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Enhancing Remote Work Competencies in Croatia: Findings from VirtualEdu Project

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The Erasmus+ project "VirtualEdu - Upskilling and certification scheme for virtual educators, managers, workers" aims to create a certification scheme that improves the skills of remote workers and certifies them. In addition, the main objectives of the project are the development of innovative training methods and materials, the establishment of a digital library of training materials and the organization of a Massive Open Online Course (MOOC) to develop the skills of remote workers. This paper presents the results of a study aimed to identify a skills gap among remote workers in Croatia to support the design of the training curriculum for the VirtualEdu MOOC. In a developed questionnaire, respondents assessed the relevance of a set of competences and skills for remote work and for trainings aimed at developing these competences and skills. The questionnaire also aimed to determine perceptions of the usefulness of training to develop these competencies. The results showed that respondents (N=86) perceived the greatest need for the development of digital skills, self-management and organizational skills, specific skills for educators and collaboration skills. The interest of Croatian remote workers in developing remote work skills indicates the need for the development of lifelong learning opportunities such as VirtualEdu training.

Keywords: remote work, remote education, Massive Open Online Course, lifelong learning, skills gap analysis.

Introduction

Academic research highlights the need to train educators, managers and other employees to work effectively remotely in order to prevent future crises. For a successful remote education, management and work, employees need many skills to properly apply remote working practices and information-communication technology (Emperatriz & Yudet, 2022; Hoic–Bozic & Holenko Dlab, 2021; Kiliç, 2022; van Laar, van Deursen, van Dijk, & de Haan, 2019). The recent SARS-CoV-2 pandemic has forced educational institutions and companies to move their activities into the virtual space, leading to ad-hoc distance education and remote work initiatives (Meisner & McKenzie, 2023). However, the lack of established protocols has had a negative impact on student learning and teacher satisfaction, so improvements are needed (Donath et al., 2024). Companies have also switched to remote management and work, but success rates vary. Challenges include insufficient replication of physical interactions in virtual environments and a lack of digital skills among employees (Saniuk et al., 2022; Tursunbayeva, Di Lauro, & Antonelli, 2021). As the DESI index shows (*Digital Decade DESI visualisation tool*, 2024), there are inequalities

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in the adoption of remote working practices and tools between countries in Western, Central and South Eastern Europe.

The Erasmus+ project Upskilling and certification scheme for virtual educators – VirtualEdu, co-funded under Key Activities 2, Strategic Partnerships for Higher Education (KA220-HED), aims to contribute to solve this problem by setting up a certification scheme and then training and certifying teachers, managers and other employees to work remotely. The overarching goal is to support the European Union's digital transformation efforts and improve preparedness to withstand the disruptive effects of pandemics and unforeseen events that impact education, collaboration and professional work in general. While other similar projects focus exclusively on the skills required for efficient and effective distance education, the VirtualEdu project also aims to improve other skills related to remote work, such as remote project management, document management, business processes and productivity improvement. These skills are needed by professionals in business, but also by managers and employees of educational institutions (*VirtualEdu project*, 2024).

The aim of the VirtualEdu project is to create a certification scheme with a clear definition of the required skills, training curriculum, resources and activities to be included in Massive Open Online Course (MOOC), and certification exams in line with the ECQA (European Certification and Qualification Association) rules (European Certification and Qualification Association, 2010). As there is no consensus in the academic literature on the essential skills and competences required for the success, efficiency and improved performance of different professionals engaged in remote work, the project consortium conducted a questionnaire-based study. In the study respondents assessed the relevance of a set of competences and skills for remote work and for training to develop these competences and skills. The questionnaire also aimed to determine perceptions of the usefulness of training to develop these competencies.

The aim of this article is to present the results of conducted study and identify the main challenges that Croatian remote educators, managers and employees face in their professional work and to show which skills they consider most important. The research findings informed the design of the VirtualEdu training curriculum and learning resources, but also contribute to the knowledge of the skills gap for the professional roles of distance workers in Croatia, which is necessary for the improvement of remote workers' competences.

The rest of the article is organized as follows. Section 2 gives an overview of related work regarding enhancing remote work competencies through training programs. Section 3 describes the methodology including research questions, instrument, procedure, and participants. The results are presented in section 4. Section 5 contains a discussion and section 6 contains conclusions.

Related Work

Various studies have demonstrated the effectiveness of training programs aimed at enhancing the professional competencies of educators. For example, Kmeta and Bjekić (2015) have highlighted the success of face-to-face and online training which

focused on empowering vocational teachers to integrate modern technologies into remote education. Similarly, Sáiz-Manzanares et al. (2022) reported positive feedback from participants in a blended learning training course designed to support teachers in the use of virtual learning environments. Evans et al. (2019) also found that professional development courses organized according to the blended learning model effectively improved teachers' use of Blackboard LMS and resulted in increased teacher activity and adoption of various online teaching tools.

In the context of digital transformation in general, not just in the field of education, the focus is on promoting digital competencies. Digital competencies encompass the awareness, attitude and ability to use digital tools and resources effectively for different purposes, as defined by Martin & Grudziecki (2006). Torres-Coronas & Vidal-Blasco (2011) describe digital competence as the ability to use information technologies and social software for analytical, productive and creative purposes. Existing frameworks that can guide the selection of those that need to be included in the training with the aim of development of remote work and education skills are DigComp (Vuorikari, Kluzer, & Punie, 2022) and DigCompEdu (Redecker, 2017). These European competence frameworks outline the digital competences required for citizens and educators.

DigComp encompasses five key areas of digital competencies: information and data literacy, digital and content creation, communication and collaboration skills, online safety, and problem-solving skills. These areas constitute the first dimension of the reference framework. In the current version, DigComp 2.2, there is 21 competence grouped in five above mentioned key areas. Second dimension includes competence descriptors and titles for each area. To determine the progression of individuals in the acquisition of each competence, a third dimension of the framework is defined - proficiency levels of each competency that are based on four overall levels: foundation, intermediate, advanced, and highly specialized. Remaining dimensions include examples of knowledge, skills, and attitudes specific to each competency (fourth dimension), and use cases (fifth dimension) (Vuorikari, Kluzer, & Punie, 2022).

DigComp 2.2 provides a detailed description of different competency areas and can serve as reference framework to develop, assess, and recognize digital competencies. However, in case of educators, DigCompEdu framework was developed to outline the essential digital competencies that educators need to effectively integrate digital technologies into teaching and learning processes (Redecker, 2017). DigCompEdu identifies six areas of digital competence for educators from all educational levels. Framework groups competencies based on three different aspects: educators' professional competencies (professional engagement), educators' pedagogic competencies (digital resources, teaching and learning, assessment, and empowering learners) and learners' competencies (facilitating learners' digital competence).

Although these two frameworks tend to seize the potential of digital technologies for enhancing and innovating remote education and work, they do not encompass all the competencies required for remote working.

A systematic literature review conducted by Kolm et al. (2022) concluded that there is no study that covers all the competency needs for remote education and work. In addition to ICT skills, the study highlights five other areas of competence

(intercultural and cultural competencies, communication skills, self-management and organizational skills, collaboration skills and domain-specific skills) that need to be considered when selecting topics for training in the field of remote work (*VirtualEdu project*, 2024). Tusyanah et al. (2023) and Borge et al. (2022) also emphasize the significance of multicultural collaborative skills in enhancing interpersonal communication, developing shared ideas, and building understanding and collective knowledge. Successful collaboration entails interpersonal trust and open-mindedness towards colleagues' viewpoints (Kulić & Janković, 2022). Factors that contribute to successful remote work include self-management and organizational skills, especially 'time management' (Manasia, Ianos, & Chicioreanu, 2019). Self-management allows for greater availability of resources, proactively initiating social interactions and improving task significance during remote work (Costantini & Weintraub, 2022). Karim, Safran, Shuib, and Azmi (2021) argue that it is important to integrate the 6Cs (critical thinking, collaboration, communication, creativity, citizenship or cultural awareness, and connectivity) into the training programs for remote workers.

Related research has shown that there are numerous professional competencies required for remote work in addition to domain-specific skills. In order to select topics for remote work training, the VirtualEdu project consortium decided to conduct additional research and investigate the skills gap analysis of the target group of participants using questionnaire.

Methodology

The study described in this article aims to identify the skills that remote workers in Croatia find the most important and their attitudes towards the usefulness of training to develop these skills. The specific research questions were:

RQ1) What do Croatian remote educators, managers and employees consider as main challenges of remote work?
RQ2) What skills do Croatian remote educators, managers and employees consider most important for remote work?
RQ3) What skills do Croatian remote educators, managers and employees consider relevant for a training dedicated to development of remote work skills?
RQ4) What are perceptions of Croatian remote educators, managers and employees of the usefulness of training for development and certification of remote work skills?

The research methodology and the instrument used was defined by VirtualEdu project consortium (*VirtualEdu project*, 2024).

Instrument and Procedure

A quantitative research methodology was used to answer the research questions. For the purpose of the study, the project consortium developed a questionnaire with 21 questions.

The first part of the questionnaire was used to determine the profile of the

participant and included questions about the organization, the industry, the experience with remote work and the professional status of the participant.

The second part of the questionnaire was designed to assess the need for remote working skills and included questions on the participant's perceptions of:

- Challenges faced by the respondent when working remotely
- Relevance of certain skills in the context of remote work
- Relevance of certain skills for a training dedicated to development of remote work skills
- Usefulness of a training for development and certification of remote work skills (i.e., with reference to the certification scheme of VirtualEdu project).

Third part of the questionnaire was used to determine demographic information (age, gender) of the participant.

The skills needs assessment in the second part of the questionnaire consisted of assessing the relevance of different categories of skills using a 5-point Likert scale, with 1 being "not relevant" and 5 being "essential/mandatory". Categories of skills were in line with the competency framework for remote work, remote management, and remote education (*VirtualEdu project*, 2024) defined by the project consortium, which includes the following dimensions:

- Digital competencies
- Collaboration competencies
- Self-management and organization skills
- Interpersonal and intercultural and communication skills
- Specific skills of remote educators.

The development of competency framework was based on DigComp and DigCompEdu frameworks and other relevant academic resources.

The designed questionnaire was distributed via Google Forms application from April to June 2023 for all partner countries. The responses of the Croatian participants were then filtered and statistically analyzed.

Additionally, a competency matrix was formulated to identify the competencies that should be focused on, categorized as either challenging, missing, or highly essential for each of the three roles (*VirtualEdu project*, 2024). To underscore the *relevance* of each assessed competency, a weighted average was computed using the following formula:

$$R_{Ci} = \frac{[(N_{Nr}*1)+(N_{Sr}*2)+(N_R*3)+(N_{Vr}*4)+(N_E*5)]}{5} \quad (1)$$

where:

- R_{Ci} – Relevance of competency *i*
- N_{Nr} – number of responses rating competency *i* as "Not relevant"
- N_{Sr} – number of responses rating competency *i* as "Somewhat relevant"

- N_R – number of responses rating competency *i* as "Relevant"
- N_{Vr} – number of responses rating competency *i* as "Very relevant"
- N_E – number of responses rating competency *i* as "Essential/mandatory".

Further, a second dimension, *score*, was calculated in a two-step process:

1. The difference between the number of responses rating competency *i* as "Very relevant" (N_{VrCi}) and the number of responses rating competency *i* as "Essential/ mandatory" (N_{ECi}) was calculated:

$$IS_{Ci} = N_{Vr_{Ci}} - N_{E_{Ci}}$$

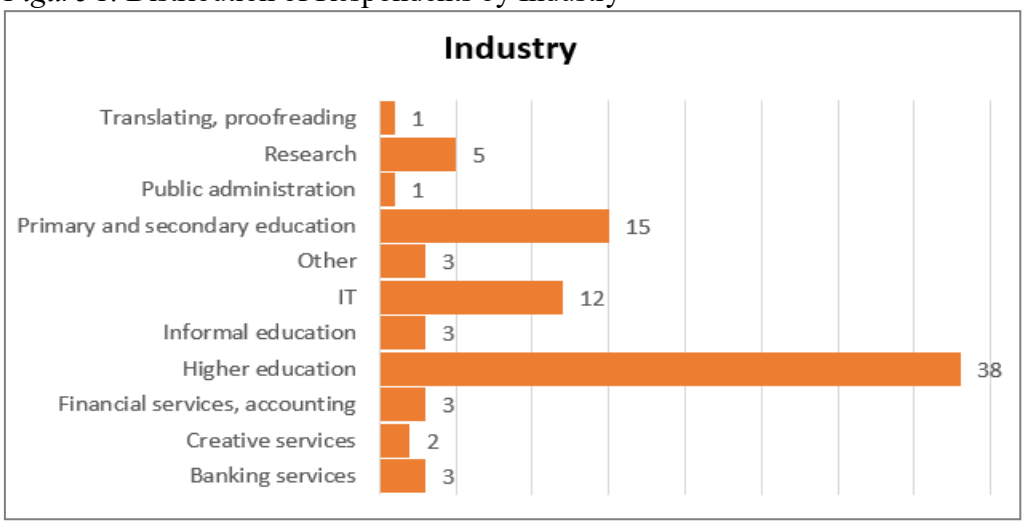
2. A score ranging from 1 to 4 was assigned based on the following criteria:

- If $IS_{Ci} < -10$, then score = 1
- If $-10 \leq IS_{Ci} < 0$, then score = 2
- If $0 \leq IS_{Ci} < 10$, then score = 3
- If $IS_{Ci} \geq 10$, then score = 4.

Participants

A total of 86 responses were collected using questionnaire from respondents in Croatia. Respondents were recruited through the convenience sampling technique. As can be seen in Figure 1, 38 (44.19%) of the respondents work in higher education, 15 (17.44%) in primary or secondary education and 12 respondents (13.95%) stated that they work in the field of information technology (IT). About half of the respondents, 51.2%, stated that they work in an organization with more than 100 employees, 10.5% of the respondents stated that they work in an organization with 50 to 100 employees, 33.7% in an organization with 10 to 50 employees, while 4.7% of the respondents work for an organization with less than 10 employees.

Figure 1. Distribution of Respondents by Industry



As can be seen from Table 1, 55 of the respondents (64%) were female and 30 (35%) male. The age distribution of respondents is balanced and ensures a comprehensive analysis of the skills gap that includes the different generations represented in the labor market: Baby Boomers, Generation X and Millennials. The highest number of respondents is in the 35-45 age group (38 or 44.18%). When asked about remote work status, 12 respondents (13.95%) indicated that they are currently involved in remote work full-time, while 26 respondents (30.23%) are involved in remote work some of the time. In addition, 43 (50%) of respondents have already experienced remote work but are not currently working remotely. Only 5 respondents (5.81%) indicated that they have never worked remotely (Table 1).

Table 1. Distribution of Respondents by Gender, Age, Remote Work Status and Size of Organization

Indicator	**Category**	**Number of respondents**
Gender	Female	55
	Male	30
	Other/Not specified	1
Age	<25 years	1
	25-35 years	20
	35-45 years	38
	>45 years	27
Remote work status	Currently working remotely full time	12
	Partially work remotely	26
	Used to work remotely, but currently are not	43
	Never have worked remotely	5

Respondents who were currently working remotely full-time or part-time were asked how long they had experienced remote work and/or remote education. The results show that remote work and remote education have increased during the SARS-CoV-2 pandemic. As shown in Figure 2, 52% of respondents who work remotely have between one and three years of experience with this type of work, 26% of respondents have more than three years of experience working remotely, while 21.9% have one year of experience working remotely. Only 2% of respondents have less than 6 months' experience of remote work. These results suggest that the vast majority of study participants have sufficient experience of remote work.

The analysis of the answers regarding the current position/role of the respondents in their organizations (Figure 3) showed that all roles are sufficiently represented among the participants: 45 (52.32%) respondents are in the role of remote educator, 31 (36.05%) respondents are in the role of remote employee, and 10 (11.63%) respondents are in the role of remote manager.

Figure 2. Distribution of Respondents by Experience in Remote Work

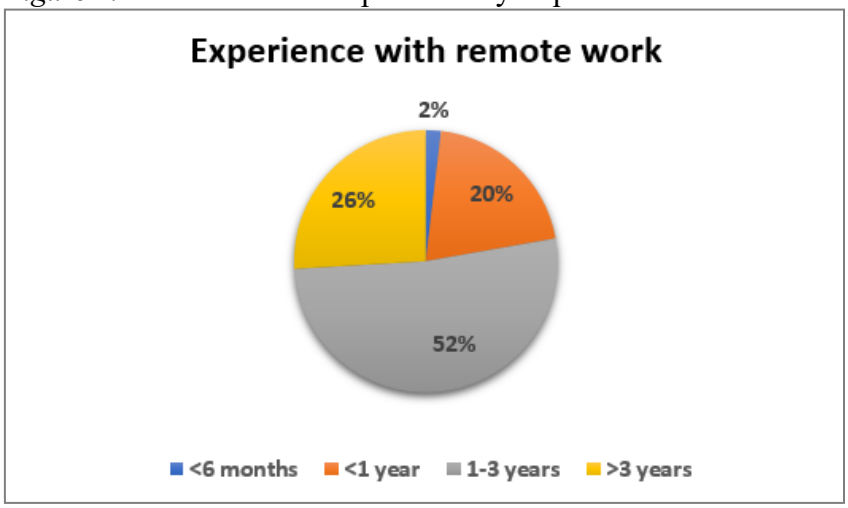
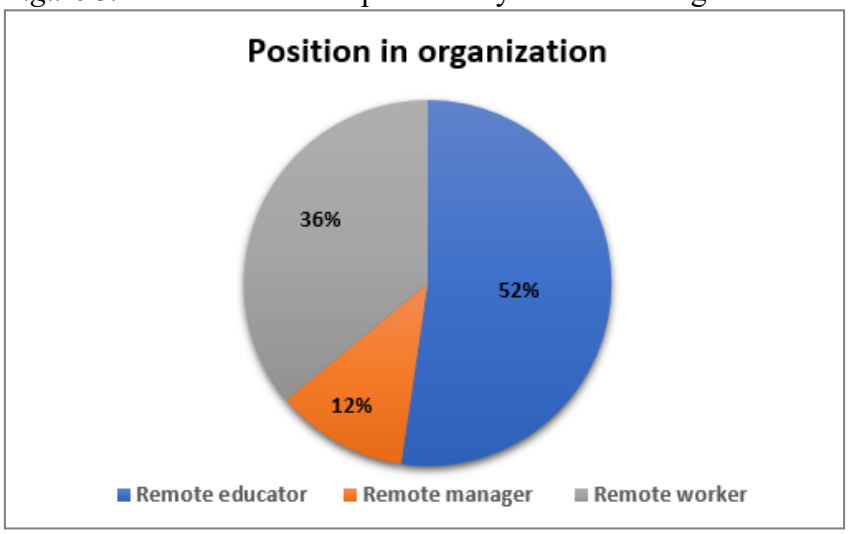


Figure 3. Distribution of Respondents by Position in Organization

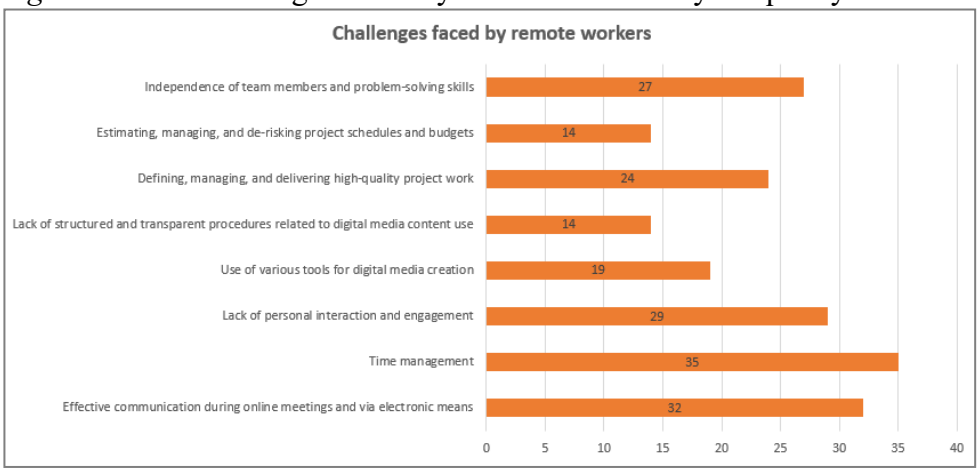


Results

Main Challenges Faced by Remote Workers

Among the main challenges (Figure 4) faced by educators, workers and managers working remotely in Croatia are *time management, effective communication during online meetings and via electronic means*, and *lack of personal interaction and engagement*.

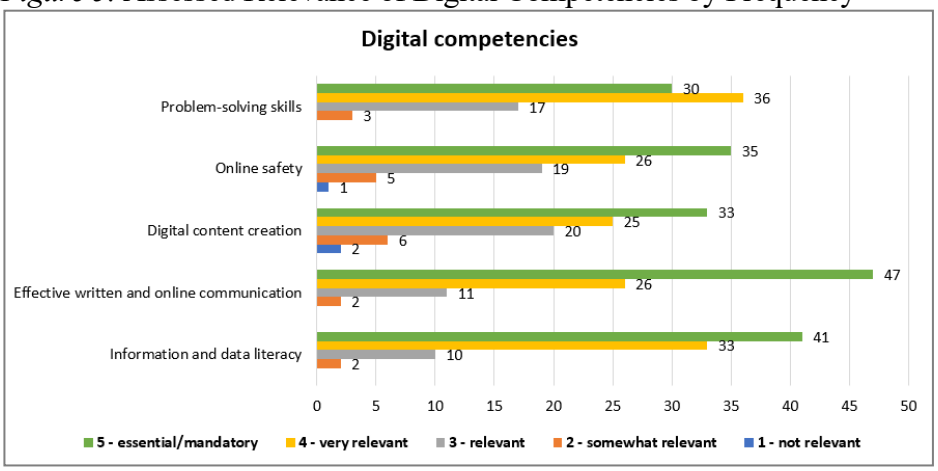
Figure 4. Main Challenges Faced by Remote Workers by Frequency



Relevance of Remote Working Skills

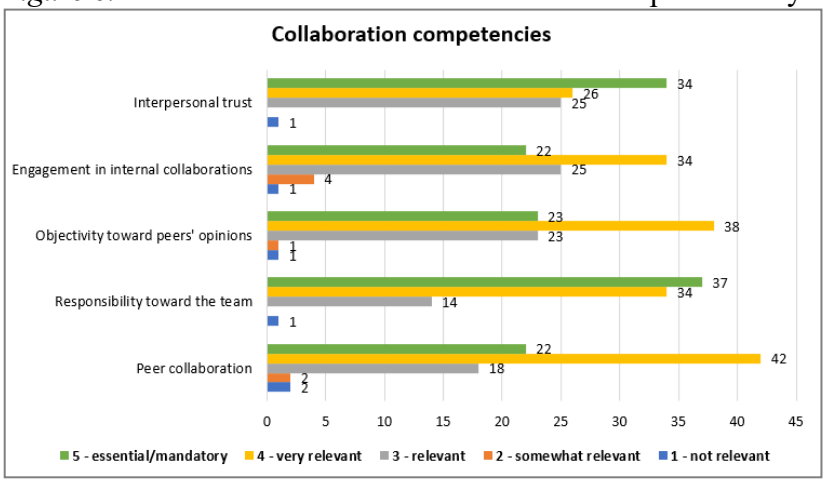
As can be seen in Figure 5, in terms of digital skills, effective written and online communication was most often assessed as essential/mandatory (47 respondents), information and data literacy (41 respondents), online safety (35 respondents) and digital content creation (33 respondents). Problem-solving skills were mostly rated as very important (36 respondents), while 30 respondents considered them essential.

Figure 5. Assessed Relevance of Digital Competencies by Frequency



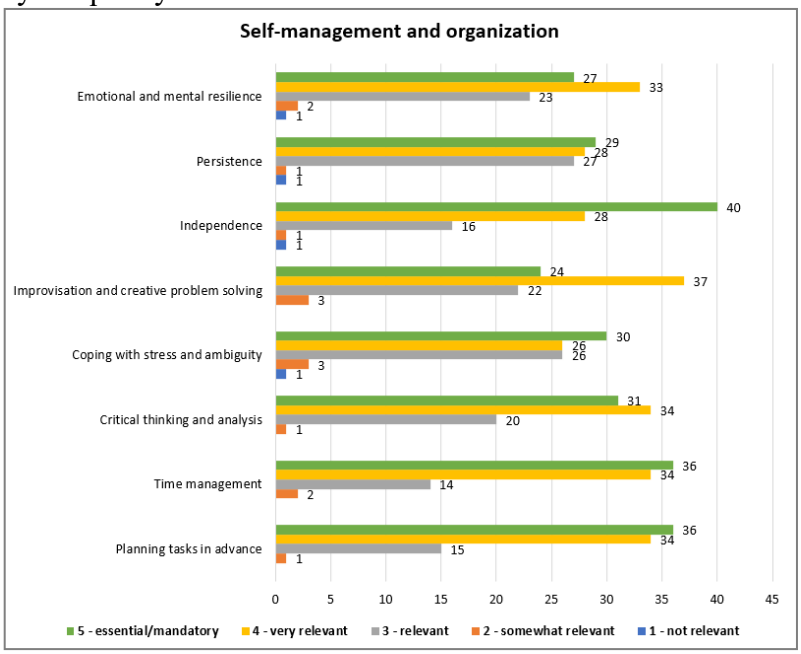
As depicted in Figure 6, within the collaboration competencies category, *responsibility towards the team* (37 respondents) and *interpersonal trust* (34 respondents) emerged as the most commonly considered essential/mandatory skills, whereas *peer collaboration* (42 respondents) and *objectivity towards peers' opinions* (38 respondents) were predominantly identified as highly relevant skills.

Figure 6. Assessed Relevance of Collaboration Competencies by Frequency



In terms of self-management and organizational skills, all competencies were mostly assessed as either essential/mandatory or very important (Figure 7). Within this category, *independence* received the highest number of respondents affirming its essential/mandatory status (40 respondents), followed by *time management* (36 respondents) and *planning tasks in advance* (36 respondents).

Figure 7. Assessed Relevance of Self-management and Organization Competencies by Frequency



Interpersonal and intercultural and communication skills were primarily assessed as highly relevant (Figure 8). Particularly noteworthy were *remote communication strategies* (36 respondents), *avoiding digital alienation by engagement with other remote workers* (29 respondents), and *managing social isolation* (29 respondents), which were frequently assessed as very relevant. Notably, *managing social isolation*

received the highest number of essential/mandatory ratings (26 respondents).

Figure 9 shows the results of the last category of skills proposed for assessment, i.e. *specific skills for remote educators* required to adequately address the specificities of remote education. *Planning and implementation of digital devices and digital content in the teaching process* (39 respondents), *using digital technologies and services to enhance interaction with learners* (38 respondents) and *using digital technologies to provide targeted and timely feedback to learners* (36 respondents) were most frequently rated as essential/mandatory.

Figure 8. Assessed Relevance of Interpersonal and Intercultural and Communication Skills by Frequency

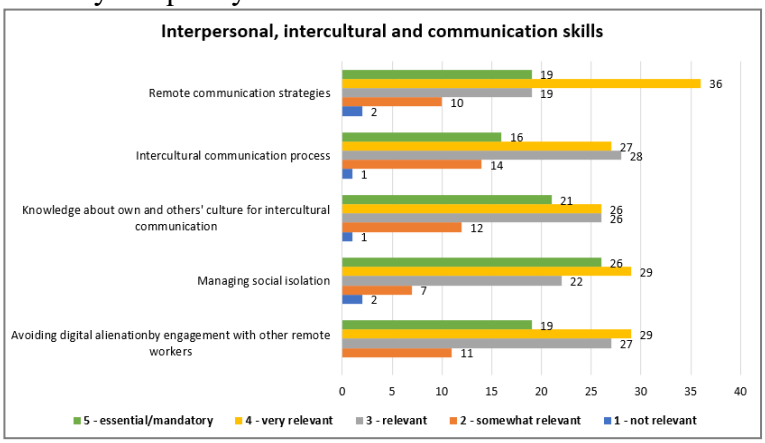


Figure 9. Assessed Relevance of Specific Skills for Remote Educators by Frequency

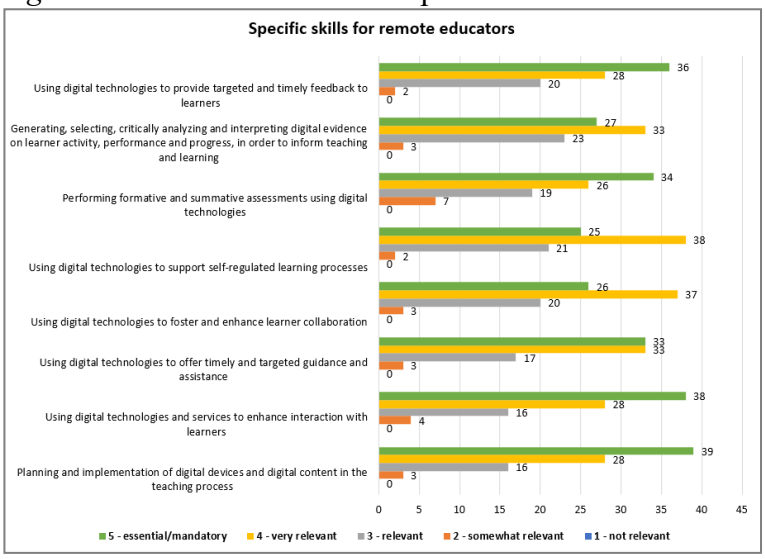


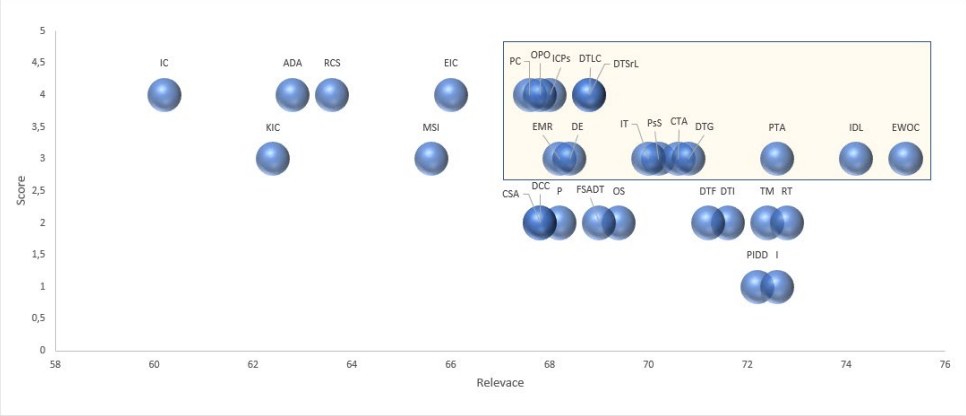
Table 2 presents the results of the two dimensions, relevance and score, calculated for the competency matrix, sorted from largest to smallest.

Table 2. Perceived Usefulness of a Training for Development and Certification of Remote Work Skills

Competency	Abbreviation	Relevance	Score
Effective written and online communication	**EWOC**	**75.2**	**3**
Information and data literacy	**IDL**	**74.2**	**3**
Responsibility toward the team	RT	72.8	1
Planning tasks in advance	**PTA**	**72.6**	**2**
Independence	I	72.6	1
Time management	TM	72.4	1
Planning and implementation of digital devices and digital content in the teaching process	PIDD	72.2	1
Using digital technologies and services to enhance interaction with learners	DTI	71.6	1
Using digital technologies to provide targeted and timely feedback to learners	DTF	71.2	1
Using digital technologies to offer timely and targeted guidance and assistance	**DTG**	**70.8**	**2**
Critical thinking and analysis	**CTA**	**70.6**	**2**
Problem-solving skills	**PsS**	**70.2**	**3**
Interpersonal trust	**IT**	**70**	**2**
Online safety	OS	69.4	1
Performing formative and summative assessments using digital technologies	FSADT	69	1
Using digital technologies to foster and enhance learner collaboration	**DTLC**	**68.8**	**4**
Using digital technologies to support self-regulated learning processes	**DTSrL**	**68.8**	**4**
Generating, selecting, critically analyzing and interpreting digital evidence on learner activity, performance and progress, in order to inform teaching and learning	**DE**	**68.4**	**3**
Emotional and mental resilience	**EMR**	**68.2**	**3**
Persistence	P	68.2	1
Improvisation and creative problem solving	**ICPs**	**68**	**4**
Objectivity toward peers' opinions	**OPO**	**67.8**	**4**
Coping with stress and ambiguity	CSA	67.8	1
Digital content creation	DCC	67.8	1
Peer collaboration	**PC**	**67.6**	**4**
Engagement in internal collaborations	EIC	66	4
Managing social isolation	MSI	65.6	2
Remote communication strategies	RCS	63.6	4
Avoiding digital alienation by engagement with other remote workers	ADA	62.8	4
Knowledge about own and others' culture for intercultural communication	KIC	62.4	3
Intercultural communication process	IC	60.2	4

Figure 10 shows the visual representation of the skills gap using the data from Table 2. Competencies that should be in the focus are framed by a yellow rectangle in the figure and shown in bold in Table 2.

Figure 10. Visual Representation of the Skill Gap Based on Competency Matrix



Relevance of the Training for Development and Certification of Remote Work Skills

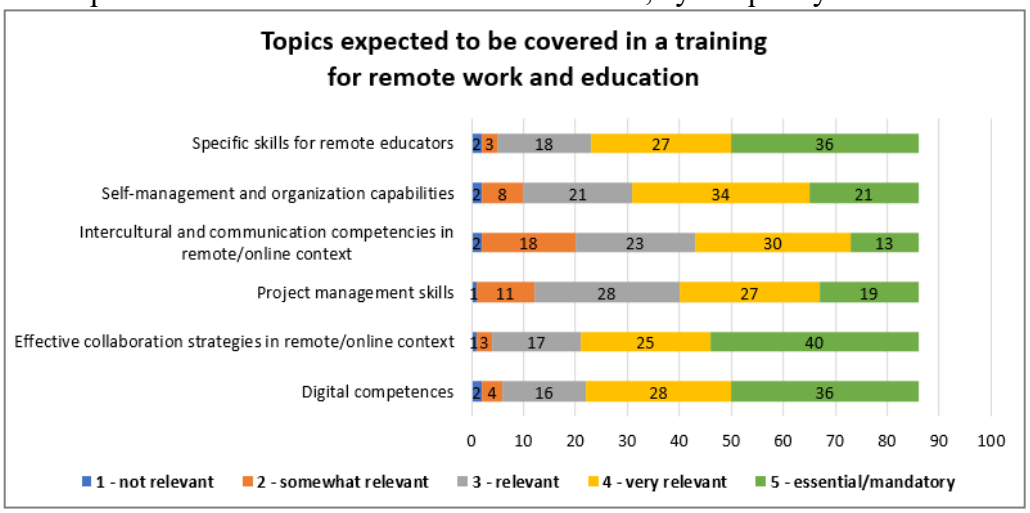
To examine relevance of the training for development and certification of remote work skills, participants were asked to express their attitudes on a scale of 1 (completely disagree) to 5 (completely agree). According to the results (Table 3), majority of participants (75%) agree and strongly agree that their professional competencies can be improved while 56% of participants are actively seeking to acquire additional skills and to extend their professional competencies. In addition, 64% of participants reported they would like to improve their capacity to face the new challenges for enhanced performance in remote work.

Table 3. Perceived Usefulness of a Training for Development and Certification of Remote Work Skills

Statement	**AVG**	**1**	**2**	**3**	**4**	**5**
I consider that my professional competencies can be improved.	4.10	2%	5%	17%	52%	23%
I am actively seeking to acquire additional skills and to extend my professional competencies.	3.96	6%	10%	28%	30%	26%
I would like to improve my operating capacity to face the new challenges for enhanced performance in remote work.	4.07	7%	7%	22%	36%	28%

When asked about the topics they would anticipate being addressed in a training session aimed at enhancing remote work skills, respondents conveyed significant interest in *effective collaboration strategies in remote/online context* (40 respondents), *digital competencies* (36 respondents), and *specific skills for remote educators* (36 respondents). However, all proposed skill categories were consistently rated as either essential or very relevant (Figure 11).

Figure 11. Preference for Specific Topics to be Considered for a Training on Development of Remote Work and Education Skills, by Frequency



Discussion

A total of 86 respondents from Croatia participated in the survey-based study, which was conducted jointly by all partners of the Virtual Edu consortium. The main objective of the study was to identify the skills needed to complement the current knowledge and competencies of remote educators, remote workers and remote managers.

Regarding the challenges faced by remote workers, educators, and managers in Croatia (RQ1), the results have shown that time management, effective communication during online interactions and the absence of personal interaction are the biggest hurdles, so addressing these challenges is essential in training to develop skills for remote work in Croatia.

Among most important skills for remote work, Croatian remote educators, managers and employees consider a whole range of skills (RQ2). Among digital skills, *effective written and online communication* received the highest number of respondents affirming its essential/mandatory status. Regarding skills related to self-management and organization, *independence* was most often assessed as essential. Within the collaboration competencies category, *responsibility towards the team* and *interpersonal trust* were most frequently rated as essential while *planning and implementation of digital devices and digital content in the teaching process*, *using digital technologies and services to enhance interaction with learners* (38 respondents) and *using digital technologies to provide targeted and timely feedback to learners* (36 respondents) emerged as the most commonly considered essential among specific skills for remote educators. Participants assessed skills for interpersonal and intercultural and communication primarily as highly relevant. These results indicate that the training for enhancing remote work competencies should cover a wide range of skills.

Regarding the RQ3, the competency matrix revealed the numerous training needs for Croatian educators, managers and employees. A significance of these results is the validation of the proposed topics for the training curriculum through the findings of the questionnaire. Main finding is that training needs for the Croatian

beneficiaries are in line with the categories of skills initially considered to be covered by the VirtualEdu training and certification program.

Respondents acknowledge the relevance of training for the development and certification of remote work skills (RQ4). They expressed the attitude that their professional competencies can be improved as well as a desire to do so in order to meet the demands of the remote work market. In addition, just over fifty percent of them are actively seeking opportunities to achieve this goal.

It is important to acknowledge a limitation in the study related to the sample size (N=86). While this sample provides valuable insights, it may not fully represent the diverse experiences within the broader population of remote workers, educators, and managers in Croatia. Future studies with larger and more diverse samples would help confirm and expand on these results.

Conclusions

The results of the study presented in this article provide insights into the skills gap among remote workers in Croatia, which is essential for enhancing their competencies. The results also informed the development of the VirtualEdu training curriculum by revealing actual needs of target group of participants as well as the perceived opportunities and usefulness of the VirtualEdu training and certification program.

The expected outcomes of training that will be organized through MOOC course promise significant benefits for educators, managers, students and employees in Croatia working remotely. Through training and certification program, educators and other professionals in the education sector will improve their remote working skills, which will have a positive impact on both educational institutions and private organizations. The results of the project are expected to extend beyond the education sector and impact the broader labor market as well as enrich corporate practices. Managers or employees who obtain certification in remote working skills will gain a competitive advantage. In addition to professionals, students from Croatian universities will also have opportunity to develop practical skills needed for employment.

Acknowledgments

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