also by (Jono et al., 2016)). The results of introducing multimedia in teaching and learning were positive and encouraging

The study of (Matijevic & Opic, 2016) developed in Croatia observe that teaching scenarios used in practice follow the features of constructivist and traditional teaching theories and that there exist combinations of teaching didactics that are student centered and those that are teacher centered. Teachers struggle to find their way in the selection and design of a media environment that fulfils the developmental needs and ways of learning of the Net generation. In many classrooms, learners still spend most of their time seated in twos at tables aligned in three columns listening to and watching what the teacher is saying and doing (in other words, teacher-centered instruction). Teaching equipment and furniture are mostly adjusted to the needs of the traditional theories of teaching and frontal instruction.

The research was carried out on a total sample of 435 pupils in the upper secondary level of education in four counties in the continental part of Croatia to examine the predictors of using the new media environment for learning. The results of this study indicate how important it is to examine the role of using the new media environment. The media environment is no longer an auxiliary (secondary) didactic activity; it has assumed a primary role in the process of upbringing and education. Naturally, it follows that it is necessary to examine its use in upbringing and education, so that it does not become an end. Voluntarism, without a well-designed didactic-methodological scenario, prevents the media environment from fulfilling its purpose, the purpose of the new age, the new Net generation.

More recent, the study of Castro-Alonso (2019) debates the learning process from multimedia modules and visualizations and stress the case of the students with low abilities of the visuospatial component of working memory. The study underlines problems in using multimedia learning materials and point some issues regarding their design and use for creating an effective learning environment. For learners with visuospatial low abilities, more effective multimedia

designs, such as those following cognitive load theory principles, should be pursued.

C. Preliminary conclusions

The brief literature review presented above, as well as many others aimed at enriching teaching scenarios with multimedia, indicate that the future of teaching in terms of multimedia instruction lies in digital media and the internet. ICT experts refer to such a type of instruction as blended learning, but in the tradition of Europe's didactic theory and terminology the term multimedia learning is more prevalent and accepted.

Trends and issues in multimedia learning research have been provided by a recent article of (Li et al., 2019). They recognized that parallel to the recent advancements in information and communications technologies, research on multimedia learning has generated several theories and empirical findings. Numerous trends and issues have emerged, showing the complex and dynamic nature of multimedia learning and the associated scholarship.

To provide a comprehensive knowledge map and an overview of recent research on multimedia learning, 411 peer-reviewed articles from 1996 to 2016 were analyzed to describe the empirical work in multimedia learning. A bibliometric approach was applied to reveal the most common keywords and terms and their interactions via co-word analysis. The results showed that cognitive load is the highest co-occurred keyword, and that animation provided the highest number of co-occurrence relationships with other keywords in our sample.

Five clusters of research trends were identified: theoretical foundations of multimedia learning, representations and principles, instructional design and individual differences, motivation and metacognition, and video and hypermedia. Despite the high co-occurrence of the terms' "memory", "working memory", and "cognitive load", only a few studies examined the role of individual differences in cognition such as working memory capacity in multimedia learning. The multimedia learning principles most discussed in the last two decades of research are redundancy, contiguity, and coherence.

According to the findings of (Li et al., 2019) that are shown in Fig. 1, there is a KNOWLEDGE GAP of research on using multimedia technologies and knowledge in engineering, health care services, nursing, information sciences, social sciences (as management, marketing, sustainable development management etc.), linguistics (1%-2%). Thus, MUST project should address these fields of education, research and university-community projects related to these.

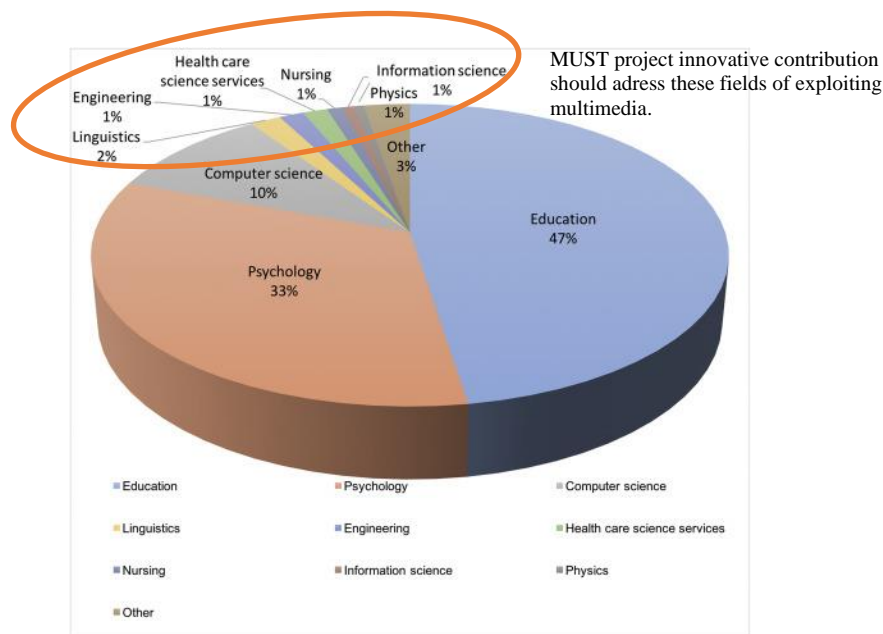


Fig. 1. Scientific and economic domains that uses/exploit multimedia resources (for education, learning, research and development, marketing etc.) as find by (Li et al., 2019)

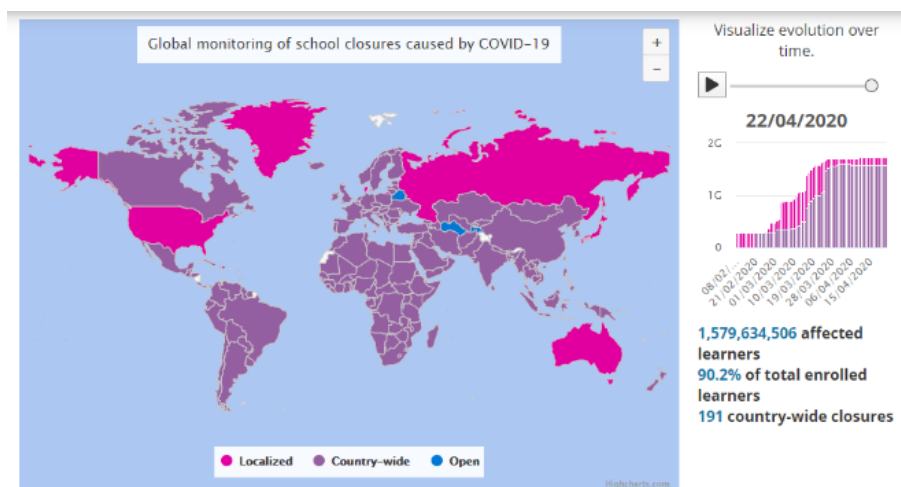


Fig. 2 Global Monitoring of Schools Closures Caused by COVID-19 (Retrieved from: <https://en.unesco.org/covid19/educationresponse>. Access on June 23, 2021)

Thus, more research and development should be conducted in accordance with other principles recently discussed by (Mayer, 2019) and address the issue of individual differences in attention and cognition during learning with multimedia technology and resources.

III. DESCRIPTION OF THE SPECIFIC CONTEXT OF MULTIMEDIA SKILLS DEVELOPMENT BY UNIVERSITY PARTNERS (A SYNTHESIS OF COLLECTED OPINIONS IN EACH COUNTRY)

In the following sub-chapters, there will be briefly presented the specific situation for multimedia training needs of university staff in the case of university partners included in MUST project.

Romania

The current situation at the Politehnica University of Timisoara and at the West University of Timisoara,

Romania was presented through the webinars available at: <https://elearning.upt.ro/ro/impreamuna-online/> (Access on June 23, 2021). The presentations conclusions and the market research developed with students and teachers have underlined the following aspects (related to the need for MUST project implementation):

- A large proportion of university teaching staff has lack of skills for supporting online trainings. The last extended training program that has been dedicated to the digital skills development for university staff was under the DidaTech project, a national project finance by the structural funds having partners other technical universities in Romania (POSDRU/86/1.3/S/60891, <https://www.cm.upt.ro/didatec/>);
- The average age of the teaching staff is between 45 and 50-year-old and they are confronting with an aversion and difficulties

- on training/teaching/examining students online; they are not digital natives, and they need continuous support and trainings;
- There is a lack of online pedagogy training for university teaching staff;
- There is a lack of online/virtual communication technologies and pedagogy for university teaching staff;
- Using the Virtual Campus facilities (<https://elearning.upt.ro/ro/campus-virtual/>) there have been developed a training module dedicated to university teaching staff in using the Moodle platform (Curs de Tutoriale pentru Profesori);
- There is a lack of multimedia skills to develop resources for engineering studies ... this fact has been seen during the restrictions period for COVID-19 pandemic when professors teaching in university laboratories were not allowed to make real classes and they do not have record lessons.

Spain

For more than a decade, the University of Alicante has been working on various projects that seek to encourage the use of technologies among teachers to adopt new and more innovative practices through various programs, among which we can highlight those developed by ICE (Institute of Education Sciences). Specifically, in the last three years it has been developed a program called Redes-Innovatic (<https://web.ua.es/es/ice/redes/redes.html>) in which it is intended through meetings and specific training actions to promote new teaching systems. In the academic year 2019-2020 the program of continuous learning of the university teaching staff is available: PROGRAMA DE FORMACIÓN DOCENTE OFERTADO POR EL ICE, <https://web.ua.es/es/ice/seminarios/oferta-formativa-ice.html>.

This training programme is aimed at the University of Alicante academic staff members, organized through courses and workshops providing practical experiences and specific demands of the UA Faculties and Schools. The ICE thus establishes a training system based on the demands and experiences of the different university offices as a mediation element between the needs and contributions of the university academic staff, individually and/or as a team, and organizing the corresponding courses and workshops.

To make the communication of the parties involved easier, effective, and dynamic, a direct system is established through a link for suggestions on the ICE home page. In addition, to promote and keep the programme updated, a coordinator has been appointed for each Faculty or School. The syllabus is planned in four academic terms. The aim is to establish a maximum of eight training courses each academic term (two per month). These courses and/or workshops must be combined with the actions developed through the Lifelong Education Programme for public servants in

the region of Valencia. This training programme is open and flexible, with the aim of finding a way to develop all the courses proposed by teachers. It is also a way to promote the courses offered and generated within the University of Alicante. As an internal study and informal discussions with university staff members, there is a specific need for training programs in the field of digital/multimedia skills development for enhancing university education, research, and university-community projects. Thus, the proposed actions in the MUST project could be framed within this philosophy and would suppose the definitive impulse to systematize and empower the UA to better respond to social needs.

According to the UNIVERSTIC report (2017), Spanish universities are quite well prepared for a digital transformation, structure-wise. ICT helped teaching to take on a more virtual perspective, ranging from internet connection in all campuses to offering MOOCs. However, the potential offered by digital technologies is not fully exploited yet. Lecturers realize the positive outcomes of using digital technologies and multimedia in university research and teaching activities, but there is a need for training to use them effectively in their daily activities. Training activities for extending operational capacity for reaching new generations, enhancing security and data protection competences and promoting research would be useful for improving their professional skills in general (according to the public information presented at: <https://tic.crue.org/wp-content/uploads/2018/03/UNIVERSITIC-2017.pdf>, access June 20, 2021).

Germany (opinion reflected by associated university partners in Regensburg)

SoWiBeFo (Germany) has rich expertise in designing innovative learning arrangements and in creating media for community, non-traditional learner and work-based learning; concepts developed are work and learning assignments, multi-media representation of work processes, one point work instructions etc. SoWiBeFo is therefore capable to transfer innovation from the German context and to develop concepts and material within the project.

SoWiBeFo Regensburg: SPS e.V.: Cluster of the Sensors Technology Industry in Bavaria: experience in business education cooperation (85 companies, 2500 partners from industry and universities); University of Regensburg, IT Training department: consultation and access to information. The associated partners will share their prior expertise on the topic with the partners. The associated partners will incorporate the knowledge gained through MUST project in their own practices and consultancy offers. Also, SoWiBeFo Ltd. Is in closed contact with the University of Regensburg which can profit of the MUST training program (the university staff!).

The solution support by the SoWiBeFo Ltd. is presented in the following. Transfer and further development of two modular online learning programs

that have been developed, implemented, and evaluated with very good results in Germany by the University of Regensburg in cooperation with ISOB GmbH and SoWiBeFo e.V. The material from the projects “Media Pedagogy for Teachers” and the major BMBF initiative “CoDiClust” (Digital Learning in Cluster of the Sensors Industry (SME)) will be transferred to Universities and Institutions of Higher Education in additional countries.

Portugal (opinion reflected by associated university partners in Porto)

Storytelme (PT) has expertise in design-implement products/services combining entertainment with literacy through personalization based on the tools of Design Thinking, storytelling, creative design methodologies for learning and process. Their innovative approaches and experience will refine processes as instructional design and design thinking, pedagogic consulting, multimedia and digital content development, technical resources to support platforms, using different methodologies (e-learning, b-learning, m-learning, responsive/cross platforms).

The increase of compulsory education in Portugal has created optimal conditions for more students to reach higher education, mobilizing a great mass of teaching professionals all over the world and posing countless challenges for the teaching profession, especially in the transition of the 20th to the 21st century, including: teaching has become student-centered; there is greater access to information; there is an interception of the digital era in teaching tools; and training interventions for online environments have been created and adapted.

The explosion of information, in a multimedia and digital context, has become a fertile area for exploring, communicating, and spreading information, thus enabling new knowledge to be learned, created, and taught. This scenario poses questions regarding the skills future and in-service teachers must acquire and develop.

These skills will give them more intervention capacity, because not only will they benefit their role as spreaders of information, but they will allow them to develop the ways in which they learn and are updated.

It is important for university staff in Portugal to develop new skills and ensure sustainability, as this is the only way they will be able to be an asset to their increasingly multidisciplinary students (which combine with rigorous theoretical teaching and highly interdisciplinary training applied in the specialized fields of multimedia). Thus, the aim is to reinforce lifelong learning and knowledge of new skills.

Lithuania

Kaunas University of Technology (KTU) has a EDU_Lab Center for Excellence in Learning and Teaching that experience in developing and introducing the system for development of the contemporary didactic (learning and teaching) competences at the University. It believes and

promotes different philosophy of teaching and learning consistent with the contemporary educational trends. It has got experience in delivering consultations, helping teachers to collect the latest knowledge of teaching, to rediscover what was forgotten during the long-standing teaching practice. In addition, EDU_Lab encourages sharing good practices and organizes workshops for teachers. Together with KTU E- Learning Technology Center, EDU_Lab seeks to deep professional knowledge and contemporary work methods of educational staff.

Nevertheless, multimedia is quite new tool that is not used efficiently at our university. COVID-19 forced our lectures to evaluate their skills in virtual learning and clearly lectures of university lack skills in this field, especially multimedia skills. That would lead to more effective education while using pure distance of blended learning at our university.

Slovenia

International School for Social and Business Studies (ISSBS, Slovenia) postgraduate programme provides an excellent opportunity to continue your studies and take on new career challenges. They offer a 1-year Master’s programme (Management and Quality in Education programme) and a 3-year PhD programme in English (Knowledge Management) as seen at: <https://mfdps.si/en/study-programmes/>. Both programmes allow for the optimum balance of work and study commitments. Students can gain expert knowledge of management, business studies, learning and education, as well as practical experience through case studies of local and foreign organizations. The PhD programme also provides excellent opportunities for research and international publication.

The e-ISSBC platform support the educational process: <https://eucilnica.mfdps.si/login/index.php>.

Furthermore, professors from different subjects and administrative staff need to update and improve their digital/multimedia skills and MUST project is considered a great opportunity. Regarding this project partner’s specifics some issues have been identified:

- ISSBS has expertise in management and quality in education and in European projects dedicated to fostering the skills of community developers and others working with non-traditional learners, as intercultural mediators. They have a strong network in the Balkan area which will be used for transferring and dissemination actions (<https://mfdps.si/en/research/>).
- ISSBS has experience in the development and implementation of e-learning; they have developed their concept of blended learning as well as distance learning using Moodle and LearnDash platforms.
- ISSBS brings this experience to the project and aims to further develop its digital learning skills along principles of interactive transmedia use and stronger engagement with the community and non-traditional learners.

- ISSBS, Slovenia will use the MakeLearn international community of universities to support MUST project solution sustainability and dissemination actions, including the initiative of supporting exchange of good practices and experiences of teaching and educating online.

The North of Macedonia

The South East European University Tetovo (SEEU, North Macedonia) has a strong tradition in the practical dimension of learning (e.g., of social workers, of NEETs and nontraditional learners etc.). The existing Max van der Stoel Institute (MVDSI), Business and Innovation Center (BIC) and the Technology Park (<https://techpark.seeu.edu.mk/>) experience and networks will be used for MUST project implementation. SEEU offers to its students and staff a range of online services for efficient communication and management of the learning processes (<https://www.seeu.edu.mk/en/current-students/online-services>) and they will be used for the MUST project developments. The specific of teaching-learning-assessment at SEEU is using online/digital/virtual/multimedia technologies ... But the teaching staff need continuous training programs for their skills update and development. Thus, the proposed MUST solution of training and assessment could better support the LLP in the field.

IV. PRELIMINARY CONCLUSIONS AND REMARKS

Technology is evolving at a faster rate than ever before and is transforming many aspects of our lives. This also holds true for the labor market: the introduction of different technologies is changing most professions across all industries. The situation has been proved true and real even in the university context where the e-learning capacities were less exploited and only some teaching staff were able to operate on-line despite. The COVID-19 pandemic has demonstrated the need for online resources created by existing university teaching staff (with support of technical and administrative staff where available). Also, the education crisis has proved that in academic fields as engineering sciences, human sciences, art (including music) etc. the multimedia materials (visual resources developed by exploiting the existing infrastructure in the universities) are of great importance and they could support even online classes.

This, these implications require a proper response from our university educational systems if we are to educate the citizens, employees, employers, and entrepreneurs of the future. In everyday life, basic administrative practices and social interaction often presuppose basic levels of digital competence. In the workplace, automation, robotization and digitalization will have an impact on existing jobs. Some of them might disappear, while new jobs will be created. What is certain is that most professions and most everyday

tasks will change as technologies are rolled out in society and within the workplace.

With all these rapid technological changes, universities are struggling to adapt, not only in terms of how to use the technologies, but also in terms of teaching the skills and training the teachers and trainers we need to do that.

The preliminary research study stresses that:

I. The acquisition of digital, including multimedia skills goes hand in hand with a lifelong learning approach.

Not only is it necessary to transform educational and training systems at all levels to meet the demands, but it is also necessary to provide opportunities to upskill and reskill across all age groups. Thus, existing departments or offices for teaching staff development in the universities must manage, support post-graduate programmes in the field. This action will be supported by Politehnica University of Timisoara, Romania through the DPPD Department (<http://dppd.upt.ro/>).

II. Universities are the starting point for digital skills education (using online platforms and creating multimedia resources in particular) and teachers should be at the core of the transformation.

There is a large disparity across university partners in the MUST project when it comes to the level of digital/multimedia skills development. The study stresses that the lack of connectivity results in a lack of digital/multimedia skills education for university teaching staff. Thus, will be full filled by the international consortium and the common activities of the MUST project.

III. The digital transformation does not only require education in digital/multimedia skills. Rather, its implications also have the potential to transform teaching methods. Thus, MUST project must contribute to the improvement of the online pedagogy methods and tools.

Unfortunately, this potential is not being fully tapped into as university teachers need to be educated themselves. The study conclusions insist that, for this transformation to be successful, teachers need to be properly assisted and trained (online and face-to-face). As teachers are already under considerable work pressure, this should not come as an extra task that will increase the pressure even more.

IV. A strategy for the digital/multimedia skills development for the teaching staff is required at each university level.

Many initiatives exist at EU level schools, such as the recent Digital Education Action Plan and several promising, but small-scale initiatives (e.g. EU Code Week, Digital Skills and Jobs Coalition, media literacy initiatives).

The proposed approach could be attached to the present annual strategic plan for teaching staff development, and it will be more effective if:

- There is a strong implication of the departments or offices for teaching staff development in the universities;

- There were more coordination and cooperation across the different departments in the university (multidisciplinary learning environment).

The strategy should be viewed as the first step towards a more over-arching strategy. At the department and individual level, the strategy should be correlated with the results of the teaching staff assessment (of their didactic activity) by students, other colleagues (peer-review) and their direct managers.

V. A harmonized method for the assessment of digital/multimedia skills of university staff should be developed.

Currently there are tools to assess the level digital skills, such as the Digital Competences Framework. Yet, such tools operate on a self-assessment basis, similar that has been planned in the case of MUST project implementation. The study calls for a MUST specific schema/module to test the level of digital/multimedia skills of trainees after they follow the training program. This would provide an insight into educational methods across university partners and create opportunities for the exchange of best practice.

The digital transformation offers many opportunities for education and the economy. However, it needs a proper policy response. Without such a response, there is a risk that a new social divide will emerge.

V. THE EXTENDED STUDY FOR MULTIMEDIA COMPETENCIES DEVELOPMENT AND THE DESIGNED OF THE TRAINING PROGRAM

A. The extended study for multimedia competencies development (results and debate)

The methodology uses for the pilot study was the survey based on designed questionnaire (agreed by all partners) that was circulated/distributes among several university communities in Europe with the support of MUST partners implications. The questionnaire is presented in the Annex and consists only of close questions; respondents answers have been ranked using a Likert scale with 5 points (1 – less needed/important ..., 5 – strongly needed/important). The distribution of the questionnaire has been done via Google Forms (https://docs.google.com/forms/d/1pFJ4sBXZ2zSWGXEdo5YyT8epSZkv4HNMEQpPrrxd_YI/edit), and the generation of the graphs and tables results have been facilitated by this. Research results (Fig. 3 to 6) are shown in the followings and also, data about the research sample demography.

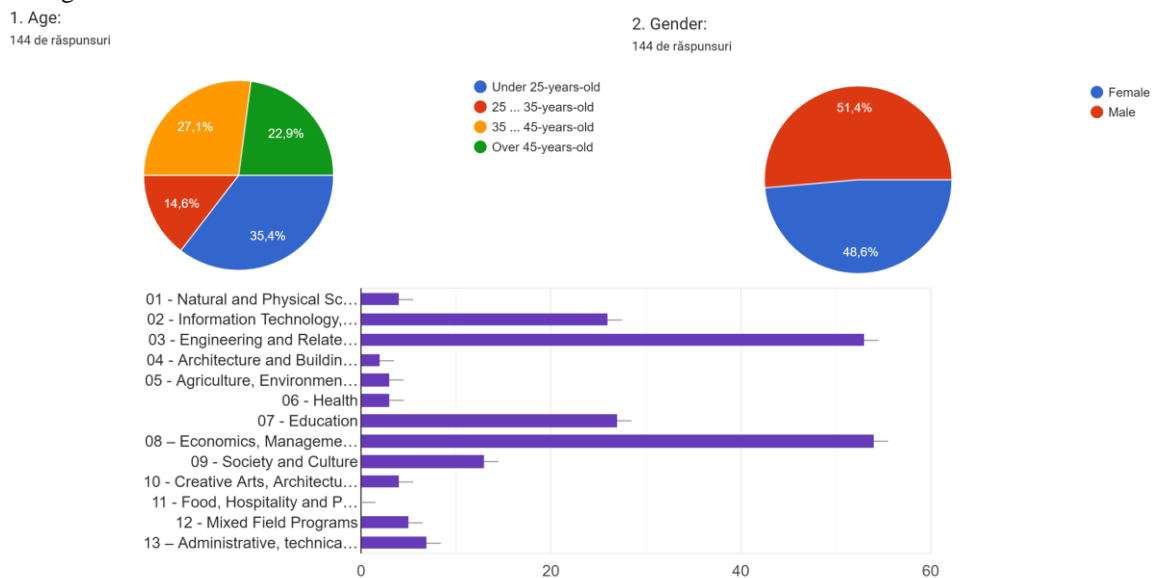


Fig. 3 Characteristics of the research sample (age, gender, field of teaching and research or for the administrative staff, the department where they are employed)

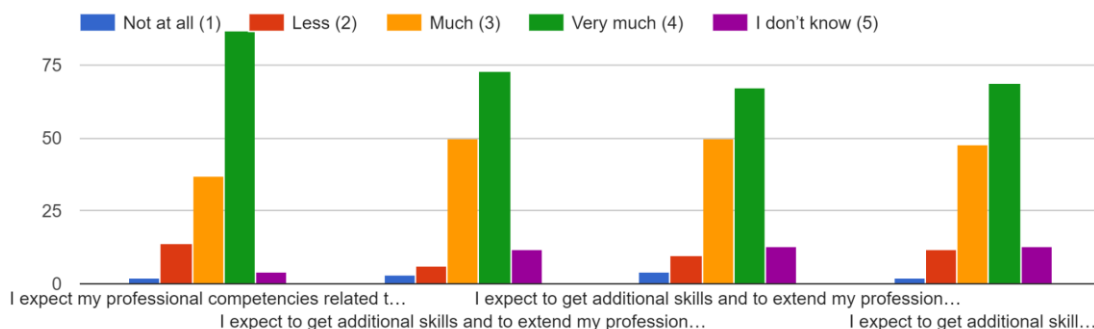
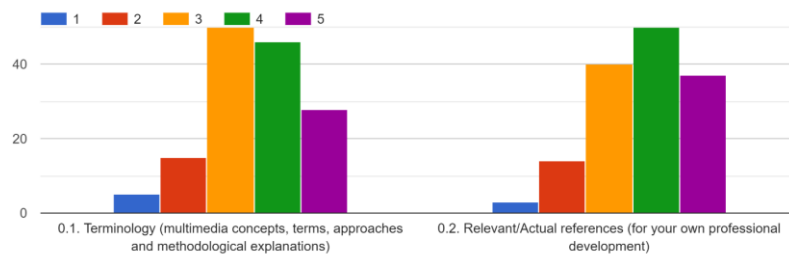
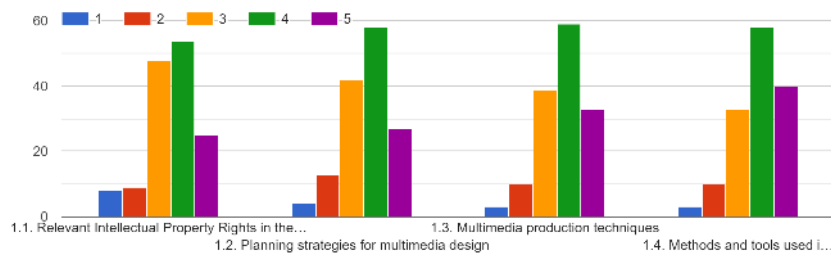


Fig. 4 Discovering the usefulness of the training program in the field of multimedia skills development

0. Support material & References



1. General basic knowledge



2. Applications and Use Cases (knowledge exploitation)

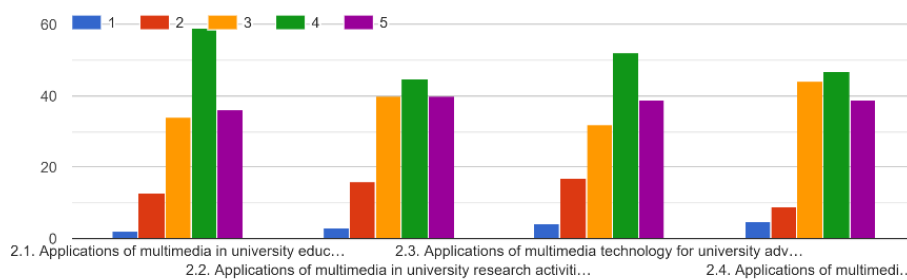


Fig. 5 Discovering the level of training needs in multimedia production and exploitation fields with respect to the training subjects listed

3. Which is the most suitable training method, orientation or tool that suit most to your learning needs (tick one only)?

144 de răspunsuri



Fig. 6 Discovering the most suitable training method preferred by the potential trainees (university staff involved in the survey)

During the month of January – February 2021 when the research has been developed, there have been received 144 completed fill-up questionnaires that has been processes. Most of the respondents were males

(51.4%) and most the respondents age was under 25 years old (35.4%). Most respondents belong to:

- Economics, Management and Commerce (37.5%) field of teaching and research or administrative staff activity field;
- Engineering and technologies (36.8%) field of teaching and research or administrative staff activity field;
- Education (18.8%) field of teaching and research or administrative staff activity field;
- Information technologies and computer sciences (18.1%) field of teaching and research or administrative staff activity field.

As can be observed from Fig. 3, the research sample is well balanced from the analyzed dimensions, but most of the respondents were from Romania (47), Slovenia (20) and Lithuania (15). Thus, there have been considered the extension of the research in the future (2022) after the intensive dissemination and multiplier events will be developed and implement by each partner in The MUST project.

The responses analysis in Fig. 4 shows that most of the respondents totally agree that getting involved in a training program in the field of multimedia skills development, will be useful for their professional life improvement; respondents' expectations are very high for all the investigated domains (see the Annex, questions' topics: I.a, I.b, I.c and I.d). Similar results have been achieved in the case of the express your level of training needs in multimedia production and exploitation fields with respect to some specific training subjects (as presented in the Annex, questions topics in section II of the questionnaire), as they have been presented in Fig. 5. Thus, the general opinions collected via this survey have underlined the followings:

- Respondents are less interested, or they expressed a moderate need for terminology in the field of multimedia, but they have a strong need for relevant and actual references in this domain (connected with their own professional development);
- Respondents have recognized a strong need for general basic knowledge in the field of multimedia (according to their answers for the

questions related to chapter II of the questionnaire, 1.1 ... 1.4, see Annex);

- Respondents have recognized a strong need for the applications and use cases with multimedia technologies (considering the knowledge exploitation) according to their answers for the questions related to chapter II of the questionnaire, 2.1 ... 2.4, as presented in the Annex;
- Most respondents agreed that the most suitable training method, orientation or tool that suit most to their learning needs is “*Best practices examples with demonstrations* (learning of other people experiences in multimedia technology)” (44.4% of the respondents agree on this). In addition, 31.8% of the respondents have considered that “*Tutorial demonstrations with exercises* (with multimedia materials)” is the most suitable training method for them (Fig. 6).

B. MUST training program designed (preliminary results)

Based on the presented conclusions of the literature review and the extended survey developed with the support of MUST project partners from: Romania, Slovenia, Lithuania, Spain, Portugal, Germany and North Macedonia there have been created a knowledge and information base for designing the training program in the field of multimedia competencies development (target group being the university staff). Thus, Table 1 presents the preliminary structure of the program that should be supported by the different intellectual outputs created during the project implementation (see the Free Tools section fo the project web page: <https://mustproject.eu/free-tools/>). This theoretical training units will be accompanying by a group of applicative units dedicated to the exploitation of multimedia knowledge in the didactic field (teaching), research and development (e.g., demonstration of research approaches and projects), for university activity promotion (including the educational offer presentation to different target groups) and to support university – community projects.

Table 1 The structure of the MUST training program (training units and elements + teaching methods)

Training Unit 1	Training Elements (Lessons)	Teaching/learning material	Teaching methods
Relevant Intellectual Property Rights in the Context of multimedia design, production and exploitation	1.1 Overview of digital skills in Europe (definitions, terminology, typology, relevant info at the EU level)	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings & further readings) 3-6 questions for evaluation of competencies	Presentation and interactive discussion
	1.2 Guidelines for intellectual property rights for multimedia	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Presentation with explanation, Self-directed learning, best practices

	1.3 Plagiarism prevention and protection of various media – video, audio, music, readings	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Lecture with explanation and examples.
Unit 2	Lesson	Teaching/learning material	Teaching methods¹
Planning strategies for multimedia design	2.1 Content marketing	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Demonstrations, cases, interactive debates
	2.2 Digital communication	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Presentation, interactive discussion
	2.3 Planning & Script Writing for multimedia design	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Presentation, interactive discussion
	2.4 Story Boarding and timeline for multimedia design	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Presentation, interactive discussion
	2.5 Online Networking and Communities	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Demonstrations, cases, interactive debates
Unit 3	Lesson	Teaching/learning material	Teaching methods
Multimedia production techniques	3.1 Audio and video program production Video recording: video editing and publish (Zoom, MS Teams, Loom and others)	PowerPoint presentation (5-10 slides) Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Self-directed learning, lecture, presentation, groupwork
	3.2 Web design and publishing	PowerPoint presentation (5-10 slides) Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Demonstrations, cases, interactive debates, invited speaker
	3.3 Libraries of multimedia resources (video, music) Video repositories: Youtube, Vimeo and alternatives OR organizing	PowerPoint presentation (5-10 slides) Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Self-directed learning, lecture, presentation, groupwork
	3.4 Interactive materials (videos, text)	PowerPoint presentation (5-10 slides) Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Demonstrations, cases, interactive debates, invited speaker
Unit 4	Lesson	Teaching/learning material	Teaching methods
Tools used in multimedia production	4.1 Designing multimedia	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Demonstrations, cases, interactive debates
	4.2 Organizing learning	PowerPoint presentation (5-10 slides) + multimedia material for explanations	Demonstrations, cases,

		Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	interactive debates
	4.3 Finding ideas and discussing knowledge	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Demonstrations, cases, interactive debates
	4.4 Organizing, documenting and testing knowledge	PowerPoint presentation (5-10 slides) + multimedia material for explanations Reading with references (2-3 pages & 2-5 references & further readings) 3-6 questions for evaluation of competencies	Demonstrations, cases, interactive debates

V. CONCLUSIONS

The Covid-19 pandemic crisis has changed the university life and activities and force them migrate online. Thus, university staff needs special attention for the development of their digital competencies. Furthermore, specific attention has been given to the multimedia competencies that need to be strengthened and thus, multimedia technology should be better exploited in the university community.

The presented literature review and the preliminary investigation of seven university environment cases on multimedia development (existing specialists and infrastructure, groups of support, organizational structure, past projects in the filed etc.) have underlined the strong need for building and development of a training program dedicated to university staff.

The training needs were identified through an online market research conducted with the support of respondents from some universities from Romania, Germany, Lithuania, North Macedonia, Spain, Portugal and Slovenia. Respondents expressed their strong needs for all proposed subject of teaching (related to the development of multimedia competencies) and they appreciate “*Best practices examples with demonstrations* (learning of other people experiences in multimedia technology)” and “*Tutorial demonstrations with exercises* (with multimedia materials)” as the most adequate pedagogical methods that must be used for their training.

In conclusion, MUST project (“Multimedia Competencies for University Staff to Empower University - Community Collaborations”) has become a necessity and the designed training program has been proved as of great need! In addition, the (preliminary) training program structure is the result of the collaborative work between all partners and has been agreed in the MUST project international consortium (see Table 1).

Future research and developments will support the applicative part of training program with training materials development (multimedia presentations, demonstrations and best practices and cases), the e-learning platform definition and guidelines for tutors and trainers.

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ANNEX

The designed questionnaire used in the survey

This questionnaire is a part of a marketing exploratory research that aims to identify the training/learning needs and motivation of university staff for multimedia learning. The research aims to identify the way to support university leaders, managers and employees to understand the strategic implications of achieving multimedia skills and using/exploiting the multimedia skills and to develop innovative and creative approaches for education, research, advertising and university-community projects.

The target group for this survey consists of university staff which are involved in activities related to design and use of multimedia Products/Services. The research results will be used to design a training program aligned to your expressed needs/requirements and adapted to your university context particularities. We intend to develop this program through international cooperation (European consortium of partners from universities and companies), using the experiences and knowledge of certain trainers with extensive expertise in the field. Also, the exploratory marketing research aims to define a target group that will benefit from this program of professional skills development.

Please, involve yourself in this research! We ensure the confidentiality of your given answers. Please tick or formulate, where appropriate, answer(s) that best fit to your opinion, in accordance with your work.

I. Do you consider that getting involved in a training program in the field of multimedia skills development, will be *useful* for you?

1	2	3	4	5

a. I expect my professional competencies related to my current job, to be improved:

Not at all	Less	Much	Very much	I don't know
1	2	3	4	5

b. I expect to get additional skills and to extend my professional competencies in education field, to improvement of my operating capacity to face the new challenges for education Z Generation of students (better face the new challenges!):

Not at all	Less	Much	Very much	I don't know
1	2	3	4	5

c. I expect to get additional skills and to extend my professional competencies in research field to better support my research results results visibility and dissemination actions:

Not at all	Less	Much	Very much	I don't know

d. I expect to get additional skills and to extend my professional competencies in university-community projects development (social projects, promote entrepreneurship education, advertising for admission process of our university, working with industrial/business partners, support visibility of our work, cultural projects, extracurricular activities with students etc.):

Not at all	Less	Much	Very much	I don't know
1	2	3	4	5

II. Express your level of training needs in multimedia production and exploitation fields with respect to the training subjects listed in the table below. For each topic, select using "X" mark, one of the five options that best suits to your needs, using the scale below:

Scale: 1= no need; 2= low level of need; 3= moderate need; 4= strong need; 5= very strong need

Learning/Training needs:	Level of training need				
	1	2	3	4	5
0. Support material & References					
0.1. Terminology (multimedia concepts, terms, approaches and methodological explanations)					
0.2. Relevant/Actual references (for your own professional development)					
1. General basic knowledge					
1.1. Relevant Intellectual Property Rights in the context of multimedia design, production, and exploitation					
1.2. Planning strategies for multimedia design					
1.3. Multimedia production techniques					
1.4. Methods and tools used in multimedia production					
2. Applications and Use Cases (knowledge exploitation)					
2.1. Applications of multimedia in university educational processes (theoretical framework + use cases for subjects/disciplines of Bachelor, Master and PhD. programmes that can use multimedia technology)					
2.2. Applications of multimedia in university research activities (theoretical framework + use cases for research and development activities)					
2.3. Applications of multimedia technology for university advertising and communication processes (theoretical framework + use cases demonstrations)					
2.4. Applications of multimedia in university-community projects (theoretical framework + use cases of social responsibility projects, university-industry collaboration projects, university-business units collaborations projects, university-SMEs projects, projects with other public bodies and NGO, cultural projects etc.)					

Which is the most suitable training method, orientation or tool that suit most to your learning needs (*tick one only!*)? – *multiple answers!*

- Theoretical knowledge
- Best practices examples with demonstrations (learning of other people experiences in multimedia technology)
- Tutorial demonstrations with exercises (with multimedia materials)
- Individual projects
- Group projects

III. In the following, please provide us some information about yourself (research sample definition):

1. Age:

Under 25-years-old	25 ... 35-years-old	35 ... 45-years-old	Over 45-years-old

2. Gender:

F	M

3. Subjects/Disciplines where you activate and areas of university where you are employed (for the case of administrative staff (*multiple answers*):
- 01 - Natural and Physical Sciences
 - 02 - Information Technology, Computer Sciences
 - 03 - Engineering and Related Technologies
 - 04 - Architecture and Building, Civil Engineering
 - 05 - Agriculture, Environmental and Related Studies
 - 06 - Health
 - 07 - Education
 - 08 – Economics, Management and Commerce
 - 09 - Society and Culture
 - 10 - Creative Arts, Architecture and Design
 - 11 - Food, Hospitality and Personal Services
 - 12 - Mixed Field Programs
 - 13 – Administrative, technical staff (not involved in education process)

4. University name:

5. Department:

6. Country _____
(defined sample, only)

- Germany
- Lithuania
- North of Macedonia
- Portugal
- Romania
- Slovenia
- Spain

7. Position (multiple answers)
- Management position (rector, vice-rector, dean, department manager, director), executive or senior managers of university
 - Administrative, technical staff
 - Research staff (not involved in education processes)
 - Teaching staff
 - Student

If you are interested to participate in “multimedia skills development” training program, please provide us an e-mail (and/or phone number) where to be contacted:

THANK YOU VERY MUCH FOR YOUR INVOLVEMENT!

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