



HOW INTEGRATING INNOVATIVE DIGITAL TOOLS SHAPED THE ERT EXPERIENCE FOR ESP INSTRUCTORS AND ENGINEERING STUDENTS IN CROATIA

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Abstract. *The transition to emergency remote teaching (ERT) during the COVID-19 pandemic has reshaped education, prompting educators to adapt swiftly. In this evolving digital context, the integration of digital tools took centre stage. This paper presents the findings of two questionnaire surveys conducted in the summer and autumn of 2020 between two Croatian ESP instructors employed at HEIs in Croatia and undergraduate engineering students of the Faculty of Electrical Engineering, Computer Science and Information Technology Osijek (FERIT), Croatia, focusing on their experiences, perceptions, and challenges related to the integration of digital tools into online ESP classes. It explored the types of digital tools employed and favoured by Croatian ESP instructors and students at FERIT, their impact on instructor and student motivation, the quality of online classes, and the creativity of materials. The findings reveal that instructors heavily relied on Learning Management Systems (LMS), video conferencing platforms and familiar tools while they steered away from more advanced, interactive tools. Although ESP instructors generally felt motivated by the digital tools and believed they enhanced the creativity of their teaching materials, the data indicate that these tools were less effective in fostering student motivation. Students, on the other hand, identified these tools as helpful and motivating. Still, a smaller but significant cohort of students felt they benefited more from traditional tools like Word.*

Key words: *innovative digital tools, emergency remote teaching (ERT), ESP instructors, engineering students, higher education, motivation*

1. INTRODUCTION

Education saw a dramatic change in March 2020 when the COVID-19 epidemic drove schools and universities worldwide to close and quickly switch to emergency remote teaching (ERT). According to a UNESCO report (2023), COVID-19 was the most severe shock inflicted on education in generations. No previous crisis disrupted education for so many and for so long.

This unforeseen transition to ERT posed significant challenges for both instructors and students. Students grappled with understanding and adapting to course content in a virtual environment while simultaneously contending with motivation and time management

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issues. On the other hand, instructors, many of whom were not formally trained for ERT, faced the challenge of redesigning their face-to-face courses into engaging and effective online formats. Additionally, they struggled with fostering student engagement and participation within the limitations of a virtual classroom.

In response to these challenges, the integration of digital tools emerged as a promising solution. According to the UNESCO report (2023), educational technology, known as ed-tech, encompasses a broad spectrum of digital and connected tools utilised to facilitate or support educational activities. Ed-tech includes not only familiar digital and analogue devices but also interactive and broadcast technologies, as well as synchronous and asynchronous methods, all of which were employed to sustain educational continuity during an unprecedented crisis. Beyond the physical devices typically associated with educational technology, ed-tech also comprises software, systems, content, platforms, connections, networks, and online applications that make hardware functional for educational purposes. Additionally, ed-tech involves the services, organisational frameworks, ecosystems, policy structures, assumptions, and underlying principles that support the use of technology in education.

Digital tools served a twofold function during ERT. First, they enabled the adaptation of traditional teaching materials to an online format, thus ensuring the continuity of education. Second, they were supposed to sustain student motivation and engagement in the virtual environment. According to Ferčec and Liermann-Zeljaka (2023), students were least satisfied with their motivation and the time and effort invested in mastering the course content. Therefore, throughout the pandemic, higher education instructors continuously struggled to come up with creative strategies to motivate students and improve the efficiency of the learning process (Khan 2024).

This paper explores the role of digital tools in addressing the challenges encountered during ERT, especially their impact on instructor and student motivation, the quality of online classes, and the creativity of materials. The paper is organised as follows. After the introductory notes, Section 2 gives a theoretical overview of research papers relevant to our topic. Section 3 presents the research aims and methodology, while Section 4 discusses the research results of the instructor and student questionnaires. The conclusion, research limitations and recommendations for further research are given in Sections 5 and 6, respectively.

2. THEORETICAL BACKGROUND

The COVID-19 pandemic triggered an unprecedented global shift in education, compelling institutions to rapidly transition from traditional face-to-face instruction to emergency remote teaching. Although the terms online or remote teaching are often used in the literature referring to the situation during the COVID-19 pandemic, emergency remote teaching (ERT) is a more precise term because it refers to a temporary shift to fully remote instruction due to crises and is aimed to provide quick and reliable access to education rather than replicating a comprehensive online learning environment, with the intention of returning to traditional or blended formats once the crisis ends. While quality online courses may take months to develop, the urgent nature of ERT can potentially compromise the quality of course delivery. Also, this transition necessitates that instructors assume greater responsibility for designing, developing, and implementing their courses. Instructors typically had limited time to

develop effective online teaching strategies, resulting in a reliance on familiar face-to-face methods that may not translate well to an online environment (Hodges et al. 2020). The use of digital tools was crucial to ensure a smooth transition to ERT, especially video conferencing platforms like Zoom, Microsoft Teams, etc., which enabled real-time, synchronous instruction, bridging the physical distance, and learning management systems (LMS), like Moodle, Merlin¹, etc., which became central hubs for distributing course materials, managing assignments, and facilitating communication between instructors and students. This is in line with research that shows that the most commonly used tools were video conferencing platforms and LMSs (Özkanal 2022; García-Martín, Rico, and García-Martín 2023; Ramadani and Xhaferi 2020; Kardum and Vukelić 2021; Chaka 2020), which is not surprising given their usefulness for both synchronous and asynchronous online teaching modes. Zoom, for example, experienced an increase from 10 million daily participants in December 2019 to over 300 million daily participants in April 2020 (Malcolm et al. 2022). However, despite enabling interactive lectures, it was observed that motivation and engagement declined in ERT classes (Ferčec and Liermann-Zeljok 2023; Hollister et al. 2022; Gonzales, Sørsum, and Raaen 2022). Students were still hesitant to actively engage in online lessons, especially when turning on their cameras, using their voices, or writing in the chat box. Some students even stated that although Zoom worked well, everything digital made them lazy (Gonzales, Sørsum, and Raaen 2022). Several factors may have contributed to the lack of motivation and engagement during ERT, such as physical separation from the instructor, which resulted in students' reduced accountability without in-person monitoring. The effectiveness of communication was also hindered as non-verbal cues are less apparent in a virtual classroom, making it difficult for teachers to gauge students' understanding and engagement levels. Furthermore, the boundaries between home and school life were blurred, which may have contributed to more distractions. The quality of instructional design and teacher preparedness, negative attitude towards ERT, limited experience with online learning platforms, inadequate course materials and social isolation are additional factors that may have caused reduced engagement and motivation. A lack of motivation can also be linked to technical difficulties; however, Tailor, Hennessy, and Jordan (2023) found that even students with reliable internet access experienced demotivation during ERT. Additionally, boredom plays a significant role in reducing motivation and engagement. Namely, research shows that most teachers and students felt that online classes were more boring and monotonous compared to in-person classes (Pawlak et al. 2022; Giray et al. 2023; Male et al. 2020). According to Henry and Thorsen (2018) and Zawodniak, Kruk, and Pawlak (2021) (in Rezaee and Seyri 2022), students who experience boredom frequently feel disconnected from their goals and participate less in activities, leading to signs of disengagement from the educational environments they are part of. Derakhshan et al. (2021) revealed that boredom stemmed from long, monotonous teacher talk, lack of student participation, poorly chosen tasks, and technical difficulties while creating a more energetic atmosphere and fostering student engagement were common solutions. Another phenomenon which should not be overlooked is Zoom fatigue. Zoom fatigue refers to "physical and mental exhaustion that results from spending extended time video conferencing" (Ebner and Greenberg 2020, 537). According to a study by Permana et al. (2023), 93.5% of the polled students felt exhausted after video conferencing. As a result, students reported

¹ Merlin is a Moodle-based e-learning platform for the higher education system in Croatia.

having difficulties concentrating and maintaining focus (Peper et al. 2021; Romero-Rodríguez et al. 2023; Permana et al. 2023), which negatively affected the academic performance of university students since zooming typically requires more focus than face-to-face classes (Jiang 2020). Peper et al. (2021) also noted that students are often less responsive during online synchronous Zoom classes, which can exacerbate fatigue symptoms and decrease learning capacity and attention (Peper and Yang 2021), which makes learning somewhat extremely difficult (Peper et al. 2021). The negative impact of Zoom classes on academic performance was observed in the decrease in understanding and remembering the materials presented during synchronous presentations (Peper et al. 2021; Permana et al. 2023), which is most likely due to the passive nature of watching Zoom presentations which hindered the encoding and consolidation of new information into long-term memory (Peper et al. 2021). Learning requires active engagement, which involves transitioning from passively watching and listening to taking on a more active, participatory role in synchronous online classes. To enhance learning in the synchronous online setting, teachers must adapt their instruction to include active student participation while students are responsible for being present and fully engaged. Each Zoom activity should foster a distinct and interactive learning environment (Peper et al. 2021). Also, it must not be forgotten that a digital teacher must have a different set of skills than a physical teacher. In other words, being a good teacher and facilitating a digital session that gives students valuable experience and good learning is important. The teacher's way of using online tools and adapting to digital teaching influences the result and the students' experience (Gonzales, Sørsum, and Raaen 2022, 8). To foster motivation and participation in online classes, it is important to use strategies and tools aimed at increasing these factors, such as interactive tools, multimedia materials, and resources such as animations, images, educational games, etc. (Guzzo et al. 2023).

3. RESEARCH AIMS AND METHODOLOGY

The research undertaken in this study had two primary objectives. The first aim was to explore the experiences, perceptions, and challenges related to the use of digital tools in English for Specific Purposes (ESP) ERT classes, focusing on Croatian ESP instructors and undergraduate students at the Faculty of Electrical Engineering, Computer Science and Information Technology Osijek (FERIT), Croatia. The second aim was to investigate the types of platforms/digital tools used and favoured during ERT and evaluate their impact on the quality of online classes and creativity of materials, as well as instructor and student motivation during ERT.

These aims were driven by the shift to online learning environments. The study sought to understand how this transition influenced ESP education, particularly in terms of how and which digital tools were utilised and preferred by teachers and students and the challenges they faced. Furthermore, it aimed to identify which tools were most effective in supporting teaching and learning online, thereby providing insights for future pedagogical strategies in ESP education.

To meet the research aims, two questionnaires were designed to target the distinct groups: ESP instructors in the Republic of Croatia and engineering students at the Faculty of Electrical Engineering, Computer Science and Information Technology Osijek, Croatia. Both surveys were conducted during the summer and autumn of 2020, capturing real-time feedback during

a critical adaptation period to online education. Both questionnaires were designed using Google Forms, which allowed for a combination of question types, including demographic, drop-down questions, multiple-choice questions, close-ended questions using a 5-point Likert scale and open-ended questions. The instructor questionnaire was emailed to ESP instructors working at higher education institutions (HEIs) across Croatia. The questionnaire consisted of 24 questions, which focused on the instructors' prior experience with online teaching, training obtained on such delivery mode, frequency of use of various platforms/digital tools and their role in the quality of ERT classes, preparation of course materials and their impact on instructor and student motivation. Furthermore, the questions related to instructors' perceptions of the effectiveness of these tools and any challenges they encountered while delivering ESP content in a digital format were also asked. The student questionnaire was distributed via Loomen, the learning management system (LMS) used at that time at FERIT. The questionnaire included 11 questions and was designed to assess the quality of online classes, followed by student motivation and satisfaction with the online learning experience, and student perception of digital tools used for course delivery. Participation in both questionnaires was voluntary and anonymous, which encouraged candid responses. Descriptive statistics were employed to analyse the responses.

The instructor sample included 52 ESP instructors employed at various Croatian HEIs. A notable feature of this group was the gender imbalance, with 96% of the teachers being female and only 4% male. This uneven distribution reflects the broader gender imbalance within the Croatian teaching profession, where women significantly outnumber men. Regarding age distribution, the largest group of teachers fell within the 40 to 50-year-old range, making up 42.3% of the sample. The second largest group, representing 50 to 60 years of age, accounted for 23.1%, followed by teachers aged 30 to 40 (26.9%) and teachers over 60 (7.7%). There were no participants under the age of 30. The teaching experience of the participants varied significantly. A sizable portion, 34.6%, had over 20 years of experience, followed by 32.7% with 15 to 20 years of experience. Teachers with 10 to 15 years of experience accounted for 19.2%, while those with 5 to 10 years comprised 11.5% of the respondents. Only a small fraction of the sample, 1.9%, reported having less than five years of experience. The distribution of ESP courses taught by the participating instructors varied across different fields. The most commonly taught ESP courses were English for Business, Management, and Economics and English for Engineering (Electrical, Electronic, Computer Engineering, etc.), with 21.3% and 19.2% of the teachers selecting these as their primary ESP courses, respectively. The distribution of other ESP courses can be seen in Table 1.

The student cohort consisted of 128 undergraduate students enrolled in the undergraduate university study programme in Electrical Engineering and Information Technology (elective modules: Power Engineering and Communication and Informatics) and the professional study programmes in Electrical Engineering (elective modules: Power Engineering and Automation) and Computer Engineering at the Faculty of Electrical Engineering, Computer Science and Information Technology, Josip Juraj Strossmayer University of Osijek, Croatia. The sample was predominantly male, with 76% male and 24% female students, reflecting the gender composition of students enrolled in FERIT.

Building on the information above, this paper seeks to explore the following research questions:

1. What are the experiences, perceptions and challenges faced by Croatian ESP instructors and undergraduate engineering students at FERIT in using digital tools during English for Specific Purposes (ESP) emergency remote teaching (ERT) classes?

2. How do digital tools and platforms used in online ESP classes impact the quality of language teaching, learning, course materials, and instructor and student motivation and engagement during ERT?

Table 1 Demographic and professional background of Croatian ESP instructors

Variable	Options	Frequencies	Percentage
Gender	Male	2	3.8%
	Female	50	96.2%
Age	Less than 30	0	0%
	30–40	14	26.9%
	40–50	22	42.3%
	50–60	12	23.1%
	More than 60	4	7.7%
Teaching experience	0–5 years	1	1.9%
	5–10 years	6	11.5%
	10–15 years	10	19.2%
	15–20	17	32.7%
	More than 20 years	18	34.6%
ESP courses taught	ESP for Science	3	3.2%
	ESP for Engineering	18	19.2%
	ESP for Business, Management, and Economics	20	21.3%
	ESP for Social Sciences	5	5.3%
	ESP for Medical Studies	3	3.2%
	ESP for Food Technology	5	5.3%
	ESP for Teaching	3	3.2%
	Other ESP courses	37	39.3%

4. RESEARCH RESULTS AND DISCUSSION

This section presents the findings from two questionnaires, which aimed to explore the experiences, perceptions, and challenges of using digital tools during English for Specific Purposes (ESP) emergency remote teaching (ERT) classes from the viewpoint of Croatian ESP instructors and undergraduate students at FERIT. It highlights their perspectives on the effectiveness of various digital platforms and tools in supporting online teaching and learning. Furthermore, it examines the impact of these tools on the quality of course delivery, the creativity of teaching materials, and motivation levels during the transition to ERT necessitated by the COVID-19 pandemic. Descriptive statistics were employed to interpret the data, providing a comprehensive understanding of the participants' experiences and attitudes toward digital tools used during ERT.

4.1. Instructor perceptions

4.1.1. Instructor prior experience, training and computer skills

Emergency Remote Teaching (ERT) emerged as a response to the abrupt transition to online education due to the COVID-19 pandemic. This shift was characterised by a lack of preparation and training for instructors, many of whom were inexperienced in delivering

courses in a digital format. Consequently, educators faced significant challenges in adapting their teaching methods without the requisite skills or experience in online pedagogy. Only 15% of Croatian ESP instructors reported having prior experience holding online classes, while 26.9% had formal online teaching training (Figures 1 and 2). These results are consistent with experiences reported by other instructors from other countries (Seabra et al. 2023; Langford and Damša 2020). Even though 71% of ESP instructors in Croatia did not receive training aimed at developing their digital skills, 81% of them are well aware of the need and importance of receiving training in the use of digital tools to update their ESP classes (Ferčec and Liermann-Zeljok 2023). Based on the 2019 report prepared by the European Commission, Croatian teachers have a lower share of ICT-related professional development than the European average. Similarly, in Italy, instructors reported being poorly prepared and trained for using apps, tools, and platforms for distance learning (Guzzo et al. 2023).

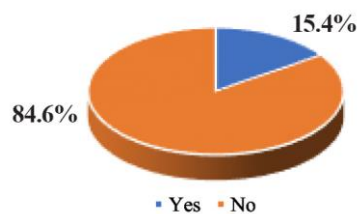


Fig. 1 Prior experience of holding online classes

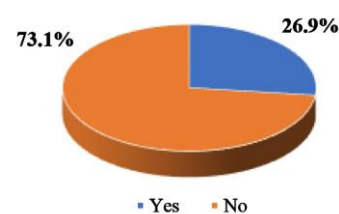


Fig. 2 Training in online teaching

Regarding the use of digital tools in face-to-face and online classes Figures 3 and 4 show that approximately 73% of Croatian ESP teachers used digital tools in face-to-face classes very often and often, while 27% of them used digital tools sometimes or rarely. However, when it comes to online classes, the figures are significantly different in favour of using digital tools, i.e., 94% of respondents used digital tools very often and often in their online ESP classes. In comparison, only 6% used them sometimes or rarely. Interestingly, there are no Croatian ESP teachers who have never used digital tools in either their face-to-face or online classes.

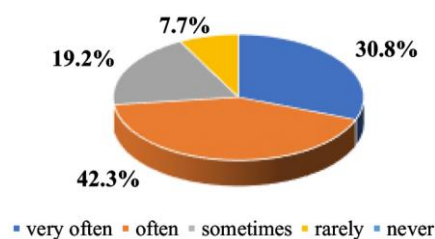


Fig. 3 Digital tools in face-to-face classes

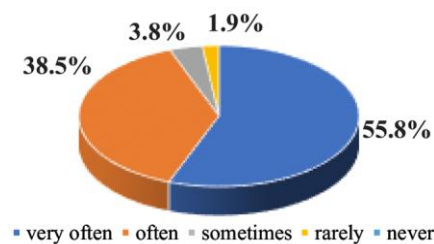


Fig. 4 Digital tools in online classes

Figure 5 illustrates the distribution of self-reported computer skill levels among 52 respondents. Most participants rated their computer skills as very good (42.3%) or excellent (23.1%), with 32.7% rating their skills as average. A small percentage (1.9%) rated their skills as poor, and no respondents rated them as very poor. These data suggest

that a substantial majority of respondents (65.4%) possess relatively high levels of digital literacy. According to a report prepared by the European Commission for 2017-2018, Croatia reported higher teachers' confidence (based on the DigComp² framework) in their digital competence compared to the European average, which aligns with the obtained results. This proficiency level can positively impact ERT's effectiveness as individuals with stronger computer skills are likely to adapt more easily to digital platforms and tools required for online instruction and learning. However, while most respondents exhibit proficiency, it is also important to consider the remaining cohort that may have lower computer skills, as they may face challenges in fully engaging with digital tools. Thus, while the overall findings suggest a strong foundation for integrating digital tools in ERT, additional support and training may be necessary for those with lower skill levels.

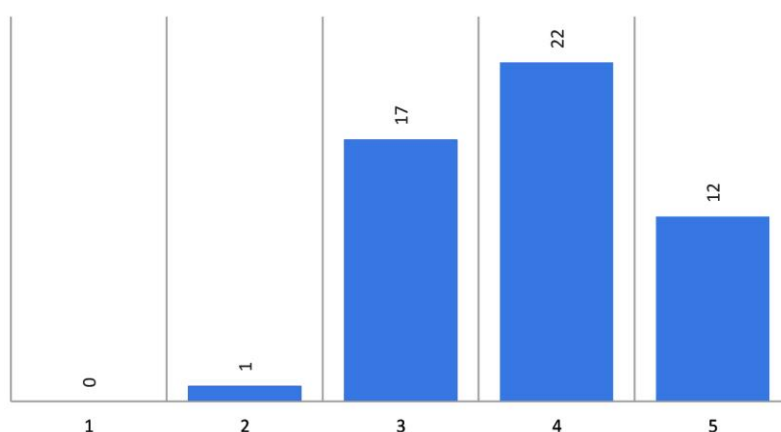


Fig. 5 Level of computer skills

4.1.2. Digital tools and platforms favoured by Croatian ESP instructors

The frequency distribution of digital tools and platforms used in online classes (Table 2) provides valuable insight into the prevalence and variability of different educational technologies employed by Croatian ESP instructors in ERT. The data reveals that certain tools are used far more frequently than others, reflecting preferences or dependencies in remote teaching strategies.

The Learning Management System (LMS) stands out as the most consistently used tool, with 82.69% of respondents indicating they use it very often, resulting in a high mean of 4.673 and a low standard deviation of 0.825. LMS platforms are foundational to online education, likely because they centralise course management, content delivery and communication. Video conferencing tools are also widely utilised, with 59.61% reporting widespread use (mean = 4.038, standard deviation = 1.143). This indicates that synchronous interaction is a key component of ERT, though the higher standard deviation compared to LMS usage

² The Digital Competence Framework for Citizens (DigComp), which was created by the European Commission, Joint Research Centre on behalf of DG EAC and EMPL, is used to match several questions on teachers' and students' confidence from the survey with the five competence areas of the DigComp framework.

suggests some variability in the extent of reliance on this tool, possibly due to differing instructional approaches or infrastructure constraints. This corroborates the experiences in other countries (Özkanal 2022; García-Martín, Rico, and García-Martín 2023; Ramadani and Xhaferi 2020; Kardum and Vukelić 2021; Chaka 2020). However, a study carried out at three faculties at the University of Priština revealed that instructors opted for other channels of instruction delivery, such as Student Services and iTeacher, which had the highest usage rates. In contrast, LMSs such as Moodle and Google Classroom were less favoured (Kulić and Janković 2022). Presentation tools are used very often by 71.15% of respondents (mean = 4.519, standard deviation = 0.887), suggesting they are an essential medium for delivering structured content, with their relatively high usage mirroring traditional classroom practices adapted to the online format. For online quizzes, a mean score of 2.846 with a standard deviation of 1.609 indicates moderate usage, with a substantial portion of respondents (34.61%) never using them. It can be concluded that quizzes were not universally adopted as the primary instructional strategies and likely served as supplementary assessment tools. Interactive worksheets and discussion boards are underutilised, with 59.61% and 76.92% of respondents, respectively, reporting that they have never used these tools. The mean scores of 1.846 (for interactive worksheets) and 1.384 (for discussion boards), along with relatively low standard deviations (1.306 and 0.787), reinforce the notion that these tools are not widely embraced. The underutilisation of interactive worksheets and discussion boards could stem from a combination of factors, including lack of familiarity, pedagogical preferences, perceived effectiveness, time constraints and student engagement challenges. The usage of video clips shows moderate to high adoption, with 44.23% of respondents using them very often, resulting in a mean score of 3.846 and a standard deviation of 1.306, which indicates that multimedia resources are moderately integrated into online teaching, possibly enhancing engagement or supplementing the textual content. Finally, voice recorders are rarely used, with 76.92% of respondents indicating they have never used them. The mean score of 1.441 and a standard deviation of 0.948 confirm that audio-based tools were not a prominent feature of online ESP education in Croatia, which could be due to the preference for video or text-based formats.

Table 2 Digital tools/platforms used in online classes (in %)

	Frequency distribution of digital tools/platforms used in online classes (in %)					Mean	St Dev
	1 never	2 rarely	3 sometimes	4 often	5 very often		
LMS	1.92	1.92	5.76	7.69	82.69	4.673	0.825
video conference	13.46	1.92	11.53	13.46	59.61	4.038	1.143
presentation	1.92	1.92	9.61	15.38	71.15	4.519	0.887
online quizzes	34.61	11.53	11.53	19.23	23.07	2.846	1.609
Interactive worksheets	59.61	21.15	3.84	5.76	9.61	1.846	1.306
discussion boards	76.92	11.53	7.69	3.84	0	1.384	0.787
video clips	9.61	5.76	19.23	21.15	44.23	3.846	1.306
voice recorders	76.92	11.53	3.84	5.76	1.92	1.441	0.948

Figure 6 provides an insightful overview of the specific digital tools and platforms favoured by Croatian ESP instructors for ERT. It highlights the prominence of Moodle/Loomen, Merlin and Microsoft Teams as the most commonly used LMSs in

online education. As expected, Zoom emerged as the leading video conferencing tool, followed by Microsoft Teams and BigBlueButton. A notable finding is that an overwhelming 98.1% of teachers relied on Microsoft PowerPoint for creating and delivering presentations despite the availability of more interactive alternatives like Genially and Mentimeter. This suggests a strong preference for traditional presentation formats among teachers. It provides teachers with a familiar, reliable and efficient solution, especially during the challenging transition to remote learning, even though more interactive alternatives could have potentially enhanced student engagement and participation. Similar results were obtained in Greece and the Republic of Cyprus, where ESP instructors also opted for basic tools instead of more advanced technologies (Constantinou and Papadima-Sophocleous 2020). In Portugal, for example, many teachers expressed concern about adapting to specific platforms and tools (Seabra et al. 2023). When asked what other challenges they faced during ERT, Croatian ESP instructors expressed similar concerns as their Portuguese colleagues, e.g. *I'm always worried and nervous about whether prepared materials and tools will work properly*, or, *My IT skills are quite poor, we had five days to learn Google Meet*, and, *Too many tools, different methodology for eLearning*. Since previous studies have shown that training in digital integration reduces anxiety about the use of technology (Christensen 2002), it comes as no surprise that some Croatian ESP instructors felt anxious about ERT, given that most did not have any previous experience and did not receive any training in online teaching. The responses by Croatian ESP teachers support the results obtained by García-Martín, Rico, and García-Martín (2023), which show that teachers did not feel fully prepared to integrate digital tools into the classroom.

Concerning formative assessment, 75% of teachers predominantly used the built-in quiz features available in their respective LMS platforms (Moodle, Loomen, Merlin). However, a smaller but significant proportion of teachers employed external quiz platforms like Kahoot (26.9%) and Quizlet (17.3%). On the other hand, for summative assessments, LMS quizzes remained the most commonly used tool (71.2%), while only 7.7% of instructors used Kahoot. Google Forms was the second most preferred tool for summative assessment (19.2%). While Kahoot enhances learning by making it more enjoyable and engaging, preventing boredom and helping teachers track student progress identifying students' strengths and weaknesses (Aidoune et al. 2022; Mawardi and Rustandi 2024), LMS platforms typically offer a wide range of question types (e.g., multiple-choice, true/false, short answer, matching, essay questions, etc.) and allow teachers to customise their quizzes which might have been the deciding factor for choosing built-in quizzes over external platforms especially when it comes to summative assessment. Despite their potential for enhancing student interaction, interactive worksheets saw less usage, with 60% of teachers who never employed them. For those who did, Google Docs/Forms was the preferred tool, while a smaller percentage opted for platforms like IslCollective (7.7%) and Wizer (5.8%). This data points to a gap in the adoption of more interactive and engaging digital resources, particularly in areas like worksheet usage and presentation tools.

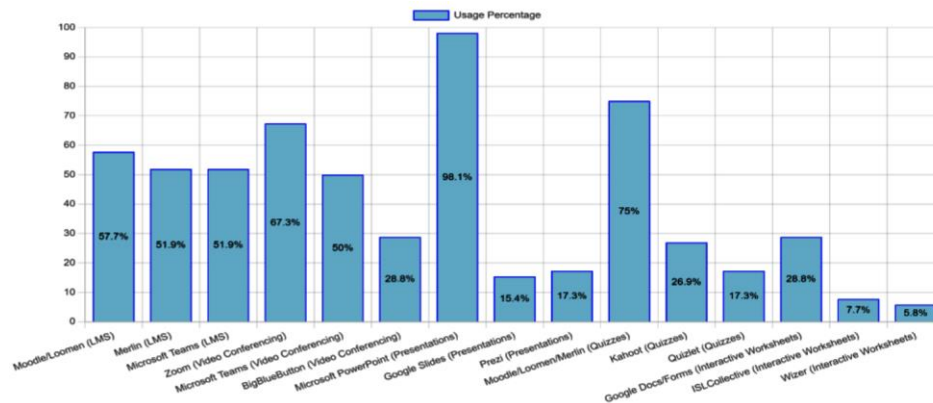


Fig. 6 Preferred digital tools/platforms among Croatian ESP instructors

When asked about the most useful tools, the responses align with the preferred tools, with most instructors specifying LMSs and video conferencing tools as the most useful during ERT.

4.1.3. Impact of digital tools on instructor motivation, student motivation, quality of ERT classes and creativity of teaching materials

The rating distribution of teachers' perceptions of digital tools provides insight into several key areas which include teacher motivation, student motivation, the quality of online classes and the creativity of teaching materials. These perceptions were evaluated on a scale from 1 (strongly disagree) to 5 (strongly agree), with corresponding means and standard deviations indicating overall tendencies and variability in responses (Table 3).

The mean score for "teacher motivation" is 3.451, which indicates a moderate level of agreement among teachers regarding the effectiveness of digital tools in enhancing their motivation. The distribution reveals that 40.38% of respondents rated their agreement at 4, while 13.46% expressed strong agreement (5). Conversely, a significant portion of teachers (21.15%) rated their agreement at the lower end of the scale (1 or 2), which suggests that a notable portion of instructors did not feel strongly motivated by these tools. The relatively low standard deviation (1.015) indicates that, while perceptions are somewhat varied, the distribution is not highly dispersed, signifying moderate consistency among the responses. In terms of "student motivation", the mean score is lower (3.235), suggesting that teachers perceive digital tools as less effective in motivating students compared to their motivation. The distribution shows that 36.53% rated their agreement at a neutral level (3), while only 9.61% strongly agreed (5). A higher percentage (21.14%) rated their perceptions at the lower end (1 or 2), indicating that many educators do not believe digital tools significantly enhance student motivation. The standard deviation (1.020) highlights some variability in the responses, signalling that teachers' views on this issue are more divided compared to their motivation. Further supporting these results is the response to the question, "It is easy to keep my students motivated and engaged during ERT", where the majority of respondents disagreed, with 25% rating their agreement at 1 (strongly disagree) and 42.31% at 2 (disagree), leading to a mean score of 2.23. This indicates that most

instructors found keeping students engaged and motivated during ERT challenging. This comparison highlights an apparent disparity: while teachers experienced moderate motivation levels, their ability to motivate and engage students was perceived as significantly more difficult.

Regarding the quality of online classes, 34.61% of respondents agreed (4) that digital tools contributed positively to the quality of online instruction, yielding a mean score of 3.363. Despite this relatively positive perception, 26.92% of teachers gave a neutral rating (3), and 15.38% rated their agreement at 2, which points to some ambivalence about the quality of online classes facilitated by digital tools. The final aspect, the creativity of materials, reveals the highest overall perception, with a mean score of 3.470. A substantial percentage of respondents (30.76%) rated their agreement at 4, while 19.23% strongly agreed (5) that digital tools enhanced their ability to create engaging and creative materials for their students. In other words, despite some motivation and perceived quality challenges, teachers found digital tools particularly useful for preparing creative teaching materials. This corroborates the findings from Finland, where teachers similarly reported that digital tools motivated them to enhance their teaching materials (Kallunki et al. 2023).

Table 3 Instructor perceptions of digital tools

	Rating distribution referring to instructor perceptions of digital tools - from 1 = strongly disagree to 5 = strongly agree (in %)					Mean		St Dev
	1	2	3	4	5			
teacher motivation	1.92	19.23	23.07	40.38	13.46	3.451		1.015
student motivation	5.76	15.38	36.53	30.76	9.61	3.235		1.020
quality of online classes	9.61	15.38	26.92	34.61	11.53	3.363		1.196
creativity of materials	3.84	15.38	28.84	30.76	19.23	3.470		1.090

4.2. Student perceptions

The data reveals varied student perceptions regarding the usefulness and motivational impact of digital tools and their preferences when comparing interactive worksheets to Word. Regarding whether students found digital tools helpful, the results indicate a generally positive perception, with 36.72% and 24.22% of students agreeing and strongly agreeing, respectively. This results in a relatively high mean score of 3.719, which suggests that most students believe digital tools are beneficial to their learning. However, 29.69% of respondents provided a neutral rating, indicating that a significant proportion of students neither strongly agreed nor disagreed about the helpfulness of digital tools. In other words, while the general consensus is positive, there is some diversity in views.

When assessing the motivational aspects of digital tools, the results indicate slightly lower enthusiasm compared to perceptions of helpfulness. Although 32.03% of students agreed, and 23.44% strongly agreed that digital tools motivate them, 29.69% provided a neutral rating. Furthermore, a smaller cohort of students disagreed, with 6.25% strongly disagreeing and 8.59% disagreeing. This distribution suggests that while many students find digital tools motivating, a notable number remain indifferent to their ability to enhance motivation. It is important to note, as highlighted by Tailor, Hennessy, and Jordan (2023), that

the pedagogical approaches teachers employed when using different types of technologies were more influential in shaping student learning motivation (SLM) than the technology features themselves (e.g., audio, visual, interactive elements). This emphasises that while technology can support learning, how it is integrated into teaching practices has a more profound impact on student engagement and motivation.

The final question aimed to determine whether students felt it was easier to follow materials in Word than interactive worksheets (e.g., Wizer, Padlet). The responses here indicate a more divided perception. The mean score of 3.078 points to a relatively neutral stance overall. A large cohort of students (39.06%) felt neutral about whether materials using traditional tools like Word are easier to follow than more advanced interactive worksheets. However, 17.97% of students disagreed, and 9.38% strongly disagreed that interactive worksheets are superior to Word. On the other hand, 22.66% agreed, and 10.94% strongly agreed, demonstrating that some students still prefer more conventional tools like Word.

Table 4 Student perceptions of digital tools

	Rating distribution referring to students' perceptions of digital tools - from 1 = strongly disagree to 5 = strongly agree (in %)					Mean St Dev	
	1	2	3	4	5		
tools_helpful	3.91	5.47	29.69	36.72	24.22	3.719	1.019
tools_motivating	6.25	8.59	29.69	32.03	23.44	3.578	1.127
Word_better	9.38	17.97	39.06	22.66	10.94	3.078	1.106

When asked which digital tool they had found particularly interesting, different platforms for online quizzes and Wizer emerged as the most interesting tools. One of the answers was: *Online quizzes because the teacher reviewed and commented on the results.* This aligns with the findings by Raime et al. (2020) (as cited in Kardum and Jurić Vukelić 2021), who observed that perceived lecturers' feedback plays a significant role in students' satisfaction with online learning. Given that we are dealing with electrical and computer engineering students who are typically expected to embrace digital tools, the following responses stand out and show that some students felt overwhelmed and demotivated by more complex tools and preferred simplicity and a more traditional approach: *Online quizzes are the best because they are the simplest. Everything else is demotivating; I prefer old-school Word.*

5. CONCLUSION

The results of this study provide a comprehensive view of the experiences and perceptions of both Croatian ESP instructors and undergraduate Electrical and Computer Engineering students at FERIT regarding the use of digital tools during ERT amidst the COVID-19 pandemic. The findings offer insights into the experiences, challenges and preferences of integrating technology into ERT.

For Croatian ESP instructors, the transition to ERT presented a significant challenge, mainly due to the lack of prior experience and formal training in online teaching, a

situation mirrored in other countries. This lack of preparedness required many instructors to adapt their teaching strategies quickly without the necessary skills to utilise digital tools effectively. Despite this, the findings show that many instructors promptly adapted to using digital tools compared to face-to-face instruction, with a high percentage reporting frequent use of platforms such as Learning Management Systems (LMS) and video conferencing tools, which demonstrates the reliance of ERT on these technologies. This rapid adoption highlights the resilience and adaptability of Croatian ESP instructors during the crisis. However, it also emphasises the need for professional development in digital teaching, as emphasised by previous research. Interestingly, while Croatian ESP instructors largely embraced digital tools, tools that foster interaction (such as discussion boards and interactive worksheets) or those based on voice recordings are underutilised, possibly indicating missed opportunities for engaging students in more interactive or multimodal ways, particularly given the demonstrated preference for interactivity among students. Based on the data, Croatian ESP instructors adopted a more conservative approach to integrating new technologies into their teaching practices. Instructors' reliance on traditional tools like PowerPoint and LMS quizzes during ERT can be attributed to several factors. Many teachers may have been reluctant to experiment with unfamiliar technologies due to concerns about potential technical issues and the time-consuming nature of learning new platforms. Tools like Genially and Wizer, which offer more interactive and engaging options, often require additional time and effort to master. Given the increased workload and time pressures during ERT, teachers likely prioritised familiar and reliable tools. Furthermore, many instructors may not have been aware of the benefits of newer tools or may have found the learning curve too steep to justify their use in an already challenging teaching environment.

Our data about whether digital tools facilitated teacher motivation, student motivation, quality of online classes and creativity of materials show that digital tools had a positive motivational impact on instructors. On the other hand, instructors expressed greater difficulty in effectively engaging and motivating their students using digital tools due to the inherent challenges of engaging students in a virtual classroom, which often lacks in-person interaction, limited opportunities for spontaneous conversations and real-time feedback found in traditional classrooms. Furthermore, while perceptions of the quality of online instruction were mixed, one clear benefit of digital tools, according to the data, was their role in fostering creativity, as teachers generally agreed that these tools enabled the development of more engaging teaching materials.

The results of the student questionnaire reveal a generally favourable view of digital tools and their impact on helpfulness and motivation. In fact, a larger percentage of students reported feeling more motivated by digital tools than the ESP instructors. Another notable finding is the divergence in student preferences between traditional and digital tools. Despite being students of electrical and computer engineering, disciplines closely tied to technology, some expressed a preference for simpler, more traditional tools (33.32% of students found teaching materials created in Word easier to follow), which shows that students' learning preferences are not solely determined by their technical proficiency, but also by their desire for efficiency and focus on their studies.

6. RESEARCH LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

The data gathered in this survey provide perceptions of integrating innovative digital tools into ESP classes during ERT from the perspective of 52 ESP instructors employed at HEIs in Croatia and 128 undergraduate Electrical and Computer Engineering students at FERIT, Osijek, Croatia. The limitations of this study stem primarily from a rather small sample size of engineering students from only one faculty in Croatia. Consequently, the experiences and perspectives shared may not necessarily reflect those of engineering students at other universities across Croatia. Furthermore, the small sample size limits the ability to draw broader conclusions or make definitive statements about the larger population. In the end, conducting a more extensive study, including ESP instructors and students across other European universities, would be interesting to find out their experiences of integrating digital tools during ERT.

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