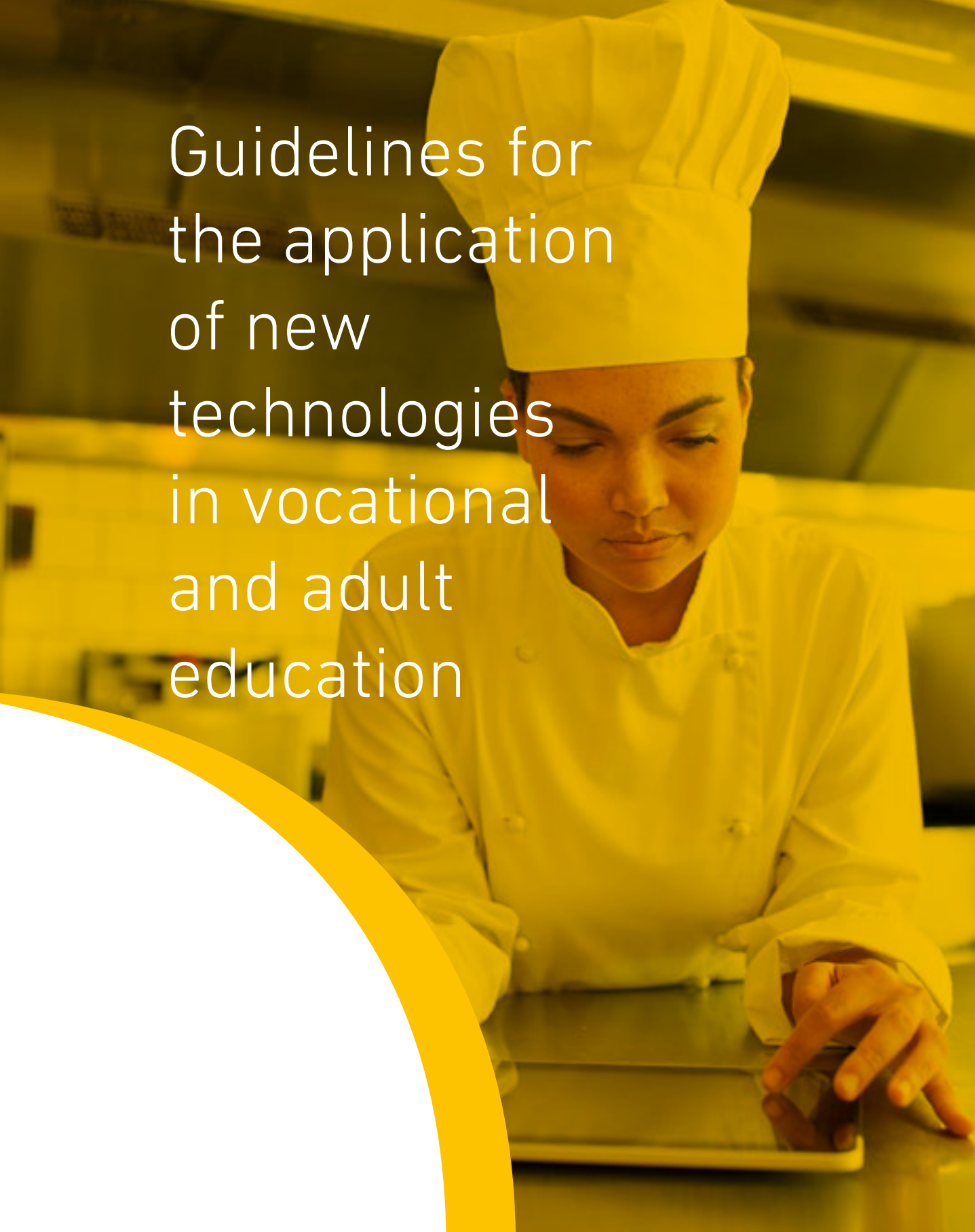
Guidelines for the application of new technologies in vocational and adult education



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GUIDELINES FOR THE APPLICATION OF NEW TECHNOLOGIES IN VOCATIONAL AND ADULT EDUCATION (EXAMPLES FROM THE TOURISM AND HOSPITALITY SECTORS)

The content of the publication is the sole responsibility of the Opatija Catering School.

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CONTENT

Introduction

"Guidelines for the application of new technologies in vocational and adult education in the tourism and hospitality sector" is a publication that goes beyond the sectors contained within its title in terms of scope and ambition. The guidelines were written as a guide for innovative practice in education at all its levels (organizational, methodological, practical), bearing in mind the accelerating development of society with which the educational system must keep pace.

The guidelines bring together experts from different fields – mathematics, physics, psychology, sociology, electrical engineering, and project management – to unify views and practices that are already being implemented or would be useful to implement in vocational and adult education, regardless of the sector.

Therefore, they are intended for all of those involved in the educational process in vocational education – primarily teachers and teaching staff, but also for the wider community that participates in social innovation through various types of engagement. They represent the result of analyses and earlier research on how to integrate technological innovations into teaching processes and form a synthesis that will help actors in *a living organism*, such as the school, in introducing changes for the success of the most important users of such an organism – students. Their purpose is manifold: to inform, teach, guide, and inspire teachers (and other actors) on the way to introducing new technologies into their daily work.

"Guidelines for the application of new technologies in vocational and adult education in the tourism and hospitality sectors" are created as part of the LAB established within the Regional Center of Competence (RCK) of the Opatija Catering School. The establishment of RCK was supported by the implementation of the "RCK RECEPT – Regional Center of Professions in Tourism" (UP.03.3.1.05.0003.) project, which is implemented by the Regional Center of Competence of the Opatija Catering School. The project was fully financed through grants from the European Social Fund within the Operational Program of Effective Human Resources 2014 -2020. The structure and organization of the work of the Regional Center of Competence are established with the funds provided and the planned activities of the project; it ensures the development and implementation of programs of mainstream education, adult education, and lifelong learning within RCK, they strengthen the competences of the professional staff, promote vocational occupations and the work of the Center, and ensure innovations and cooperation with universities, scientific organizations, professional chambers and associations, and relevant business entities.

Part 1 of the Guidelines is dedicated to the **pedagogical layer of application**. The authors Slavica Šimić Šašić, Maja Cindrić, and Robert Babić (*Okviri znanja d.o.o.*) preliminarily deal with the general purpose and needs of introducing new technologies into the teaching processes, with the assumption of improving the quality of education, in the context of intense social and technological changes, changes in the labor market, as well as the changed role of the school in this new environment.

Namely, as the authors point out, the use of digital technology in teaching is not an end in itself. As in any aspect of modern life, teaching included, digital technology is used to facilitate business, more successful communication, generate more data, enable more efficient cooperation with other actors, and save time.

Deriving key items from the reference points of the strategic documents of the EU and the Republic of Croatia related to the field, which suggest that vocational education and training should be the driver of innovation and growth (especially in the field of green and digital transition), the authors underline that vocational education and training should be made more attractive, especially in terms of new learning environments and new tools and teaching methods.

Looking back at learning theories with an emphasis on constructivism and providing a brief overview of knowledge derived from neurobiological research related to the learning processes of the so-called *digital natives*, the authors continue with some of the possible teaching approaches, stating the possibilities and advantages of using digital technology in the teaching process.

In the second chapter, they deal with innovative learning methods (research-based learning, problem-based learning, project-based work, flipped classroom, gamification, distance education, etc.), while in the third chapter, they deal more specifically with innovative teaching methods using digital content, stating and elaborating on the key elements, purpose, and goals that should be taken into account when introducing digital technology into teaching, as well as strategies and approaches to ensure the democratization of learning.

In the conclusion of Part 1 of the Guidelines, they point out that digital technologies themselves cannot transform education, but they have great potential for transforming teaching and learning practices in schools. The school and the teaching process must respond to the demands of modern life, especially secondary vocational education, which directly prepares students for the labor market. It is precisely this point of view that prompted changes in the creation of an educational policy, which is now focused on learning outcomes. Orientation of vocational curricula toward learning outcomes allows the teacher freedom in creating, particularly in terms of practical activities that can now follow changes in the economic sector in a dynamic manner; the teacher puts the student at the center of the teaching process, and the focus on the outcome helps the student achieve specific educational goals and provides clear guidelines for evaluating and improving the learning process.

In **Part 2 of the Guidelines**, a group of authors (*Algebra*) dealt with the **technological layer** of the application of new technologies. In the first chapter, existing resources are analyzed in such a way as to emphasize that understanding the current state of technical and software equipment, as well as the competence of educational staff, are the basis of any implementation strategy. In addition to providing a clear overview of current possibilities, this chapter points out and identifies problem areas in teaching.

The second chapter of this part of the Guidelines focuses on a series of resources and instructions that enable the effective use of technology in the classroom, using the example of the currently most commonly used digital tools in teaching: *Office 365, Google Drive, Google Docs, Mentimeter, Zoom, and Kahoot!*, but they are not described stating by their technical specifications; the focus is rather on a pedagogical approach that will ensure that the technology serves its primary goal: enriching the learning process.

Before introducing any changes related to the use of ICT, digital educational content, or technologies, it is important to carry out a thorough analysis of the school's needs and resources.

This includes the identification of existing infrastructure, available devices, and the educational needs of students and teachers. Therefore, the third chapter places emphasis on continuous implementation and quality assurance monitoring, i.e., on mechanisms that enable constant evaluation and adjustment, so that technological tools and methods can continuously support teaching goals.

In the fourth chapter, specific innovative activities are presented that serve as examples of how technology can be applied in the real world of education. With the help of these examples, teachers can see how technology can be applied with specific solutions and inspiration for their own practice.

Part 3, which is the final part of the Guidelines for the application of new technologies of the group of authors (*Algebra*) focuses on **communication and evaluation** and is designed to provide comprehensive guidance and support to educators, not only to teachers.

Multiple actors are involved in the complex task of implementing technological resources and tools in teaching processes. The role of RCK is to connect everyone: teachers, students, participants in adult education, external partners, mentors, and representatives of the business community, in a synergistic relationship. Each actor has a unique role and contribution, which is achieved through extremely important two-way communication and building trust, ideally by solving challenges together and establishing continuity of collaboration.

The second chapter of this part of the Guidelines clarifies what a communication plan is with elaborated internal and external communication with key actors. Communication plans in education are documents that define the purpose, goals, target audience, messages, and communication activities in the educational system. Their function is to ensure effective and targeted communication with all actors of the educational system: students, teachers, parents, local community, and decision-makers, whereby only some of the possible goals of such communication are educational, social, or administrative.

The third chapter of this part of the Guidelines deals with the system of evaluating the introduction of new technologies in RCK, which essentially answers two key questions: *How can we be sure that the introduced changes bring tangible benefits? How can we measure the success of the introduction of new technologies and new digital tools?* Further in the text, the authors list the key steps in the evaluation: defining the purpose; selection and development of evaluation instruments; data collection and analysis; preparation of reports and recommendations; implementation of recommendations and supervision; reflection and long-term planning.

In conclusion, in a world of rapid technological change, educational systems face the challenge of integrating new technologies in order to remain relevant and provide the best possible education to their students. While technology provides many opportunities to improve the quality of education and continues to change it, successful integration requires careful planning, implementation, and evaluation to ensure that changes bring real benefits to students, teachers, and the wider educational community. The process of introducing new technology is a journey, not a final destination. While many institutions focus on the initial phase – procurement and implementation – what follows is often just as important, if not more so.

PART I

Guidelines for the application of new technologies in vocational and adult education in the tourism and hospitality sectors – pedagogical level

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Chapter 1

Purpose of introducing new technologies

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1.1 Quality of education

The quality of education can be viewed from different aspects (state/local community, students, teachers, economy). All of the views on the quality of education have a common denominator – the achievement of minimum standards or indicators that cover key aspects of quality, such as the capacity to set goals and achieve them in a given context, the ability to meet the demands and expectations of direct and indirect users, and the pursuit of excellence (Bezinović, 2010). Quality standards refer to factors that make educational practice (i.e., school) better and increase its efficiency and ability to achieve positive outcomes for the benefit of all those involved. Indicators of the quality of education are different, and in the literature, one can find that it is divided into the following areas: learning and teaching, school culture, school management, and the professionalism and personal development of teachers (Jurić, 2007).

The European Commission (2001) defines 16 indicators of the quality of education divided into four areas: 1) student achievements (mathematics, reading, science, information and communication technologies, foreign languages, learning to learn, and civics); 2)

success and transition (persons who have dropped out of studies, persons who have completed secondary education, participation in higher education); 3) monitoring of education (evaluation and monitoring of education, involvement of parents in education), and 4) resources and structures (education and training of teachers, participation in preschool education, number of computers per student, and cost of education per student).

Today, the quality of education implies the following: focus on the student in the curricular approach, which implies the operationalization of goals, monitoring and evaluation of learning processes and outcomes with the aim of achieving certain competences; a constructivist approach to learning and teaching that includes active teaching and learning, modernization of the didactic and methodical approach, the use of information and communication technology (ICT), and inclusive quality which implies teacher flexibility, taking into account the diversity of students in terms of using different didactic materials, techniques, and strategies. Looking at the importance of education, especially vocational, for the development and competitiveness of the economy, it is clear why it is important to take account of the quality of education.

1.2 Social and technological changes, labor market, school's role

Secondary schools, as part of the Croatian educational system, provide educational services, enabling students to develop their potential with the aim of personal development and inclusion in the labor market, as well as readiness for lifelong learning. Secondary education enables everyone, under equal conditions and according to their abilities, to acquire knowledge and skills for work and continuing education. Rapid social, economic, and technological changes require the education system, i.e., schools, to adapt in order to meet the needs of students and harmonize with the changing demands of the labor market. Competences required by the labor market are often not in line with the competences that students develop during education. The document "The Future of Work in Croatia – The Transformation of the Croatian Workforce" (2021) predicts that, in the age of digitization and automation, during the current decade, around 97 thousand new jobs will be created that do not exist now. Furthermore, it is stated that, by 2030, activities that require physical fitness and basic cognitive skills will be replaced by activities that require better social and emotional skills (interpersonal communication, compassion, leadership, entrepreneurship, and taking initiative), technological skills (basic digital communication skills and advanced IT and programming skills), and higher cognitive skills (creativity, critical thinking, and decision-making).

The time we live in is called the information age. The industrial society was focused on the production of goods and the acquisition of profit, and on the other hand, the information society is focused on the production of knowledge. Information, technology, and knowledge play a central role in the information society – the labor market is increasingly interested in what a worker can create with their knowledge. The information society requires different knowledge, skills, and competences, i.e., it requires a capable and adaptable workforce, that is ready to take certain risks, think independently, process information, and solve problems, which will be willing and able to work in teams, to collaborate, and to be dedicated to lifelong, continuous acquisition new knowledge and skills in order to remain competitive on the labor market throughout their career. The role of the school is to prepare a young person for the real world, for continuing education, or for the labor market. Therefore, modern society, i.e., the school, must provide conditions for the acquisition of the necessary competences that correspond to the needs of young people and the labor market, i.e., those that will be applicable in different situations. Accordingly, the education system must become more flexible and dynamic, applying innovative approaches to learning and teaching. The information age is accompanied by a change in the paradigm of education, in which the focus shifts from teachers to learning, i.e., students. In order to fulfill its purpose, the education system must be future-oriented more than ever. Education has a hard time following rapid changes that lead to uncertainty and instability, and the unpredictable future is its biggest challenge (Camović and Đipa, 2021). Information and communication technologies have changed our way of life, way of doing business, way of learning, thinking, and interpersonal relationships, so due to new trends, educational institutions have to change and redefine their role. The new role of schools is to create a knowledge economy, and the basic economic resources of society are no longer capital and labor, but the knowledge, skills, and abilities of individuals that enable the welfare of society. The information age is characterized by valuing information and knowledge as resources (Mikelić Preradović et al., 2018).

1.3 Strategic documents of the European Union and the Republic of Croatia

The strategic goals of the European Union (EU) in the coming period are a greener, more digital, and more resilient Europe. European Education Area initiative helps the EU Member States to work together to build more resilient and inclusive education and training systems[1] by focusing their efforts on improving quality and equality in education and training on teachers, heads of training, and school principals, and on digital and green education. Initiatives such as the "European Skills Agenda," the "European Education Area," and the "EU Digital Education Action Plan" aim to develop better skills and create resilient, future-oriented education and training systems fit for the digital age. (Analysis of existing EU, national, regional, and local strategic documents related to the field of education in the tourism and hospitality sectors, Opatija Catering School, 2022a).

Five strategic priorities listed in the EU strategic framework for the period 2021 -2030 are as follows:

- Strategic priority 1: Improving quality, equity, inclusion, and success for all in education and training.
- Strategic priority 2: Achieving lifelong learning and mobility for all.

1 Source: https://education.ec.europa.eu/hr. Retrieved October 5, 2023.

- Strategic priority 3: Improving competences and motivation in the teaching profession.
- Strategic priority 4: Strengthening European higher education.
- Strategic priority 5: Support for green and digital transition in and through education and training.

Specific issues and activities for Priority Area 5. – Green and digital transition:

- increasing availability, access, and quality of digital equipment and infrastructure
- increasing connectivity and strengthening open and digital educational content and pedagogical methods at all levels of education and training in order to better adapt education and training systems for the digital age
- solving the issue of developing basic and advanced digital skills and competences at all levels and in all forms of education and training (formal and informal), as well as traditional and combined teaching and learning and remote teaching and learning to address the technological and digital transformation of the economy and society and in order to respond to it
- strengthening the exchange of best practices and the implementation of activities included in the Digital Education Action Plan 2021 -2027, which explores ways to encourage a more integrated approach to the development of the digital education policy through the possible establishment of a European Digital Education Hub.

The strategic documents of the EU and the Republic of Croatia suggest that vocational education and training should be the driver of innovation and growth, especially in the field of green and digital transition, and that they should be made more attractive, especially in terms of new learning environments, tools, and teaching methods, with a special emphasis on digitalization. There is an emphasis on superior opportunities for learning by doing, apprenticeships, and improved quality assurance. With its "Vocational Education and Training System Development Program 2016 -2020," the Republic of Croatia defined a vision of vocational education and training that should be focused on quality and efficiency and that should be attractive, innovative, relevant, and connected to the labor market, and which will enable the acquisition of competences for personal and professional development as well as continuing education and lifelong learning.

The EU recommends Principles for National Vocational Education and Training Reforms (VET):

- Rapid adaptation to changes in the labor market – Member States should establish appropriate frameworks and measures to ensure that VET provides a balanced mix of skills and responds quickly to changing labor market demands. Learning by doing and apprenticeships are particularly effective approaches in ensuring the relevance of VET in the labor market.
- Flexibility and opportunities for advancement form the focal point of VET – Member States should ensure that vocational education and training programs are personalized and student-centered. This helps to achieve strong engagement and makes VET more attractive, which leads to increased employability. Vocational qualifications should be broken down into smaller units and relevant learning outcomes, which would enable flexible updating of content and its adaptation to individual needs.
- VET is a driver of innovation and growth – VET should be part of economic, industrial, and innovation strategies, especially those related to recovery and green and digital transition. Vocational education and training institutions should have state-of-the-art infrastructure, and digitization and VET training strategies should be adapted and expanded to encourage the acquisition of entrepreneurial, digital, and green skills, especially for adults. All of the latter should prepare Europe for the digital and green transition and support bottleneck occupations.
- VET is an attractive choice based on the modern and digitalized provision of skills and training – Member States should make vocational education and training more attractive, especially in terms of new learning environments, tools, and teaching methods, with a special emphasis on digitalization. Education and training systems should enable vertical and horizontal transitions between vocational education and training, general education, higher education, and adult education.
- VET promotes equal opportunities – vocational education and training programs should be inclusive and accessible to vulnerable groups, such as persons with disabilities, people with no skills or qualifications, minority groups, people of migrant origin, and people with fewer opportunities due to their socio-economic background or the area in which they live. Targeted measures and flexible forms of training can prevent early abandoning of education and training and support the transition from school to work.
- VET is based on a culture of quality assurance – The European Reference Framework for Quality Assurance in Vocational Education and Training (EQAVET) refers to a set of common indicative descriptors and common reference indicators for quality assurance in vocational education and training that are applied at both system and service providers level, in accordance with the national context. The EQAVET national reference points have a role in bringing together national and regional actors and assisting in the further development and implementation of the EQAVET framework. (Analysis of existing EU, national, regional, and local strategic documents related to the field of education in the tourism and hospitality sectors, Opatija Catering School, 2022a).

Therefore, we can conclude that the reform of vocational education should develop flexible and inclusive vocational education and training based on learning outcomes, innovative learning and teaching methods, and on partnership with all actors, particularly employers.

1.4 Curriculum approach

In pedagogy, the term curriculum implies the order of learning by year, and this term has long been identified with the school curriculum (Previšić, 2007). The development of the curriculum was carried out in three phases: in the first phase, the curriculum is determined as a teaching program that emphasizes the programming of educational content; in the second, it is extended to planned and unplanned teaching and learning processes that take place in the organization of the school, and in the third phase, the emphasis is put on learning outcomes, and therefore, such a curriculum is called an outcome-based curriculum, i.e., one based on competences. Development of curriculum and its reforms take place in the context of wider social, economic, and technological changes and are accompanied by a change in approach to teaching and learning, from the traditional behaviorist approach to the modern constructivist approach. Curriculum development focused on student competences is one of the main directions of curriculum policy (National Curriculum Framework, 2010). The curriculum framework of the competence approach specifies desired outcomes, knowledge levels, teaching methods, and achievement assessment standards. Today, it is the dominant curriculum model that implies a holistic approach to the student's knowledge, which views knowledge, skills, and attitudes as a whole that the student should adopt. It looks at all elements of educational outcomes as parts that are interconnected. It additionally emphasizes the development of creativity, problem-solving, social interaction, lifelong learning, and other competences required by the new economic and social context and the developmental needs of an individual (Baranović, 2006).

1.5 Competences

The term 'competences' refers not only to knowledge and skills; it also includes the ability to respond to complex demands by using and mobilizing psychological resources (including skills and attitudes) in a specific context. For instance, the ability to communicate effectively depends on knowledge of the language, practical information skills, and attitudes toward the interlocutor.

The Council of the EU (2006) adopted the "Recommendation on key competences for lifelong learning," which includes eight key competences necessary for personal fulfillment, a healthy and sustainable lifestyle, employability, active citizenship, and social inclusion. These competences are: 1) literacy, 2) multilingualism, 3) mathematical competence and competence in science and engineering, 4) digital and technology competence, 5) interpersonal skills and the ability to acquire new competences, 6) active citizenship, 7) entrepreneurship, 8) cultural consciousness and expression.

EPSO (*European Personnel Selection Office*, 2021) defines eight general competences expected of EU employees: critical thinking, analyzing, and creative problem solving, decision-making and achieving results, digital literacy and adaptability (information management), organization, collaboration, learning as a skill, communication, entrepreneurship.

The conceptual framework of the project Definition and Selection of Competences (DeSeCo) divides key competences into three general categories:

- interactive use of tools – use of physical tools, such as information technology, and social and cultural tools, such as language, which is needed to interact with one's environment
- interaction in heterogeneous groups – collaboration with other people from different environments in an increasingly interdependent world
- autonomous action – assuming responsibility for managing one's own life in relation to the wider social context.

The World Economic Forum (WEF, 2023) adopts ten key competencies: the first is analytical thinking as a key cognitive competence, followed by creative thinking; self-efficacy; resistance, flexibility, agility; motivation and self-awareness; curiosity and lifelong learning; reliability and attention to detail; technology literacy; empathy and active listening; leadership and social influence, and quality control.

WEF estimates that the need for creative thinking is recording the highest growth, and it is followed by analytical thinking. Technology literacy is the third fastest-growing basic skill. Self-efficacy skills are ranked above working with others. The social and emotional attitudes that companies consider to have the fastest growing importance are curiosity and lifelong learning; resilience, flexibility, and agility, as well as motivation and self-awareness. Systems thinking, artificial intelligence and big data, talent management, focus on providing services, and customer service round out the top ten growing skills.

In the document "Youth employability skills portfolio," which was created by comparative research in six countries of Southeast Europe (Albania, Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, and Serbia, ed. Milica Škiljević, 2017), the following skills are addressed as key skills in the employment of young people: communication skills, teamwork, knowledge of foreign languages, desire to learn and desire for self-improvement, IT and computer skills, adaptability and flexibility, problem-solving skills, work ethic, ability to work under pressure, planning and organization skills, and entrepreneurial skills.

It should be emphasized that the list of required competences changes over time and that emphasis is placed on the needs of students in the 21st century and the demands of the labor market. In any case, these competences require innovative teaching approaches.

1.6 Learning theories – constructivism

Different learning theories try to explain the learning process. The behaviorist approach is focused on behavior, and it ignores psychological processes (thinking, memory, emotions). According to this approach, learning is a relatively permanent change in behavior, which is a consequence of practice or experience. Behaviorist learning theories emphasize that learning is determined by stimuli from the environment, by pairing stimuli or behavior with reinforcement or punishment. The student is passive and dependent on the teacher's control over them. The student is like a blank slate who simply responds to stimuli from the environment that are shaped by positive reinforcement for desirable behavior and punishment for undesirable behavior, which thus increases or decreases the probability of repeating the behavior. Forming a link between stimulus and response, based on associations that result in observable behavior, is an obvious

form of learning according to this approach. From the behaviorist tradition comes the traditional teacher- or content-focused approach, while the student is a passive recipient of information.

As a response to behaviorism, cognitivist learning theories were developed. They deal with thought activities that actively process information, whereby learning is considered a process of organizing, storing, and searching for connections between information. Cognitive learning is based on the creation of cognitive schemes, and the result is general knowledge that is achieved through learning by insight and covert learning.

For the field of education, cognitivist theories of information processing and constructivism are important – a model of in-depth information processing that seeks to determine the conditions for the successful processing of new information in order better to integrate it with existing information in long-term memory, so that acquired knowledge and skills can be easily recalled and applied in new situations. Constructivism defines learning as a process that leads to a new understanding of the world and oneself by changing cognitive structures. A person who learns through their own activity builds their inner experience and discovers meaning in the phenomena around them. Students construct new meanings and understanding by integrating new information (learned from new experiences) with prior knowledge (gained from past experiences). According to this theory, the process of adaptation plays an important role, and it refers to the tendency of the organism to be aligned with the environment. The main goal is to maintain a balance between new and old thought structures, which is achieved through assimilative and accommodative processes. Assimilation is the process of understanding a new experience on the basis of an old one, and its incorporation in already existing thought structures. Accommodation refers to changing existing thought structures in accordance with new experiences, which happens when new information is too different to fit into existing structures, which thus opens the way to learning something new. Constructivist learning implies that learning is an active process of creating knowledge through constant social interaction, and we can perceive it as the opposite of mechanical learning and acceptance of information content. This approach implies that the student is an active participant in the learning process. Based on observations and their own experience in their physical and social environment, the student constructs their own knowledge, which is, therefore, unique to each individual. In this case, the active attitude of the learner is important; they need to be involved in what is being learned, conduct research, ask questions, create hypotheses, solve problems, and cooperate with others. The role of the teacher changes with the constructivist approach to learning. The teacher is no longer the primary source of information but becomes the organizer of the learning process. Their role is to choose suitable forms of work, teaching methods, and sources of knowledge and thus shape the environment for learning and encourage and guide students in the independent discovery of new terms, concepts, and principles. Wangpipatwong and Papasratorn (2008) point out that constructivist learning is an ideal pedagogical approach for e-learning. They developed a constructivist e-learning environment (CEE), which consists of three parts: research, collaboration, and construction of new knowledge.

The principles of the constructivist approach are as follows:

- Students learn by actively participating and reflecting on experiences.
- Students learn by building on what they already know.
- Students develop higher-order thinking through guidance at key points in the learning process.
- Students differ in ways and forms of learning.
- Students learn by interacting with others.
- Students learn through instruction and experience in accordance with their cognitive development.

1.7 Learning of today's students, the so-called digital natives – neurobiological research

"It is not true that digital natives cannot follow lessons, but they consciously choose not to." (Prensky, 2001)

Recent research in the field of neurobiology indicates that various stimuli change the structure of the brain and affect the way people think and that these changes take place throughout life. Today's children, born in the digital age, the so-called *digital natives*, use digital technology on a daily basis and differ from earlier generations in their behavior, way of thinking, information processing, interaction, and communication with others. Prensky (2001) hypothesizes that the brains of digital natives are most likely physically different because of their exposure to digital technology while growing up. The way they receive information depends on the way they process it. They are prone to quick feedback on their knowledge and quick answers to their questions; they are more susceptible to multimodal content, i.e., content presented with photos, sound, and video. They learn more easily when they are surrounded by dynamic media with a high level of interactivity, and they use a random approach to content instead of a linear one. If they are offered static text and images, their interest and attention decrease. Since they are mostly visual learners, verbal or textual content should be supported by visual content, which leads to better memory and motivation to acquire knowledge (Ivanova, 2009).

Older generations, the so-called *digital newcomers*, have the habit of long-term planning and expectations, while, for the new generation, it is important that all information is available to them immediately. Older generations see such impatience as a lack of attention, social skills, and personal contact. Their way of directing attention is different; they direct it in a non-linear manner, and they are focused on several things at once. As digital natives have grown up with digital games, the dominant learning method is trial and error. Teachers can use the above to design teaching materials that will allow them to experiment with content in order to learn it better, avoid teaching classes, and apply learning through play (Feiertag and Berge, 2008). Students should see an explicit link between the content they are learning and things they are personally interested in. For them, learning is a process that must be relevant, immediately useful, and fun, so teachers should allow students the freedom to incorporate personal interests and preferences in learning activities. This generation of students

is very socially connected in a virtual environment; they like interaction, creation, and teamwork-based learning. Their thought process is accelerated; it requires thinking, and they learn and reason at the speed they do when playing digital games (Prensky, 2001).

Scientists who refer to the discoveries of neurobiology claim that these students, as a result of daily stimulation of several different senses, have developed different, hypertextual minds. Their minds seem to have parallel cognitive structures that do not operate in sequences. The linear way of thinking, which is still dominant in educational systems, makes it difficult for them to learn because their brains were developed with exposure to computer games and multimodal content (Prensky, 2001). Therefore, the newer generations possess a different combination of cognitive skills, they have a developed representational competence (the ability to recognize visual forms in three-dimensional space), multidimensional visual-spatial skills, mental maps, inductive reasoning abilities (formulating assumptions and noticing the rules of dynamic presentation), and reacting more quickly to the expected and unexpected stimuli. It is very easy to notice that a large number of children of the newer generation know their way around in terms of computers, but their reading comprehension is lacking – putting words and sentences into a context they understand and can relate to (McNamara, 2009). Every day, they are inundated with digital materials (with a possible educational purpose that they may not necessarily be aware of), different types of information, and sources of knowledge that move away from traditional textbooks (containing sound, text, image, and video).

Digital natives, accustomed to the high-speed multitasking, random access, activity, connectivity, fun, imagination, and quick results of their video game and Internet worlds, find much of today's education curriculum boring, no matter how well-intentioned (Prensky, 2001). Prensky believes that a more concerning issue is that the many skills that new technologies actually encourage (for example, parallel data processing, graphic awareness, random access), which have a significant impact on their learning, are almost completely ignored by teachers. Due to all of the above, digital newcomers should learn to communicate in the language and style of their students, i.e., digital natives, and adapt teaching methods to modern generations because the teaching methods they used as students are becoming increasingly ineffective.

1.8 Teaching

1.8.1 Approaches to teaching

In the last thirty years, there has been a shift in the perception of humans as active participants in their own lives, who have the ability to self-regulate motivation, cognition, emotions, and actions, which enables them to take an active role in their own lives (Bandura, 2001). Therefore, there has been a shift in the understanding of students as active participants in their own learning process, and the direct consequence of this is a paradigm shift in education. Instead of focusing on the content to be learned/taught and the teacher as the transmitter of such content, the emphasis is now on the student. The traditional content-centered teaching approach no longer meets the needs of students and needs to be replaced by an innovative student-centered approach. In the traditional approach, the teacher is the source of information that they convey to the students, usually in the form of a lecture. In this case, students are passive recipients of information that they try to remember, while often lacking understanding and the ability to apply it. With summative evaluation, the teacher assesses the success of the student in such a learning process.

In the student-centered approach, the teacher's role is to create a stimulating environment for learning, using active teaching methods that will encourage the active involvement of the student and their own construction of understanding of the content they are learning, followed by discovery learning, experiential learning, and collaborative learning. In this approach, in addition to evaluating what has been learned, the teacher applies evaluation for learning with the aim of improving future learning and teaching, and evaluation as learning to improve students' self-regulation learning skills, as well as peer evaluation. The traditional approach focuses on academic skills in traditional areas, while the innovative approach emphasizes a holistic approach to development, student well-being, academic skills, and transversal competences.

1.8.2 Teaching methods – active teaching

A teaching method is a learned generalized pattern of behavior that can be systematically applied in different teaching areas with the aim of facilitating and improving learning outcomes. Teaching techniques are narrower than methods that refer to specific procedures developed for the purpose of teaching a certain type of material.

Teaching methods differ according to the degree of activation of students and teachers in teaching as well as according to the number of people being taught, therefore we distinguish between:

- direct teaching
- discovery-led teaching – active teaching, and
- independent learning.

Direct teaching is still the most widespread method of teaching, in which the teacher directly conveys structured information to students or demonstrates the steps they need to follow in order to acquire skills. Its main features are the central role of the teacher and the highly structured information. This method is applicable when we have a large amount of material, a large number of students, and limited time. This method is suitable when the goal is to present facts and data, when the material is difficult to access in another form, when it is necessary to stimulate students' interest, guide students to new content, or when it is necessary to summarize and synthesize material from several sources. On the other hand, direct instruction is not suitable when the goal is the application of knowledge or skill training, when other sources of information are readily available when students are heterogeneous in relation to prior knowledge, when the content is abstract and complex, and when active student participation is desired. The main downside of the method is its incorrect application, which amounts to stringing together unrelated facts, which encourages mechanical memorization instead of deductive reasoning. Students are mostly passive and direct teaching makes active learning difficult. Direct teaching is based on the social learning

model (acquisition of procedural knowledge, cognitive, psychomotor, and social skills) and on the information processing model.

At the other end of the spectrum of teaching methods, there is independent learning with the highest degree of student activation, where the teacher is passive. However, in order for a student to be successful in independent learning, they should have developed skills for monitoring the teaching process (purposeful listening, making notes, connecting and comparing with existing knowledge) and independent learning skills (organizing and elaborating the text, solving problems, writing, storing information in long-term memory, critical thinking, and metacognitive skills, and skills related to demonstrating and using knowledge) (Vizek Vidović et al., 2014).

Recently, there have been talks about the skills of self-regulation of learning, i.e., self-regulated learning. Self-regulated learning is defined as a process that helps students manage their own thoughts, behavior, and emotions in order to successfully manage their learning experiences (Zumbrunn et al., 2011). It is a process that integrates metacognitive (planning, goal setting, organization, self-monitoring, self-evaluation), cognitive (choice of learning strategies, structuring the environment), and motivational aspects (self-efficacy, interest in the task, self-attribution) in order to effectively regulate one's own learning process (Zimmerman, 2002). Students whose learning is self-regulated achieve more positive educational outcomes, are more successful in solving problems, have better academic results, are intrinsically motivated, and show greater interest in solving tasks (Zimmerman, 2002). However, the effects of self-regulated learning go beyond the educational context. The ability to self-regulate gives students a more positive attitude towards the future, empowers them to manage their own social behavior, and supports the development of lifelong learning skills, which in turn makes it easier to deal with the demands of modern society. However, the learning of a significant portion of students is not self-regulated in the best possible way because they lack the knowledge and skills necessary to effectively manage their own learning. Part of the research shows that, with age and the development of cognitive abilities, there is a developmental progression in self-regulation of learning, while on the other hand, some results indicate stagnation, or even decline, in the period of early and late adolescence. As the learning context is an important component of self-regulated learning, teachers as mediators in socialization play an important role in encouraging self-regulated learning in various, direct and indirect ways: by teaching students effective learning strategies or by structuring the learning environment so that students have the opportunity to discover effective learning strategies themselves (according to Šimić Šašić et al., 2021).

For all the above reasons, the best teaching method is guided discovery teaching. The beginnings of the interactive and experiential approach to teaching go back to ancient times and the Socratic method, which was based on discussion. Socrates feigned ignorance and asked his students to express their opinion, then he would, using astute questions and ironic remarks, make them see their own lack of knowledge, and with skillful argumentation, he would make them accept his point of view. The goal of such a conversation is to raise doubts about one's own knowledge and create a foundation for accepting new knowledge. This method of teaching is important for contemporary practice because students and teachers are partners in the process of learning the truth. The approach supports critical thinking and problem-solving using arguments and dialogue. Social constructivists contributed to the development of this teaching method; therefore, it is based on learning by discovery. The main goal of discovery learning is to help the student ask questions and look for answers and solutions that will satisfy their curiosity. Guided discovery teaching involves the active participation of students and teachers alike, and the concept of active teaching is closely linked to it.

Active teaching implies the use of teaching strategies/techniques that maximize interaction between students and teachers, students and teaching content, and among students. The positive consequences of active teaching are as follows: increased student attention, development of communication skills and argumentative discussion, assertiveness, respect for others, cooperation – cooperative learning, active listening, empathy, development of creative, critical, and divergent thinking, increase in intrinsic motivation, reduction of negative emotions (anxiety, fear, stress), increased appreciation of learning and knowledge, and positive attitudes towards learning.

Pyramid of active learning

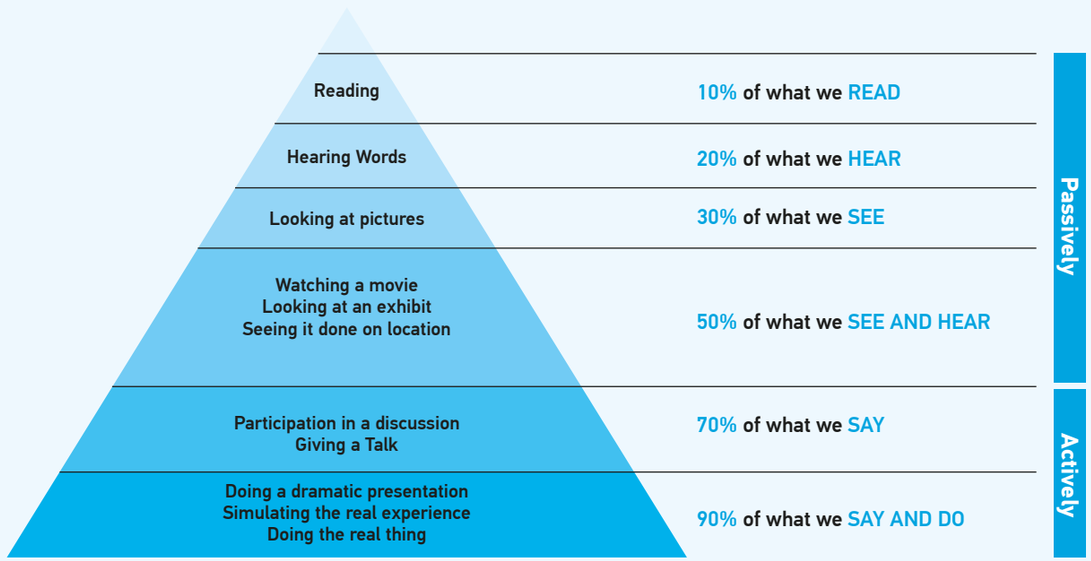

Figure 1 *Pyramid of active learning* (E. Dale)

If we look at direct teaching in class from the perspective of Bloom's taxonomy in the traditional approach, in most cases, lower levels of cognitive processes (memorization and understanding) are encouraged, while higher levels of cognitive processes (application, analysis, evaluation, and creation) are left for practice at home. By applying innovative teaching methods (e.g., flipped classrooms), the situation is reversed, memorization and understanding are encouraged by activities at home, and application, analysis, evaluation, and creation are encouraged in class.

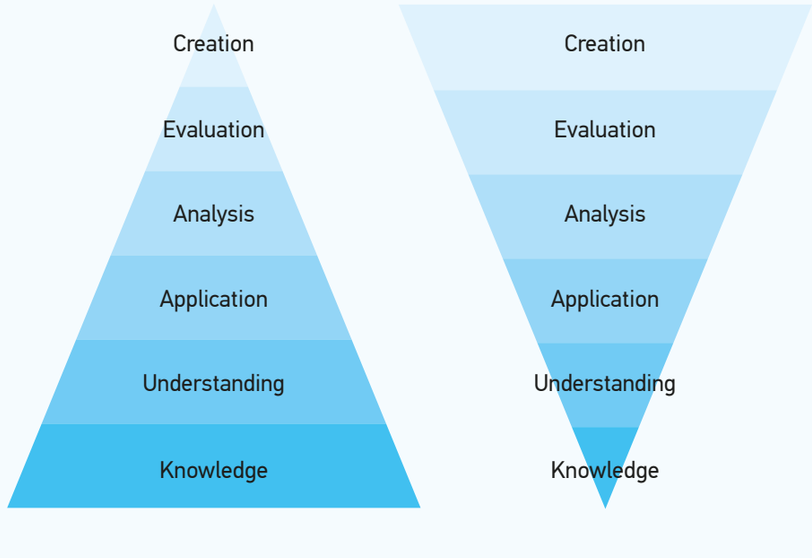

Figure 2 *Encouraging cognitive processes in traditional and active teaching*

1.9 Digital technology in teaching

The premise of sustainable development is quality education, and the key tool for achieving this goal is digital technology (Haleem et al., 2022). The main goal of using information and communication technology (ICT) in teaching is to improve the quality of education and help students achieve learning outcomes. ICT is used with the aim of strengthening the creativity, dynamism, and flexibility of the teaching process, which becomes more familiar and more interesting to the student. However, access to technology does not imply more effective learning. The introduction of digital technology alone will not lead to a change in the development of student competences and the achievement of learning outcomes. Digital technology is a tool, just like chalk and a blackboard, and it should be used carefully in order to encourage active participation of students in classes, higher cognitive processes, and the development of competences. When used in the right way, ICT can enhance learning outcomes.

1.10 Impact of digital technology on learning

Today's students, i.e., *digital natives*, were born in a digital environment and they use technology on a daily basis. Therefore, we must take this environment into account as a developmental framework, i.e., educational experts view technology and media as an important secondary socialization factor. Digital technologies help students develop skills that will require professional performance, such as problem-solving, creating a thought structure, and understanding the processes. They are also planning for an unpredictable and changing future in which technology will play a key role. The acquired qualities and abilities of the students will be crucial for their professional success. Educational resources and digital tools help improve the classroom atmosphere and make the teaching and learning process more engaging. They give the educational institution greater flexibility and the possibility to adapt the curriculum based on the requirements of each student.

Since today's youth are accustomed to using electronic devices, their involvement in education would undoubtedly help stimulate their interest and increase their level of involvement. Integrating technology into education provides students with an engaging learning experience, allowing them to stay more interested in the subject, with no distractions. Learning can be made more dynamic and interesting by setting tasks that involve technological resources, oral presentations, and group participation. Using computers and other devices in combination with digital tools allows students to play a more proactive role and be at the center of the learning process. The teacher becomes a guide in this process and can assess the effectiveness of learning. By using a variety of digital resources, students can download the information they need or upload their own content. Web 2.0 technologies (wikis, podcasts, blogs, etc.) make it easier for students to generate content, collaborate with others, evaluate other people's work, and move toward collaborative learning. Digital technologies facilitate the use of tactics such as gamification or approaches such as flipped classrooms that optimize learning.

Haleem et al. (2022) state the possibilities and advantages of using digital technology in the classroom, which are:

- Classes are more interesting, exciting, and participatory, they facilitate visual learning, and instructional materials can help students be more detail-oriented through interactive online presentations.
- Students have more options and control over their learning experience, greater freedom, and availability of teaching materials, lectures, or laboratories, they can participate in lectures that are broadcast live at a certain time, but they can also watch recordings of lectures independently.
- Students who learn using technology can build skills that will help them succeed in the future.
- The transformation of innovative ways of learning – students are encouraged to explore information in new and exciting ways through educational applications and programs, and teachers can use interactive whiteboards and classroom clickers to introduce and reinforce subject knowledge, as well as provide feedback.
- Students develop independent learning skills, and they improve performance and efficiency – digital learning tools and technology engage students and improve critical-thinking skills, which is the foundation for developing analytical reasoning.
- They expand knowledge – students are more involved and want to learn more; they may not even realize they are actively learning because they learn using exciting approaches such as peer-to-peer learning, teamwork, problem-solving, flipped teaching, concept mapping, playing games, staging, role-playing and telling stories. Being far more engaging and memorable than bulky textbooks or one-sided lectures, digital learning provides a deeper context, a broader perspective, and more stimulating activities compared to traditional teaching strategies. Students can better connect information, which is a more exciting and engaging approach to information processing.
- Problem-based learning – it is emphasized in digital learning solutions and constructive collaborative learning techniques that focus students' attention on real-world learning approaches. Digital learning tools and technology support students in developing problem-solving skills, understanding new technologies, and self-motivation, which prepares them for future education and work.
- Student performance is improved through a systematic approach to teaching procedures and resources.
- Inclusive environment – it enables recognition of individual needs of students, as well as students with disabilities, it enables learning at their own pace and correction of weaknesses.
- Developing teamwork and communication skills.
- Improved teaching productivity – digital aids facilitate planning, enable easy and practical learning, quick assessment, better resources, and new skills.
- Progress monitoring.
- Teachers can provide additional help and support.
- Information sharing, availability.
- Improved access to educational resources – at any time, seven days a week. Cloud storage, video recording of lectures, and the availability of notes in electronic form have made it easier for students to access resources at their convenience.

ICT can improve the quality of teaching and learning thanks to access to a large selection of educational resources and by enabling the application of methods of active participation. This means that ICT provides new ways of support for students because it changes teaching and learning methods (Kolić-Vehovac et al., 2020). In the digital environment, students have the opportunity to create and connect knowledge with the real environment, which ensures meaningful learning and encourages motivation (Caena and Redecker, 2019). When it comes to the relationship between the use of ICT and student achievement in academic subjects, analytical results based on the PISA data reveal a bell-shaped relationship between the use of ICT and their test scores in reading,

mathematics, and science. Moderate use of digital devices in school may be more beneficial compared to no use at all, but excessive levels of ICT use are also associated with lower student achievement. Students with very high and very low levels of use of digital devices at school tend to show worse results in reading, science, or mathematics (OECD, 2019), and even collaborative problem solving (OECD, 2017). A similar pattern emerges with regard to adolescent mental well-being (OECD, 2017). By using ICT in learning and teaching, it is possible to support various aspects of knowledge building, and the effectiveness of ICT increases with frequency and appropriate use (Chaudhary, 2018).

1.11 Teachers' attitudes toward new technologies

Teachers believe that ICT contributes significantly to their teaching by helping them to better explain some concepts, making classes more interesting, and encouraging them to change how they interact with students. They believe that ICT can be used in most subjects.

The advantages of using ICT seen by teachers are: better student control over their own learning processes, immediate feedback, simulations that help students distinguish, change, and control variables and help develop their conceptual understanding (Cox and Webb, 2004).

On average, teachers in Croatia express moderate agreement when it comes to advantages of students' use of ICT. By using ICT, students learn new and useful content, become more independent in searching for information, and acquire useful IT skills. ICT helps them in completing their school duties and facilitates communication between students and teachers, as well as among students. However, teachers also point out the disadvantages of students' use of ICT in everyday life. These imply a rapid spread of rumors, gossip, and scheming among students, decrease in physical activity, exposure to violent and inappropriate content, the possibility of becoming addicted to ICT, neglecting school duties, and lack of socializing with parents and friends.

Also, on average, teachers express moderate agreement when it comes to the advantages of using ICT in classes. They point out that students do their homework more regularly, work harder on what they are learning, get involved in class discussions more, remember the material more easily, and concentrate better on what they are learning. Using ICT in classes has a positive effect on the classroom climate, student involvement is greater, distractions are reduced, collaborative learning is facilitated, and students acquire the material more easily. When it comes to the disadvantages of using ICT in classes, they have a moderate perception of the disadvantages of using ICT. It is more difficult for teachers to monitor what students are actually doing, it is more difficult for them to gain insight into how students learn, and it is more difficult for them to notice which students are not actively participating in class. On the other hand, it is more difficult for students to assess how much they have learned, they use applications that are not related to what they are learning, they have fewer opportunities to develop effective learning strategies, ICT encourages them to learn superficially and distracts them from the material at hand.

Teachers assessed the perceived usefulness of ICT as moderate; it is most evident in improving performance and increasing productivity. It is interesting to note that, at the end of the implementation of the project within the framework of which this research was conducted, there was a decrease in the perceived usefulness of ICT (Smojver-Ažić et al., 2020). These results tell us that saturation can occur, i.e., that teachers should plan the use of technology well.

Teachers involved in the RCK Recept project use the platform *eTwinning* (76%), a smaller number of them use the *Online teachers academy platform*, 70% of them attended training related to digital competences, and most teachers do not use or are not aware that there is a digital platform within RCK Recept. Only 20% of teachers are aware of the fact that digital educational content, tools, and methods include pedagogical models of ICT application in learning and teaching, and 9% know that the developed educational content also has an innovative component. Almost 60% of the surveyed teachers use digital tools in class often (38.1%) and very often (21%). More than 90% of the surveyed teachers (91.4%) rated the current level of use of digital tools in teaching in their school by teachers and students with grades from 3 to 5. Teachers rated the digital infrastructure in their schools as satisfactory. The largest number of surveyed teachers (89.6%) rated the digital competences of students in their school with grades from 3 to 5, and the largest number of surveyed teachers (95.2%) rated their own digital competences with grades from 3 to 5. The majority of teachers (79%) rated their motivation for the transition to digital education with grades from 3 to 5, and 19% of teachers were extremely motivated (Research on the application of technology in the field of education in the tourism and hospitality sectors at the RCK level as part of the RCK Recept project, Opatija Catering School, 2022 b). Teachers assess their digital competences and their degree of use of digital tools as satisfactory.

International research indicates that the methods used by teachers in the classroom depend, to a greater extent, on the environment and teaching culture in which they grew up rather than on their own education. Only a few of them "outgrow" the teaching method they were taught (Stigler, Hiebert, 2009). The key factor for implementing digital technology in teaching is the attitudes and competences of teachers.

Competences that a teacher needs to introduce an innovative learning environment are as follows:

- knowledge of the 21st-century competence areas, which they must master themselves
- mastering the curriculum of a particular subject to the extent that they can choose the contents with which they can specifically develop a particular competence
- the ability to plan and cooperate with other teachers in the class council, which enables synergy of effects and prevents oversaturation of certain elements
- pedagogical and didactic knowledge that enables the teacher to organize student-oriented classes with continuous evaluation and feedback
- mastering the use of devices and the ability to search for and evaluate applications suitable for the implementation of certain activities and the achievement of the general or specific

goals of the subject (Vičić Krabolja and Šverc, 2019).

Teachers need to find a way to lead a discussion in a language that their students understand, encouraging them to use technology for educational purposes and giving them tasks that will activate and motivate them to learn. For the success of the implementation of ICT in school, it is important that teachers take a positive stand toward the application and use of computers in education. Instead of referring to students who fail to master the material due to a learning method that does not match their abilities and memorization as children with disabilities in terms of concentration and memory, one should start appreciating the abilities that these children do have – the ability to acquire information quickly and multitask. Since they use digital technologies on a daily basis, they should be encouraged to direct their skills and knowledge of working with digital technology toward education. Traditional teachers hesitate to include modern technology and devices in school; they perceive them as a distraction rather than an intelligent aid to learning (Prensky, 2001). Digital technology can make the educational process more efficient and economical. However, research shows that more efficient schools tend to use more innovative approaches and use ICT resources appropriately and that technology itself is not the cause of the improvement of the educational process (Higgins et al., 2012).

Chapter 2

Choosing new technologies – a view through the prism of innovative teaching methods

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Choosing new technologies – a view through the prism of innovative teaching methods

Modern teaching is based on the idea of active learning in which the student explores, creates, and collaborates in interaction with others and a stimulating environment in which the teacher encourages learning. Digital technology is a tool that should be adequately implemented in appropriate and innovative teaching methods.

2.1 Exploratory learning

Exploratory learning is a form of active learning that begins with asking questions that students explore in detail in order to develop knowledge or come up with a solution. It includes problem-based learning and is used in small-scale research and projects. It is an approach to teaching that allows students to participate in activities that lead them to adapt existing knowledge or acquire new knowledge.

The basic phases of exploratory learning are as follows:

1. research problem
2. goal
3. research questions
4. research procedures, and
5. answer to the research question.

We distinguish between several types of exploratory learning:

Structured exploratory learning – a sequential process that helps students learn how to ask questions and explore real-world problems. This form of exploratory learning is often used in science and is associated with the scientific process of finding solutions.

Open-ended exploratory learning approach – students are given the freedom to explore their own interests and ask questions about the topic they are studying. It is more often represented in the humanities and it enables a deeper exploration of the topic and a discussion of different points of view.

Problem-based exploratory learning approach – it focuses on solving real-world problems through the application of research. It is often used in math and engineering classes, and students are asked to apply what they have learned to solve real-world problems.

Guided exploratory learning approach – teachers guide students through the exploration process and help them ask questions and find solutions to real-world problems. It is often used in primary and secondary schools.

Exploratory learning enables the development of research skills, thinking, and problem-solving skills; it improves critical thinking, creativity, and communication skills; it enables the connection of learning with real life, helps the student to understand complex topics, and encourages engaged learning. This method encourages natural curiosity and the development of skills related to independent, self-regulated learning, as well as those related to teamwork. Examples of exploratory learning are as follows: experiments, field trips, debates, projects, and teamwork (Ristić Dedić, 2013).

A framework for designing guided exploratory learning:

- introduction – invitation to research, stimulating curiosity, presenting a topic that will stimulate the interest of the research community, connecting with the student experience
- immersion – building background knowledge, what do students already know, what can be studied for new research?
- explorations – literature search, ideas
- identification – research question
- collection – comprehensive information
- creation – presentations, summarizing, interpreting, and expanding knowledge
- sharing – research question experts, collaborative learning
- evaluation – achieved goals, reflection, self-evaluation.

2.2 Problem-based learning

Problem-based learning implies learning through the experience of solving problems. It is characterized by a high degree of observation of relationships and cause-and-effect relationships. With problem-based learning, we associate a problem situation that represents the initial state of psychological tension, surprise, interest, and mental and emotional strain of an individual who needs to solve a given problem. In a problematic situation, the student cannot find their way around based on what they know, i.e., what they have learned up to that point. Problem-based learning is closely related to exploratory learning because solutions can only be found through research. Its attributes are similar to those of exploratory learning.

The stages of problem-solving are:

1. problem setting – defining the problem
2. problem-solving – finding the principles of the solution, stating hypotheses, problem-solving process, data collection
3. reasoning – drawing conclusions, important conclusions, general conclusions, and applying the conclusion to the problem situation.

We connect learning by insight with problem-solving, which takes place in the following stages:

- preparation phase – analysis of the problem, collection of information and materials, and initial conscious work on the problem
- incubation – active processing, slow, automatic expansion of memory activation, passive forgetting of superficial details and previous attempts at problem-solving, associative play between problem elements
- illumination – insight, problem solving
- verification – checking the solution.

Methods of problem-based teaching:

- Problem-based reading – directed independent quiet reading. The student selects facts, decodes the text, finds relevant and cause-and-effect relationships
- Problem-based presentation includes problem questions and tasks that imply research work
- Heuristic conversation – the teacher's questions help the student to discover something new. At this point, the nature of disclosure plays an important role. Questions bring about new knowledge.
- Research method – it is applied in the process of acquiring new knowledge, i.e., in the lessons where new material is being studied. The student independently goes through the phases of problem-based learning; they independently research and adopt the teaching content.
- Method of creative problem-solving – a type of task that includes elements of problem-based teaching. Sometimes the teacher will offer a number of solutions (alternatives), and the student will choose them independently.

Problem-based learning can be used in individual work, pair work, and group work, but also in the frontal form of work that encourages creative thinking.

2.3 Project-based work

Project-based work is a type of activity that helps develop students' creative abilities and the formation of teamwork skills. The purpose of the projects is to update and use them in practice to expand and deepen the acquired knowledge. Work on the project can be done individually, in pairs, or in micro groups, and it implies solving problems and searching for optimal solutions.

The stages in the implementation of the project are as follows:

1. choice of topic,
2. planning,
3. implementation,
4. presentation, and
5. evaluation of results.

Each project has a goal, a certain duration, i.e., a completion deadline, and a result (which is a product). Also, each project implies a more complex task (which can be broken down into simpler ones), and it typically involves the work of several students – the team also implies cooperation and coordination of all participants. Project-based work is especially suitable for vocational schools!

The positive effects of project-based work are: increased motivation, involvement in learning, more positive attitudes, self-efficacy, and cooperation.

2.4 Flipped classroom

Flipping the classroom means that events that traditionally took place inside the classroom now take place outside the classroom and vice versa (DeLozier and Rhodes, 2017). The flipped classroom approach follows a social and constructivist framework rooted in the idea that active learning takes place during class, and all passive work can be done at home. Before even coming to class, students get to know the teaching material, usually by watching a short video, and the time in the class is used to deepen their knowledge through practice, to solve problem tasks, and to interact with other students and the teacher. Students are at the center of the teaching process and are engaged in activities that require cooperation with other students and the teacher and are based on solving problems.

Figure 3 *Flipped classroom*

The advantages of the flipped classroom are: student activity, applicability in all areas, closeness to students who use technology on a daily basis, providing help to students with learning difficulties, revisiting, self-paced learning, greater interaction, overcoming differences in abilities, individualized teaching, reducing boredom and disciplinary issues, etc.

We distinguish between several types of flipped classrooms:

- Standard flipped classroom – 180 – for homework, students are given videos and materials they need to watch and read to prepare them for the following day of classes. During the lesson, what the students have learned is put into practice, and the teacher has time for an individual approach.
- Discussion-focused flipped classroom – students are introduced to the topic at home through videos or materials, and the assigned topic is discussed in class.
- Micro-flipped classrooms – combining traditional and flipped classroom techniques (good for transitioning from traditional teaching to the flipped classroom).
- Method 270 – flip the teacher – the student creates educational content and presents it to their classmates,

which makes the learning experience for the student two-fold.

- Debate-focused flipped classroom – students prepare at home, and the debate takes place in class.
- Mock flipped classroom – students watch a video in class.
- Virtual flipped classroom – the class takes place using a learning management system.

Students' opinions on the flipped classroom are mostly positive; they find watching videos more effective than reading, they recommend a quiz after watching videos, and they prefer live video lectures, but they liked the interactive activities in class more than traditional lectures and prefer shorter videos. Using the flipped classroom improves exam performance.

Implementation steps:

1 Introduction
   - Before class: video, text, presentation
   - During class: goals, evaluation criteria (checking prior knowledge)

2 Exercise
   - The teacher provides support, resolves doubts, and checks understanding using a quiz or a test
   - Students bring notes and compare them with other students

3 Creation
   - Students summarize what they have learned, which encourages creativity

Implementation instructions:

a) Choose a topic, prepare homework for students, and prepare your students: in the instructions, emphasize why it is important for them to watch the video, ensure that the materials are available, put them on the learning management system, instruct the students what they will do during the class.

- Activities during class (problem-solving, think-discuss-share, debate, discussion, case study, IF-AT cards – feedback on accuracy during task solving, mental maps, essay, role-playing, group research, studying in pairs, etc.)
- Reflection, feedback, presenting what has been learned

b) Creating video content:

- Lesson planning, video recording (one topic, maximum duration 15 minutes, voice modulation, recording in pairs), video editing, posting the video on the Internet
- Video creation tools (*Screencast-o-matic, Camtasia Studio, Office Mix*)
- Video uploading services (*YouTube, Vimeo, TeachersTube, Edutorij*)

Video interaction tools (*EdPuzzle, Zaption, Verso*)

- Learning management (*Moodle, Schoology, Canvas, Loomen, Google Classroom*)
- Steps for students: before class – preparation; during class – application, discussion, feedback, and after class – verification of understanding and expanding knowledge.

2.5 Gamification

Gamification is the application of games or game elements in situations that are not exclusively related to the game (educational context) with the aim of increased motivation and concentration, and is based on the use of video game principles (Lovrečki and Moharić, 2021). The authors recognize the motivational power of games and try to apply them in an educational context. Gaming is associated with trial and error, as well as with success based on practice, experience, reflection, and learning, it includes processes of experimentation and discovery, it evokes different emotions (from curiosity to frustration), it provides positive emotional experiences such as pride and optimism, as well as opportunities to develop students' resistance to failure by reconceptualizing failure as a key part of learning, encouraging cooperation and tolerance. Game design elements are the basic building blocks of gamification applications, and typical game design elements include points, badges, leaderboards, performance charts, meaningful stories, avatars, and teammates. Points are the basic elements of many games and gamified applications. Usually, the successful execution of certain activities within the gamified environment is rewarded, and the reward serves to represent the player's progress numerically. One of the most important purposes of points is to provide feedback. Points make it possible to measure the player's behavior in the game and serve as continuous and immediate feedback but also as a reward.

Most of the popular digital tools in the field of gamification are free of charge or some of their functions are free of charge. There is the possibility of using joint subscriptions at the level of the school institution, which truly makes these applications available for all teachers. The most popular digital applications in the gamification world are: *Learning Apps, Wordwall, Kahoot, Quizizz, H5P, Wizer, Genially, Quizlet*.

In the research on the preparation and implementation of the experimental application of the model of using ICT in learning and teaching (Carnet, 2022), students who were taught using the game-based method perceived the lessons to be of higher quality in general, but also during the experimental implementation of the use of ICT, and were more involved in learning, they were more motivated, and had a more positive attitude toward the use of ICT in classes, compared to students who were taught using the collaborative and problem-based method and compared to the control group.

2.6 Distance education

Distance education implies teaching and learning in which the student and the teacher are not physically present together and communicate using technology. Distance education is a form of classes that takes into account the location, and e-learning implies the use of electronic media and information and communication technology in class and is most often associated with distance education. A framework for understanding distance education is described in terms of three interrelated variables: interaction, structure, and autonomy. The first two variables refer to the way in which the class is designed and carried out, and the teacher is the one who is responsible, i.e., the one who is in charge of distance education. The third, autonomy, refers to the student and their ability to control their own learning (Moore, 2013). Distance learning can be synchronous, when it takes place in real-time via video conference

or direct correspondence, and asynchronous, when the participants are both physically and temporally apart, in the sense of tasks that students solve independently. Barnard et al. (2009) emphasize that distance education eliminates the limitations in terms of location, time, and physical materials and gives students control over their own learning. In other words, distance education places the student at the center of the educational process and requires their independence. This is especially pronounced in asynchronous classes when students decide for themselves what, when, how, and for how long they will be learning. Research shows that distance education can be as successful as traditional education if appropriate teaching methods and technologies are used, if there is interaction between students and teachers, and if there is timely feedback from the teacher to the student (Ross et al., 2010).

Students who spend more time studying using computers achieve above-average results on the PISA test (OECD, 2005). Better results in reading, mathematics, and science literacy are achieved by students who started using digital devices and the Internet at an earlier stage, students with more developed digital competences, students who learned less about the use of the Internet at school, and those who used digital devices during the classes of certain subjects (Markočić Dekanić et al., 2020). E-learning can have a great impact on increasing students' motivation to work and the adoption of the necessary learning outcomes (Bulić et al., 2017), and students perceive such learning as extremely positive. Bulić et al. (2017) determined that students in the 5th and 6th grades of elementary school make better progress in adopting educational outcomes in distance education compared to those who attended traditional classes, while such differences were not established for students in the 7th and 8th grades. The authors conclude that in the older group of students, e-learning is not less effective than traditional learning. Bulić and Kostović-Vranješ (2019) found that e-learning affects students' self-responsibility in completing homework. Students in the 7th and 8th grades completed their tasks more often in e-learning situations than in traditional classes. A meta-analysis conducted by Voutilainen et al. (2017) found that e-learning methods result in slightly higher test results compared to traditional methods, and they conclude that the size and direction of the effects are highly situational. Similarly, Bernard et al. (2004) found small but positive effects of distance education on student achievement and attitudes towards technology, while they found small but negative effects on retention, attitude towards the subject, and the teacher.

2.7 Other innovative techniques

Interactive technologies are methods that help teachers and students switch places. When interacting in groups and working on information, students discover new opportunities for self-learning. It is a whole complex of work methods and techniques aimed at creating activities in which students communicate with each other and work on solving a common problem. Interactive technologies are implemented through seminars, debates, problem-based lectures, and discussions in schools, where students can express their thoughts and learn to argue their own opinion.

Portfolio: A portfolio helps in evaluating the dynamics of learning outcomes. It can be used to visualize educational achievements and discoveries. This innovation is carried out through the following ways of collecting information: electronic portfolios, achievement maps, and growth diaries. They record all events and projects and collect materials that confirm participation in projects, discussions, and results of creative activities.

Online laboratories: Online laboratories, whether remote or virtual, are yet another innovation aimed at improving technology-supported teaching and learning. Virtual online laboratories allow students to simulate scientific experiments, while remote ones allow students to use real laboratory equipment remotely via the Internet.

International collaborative projects: Collaboration through technology can improve students' interaction, engagement, learning, and thinking skills, as well as increase the flexibility and diversity of their educational experiences. Technology-supported collaboration can improve students' awareness of global challenges and develop their understanding of other cultures.

Real-time formative assessment: Technology makes it much easier to use real-time formative assessment, or interactive assessment of student progress and understanding. Clickers, tablet computers, and other types of technology enable instant interaction and feedback between teachers and students. In real-time formative assessment, the software enables the use of various inputs for student assessment, including open-ended responses, student questions, photographs, or mathematical formulas.

Skill-based assessment: Technology has considerable potential to expand the range of learning opportunities available to students, as well as the potential to assess a wide range of innovation skills in a formative manner. Different learning options and personalization technologies can offer students a type of education that is engaging and enjoyable. The application of ICT offers an example of technology-supported education, which provides a wider range of experimentation and learning by doing compared to education without technological support. Simulations enable greater experimentation. Online laboratories (remote or virtual) using simulations can provide a relatively inexpensive and flexible approach to experiential learning. They also extend learning time and offer access that is not limited to a specific schedule or location. In addition, technology-supported simulations enable the study of subjects that would otherwise be almost impossible to study without the help of technology.

2.8 Why do schools need innovation?

In order for schools to keep up with global and technological changes, ensure the quality of education in accordance with the demands of the labor market, and ultimately be able to fulfill their role, it is necessary to innovate the curriculum and the way of teaching. Innovations can help transform teaching and learning practices and enable the development of skills and competences needed for the future. Harnessing the potential of new technological tools can help transform teaching and learning,

making it more interactive, personalized, and interesting. By adapting the way of teaching to the needs of today's students, and using innovative technologies, we influence the future. The rapid pace of social and economic change requires students to be well-equipped with the necessary key competences and transversal skills to face uncertainty, be resilient, collaborate to solve complex problems and become active citizens. The application of innovative teaching methods and digital technology can help achieve these goals.

There are four main obstacles to the positive effects of digital technology integration in classrooms: teachers' attitudes and beliefs, school resources, teachers' digital skills and knowledge, and institutional factors. We often resist change because we are used to a certain way of working; we doubt our own competences due to self-efficacy and a negative attitude toward digital technologies, conformity, etc. Therefore, it is very important to provide teachers with support on the way to the implementation of innovative methods in the form of education, opportunities for adaptation, exchange of experiences, work on oneself, improvement, and strengthening the sense of self-efficacy. Ready-made recipes are not always suitable for everyone; it is important to be aware of our own strengths and weaknesses and strive to improve our practice. Digital technologies alone cannot transform education, but they have an immense potential to transform learning and teaching practices in schools and open new horizons. The integration of innovative teaching methods and digital technology plays a key role in the transformation of education. In order to improve the quality of education, changes must come from within, from the teachers themselves, because teachers are the key change agents.

Chapter 3

Implementation for preparation – what should be taken into account when introducing digital content into classes

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3.1 General guidelines for the use of digital technology in the teaching process

The use of digital technology in teaching is not an end in itself. As in any aspect of modern life, teaching included, digital technology is used to facilitate business, more successful communication, generate more data, enable more efficient cooperation with other actors, and save time. Today, everyone is aware that, for instance, bank transactions and banking operations are much more efficient using digital banking applications than they were ten years ago when one had to go to the bank for each transaction physically. Everyone would rather pay bills using a banking application from the comfort of their own home than wait in line at the bank. With the digitization of many aspects of business, offers and demands have become more complex, and everyday life has become faster.

POPRAVITI na kraju

The school and the teaching process must respond to the demands of modern life, especially secondary vocational education, which directly prepares students for the labor market. It is precisely this point of view that has prompted changes in the creation of educational policy focused on learning outcomes, statements that are set before teachers as the goal of education, and the student, along with everything they will acquire upon completion of education, is at the center of the teaching process. This is precisely why we can no longer be satisfied with traditional forms and methods of teaching, which focus on the content that the teacher presents and the student memorizes.

The goal of using digital technology in teaching is, on the one hand, ease of use and, on the other, the creation of a rich educational environment permeated with visual representations and access to a plethora of information.

The impact of digital transformation in education is manifested in the improvement of the learning experience for students and teachers, but also for other people involved in the learning process. Such changes are aimed at improving inclusion and accessibility through an interactive and adaptive environment. All of the above results in cheaper online education but also more comprehensive and inclusive education. Some of the possibilities that the digital transformation in education enables are micro-lessons, interactive videos or tests, and even games or learning methods based on artificial intelligence. The above options help the student to be more involved in the process and integrate with the appropriate elements or tasks.

Digital transformation for educational institutions is a big step forward in improving the learning process and automating many operations: from printing numerous assignments and term papers to grading tests and calculating grade point averages.

Digital learning can influence the improvement of students' ability to learn independently. Digitalization of education allows students to personalize their learning experience through a choice of software, techniques, and learning resources. Education has become more accessible thanks to the possibility of storing educational materials on the World Wide Web. Schools can now, to a greater extent, provide access to affordable electronic devices such as laptops/tablets, which, for people of lower socio-economic status, means they have access to the same academic resources as their more "privileged" peers.

Naturally, the digitalization of education does not come without its shortcomings. A report published by Victoria University of Wellington's Institute for Governance and Policy Studies has highlighted some of the issues students may face in today's increasingly digital environment. The study found that attention spans are increasingly shortened due to the need for multitasking. Students often have to quickly browse and switch between several open tabs simultaneously, use various interactive technologies such as whiteboards, and participate in different activities. Today, the learning process is much more dynamic, which has resulted in the shortening of the attention span of most young people. The time spent on electronic devices is increasing, which puts young people's cognitive and social development at risk. Also, students are more prone to the loss of concentration. Violence on the Internet (the so-called cyberbullying) among adolescents has become an alarming issue in schools and affects (mental) health and academic performance. Social networks are overly saturated; it is common for an individual to communicate with hundreds of other users who share their life successes, milestones, and personal triumphs. Furthermore, young users can communicate with many people around the world with whom they share common interests. Despite this privilege, there are concerns that our brains are simply not equipped to process such large networks. Evolutionary biology suggests that our brains are designed for smaller networks than those that exist today. Students are more likely to share details about their lives with a potentially global audience, creating new and complex consequences for mental health.

The key elements that should be taken into account when introducing digital technology into classes are as follows:

- Goals and purpose: Define clear goals and the purpose of using digital technology in class. Technology should support pedagogical methods and contribute to the achievement of educational goals.
- Enrichment of the curriculum: Integrate digital tools and resources into the curriculum to achieve alignment with learning outcomes.
- Appropriate tools: Choose digital tools and platforms that correspond to the age, knowledge level, and needs of your students. Take into consideration a variety of tools, including online courses, interactive applications, videos, and other resources.
- Ensuring access: Ensure that all students have access to the necessary equipment and Internet to prevent disproportionality and ensure inclusivity.
- Teacher training: Ensure that teachers are well-trained in the use of digital tools and technologies. Provide ongoing support and training to improve their digital literacy.
- Safety on the Internet: Set guidelines and policies for safe use of the Internet and digital tools in the classroom. Inform the students about online security and protect their personal data.
- Interactive teaching: Encourage interactive teaching and collaboration among students through online platforms. Facilitate discussions, teamwork, and projects that require digital tools.
- Follow the progress: Use digital tools to monitor students' progress and adapt the teaching process to their needs. Analyze data to improve the educational process.
- Creativity and innovation: Encourage students to use digital tools to express creativity and to explore and solve problems.
- Screen time: Set guidelines for a reasonable amount of screen time to avoid overexposure to digital devices.
- Involvement of parents: Inform parents about how to use digital technology in the classroom and work with them to support learning at home.
- Evaluation of efficiency: Regularly evaluate the effectiveness of the use of digital technologies in the classroom to identify what is working and what can be improved upon.

The goals and purpose of using digital technologies in classes can vary, but they usually include the following:

- Improving the educational experience: The use of digital technologies can improve the way students acquire knowledge and skills. This can make lessons more interesting, interactive, and attractive for students.
- Personalization of learning: Digital technologies make it possible to adapt lessons to the individual needs of students. Teachers can use a variety of tools and resources to enable each student to learn at their own pace and style.
- Increasing access to education: Digital technology can make education more accessible to a wide range of people, including those who are located far from school or have special needs.
- Development of digital skills: Using digital technologies in the classroom helps students develop the skills they need in today's world, including digital literacy, problem-solving, and critical thinking.
- Increasing teaching effectiveness: Digital technologies enable faster access to information and tools, facilitating the learning and teaching process.
- Encouraging creativity: Digital technologies allow students to be creative, i.e., they give them the opportunity to express their own ideas in different ways, including multimedia presentations, videos, and digital art projects.
- Increasing motivation and engagement: Interactive content and games make learning fun and motivating for students.
- Preparing for the future: The use of digital technologies prepares students for future professional challenges in a world that is increasingly reliant on technology.
- Increasing teacher efficiency: Teachers can use digital tools to track students' progress, organize materials, and communicate with students and parents.

Therefore, the purpose of using digital technologies in teaching is to improve the quality of education, prepare students for the labor market, and support diverse learning styles and students' needs. Depending on the context and goals of the educational institution, specific goals can be set for integrating digital technologies into the teaching process.

All the listed positive effects of using digital technologies in teaching must not overshadow the goals of the educational programs themselves and the learning outcomes defined by legal documents, such as curricula or vocational curricula and qualification standards. On the other hand, the teacher can set more complex goals of the teaching process if they integrate digital technology into it. For instance, if the goal is to "develop creativity in the presentation of the tourist element," it will be easier to stimulate this type of creativity by using digital tools than by creating posters using pen and paper.

The application of digital technology in teaching can be achieved with a variety of tools and resources, depending on the objectives of the class and the needs of teachers and students. Here are some appropriate tools that are often used in education:

- LMS (*Learning Management System*)**:** Platforms such as *Moodle, Loomen, Teams*, or *Google Classroom* enable the organization of classes, access to materials, setting tasks, and monitoring student progress.
- Interactive whiteboard**:** The interactive whiteboard allows teachers to create interactive content and encourage student participation.
- Online collaboration tools: Tools such as *Google Workspace* (*Google Docs, Sheets, Slides*) enable teachers and students to have a common working environment for collaborating on projects.
- Multimedia content: Videos, animations, and interactive multimedia content can enhance understanding of complex concepts.
- Online teacher resources: There are many online resources and platforms, such as Carnet's e-School, *Khan Academy, Coursera*, and *edX*, which offer materials for teachers and students free of charge.
- Social networks for learning: Platforms such as *Edmodo* and *Schoology* enable teachers to create private online communities for learning and communication.
- Electronic books and textbooks: E-books and digital textbooks facilitate access to educational material and can be interactive.
- Quiz and assessment tools: Tools such as *Kahoot!* and *Quizlet* enable the creation of quizzes and tests to assess student knowledge.
- Programming and STEM tools: To learn programming and science, tools such as *Scratch, LEGO Mindstorms*, and *Raspberry Pi* can be extremely useful in developing science, mathematics, and computer literacy.
- Tools for virtual reality (VR) and augmented reality (AR): VR and AR technologies provide learning experiences that are immersive and interactive.
- Project management tools: Teachers and students can use tools such as *Trello* or *Asana* for the organization and monitoring of projects.
- E-portfolios: Digital portfolios allow students to document and share their academic progress and achievements, and teachers get a complete picture of the continuity of their students' work and education at the end of the academic year.

It is important to choose the tools that best suit the specific needs and goals of teaching and to ensure that teachers and students are sufficiently trained to use them effectively.

Ensuring access through digitalization of teaching for all students, regardless of their individual needs or socio-economic background, is extremely important in order to achieve inclusivity and equality in education.

We present several strategies and approaches that can ensure equality of access for all, regardless of the aforementioned work challenges:

- Adapting the material: Teachers should ensure that digital materials are available in a variety of formats, including text, audio, and video. This will help students who have different learning styles.
- Assistive technologies: Provide access to assistive technologies such as screen readers, text output, speech

synthesis, and other tools that help persons with disabilities access digital content.

- Adaptations for persons with disabilities: Ensure that digital materials are accessible to persons with disabilities; this may include accessible photo tags, text alternatives for multimedia content, and other adaptations.
- Internet access: Ensure all students have access to the Internet and digital devices. Schools should consider providing free-of-charge or affordable Internet access, especially for lower-income families.
- Digital literacy: Provide digital literacy training to teachers, students, and parents so that everyone can use digital tools and technologies.
- Ease of use: Choose digital tools that are intuitive and easy to use so that all students, including those less experienced with technology, can easily follow along.
- Individualized approach: Consider individualized approaches for students with special needs to provide tailored learning and support.
- Cooperation with parents: Involve parents in the educational process and communicate with them to understand their needs and challenges and provide support at home.
- Progress monitoring: Regularly monitor the progress of all students, identify their needs, and provide additional support as needed.
- Policies and guidelines: Introduce policies and guidelines that encourage inclusive digitalization of teaching and ensure that all students are included.

Ensuring access to digital education for all students requires awareness, investment in resources, and continued commitment to inclusive education. The aim is to ensure that no one is excluded from learning opportunities due to technical, economic, or other barriers.

Guidelines and policies for the safe use of the Internet and digital tools in the classroom are essential to protecting students from potential risks and inappropriate behavior online.

Here are some guidelines and policies that schools should consider:

- Rules of conduct on the Internet: Define clear rules and expectations for student behavior online. These include decency, respect for copyright, prohibition of online violence, and respect for privacy.
- Rules for using digital devices: Define when and how digital devices may be used in the classroom. This may include restricting use during class hours or specifying the locations in which devices may be used.
- Filters and security measures: Use filters and security measures to limit access to inappropriate or harmful content on the Internet. Make sure these tools are updated regularly.
- Reports concerning violence on the Internet: Set clear guidelines for reporting any incidents of cyberbullying and ensure that such incidents are treated seriously and confidentially.
- Security awareness: Properly inform students about the risks of the Internet and teach them how to recognize and avoid potentially dangerous situations.
- Access to personal data: Teachers and students should be instructed on how to manage personal data and be aware of the consequences of sharing such data online.
- Rules for sharing content: Teach students about copyright and digital content-sharing rules. Encourage them to be responsible Internet users.
- Cooperation with parents: Communicate with parents and inform them about the school's guidelines and policies for the safe use of the Internet. Cooperation between the school and parents is essential for the protection of students.
- Regular updates and education**:** Conduct regular education for teachers and students on the safe use of the Internet and digital tools. Technology is changing rapidly, which makes it important for everyone to stay informed.
- Evaluation and revision: Regularly review and update guidelines and policies to ensure they reflect the latest technological and societal changes.
- Emphasizing the positive aspects: Promote the positive aspects of digital tools and the Internet, such as their contribution to education and skill development.

These guidelines and policies should be aligned with local laws and standards and tailored to the needs of the school and students. The key is to create a safe and stimulating environment for learning through digital technologies.

Classroom interaction using digital technology implies creating a dynamic learning environment that encourages students to actively participate, think critically, and collaborate.

Here are some suggestions for conducting interactive classes with the help of digital technologies:

- Interactive content: Create or use interactive materials such as quizzes, simulations, animations, and virtual reality to engage students and stimulate their curiosity.
- Online discussions: Use online discussion platforms or social networks to encourage students to discuss concepts, ask questions, and express their opinions.
- Collaborative projects: Encourage students to collaborate on projects with collaborative document editing tools such as *Google Docs* tools or project management tools such as *Trello*.
- Virtual field trips: Give students virtual field lessons through applications or websites that allow them to explore the world outside the classroom.
- Use of games: Use educational games and simulations to make students more engaged and motivated to learn.
- Videos and webinars: Use video lessons and webinars to introduce students to various concepts and expert lecturers.
- Self-assessment: Allow students to independently assess their progress through online quizzes or other self-assessment tools.
- Content customization: Use content customization tools to

provide individualized learning for each student.

- Open resources: Use free open educational resources (OER) available online to provide students with additional materials and information.
- Real-time questions and discussions: Use real-time questioning and discussion tools to encourage active student participation during the process of distance education.
- Progress monitoring: Use tools to monitor student progress to gain insight into their understanding and tailor lessons to their needs.
- Feedback and evaluation: Provide quick and constructive feedback through digital tools to help students improve their skills and understanding of the material.

It is important to ensure the purposeful use of interactive teaching with digital technology and to support educational goals. Additionally, it is necessary to ensure that all students have access to the necessary technological resources in order to achieve inclusivity and equality in education.

Using digital tools in the classroom to encourage creativity, exploration, and problem-solving can greatly enrich the learning experience. Digital tools that can be used in this context, especially in terms of vocational education in tourism and hospitality, include the processing and preparing various multimedia content. Teachers and students can use the tools to create multimedia presentations, videos, animations, and digital artworks to express their creative ideas. It is important to ensure that digital tools support the learning objectives and are used in a way that encourages critical thinking, analytical skills, and creativity.

3.2 Innovative teaching methods and digital content

In the previous chapters, innovative teaching methods that may or may not require digital technology were described, but now we will focus on ways of applying digital technology in teaching. Innovative teaching methods and digital technology together can create a dynamic and interactive learning environment that encourages student engagement and creativity and facilitates understanding of complex concepts.

Modern technologies, such as computers, tablets, and mobile phones, which today are available to almost every student at home and at school, can be used in the flipped classroom method, where students are given a problem task or a topic to be covered during the following class, and those at home can examine the topic through different sources. For instance, the teacher can assign students the task of researching what mulching is. In doing so, students should be given guidelines because otherwise, they might just come up with a simple definition, the first one they stumbled upon.

Although they are often the target of criticism, modern technologies also have many advantages, especially if they are used in classes; they are interactive and keep students' attention. In addition, visual and auditory media help students remember facts more easily and link the concepts.

By asking research questions, students become more prepared for a critical review of different sources, especially those that are available to them on the Internet. Should we resort to a priori avoiding these sources, the students may use information in the future and in the workplace that can lead them astray or provide a distorted picture of reality, such as numerous videos that show a certain process at an accelerated pace, which can lead the student to criticize their own process that in reality it lasts much longer.

In addition to the application of technology as a source of information, technology is becoming an increasingly popular tool in every profession. Today, there are numerous applications that facilitate business in all areas.

Although the application of technology is unpredictable in its aspects and rapid in terms of development, young people today are particularly active and skilled in presenting and marketing their own activities. They will easily be able to direct these skills toward the presentation and marketing of their own products and visibility in the search for potential consumers. In addition to asking a research question, a flipped classroom can be created in such a way that teachers set up video lessons or other digital materials that students study at home, and classroom time is used for discussion, questions, and practical application of the material.

Research task:

Why is meat from small butcher shops more expensive than meat in retail chains? For each source, provide a link if it is an Internet source or the name of the book, article, or journal in which you found the information. Write what you learned from each source.

Source 1:

This source says the following:

Source 2:

This source says the following:

Source 3:

This source says the following:

Source 4:

This source says the following:

Conclusion:

Write a conclusion about what you have learned from all of the sources. Try to assess how reliable each source is, i.e., to what extent you can trust a particular source and why.

Research task:

How to nutritionally enrich pasta using an ingredient from the environment?

Learning outcome achieved by solving this task:

- raising awareness of the importance of nutritionally enriched food,
- listing additional raw materials used in baking.

Research task:

Can bread be made without using flour?

Learning outcome achieved by solving this task:

- applying the correct methods of preparation of raw materials in the production of bakery wares,
- listing the basic machines, devices, tools, and accessories used in a bakery,
- describing the functioning of basic machines and devices,
- describing the proper handling of tools and accessories,
- describing proper cleaning, washing of parts of machines and devices as well as accessories and tools.

3.3 Preparation for classes – pedagogical aspect

Everything mentioned thus far, from the rapid economic growth and development, the technological revolution, the unpredictability of the labor market and economic needs to the theoretical foundations of how knowledge is created and built in the mindset of each person, has encouraged many societies to make changes in the legislative bases of education. An educational policy aimed at changing external factors encourages professional circles to a common cycle of change.

Every teacher is aware of the fact that teaching must be based on legal acts that provide an educational framework. In the Republic of Croatia, this process is still ongoing; in some places, it has been partially implemented, while some vocational occupations already have a defined vocational framework. The model by which they try to define occupation and qualification in vocational occupations starts at the initiative of national agencies in such a way that the occupational standard and then the qualification standard are defined according to the profession. The occupational standard defines the tasks that are performed within the profession, while the qualification standard defines the competences that a person acquires by completing formal education. The occupational standard and the qualification standard correlate in such a way that, for each of the listed jobs defined in the occupational standard, there must be a competency in the qualification standard that is necessary to perform a certain job.

Which document should be deemed relevant for the teaching process? Within the framework of formal education in vocational schools, the qualification standard is the framework that regulates the final qualification that the student acquires upon completion of education. In other words, every student who completes education for such a qualification must possess all the competences specified in the qualification standard.

In the register of the Croatian Qualifications Framework (CROQF) by the time of writing these guidelines in the tourism and hospitality sectors at levels 4.1 and 4.2, 11 occupational standards were recorded, while 13 qualifications were recorded in the register of qualification standards for the same sectors[2] at levels 4.1 and 4.2. Although the qualification standard has not been entered for some qualifications acquired through educational programs in vocational schools, it does not mean that this will not be done in the future. By entering the qualification standard in the CROQF register, it becomes the umbrella document on the basis of which the vocational curriculum and the school curriculum are prescribed. Up to that point, the documents that regulate the implementation of the educational process that are considered valid are tourism and hospitality curricula[3]. Curricula are documents that guide teaching towards the realization of the content of a particular class and subject, while the curriculum orientation of education emphasizes the orientation to the competences

2 Source: https://hko.srce.hr/registar/standardi?datumOd=&datumDo=1.10.2023.&sektor=10&razina=11&razina=4&razina=5&agencija=. Retrieved October 5, 2023.

3 Source: https://www.asoo.hr/obrazovanje/strukovno-obrazovanje/kurikulumi-nastavni-planovi-i-programi/turizam-i-ugostiteljstvo/. Retrieved October 5, 2023.

that the student must acquire in the education process, which are expressed in the form of learning outcomes. The lack of learning outcomes in the basic document, which is still in force, was bridged by the Agency responsible for vocational and adult education (ASOO) by publishing the "Recommendations/framework for the implementation of learning outcomes," in which the learning outcomes for appropriate qualifications at the level of professions are elaborated by grades and subjects with distinguished generic competences. Learning outcomes are statements that indicate which knowledge, skills, and abilities students have acquired and are able to demonstrate at the end of a certain learning cycle.

Orientation of vocational curricula according to learning outcomes allows the teacher freedom in creating practical activities that can then dynamically follow changes in the economic sector as well. Thus, the teacher puts the student at the center of the teaching process, while standard documents such as curricula put the teacher at the center of the teaching process, whose task is to process the teaching content instead of helping to achieve learning outcomes. It is important to emphasize that such documents do not reduce the teacher's responsibility; on the contrary, it has increased significantly, especially if we take into consideration the requirements in cross-subject topics, i.e., the outcomes such as "participates in a project or production from idea to realization," "gets familiar with and looks critically at the possibilities of career development and professional guidance," etc.

This process of defining the legal framework has not yet ended at this moment, but once this framework takes on all the key elements (occupational standard, qualification standard, and vocational curriculum), the process is not final but is subject to a dynamic process of upgrading, improvement, and modernization by changing market requirements and trends in the economic and business sectors.

Although it sometimes may seem simple to say what we want students to know at the end of a particular period of education, each outcome can be thought about at different levels: at the level of the lesson, at the level of the teaching unit, at the level of the subject in each individual class, and at the level of the qualification. The defined outcomes at the qualification level, which are general and include broad and complex competences, need to be elaborated at the levels of classes, teaching units, and lessons.

Learning outcomes, also known as learning objectives, are concrete and measurable results that teachers want to achieve in teaching and the educational process. Setting learning outcomes is essential for planning, conducting, and evaluating classes. Learning outcomes help teachers clearly define what students should learn or achieve during class. Objectives should be specific, measurable, achievable, relevant, and time-bound (the so-called SMART goals). Based on the set learning outcomes, teachers can plan specific activities, lessons, and resources that will help achieve these goals. The outcomes serve as guidelines for curriculum design; they help to select appropriate teaching methods and digital tools to support the achievement of objectives. For instance, if the learning outcome is related to understanding art history, the teacher can opt for digital galleries and interactive presentations. Learning outcomes also serve as a basis for setting assessment criteria. Teachers can assess students based on whether or not they have achieved the learning outcomes.

Using learning outcomes as a basis for lesson preparation helps teachers focus on achieving specific educational goals and provides clear

guidelines for evaluating and improving the learning process.

Learning outcomes defined in legal documents are the starting point for lesson preparation. In each outcome, there are two elements: an active verb that indicates the complexity of a particular competence that needs to be acquired and the second part of the outcome statement, which is related to the content of the teaching unit. In the modern approach to teaching, the content has a dual role, i.e., the role of information that the student needs to acquire and the role of a tool for developing the competence described by the active verb. The structure of the complexity of active verbs is described by structures that are called taxonomy, of which Bloom's revised taxonomy has perhaps been the most prominent recently, and it divides knowledge into factual, conceptual, procedural, and metacognitive.

Dimensions are also defined for each category – remember, understand, apply, analyze, judge, and create. Bloom's taxonomy differentiated the verb "to know" into many "active verbs." In reality, taxonomies are an attempt to define more clearly and precisely what we expect from students and what they will learn within a particular educational cycle, subject, unit, or lesson. For instance, when the teacher sets a task: "Measure the consumer voltage," the student's solution can range from recognizing the measuring instrument to the correct use of that instrument, including multiple measurements to achieve accuracy, the application of mathematical knowledge, and a good estimate, etc. Taxonomies differentiate types of knowledge – from factual knowledge, which the student remembers or is offered multiple choices, through recognition, to the fact that they connect knowledge of measurement with knowledge of mathematics and physics, which would be conceptual knowledge that belongs to the level of judgment or creativity if the measurement procedure is applied in a certain problem situation. In such a case, procedural knowledge would be the skill with which the student would use an instrument, while metacognitive knowledge would ultimately represent a review of all the above and the possible shortcomings of the above data.

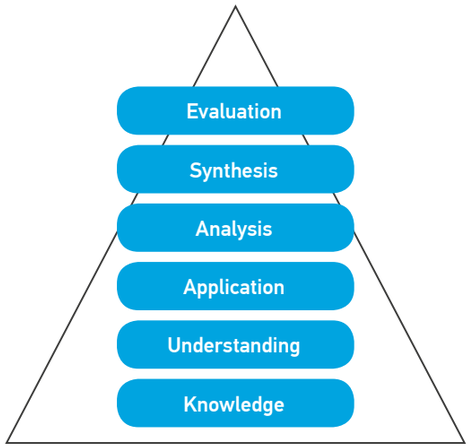


Figure 4 *Classification of cognitive levels according to Bloom's taxonomy*

This classification of cognitive levels can help the teacher in evaluating and monitoring students, but also in planning the lesson. However, the cognitive area is only one part of the totality of all educational goods that the student receives in the education process. The assumption is that every teacher is aware of the fact that a student who is highly motivated for the profession for which they are being educated is able to acquire all content easily and at all levels, but if we teach only those who came to school with a high level of motivation, it will be a difficult task since there are relatively few

such students. Apart from the development of the students' cognitive level, another one of the educational goals is certainly the affective one, which refers to attitudes, opinions, motivation, engagement, etc. The division of educational goals into cognitive and affective areas also includes a component of the psychomotor area, which is not negligible, especially in education for practical occupations such as those from the electrical engineering and computing sectors.

The aforementioned divisions of educational goals, or, simply put, everything that we want our students to acquire during the education process, cannot be observed in isolation. All knowledge, attitudes, opinions, and procedures must be developed in parallel.

The overall goal of every teacher is to teach their students as much as possible within the scope of their subject, and in addition to the content itself, the teacher must interweave a multitude of other competences that students must develop in all topics. They are not directly taught, but without them, the knowledge of the content will not make sense.

There is a broad spectrum when it comes to these competences, and they are very often cited as abilities necessary for career development:

- communication skills (listening, speaking, writing)
- ability to work in teams
- ability to perform multiple actions at the same time (better known as multitasking)
- analytical and research skills
- interpersonal skills
- decision-making and problem-solving abilities
- ability to plan and organize work
- creativity
- ethics and integrity
- critical thinking and self-criticism
- marketing and promotion skills
- abilities related to lifelong education
- skills in the use of information technologies.

It is precisely because of these competences (abilities and skills) that are not directly taught but must be followed and developed through proper selection of activities and high-quality guidance of students through the teaching process that teaching any subject is a challenging and complex task. In that case, the student has a more demanding job rather than only acquiring certain content. It is precisely for this reason that in recent history, numerous researchers of the educational process have focused on the complexity of the teaching process. The way in which a person learns, what processes take place in the human brain during the acquisition of certain knowledge, and whether there is a more efficient or less efficient way of learning – these and many other questions become the goal of research and development of many theories. Ultimately, the actors involved in the educational process must decide how and when to apply the results and conclusions in practice in order to achieve the teaching goals to the greatest extent possible.

The teacher's focus is on their students whose teaching they perceive in an integrated way from various aspects and follow their progress from the initial to the final stage. It is a process

that requires a good understanding of the student's capabilities. On the other hand, an important aspect in the observation of teaching and teaching outcomes is education policy at the level of an individual state. The educational policy does not focus on the individual student or the students' progress during the learning process but rather emphasizes the teaching outcome from the perspective of a citizen of the future who will contribute to the betterment of the society which they are a part of using their competences, knowledge, abilities, and skills. Economic growth and development of society and industrial and technological revolutions change the goals of education from the aspect of educational policy. Therefore, education itself must evolve, not only in terms of teaching methods but also in setting the goals and outcomes of the educational process itself. The paths of change differed depending on the age and the educational policy itself. On occasion, certain theories and paradigms were used in reforms of educational processes, and sometimes new theories were born following the reform itself. It is important to note that it is difficult to fully implement a certain teaching theory in teaching practice because the very attempt of any change in educational systems is a process that requires time and effort. Although numerous learning theories have paved the way for modern teaching methods, the theory of constructivism stands out the most.

The learning outcomes should clearly state what the student should know and be able to do after the education process and how they will be able to demonstrate the acquired knowledge, skills, attitudes, independence, and responsibility. Such claims must be concise, clear, and transparent, and they need to address what the student will be able to do upon completion of the unit/subject/educational program and they must be designed as an optimal, comprehensible, and measurable display of knowledge and skills with associated independence and responsibility. Learning outcomes should not contain long and complex statements or unfamiliar words; they should instead start with an active and precise verb whenever possible and build on the content to which they refer. Below is a table with suggestions of active verbs arranged according to the levels of Bloom's taxonomy. This certainly does not mean that it is not possible to use another verb, and that a particular verb in another context will not reflect the proposed level.

LEVEL	ACTIVE VERBS
6. **EVALUATION / VALUATION** (evaluation of something/ someone)	▪ choose an option, measure ▪ argue ▪ critically judge, defend views, evaluate ▪ justify, choose, support, confirm ▪ predict, review, recommend, evaluate, judge ▪ rank ▪ self-assess, self-evaluate ▪ compare, determine, valorize, conclude
5. **SYNTHESIS** (connecting parts or ideas into a whole, expressing originality)	▪ generalize ▪ generate, integrate, build ▪ classify ▪ organize, design ▪ plan ▪ connect, suggest, predict ▪ rearrange, present, prepare, arrange ▪ develop ▪ combine, create, manage, organize, lead, conclude
4. **ANALYSIS** (breakdown into components for the purpose of adapting to new information)	▪ analyze ▪ identify ▪ examine, isolate, calculate, categorize ▪ comment ▪ connect, review, evaluate, verify ▪ break down, distinguish ▪ solve, sketch, sort ▪ contrast, compare, establish
3. **APPLICATION** (using a general concept for problem solving)	▪ demonstrate, illustrate ▪ interpret, interview ▪ plan, research, select ▪ expose, calculate, perform, use ▪ select, connect, predict, present, adjust ▪ apply ▪ implement, interpret, arrange, resolve
2. **UNDERSTANDING** (comprehension, ability to organize, understanding what has been read)	▪ provide an example ▪ discuss ▪ group ▪ identify, extract, calculate ▪ explain, describe, show, predict ▪ reshape, recognize ▪ discuss, distinguish, consider, summarize, place, classify ▪ compare

Chapter 4

Examples of small innovative activities

Chapter 4

Examples of small innovative activities

4.1 Example of a small innovative activity 1: Food and health

Knowledge of the type, quality, and composition of food is necessary in the process of obtaining a chef qualification. Especially nowadays, when the diversity of eating habits, specialized forms of nutrition, awareness of the caloric value of food is ubiquitous. With the same goal in mind, the chef qualification standard itself[4] distinguishes the following learning outcomes within the *Food and health* learning outcomes that need to be realized in the process of acquiring the qualification:

- describe the impact of food on health
- analyze food pyramids
- adapt the menu to the specific needs of the guests.

4 Source: https://hko.srce.hr/registar/standard-kvalifikacije/detalji/285. Retrieved October 5, 2023.

Methods of working in the classroom will be presented using this example of a small innovative activity, with an emphasis on the use of digital technology with the aim of developing these learning outcomes. In addition, we ought to emphasize the generic learning outcomes, as well as the outcomes defined in cross-subject topics, which are an integral part of the recommendations for the realization of learning outcomes.[5]:

- share positive experiences
- use various IT programs
- point out appropriate behavior during presentations and practical work
- develop the skills of independent research and problem solving
- encourage different ways of finding solutions to problems
- persistence,
- develop a sense of security, creativity, and highly developed hygiene habits.

A. Preparation for classes

- What is needed for implementation: computer, tablet, or smartphone, printer, scissors
- Digital applications that will be used: *Canva* and *MyFitnessPal.*

Canva[6] is a digital application that has a wide range of possibilities for designing posters, flyers, cards, advertising materials, presentations, video materials, smart board templates, and posts on social networks. *Canva* has the option that is free of charge, but then the possibilities of using their templates are limited, while with an extra charge of EUR 11.32 per month you become a *Canva Pro* package user with unlimited possibilities and use of all resources. *Canva* has an access option to *Canva Education* package that students and teachers can access for free.

The free version of *Canva* offers great possibilities, so before deciding to buy a license, it is best to look through what is offered inside the free version.

5 Source: https://www.asoo.hr/obrazovanje/strukovno-obrazovanje/kurikulumi-nastavni-planovi-i-programi/turizam-i-ugostitelstvo. Retrieved October 5, 2023.

6 Source: https://www.canva.com. Retrieved October 5, 2023.

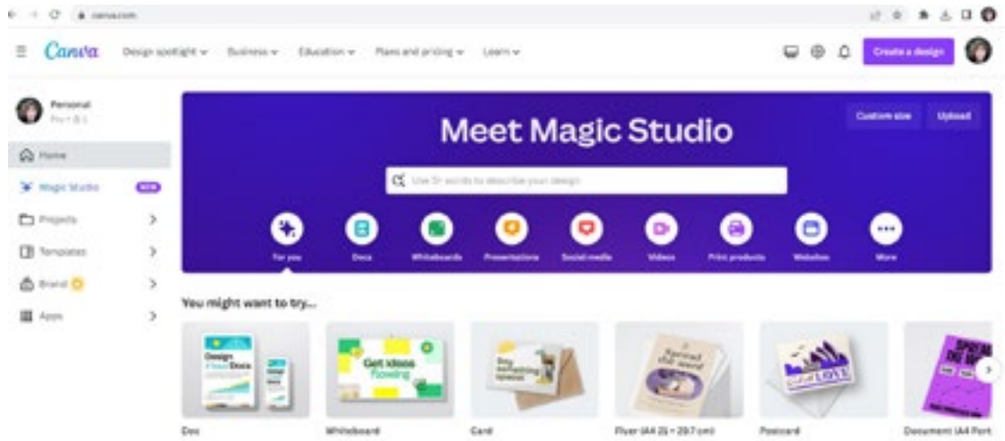


Figure 5 *Canva home interface*

Canva requires registration which can be done with existing accounts such as a Google or Facebook account, or a new account can be created exclusively for the use of *Canva*. It can be used in a desktop version for computers and a mobile version for tablets and smartphones.

MyFitnessPal[7] is a digital application whose primary purpose is personal monitoring of the intake of caloric and nutritional values of meals according to the selected settings, the desired daily calorie intake, the ratio of nutritional elements or the ratio of, for example, carbohydrates and fat.

7 Source: https://www.myfitnesspal.com/account/create/welcome?callbackUrl=https%3A%2F%2Fwww.myfitnesspal.com%2Fpremium. Retrieved October 5, 2023.

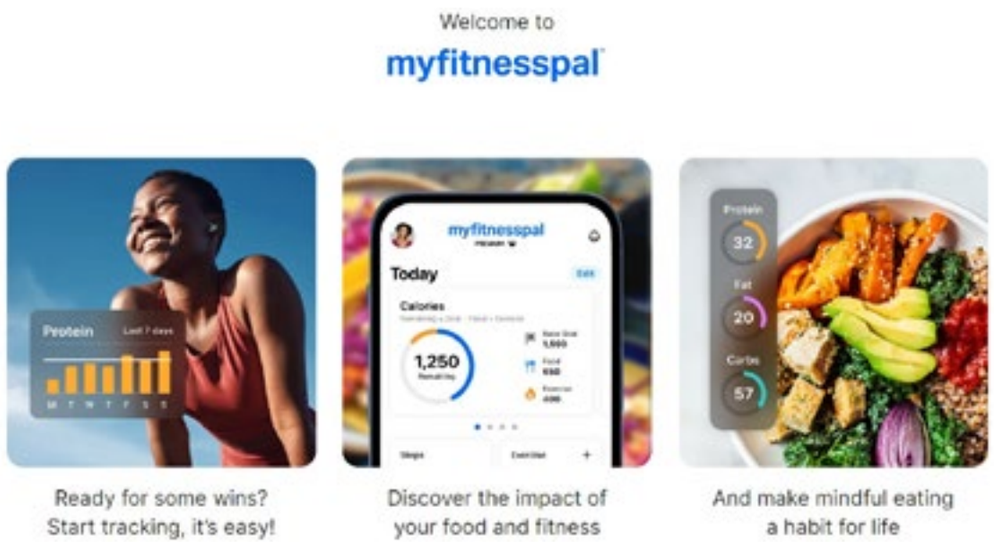


Figure 6 *MyFitnessPal application home interface*

If the user limits the daily intake of carbohydrates in the app settings, the application alerts them when they create a menu in which such a value is exceeded. In order to provide an example of this small innovative activity, we will opt for the option of searching the nutritional and caloric values of individual foods that this application offers. *MyFitnessPal* application has a grocery database that users update daily, and in the application database, there are numerous groceries, as well as ready-made meals, which can be found on the Croatian market, whose composition and values have already been saved by another user. Entry of a new food or finished product into the database is simple; all it takes is to scan the product's barcode. The application loads into the database all the information about the product that is on the packaging. Data on all of the other food products of plant and animal origin is available in the database.

Both *MyFitnessPal* and *Canva* are free for the basic activities they offer. Monitoring refers to the application's personal engagement with the goal of monitoring and correcting those users who want to use it for weight loss purposes, for example. It is similar to *Canva*; you need to create a user account or simply log in using a Google or Facebook user account. The application also has an option to track physical activity, as well as an option to track weight, although those option will not be used in this example of a small innovative activity.

Both *MyFitnessPal* and *Canva* have a desktop, a tablet, and a smartphone option.

B. Goals of the teaching process: Train students to collect information about food and use it to prepare menus depending on the guests' needs and wishes. Make students aware of the importance of the structure of food and its nutritional and caloric value.

C. Tasks of the teaching process:

1. use digital applications to create cards with nutritional and caloric values of food products
2. create menus according to given parameters using the created cards
3. calculate the caloric and nutritional value of an individual dish
4. create a healthy food pyramid using the created cards.

During the implementation of the first task, the teacher can choose between different forms of work:

- divide the students into groups, where each group will create cards of given food products, or
- divide students into pairs, where one student will create a card and the other will search for information about a food product, or
- individually hand out grocery lists to each student who then both designs and collects data.

Each form of work has its advantages and disadvantages. The group form of work must be elaborated in detail and the speed of the students' work must be well estimated so that all students are engaged in the process. Individual work is slower, but every student goes through all stages of the process. Prior to the lesson itself, it is advisable to instruct the students how to install the applications if they use mobile versions and how to create user accounts or prepare existing accounts on Google or Facebook.

D. Course of the teaching process
Motivation:

Following the ideas and assumptions of modern teaching, it would be advisable to start the lesson with a problem situation that is discussed, and to think of ideas for its realization. For instance, the teacher can start with a story: "In a recent conversation with a colleague who runs a medium-sized catering establishment, I learned that there are increasingly more guests with different requirements regarding their diet; guests want to supplement the standard vegetarian and vegan menu with a keto diet, a no-carb diet, and the intake of organic fats, requirements with reduced caloric but rich nutritional value, with the given caloric value that should be distributed in three meals. I was not sure what to tell them and whether the guest *has* to get everything they desire. What do you think about the different guest requests?"

Questions for students after the discussion:

- How to organize the menu according to the given caloric value?
- How to organize the menu according to the given nutritional value?

The ideas that the teacher receives from the students can be written on the board or on the smart board, whose option can be found in *Canva* by selecting the *Whiteboard* and then *Idea board* option.

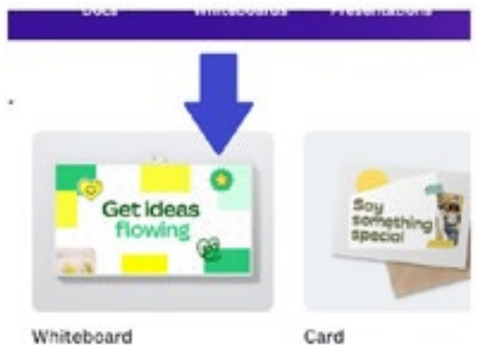


Figure 7 *Whiteboard tool in Canva*

Figure 8 *Whiteboard option in Canva*

Surely, it is difficult to predict the course of the discussion, but keep in mind that the discussion of ideas strengthens their communication skills, the creativity in terms of finding solutions, but also the exchange of positive experiences that some of the students may have. Starting from a divergent discussion, try to guide students towards the importance of knowing the nutritional and caloric values of foods. Students are certainly not expected to memorize this information, but it is important to develop a sense of the order of magnitude,

as well as to be aware of relationships with different foods.

After the discussion, present the tasks to the students and instruct them to make grocery cards. In this step, you can give the students a template if you want to save time or have fun with them designing the cards. This is one of the possible designs made using the template in *Canva*, and the steps of card creation will be explained at a later stage.

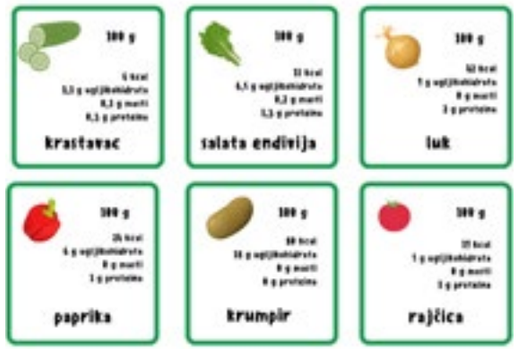


Figure 9 *Example of cards made in Canva*

Steps in card creation using the template in *Canva*:

- On the site of the search engine, where *Canva* asks “What will you design today?”, type “Flashcard” (you can also add the word “vegetable,” although you will be able to add pictures of other food products later)

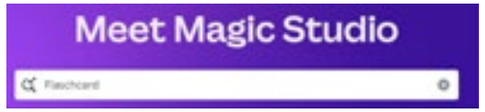


Figure 10 *Search engine in Canva*

- *Canva* offers more options, but the tabs shown below have been selected for this example. When you select the option you want, the workspace and the existing cards will appear, which you can edit as desired.

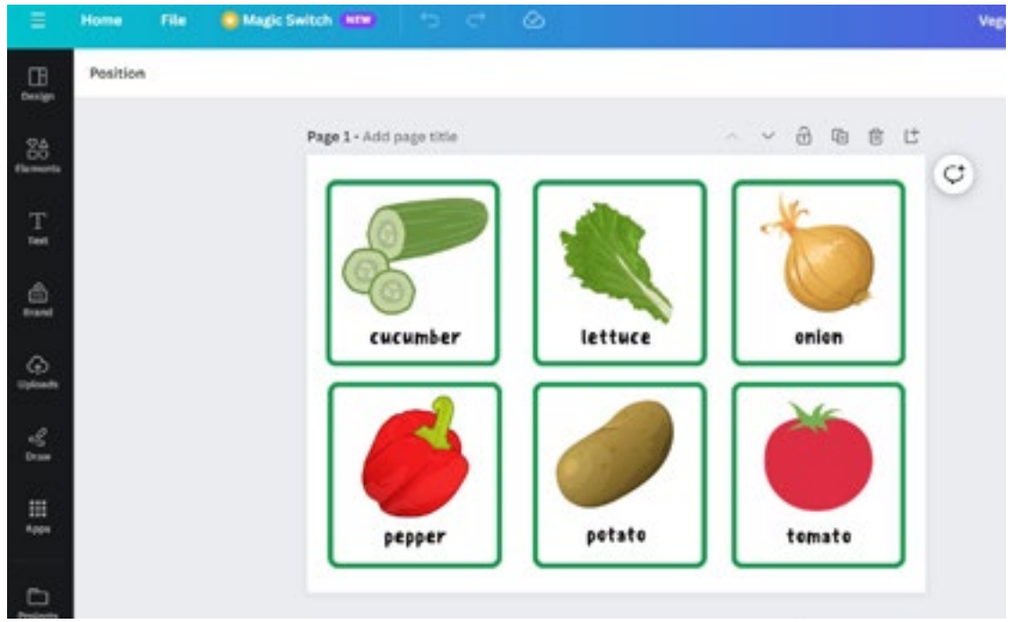


Figure 11 *Card template in Canva*

- By selecting the image, it can be reduced and placed in one corner of the card.
- By selecting the name of the vegetable in English, change the name in Croatian.
- To add additional text, select the "Text" tool on the toolbar (on the left on the black background) and then "Add a text box," where the text box appears somewhere on the desktop. Move the text window to the desired location and enter the required data on the card.
- The typed text that we will need on other tabs as well can be simply duplicated by selecting the icon marked with a blue arrow that appears above the text space.

Figure 12 *Duplicating icon in Canva*

- In the same way, the caloric and nutritional value of one food product is entered and copied and pasted on all other cards, and afterward, only the numerical values are changed.
- There are six cards on one page. You can duplicate the pages in the same way as the text and only change the titles, text, and images.
- Since vegetables are not the only food group you will need, it is possible to change the images as well. Mark the image and press the trash can icon or the "Delete" button to remove the image.
- You can search the database by selecting the "Elements" tool on the toolbar on the left to find images of other food products, e.g., meat, oil, etc.

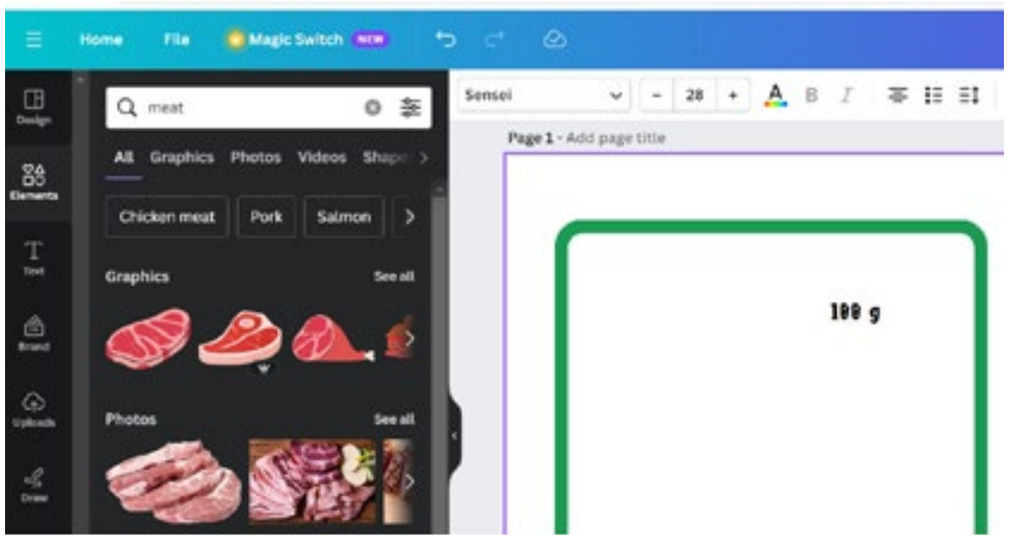


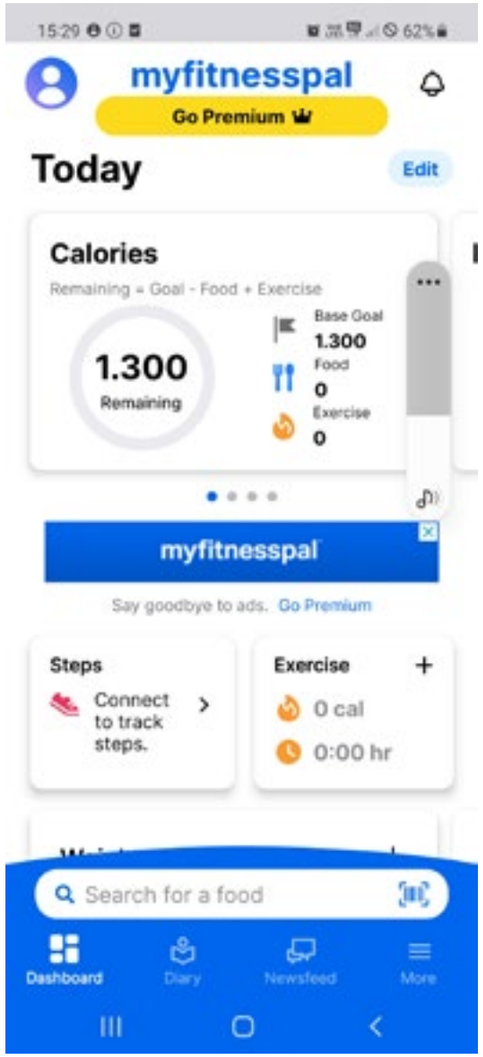
Figure 13 *Gallery for a selection of photos or drawings*

Students in the class can work individually or in groups, but they can work on the same document because *Canva* offers a teamwork option.

The entry of nutritional and caloric values of foods, as mentioned earlier, can be found in the *MyFitnessPal* application. In the introductory discussion, students can also ask if they know of any application that offers this type of information with the possibility of organizing menus. The above application is certainly not the only one with these options, but it has a large number of users who regularly update the database, which facilitates the process of organizing a menu.

The data taken from the *MyFitnessPal* application is written on the cards provided at the end of these guidelines and described in the following steps:

- When entering the application, a search engine appears at the bottom, in which you simply enter the name of the food product.
- The application offers numerous records under this name that users enter themselves. At this point, the students can be reminded to approach the data critically.
- There is also a barcode icon next to the search bar. By activating and scanning the barcode on a product (e.g., frozen peas), all information about that food product can be downloaded.



Slika14. *MyFitenssPal mobile application interface*

The cards can be supplemented with other data and their digital or paper versions can be used.

After they have created the cards, the students are given the task of distributing them into a healthy food pyramid in a visible place in the classroom. The next task for the students is to organize the menu according to the given parameters. Students independently select food cards according to the requirements of the menu, thereby practicing how to estimate the quantity and the total sum, after which they independently create a proposal for the dishes on the menu.

The cards can be used long-term in various food preparation activities, whereby students will gradually remember and become aware of the value of food products, and the collection of cards in the healthy food pyramid can be expanded. For instance, students may be asked to randomly choose five cards and create two dishes with the minimum amount of waste according to the no-waste principle.

4.2 Example of a small innovative activity 2: Discovering logarithms

Mathematics as a subject often presents a great challenge to students and teachers because the complexity of mathematical concepts requires continuous work and constant upgrading. On the other hand, the legislative framework defined in the Mathematics Curriculum in Secondary Vocational Schools clearly defines the contents of learning outcomes and the levels of outcomes set by active verbs. In addition to mathematics, teachers of other natural science subjects face similar challenges as well. This is precisely why the example for the general subject was chosen as an example of the application of innovative work methods in teaching using digital technology.

The Mathematics Curriculum in Secondary Vocational Schools highlights the following learning outcomes which are, content-wise, related to the logarithmic function:

- It determines a domain, a codomain, an image, growth and decay, inverse function of exponential and logarithmic functions, and draws a graph of functions (MAT SŠ B.3.2., MAT SŠ C.3.1.)
- It models a problem situation, determines and checks solutions and determines their meaningfulness (MAT SŠ B.3.3, MAT SŠ C.3.2)

Also, the generic learning outcomes need to be emphasized as recommendations for the realization of learning outcomes:

- Use dynamic geometry programs and other appropriate and available interactive computer programs and

tools for discovering properties and regularities.

A. Preparation for classes

The logarithmic function, the definition of the logarithm, and thus all the properties of the logarithmic function are only one part of the results from the Algebra domain and, in terms of the previous knowledge basis, they require an understanding of the concept of an equation, equation solutions, functions, and function graphs. This is knowledge that has been built on since the lower grades of elementary school, and there is often no transfer of such knowledge to new equations and functions, and only parts of the material are selectively attempted to be mastered.

Below is an example that tries to engage students in searching for logarithms, although not under that name, and in presenting data using a diagram.

- What is needed for implementation: computer, tablet, or smartphone, calculator
- Digital applications that will be used: *Desmos and Excel*

There are many dynamic geometry programs and mathematics teachers mostly use them to demonstrate and display functions, but the use of programs such as *Geogebra* and *Geometer's Sketchpad* rarely represent a path to easier understanding for the student. The essence of student-centered teaching implies that students work and research independently.

Desmos is a dynamic geometry program that is free of charge with the condition of registration, which can be done through a Google or Apple account.

MS Excel is a Microsoft tabulation and calculation program, it is an integral part of the *Microsoft Office* package and students of the third grade of high school should be familiar with it, so it can be quite useful to incorporate it in this environment as well. Excel spreadsheets are used in various forms of business, including the hospitality and tourism sectors.

B. Goals of the teaching process: Develop students' analytical and research competences using the example of logarithmic functions

C. Tasks of the teaching process:

- make a transfer of knowledge in terms of the concept of solving an equation
- develop an estimate of the value of the exponent in an exponential equation
- empirically find values $log_2 3$
- empirically find values $log_2 5$, $log_2 6$, $log_2 7$
- enter the empirically found values in the diagram.

D. Course of the teaching process

Motivation:

Depending on the student's prior knowledge of exponential equations, the exponential equation can be set in a traditional way:

$$2^x = 4$$

or put a check box instead of x, as in the lower grades of elementary school. Although it may seem frivolous for this level, the check box directs the students to find the number that needs to be put in the place of the exponent to get 4. Writing an equation with an x in the exponent directs students of a lower level of knowledge to search for a procedure that solves the equation, where the meaning of the concept of solving the equation is lost because the focus is on the procedure itself. After all the students find out that the answer is 2, another equation is written:

$$2^x = 3$$

The equation can again be shown using a check box in the exponent. At this point, the teaching process becomes problem-oriented because this task is a problem task for students without any knowledge about logarithms. There is often a debate among mathematics teachers as to which task in mathematics is a problem task. The content of the task is not what distinguishes a routine task from a problem task, but rather the person solving the task. For a student who has knowledge about logarithms, this task is routine; by applying the rules, it is easy to determine that it is . However, by determining the rules, the student becomes a passive recipient of orders that they do not understand and they use them only with the aim of mastering the material and passing the exam. That is why the teacher must be patient and only offer guidelines for finding the appropriate number and asking questions with the help of which the students will find the appropriate decimal number themselves.

Questions for students:

- What should be the number that powers the number 2 to get the number 3? Natural or decimal?
- Can you tell which two numbers that number is between?
- How can we find it?

We expect students to use a calculator, but if they do not, encourage them to use the calculator and try to guess which number it is. Write their estimates on the board to guide them toward the most accurate solution. If students use a calculator on a computer or tablet, they will have multiple number entries in the *history* option so they can be corrected. They will see very quickly that it is a number between 1.5 and 1.6. A value of 1.585 can be accepted because it is accurate to three decimal places.

In the same way, encourage students to look for solutions to the following equations:

$$2^x = 5,\ 2^x = 6,\ 2^x = 7$$

As students come up with the appropriate values, enter them on the board in the point coordinate table.

X	1,585	2,322	2,585	2,807
y	3	5	6	7

Now instruct the students to open the *Desmos* program and enter pairs of points into the diagram.

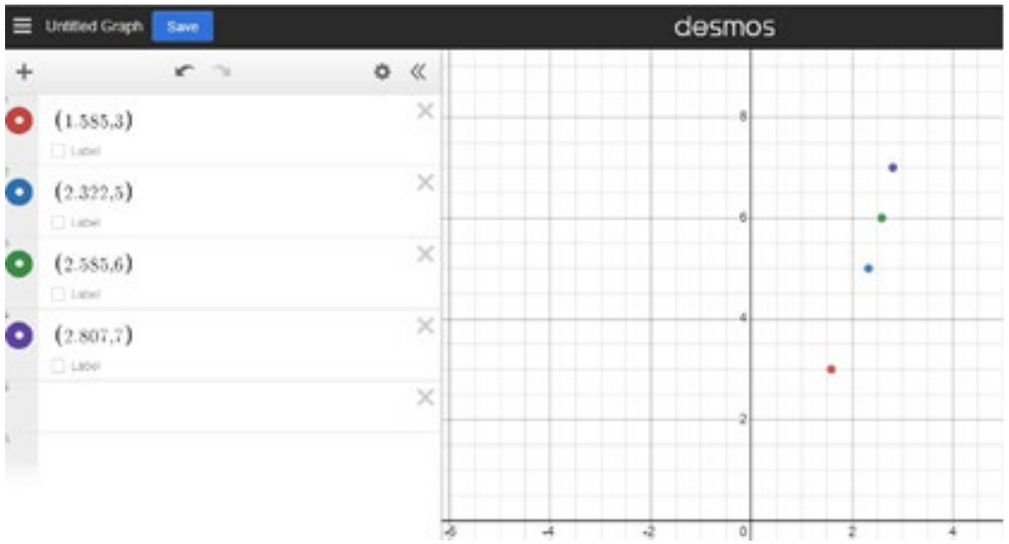


Figure 15 *Plotting points in the Desmos application*

If we connected these points with a line, what would it look like? What about the other points? Can we find more points to make our graph more complete?

Students can now be instructed to create an *Excel* spreadsheet. We select one column for the value of the exponent, while for the other we use the POWER function (2; cell number of the exponent).

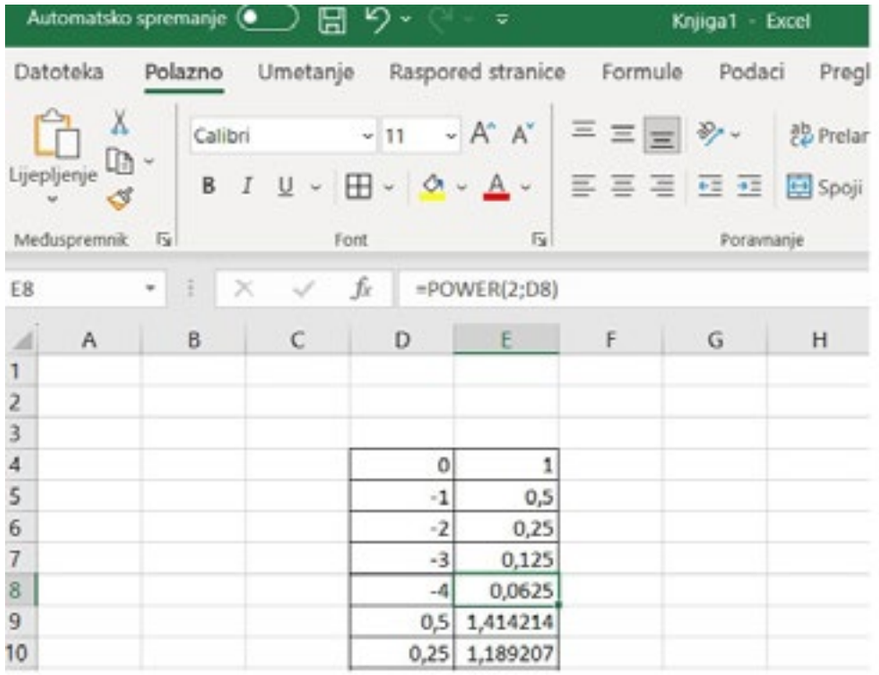


Figure 16 *Calculation of point coordinates in MS Excel*

By entering more points, the curve of the graph of the exponential function is more clearly visible. After this part, we can go back to the numbers that the students searched for, and the graph of the exponential function itself, its domain and codomain can be studied during one of the following lessons.

At this point, remind the students which problem was a starting point and what resulted from it. Tell them the story about how, in the 17th century, John Napier was also looking for these numbers, but he did not have a calculator and instead used other forms of calculation to find these numbers and wrote them all in tables and called them logarithms. He decided to call the number 1,585 . Now the students can be asked to name the other logarithms themselves and relate them to the exponential equation. Concrete examples will make it easier to transform an exponential expression into a logarithmic expression:

$$a^x = y$$

$$x = \log_a y$$

The concept of logarithm and the relationship between logarithmic and exponential functions introduced in this way will provide a basis for further research into exponential and logarithmic functions, their properties, domains, codomains, and inverse functions.

4.3 Example of a small innovative activity 3: Communication and creativity in presentation

Promotion and visibility of any product, including tourist products, is something that makes it easier to reach users. In the multitude of the same offers, regardless of demand, communication competence and creativity in presentation are crucial. Although learning outcomes are defined by "Recommendations for Implementation" determined by verbs at the level of reproduction (explain, introduce, instruct), the outcome related to *implementing* and *presenting* imply a complex set of competences, from creativity, critical thinking, and problem solving.

Learning outcomes defined in the "Recommendations for Implementation" for obtaining the hotel and tourism technician qualification:

- explain and define promotion in tourism
- explain the importance of promotional activities
- guide students through the stages of promotion planning
- introduce students to the main elements of the promotional mix
- carry out the task using the example of how the hotel uses public relations and advertising (promotional mix elements)
- present the completed task (PPT presentation).

Competences from the "Recommendations" part defined in cross-subject topics emphasize that the student:

- independently searches for new information from different sources, transforms it into new knowledge, and successfully applies it when solving problems
- independently searches for information and selects activities within their area of interest
- independently conducts complex research to solve problems in the digital environment
- critically selects suitable digital technologies
- chooses appropriate relationships and communication.

An example of an activity includes the creation of means of a promotional mix: advertising, methods of personal selling, preparation for public relations, and personal selling.

A. Preparation for classes

- What is needed for implementation: computer, tablet, or smartphone
- Digital applications that will be used: *Canva*

B. Course of the teaching process

Motivation:

For the purposes of motivation, the teacher can simulate the situation of a small hotel on a remote island that has invested in renovation, but even after a year, it fails to attract guests and fill the accommodation capacity to such an extent that it is unable to cover the renovation costs and make a profit. Regardless of the fact that it is located near the sea coast, its distance from one of the tourist centers and the access road are its biggest disadvantages. Students are now asked to have a divergent discussion of possible solutions. The discussion should gradually be directed toward ideas that turn disadvantages into advantages, such as seclusion that is much needed for relaxation after the hustle and bustle of the city, untouched natural beauty, the possibility of organizing sports and recreational activities, etc.

Questions for students after the discussion:

- What means would you use to create a promotion?
- Where would you place the promotional material?

Students will probably come up with the idea of promotions using social media very quickly. Now they can be encouraged to think about the target group that might be interested in the offer.

Canva, which is described in more detail in the first example, has the option to create promotional material that can include videos, audio recordings, and social media posts without them having to be published.

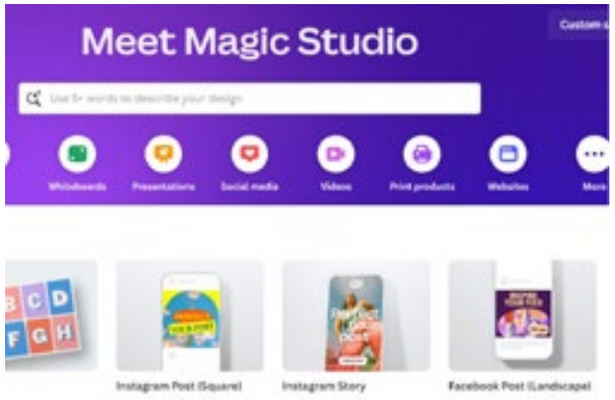


Figure 17 *Tools for creating posts in Canva*

Students can be divided into groups with specific tasks for each group member: writing a promotional slogan, collecting photographs, highlighting advantages, etc. At the end of the lesson, the groups present ideas and their implementation, and on the *Mentimeter* application, there is an option related to voting for the best presentation, as well as evaluation according to all elements of the promotion.

References

/ Bandura, A. (2001). *The changing face of psychology at the dawning of a globalization era*. Canadian Psychology, 42, pp. 12-24.

/ Baranović, B. (2006). *The knowledge society and the national curriculum for compulsory education*. In: Baranović, B. (ed.) *National curriculum for compulsory education in Croatia – different perspectives*. Zagreb: Institute for Social Research, pp. 8-36.

/ Barnard, L., Lan, W.Y., To, Y.M., Osland Paton, V., & Lai, S.L. (2009). *Measuring selfregulation in online and blended learning environments*. Internet and Higher Education 12, pp. 1-6.

/ Bernard, R. M., Lou, Y., Abrami, P. C., Wozney, L. Borokhovski, E., Wallet, P. A., Wade, A., & Fiset, M. (2004). *How does distance education compare to classroom instruction? A meta-analysis of the empirical literature. Review of Educational Research*, 74(3), pp. 379-439.

/ Bezinović. P. (2010). *Self-evaluation of schools and culture of quality in education. Institute for Social Research in Zagreb*, Zagreb: Center for Research and Development.

/ BOS, *A portfolio of skills necessary for youth employment at the regional level*. Erasmus + (2017): http://www.alfa-albona.hr/wp-content/uploads/2014/11/WEB__Portfolio_Alfa-Albona.pdf

/ *The future of work in Croatia – Transformation of the Croatian workforce in the age of digitization and automation*. McKinsey & Company (2021): https://www.mckinsey.com/~/media/mckinsey/Locations/Europe%20and%20Middle%20East/Croatia/Future%20of%20work/Future-of-work-Croatia-HRV.pdf

/ Bulić, M., & Kostović-Vranješ, V. (2019). *The impact of e-learning on student self-responsibility in doing their homework*. Školski vjesnik, 68(1), pp. 112-126.

/ Bulić, M., Jelaska, I., & Mandić Jelaska, P. (2017). *The effect of e-learning on the acquisition of learning outcomes in teaching science and biology*. Croatian Journal of Education 19(2), pp. 447-477

/ Caena, F. and Redecker, C. (2019). *Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators (DIGCOMPEDU).* European Journal of Education, 54(3), pp. 356-369.

/ Camović, Dž. and Đipa, A. (2021*). Establishing creativity as a key skill for the 21st century – the role of higher education teaching in stimulating the creative potential of students*. Adult Education, 11, pp. 99-122.

/ CARNET (2022). *Scientific research on the preparation and implementation of the experimental application of the ICT use model in learning and teaching: report on the conducted research*.

/ Chaudhary, B. (2018). *The role of ICT in promoting constructivism*. International Journal of Technical Research & Science, 3(1), pp. 1-4.

/ Cox, M. J. and Webb, M. E. (2004). *ICT and pedagogy: A review of the research literature*. Coventry: Becta: https://dera.ioe.ac.uk//1599/1/becta_2003_attainmentreview_queensprinter.pdf

/ DeLozier, S. and Rhodes, M.G. (2017). *Flipped classrooms: a review of key ideas and recommendations for practice*. Educ. Psychol. Rev. 29:141-151.

/ EPSO, Competency Framework (2022): https://eu-careers.europa.eu/hr/system/files?file=2023-04/HR.pdf

/ *European Report of the Quality of School Education – Sixteen Quality Indicators* (2001). Luxembourg: Office for Official Publications of the European Communities.

/ Feiertag, J. and Berge, Z. L. (2008). *Training Generation N: How educators should approach the Net Generation*. Education & Training, 50 (6), pp. 457-464.

/ Haleem, A., Javaid, M., Qadri, M. A., and Suman, R. (2022). *Understanding the role of digital technologies in education: A review*. Sustainable Operations and Computers, 3, pp. 275-285.

/ Higgins, S., Xiao, Z.M., and Katsipataki, M. (2012). *The Impact of Digital Technology on Learning*. Full Report. Durham University.

/ Integration of digital technology in learning and teaching and school operations (2018): https://pilot.e-skole.hr/wp-content/uploads/2018/04/Prirucnik_Integracija-digitalne-tehnologije-u-ucenje-i-poucavanje-i-poslovanje-skole.pdf

/ Ivanova, A. and Ivanova, G. (2009). *Net-generation learning style: a challenge for higher education*. In: Rachev, B. and Smrikarov, A. (ed.) *Proceedings of the 2009 International Conference on Computer Systems and Technologies and Workshop for PhD Students in Computing*. New York: ACM.

/ Jurić, V. (2007). *Curriculum of the modern school*. In: Previšić, V. (ed.): *Curriculum: theories – methodology – content – structure*. Zagreb: Institute of Pedagogy and Školska knjiga, pp. 253-307.

/ Kolić-Vehovec, S., Vuković, A., and Mehić, N. (2020). *Introduction of modern technologies in learning and teaching*. In Kolić-Vehovec, S. (ed.). *Introduction of modern technologies in learning and teaching: research on the effects of the e-School pilot project*. Rijeka: Faculty of Philosophy, University of Rijeka, pp. 3-36.

/ Lovrečki, K. and Moharić, I. (2021). *Gamification (video game elements) in teaching: a view from a pedagogical and didactic perspective*. Journal of Educational Sciences, 5(5), pp. 71-85.

/ Markočić Dekanić, A., Gregurović, M., Batur, M., & Fulgosi, S. (2020). *Pisa 2018: results, determinants, and implications. International survey of students' knowledge and skills*. Zagreb: National Center for External Evaluation of Education

/ Masters, K. (2013). *Edgar Dale's Pyramid of Learning in medical education: A literature review*. Med. Teach. 35, e1584-e1593.

/ McNamara, D.S. (2009). *The importance of teaching reading strategies*. Perspectives on language and literacy, pp. 34-40.

/ Mikelić Preradović, N., Babić, M., Jelača, B., Kolarić, D., and Nikolić, V. (2018). *Integration of digital technology in learning and teaching and school operations*. Croatian Academic and Research Network – CARNET Moore, M. G. (Ed.). (2013). Handbook of distance education. Routledge.

/ National Curriculum Framework for preschool education and general compulsory and secondary education (2010). Zagreb: Ministry of Science, Education and Sports: http://www.azoo.hr/images/stories/dokumenti/Nacionalni_okvirni_kurikulum.pdf

/ OECD (2005). *Defining and selecting key competences*. National Center for External Evaluation of Education – PISA Center: https://pisa.ncvvo.hr/wp-content/uploads/2018/05/Definiranje-i-odabir-kl-ju%C4%8Dnih-kompetencija_Final-version.pdf

/ Orlando, J. (2013). *ICT-mediated practice and constructivist practices: is this still the best plan for teachers' uses of ICT?*. Technology, Pedagogy and Education, 22(2), pp. 231-246.

/ *A portfolio of skills necessary for youth employment*, ed. Milica Škiljević, (2017) Belgrade: Belgrade Open School https://media.cgo-cce.org/2017/11/Portfolio-vjestina-neophodnih-za-zaposljivost-mladih-na-regionalnom-nivou.pdf

/ Prensky, M. (2001). *Digital Natives, Digital Immigrants*. On the Horizon, 9(5), pp. 1-6.

/ Recommendation on key competences for lifelong learning, EU (2006): file:///C:/Users/Korisnik/Desktop/Klju%C4%8Dne%20kompetencije_preporuke%20Vije%C4%87a%20EU.pdf

/ Previšić, V. (2007). *Curriculum: theories, methodology, content, structure*. Zagreb: Školska knjiga.

/ Ristić Dedić, Z. (2013). *Exploratory learning as a means and goal of science education: a psychological perspective*. Child, kindergarten, family: Journal of Preschool Education for Experts and Parents, 19(73).

/ Ross, S. M., Morrison, G. R., & Lowther, D. L. (2010). *Educational technology research past and present: Balancing rigor and relevance to impact school learning*. Contemporary Educational Technology, 1(1), pp. 17-35.

/ Smojver-Ažić, S., Kalebić Maglica, B., and Martinac Dorčić, T. (2020). *Attitudes of teachers and students towards ICT*. In Kolić-Vehovec, S. (ed.). *Introduction of modern technologies in learning and teaching: research on the effects of the e-School pilot project*. Rijeka: Faculty of Philosophy, University of Rijeka, pp. 3-36.

/ Stigler, W. J., Hiebert, J. (2009). The Teaching Gap: Best Ideas from World's Teachers for improving education in classroom. New York: Free Press.

/ World Economic Forum (WEF), *Future of Jobs Report, 2023*: https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf?_gl=1*1vp45xz*_up*MQ..&gclid=CjwKCAjwseSoBhBXEiwA9iZtxme2Hc2iVZw2Sr-D4450S7ZelfTzpVBu2wypb-AiiBhzg-jcA8W4FRoCkZAQAvD_BwE

/ Šimić Šašić, S., Kalajžić, A., and Nikčević-Milković, A. (2021). *Encouraging self-regulated learning – the role of certain sociodemographic factors, teacher perceptions of teaching and learning, commitment to work, and burnout at work*. Psychological Topics, 30(3), pp. 467-487.

/ Opatija Catering School (2022a). *Analysis of existing EU, national, regional, and local strategic documents related to the field of education in the tourism and hospitality sectors*. ILLYRICUM SAVJETOVANJE d.o.o., M.Sc. Zrinski Pelajić.

/ Opatija Catering School (2022b). *Research on the application of technology in the field of education in the tourism and hospitality sectors at the level of regional centers of competence as part of the RCK Recept*

project. ILLYRICUM SAVJETOVANJE d.o.o., M.Sc. Zrinski Pelajić.

/ Vičič Krabonja, M. and Šverc, M. (2019). *Do we know how to use ICT to support the introduction of innovative learning environments?*. Polytechnic: Journal of Technical Education, 3(2).

/ Vizek-Vidović, V., Vlahović-Štetić, V., Rijavec, M., Miljković, D. (2014). *Psychology of education*. Zagreb: IEP-Vern.

/ Voutilainen, A., Saaranen, T., & Sormunen, M. (2017). *Conventional vs. e-learning in nursing education: A systematic review and meta-analysis*. Nurse Education Today, 50, pp. 97-103.

/ Wangpipatwong, T. and Papasratorn, B. (2008). *The influence of constructivist e-learning system on student learning outcomes*. In: Van Slyke, C. (ed.), Information Communication Technologies: Concepts, Methodologies, Tools, and Applications, Volume 1 (1109-1121), Hershey & London: IGI Global.

/ Zimmerman, B. (2002). *Becoming a self-regulated learner: An overview*. Theory into Practice, 41(2), pp. 64-71.

/ Zumbrunn, S., Tadlock, J., and Roberts, E. D. (2011). *Encouraging self-regulated learning in the classroom: A review of the literature*. Metropolitan Educational Research Consortium (MERC).

List of figures

PART II

Guidelines for the application of new technologies at the technological level

group of authors (Algebra)

Introduction

In light of the constant evolution of technology, education is at a turning point. However, it is not about confronting tradition and innovation but their synergistic connection. Since technology is developing at an incredible speed and is becoming an integral part of everyday life, the tourism and hospitality sectors, known for their dynamism, face challenges and opportunities brought by new technologies and digital innovations. In this context, vocational and adult education must adapt to remain relevant and effective.

"Guidelines for the application of new technologies in vocational and adult education in the tourism and hospitality sectors" represent the result of analyses and earlier research on how to integrate technological innovations into teaching processes and form some synthesis that will help actors in *a living organism* such as school in introducing changes for the success of the key users of such an organism – students. Their purpose is multi-fold: to inform, teach, guide, and inspire teachers (and other actors) on the way to introducing new technologies into their daily work.

Vocational education, which plays a crucial role in preparing young people for work challenges in the tourism and hospitality sectors, is now facing pressure due to the necessary inclusion of technological tools in its curricula. However, it is not enough to simply add technology to classrooms. The question is how to do this to enrich the learning experience, increase student engagement, and provide access to the latest resources and information.

In light of these challenges, the first part of this section of the Guidelines dives into the analysis of existing resources. Understanding the current state of technical and software equipment, as well as the competence of educational staff, is the cornerstone of any implementation process. In addition to giving a clear overview of current possibilities, it also indicates and identifies problem areas in teaching.

The advancement of technology brings about new challenges in its application. The second chapter of this part of the Guidelines focuses on a number of resources and instructions that enable the effective use of technology in the classroom – mostly on the example of ICT in teaching. This is not just about technical specifications; the focus is also on a pedagogical approach that will ensure that technology serves its primary purpose: enriching the learning process.

However, the adoption of new technology is not a linear process. The third chapter, therefore, emphasizes continuous implementation and quality assurance monitoring. In an age when technology is changing rapidly, it is essential to provide mechanisms that allow constant evaluation and adaptation to ensure that technological tools and methods continuously support learning objectives.

In the fourth chapter, concrete innovative activities are presented that serve as examples of how technology can be applied in the real world of education. With such examples, teachers can see the technology in action, providing concrete solutions and inspiration for their own practice.

Finally, these guidelines are not just an answer to the question "How?"; they are instead a vision of the future of education in which technology serves as a bridge between traditional

teaching methods and the needs of modern society. In a world where borders are constantly shifting, we must prepare the next generation for the challenges and opportunities that the future holds.

At their core, these Guidelines are more than a mere collection of technology-related tips and tricks. They serve as a tool for change, a call to action, and an inspiration for all those committed to creating a world of education that is innovative, relevant, and, above all, student-centered.

As technology continues to evolve and change our lives, our education must keep pace. These guidelines will equip educators with the knowledge, skills, and resources needed to navigate the ever-changing educational landscape.

Join us in this adventure, and let's reshape together the future of vocational education in the tourism and hospitality sectors.

Chapter 1

Planning the implementation of new technologies in the educational programs of the Regional Center of Competence

Chapter 1

Planning the implementation of new technologies in the educational programs of the Regional Center of Competence

1.1 Analysis of existing resources – knowledge and skills

The Regional Center of Competence (RCK) of the Opatija Catering School is the holder of the project "RCK RECEPT – Regional Center of Professions in Tourism." Thirteen holders participated in the project, and they conducted research on the application of technology in the field of education in the tourism and hospitality sectors at the level of the Republic of Croatia. The purpose of research on the application of technology in the field of education in the tourism and hospitality sectors, as part of the project "RCK RECEPT," was to obtain a detailed description of the level of adoption of modern didactic tools, materials, and methods in the applicant school and partner schools at the pedagogical and organizational (school) levels, with the aim of creating a basis for the creation of "Guidelines for the application of

POPRAVITI na kraju

new technologies in tourism and hospitality education," and the creation of local applicable innovative solutions at the pedagogical and organizational (school) levels.

The survey questionnaire was filled out by 105 representatives of the participating schools: representatives of the Karlovac Catering and Trade School (28 representatives or 26.7%); representatives of High School Croatian King Zvonimir (25 or 23.8%); representatives of the Opatija Catering School (22 or 21%); representatives of the High School Dr. Antun Barac Crikvenica (17 or 16.2%); and representatives of Mali Lošinj High School Ambroz Haračić (13 or 12.4%).

The pedagogical and teaching status of the representatives of secondary schools included in the survey questionnaire (noting the possibility of multiple answers) was as follows:

- teacher of general education subjects (68 or 64.8%)
- vocational subject teacher (29 or 27.6%)
- vocational teacher (practical teaching, workshop-type exercises, etc.; 8 or 7.6%)
- teaching assistant (3 or 2.9%).

The focus groups included a total of 29 participants, representatives of secondary schools involved in the "RCK RECEPT" project. Except for the focus group of the Opatija Catering School, which had five members, all the focus groups of the other schools participating in the research had six members.

By researching the use of digital platforms and digital tools in the educational process and the very quality of the ICT infrastructure in schools for digital and green competences, an attempt was made to conduct an analysis of existing resources that include the level of technical and software equipment of the RCK, and the knowledge and skills of educational staff necessary for working with new technologies, all in order to present possible technical solutions for the improvement of teaching processes based on the identified problems in teaching.

The research questions included the existence of a digital platform, the share of educational content on the digital platform, the use of the platform to improve the teaching process, pedagogical models of the application of ICT in learning and teaching, educational content, the existence of an innovative component, the use of games in teaching, digital and green transformation, use of digital tools, use of digital tools in teaching by students and teachers (scaling), speed and stability of the Internet network in the respondents' school, compliance with the EU Regulation on the protection of personal data in communication via the Internet, digital competences of students, digital competences of teachers, the possibility of organization of training aimed at increasing the digital competences of teachers and students, the green competences of teachers, the possibility of training for green competences, and the motivation of teachers and students for the transition to digital and green education.

The largest number of respondents work in a school that has its own IT (digital) platform, which can be accessed by all teachers and students. However, most respondents are not aware or familiar with the digital platform. In addition, the majority of respondents are not aware of whether there is educational content on such a digital platform, whether there is any user-friendly educational content, and whether there is a possibility to save educational content from the platform to the user's medium, just as most are not familiar with the possibility of using the digital platform to improve teaching. Less than a quarter of respondents are aware of the fact that their school has developed its own digital educational content, tools, and methods, and even fewer know that they include pedagogical models of ICT application in learning and teaching, as well as that they have an innovative component. The vast majority of respondents use games in teaching, albeit rarely, and almost a third of teachers do not use games in their teaching. When asked how their school deals with the digital and green transformation in education, only a handful of teachers (8) believe that a rapid transformation is taking place. When it comes to the frequency of using digital tools in teaching, more than half of the respondents use digital tools in teaching often and very often, although the vast majority of surveyed teachers (more than 90%) evaluated the current level of use of digital tools in teaching in their school by teachers and students with a rating of 3 to 5.

Affirmative statements:

- *Students know their way around digital technologies because they grew up with them.*
- *Students perform very well in the digital environment. I believe they are sufficiently computer-literate.*
- *Students are sufficiently competent to use digital tools. They understand everything and have digital competences.*
- *Students are familiar with digital skills. Students generally have a good command of digital tools.*
- *Students know their way around digital content and regularly fulfill their obligations related to it.*
- *All of them use ICT and are computer literate.*
- *Although I haven't been working with students for a long time, they use digital content shared on the learning platform very well.*
- *Most students use digital tools without any issues.*

Negative statements:

- *Students use their digital competences mainly for playing games and social media, not for work.*
- *Students are mostly uninterested to such an extent that most of them don't even know how to send an e-mail.*
- *Students use digital technology for private needs but do not have much motivation to use it for educational purposes.*
- *They often do not know the basic rules of behavior on the Internet; they do not know how to use sources of knowledge.*
- *Students are experts when it comes to mobile devices, but they do not know how to use computers at all.*
- *Students demonstrate a lack of knowledge when using the Internet.*
- *They know how to use things in which they are interested and are not competent for the rest.*

1.2 Analysis of existing resources – ICT infrastructure and digital competence

The largest number of surveyed teachers evaluated the speed and stability of the Internet network in their school with a rating of 3 to 5, the same rating range with which they evaluate the security of the Internet network in their school. Slightly less than half of the respondents believe that the privacy rules of the EU General Data Protection Regulation are respected in communication via the IT network. It is indicative that more than half of the respondents either do not believe that to be true or do not know/cannot assess. The largest number of surveyed teachers evaluated the digital competences of students in their school with a rating of 3 to 5, the same as their own digital competences. Two-thirds of respondents want to organize training both for teachers and students who are not sufficiently digitally competent.

Affirmative statements of teachers and their digital competences:

- *Constant education and work that require the use of various platforms and programs are responsible for my competences in this field.*
- *Through training, I managed to reach the above level, and I use various digital tools.*
- *Constant education and work that requires the use of various platforms are responsible for my digital competences.*
- *I know my way around digital technologies.*
- *I successfully use information technology and digital tools with prior preparation.*
- *I use various programs and tools, both old and new. I have no problem using new digital tools.*
- *I have been using digital tools since I was a child, I have reached a more advanced level of use through training; I follow digital competences trainings.*
- *I often use digital tools in teaching and consider myself competent.*

Less affirmative statements of teachers and their digital competences:

- *There are still many digital tools I should master. I need more education. I could learn more. I can do better. I am still not well-versed enough when it comes to some things.*
- *I do not think I am sufficiently knowledgeable. I would be happy to be more acquainted with even more programs, applications, etc.*
- *I am not yet sufficiently acquainted with the programs/tools that I could be using. We can always do more and better.*
- *I was not involved in it from the very beginning.*
- *I would like to acquire more competences when it comes to creating quizzes; creative approach to platforms.*
- *I would be able to use digital content even more if there were textbooks with ready-made quizzes.*
- *There is always room for improvement. Digital competences are an area I need to work on further.*
- *I try to use new digital tools in teaching, but there is still room for improvement.*

The analysis of the survey questionnaire showed that a significant number of surveyed teachers either confuse the concept of RCK's digital platform with the digital platform of an individual school or are not informed at all about the existence of RCK's digital platform. Therefore, it is necessary to clarify the role and importance of RCK's digital platform to all teachers through additional training and to promote the benefits of its use for RCK Recept member schools.

Despite individual cases where teachers, in a very tangible and innovative manner, apply the digital platform in the educational process. Still only a small number of surveyed teachers use educational content with an innovative component and put it onto RCK's digital platform. Through a communication campaign targeted towards all teachers, it is necessary to clarify the purpose of the digital platform and raise awareness of the advantages of using digital tools in the educational process for both teachers and students.

The majority of surveyed teachers believe that they are sufficiently digitally educated, but they also believe that continuous education is important for the use of digital platforms and tools in the educational process.

As for the students, the general perception is that they know their way around social media and games, but when there is a need for an analytical approach and, for example, a certain type of research, they are mostly incompetent and unmotivated and give up quickly. However, there are also positive examples, i.e., if you get them interested in a certain topic in the right way, they become very motivated and persistent.

This research attempted to analyze the knowledge and skills of RCK's educational staff necessary for working with new technologies in order to, by identifying problems in the implementation of the teaching process, offer possible technical solutions for the improvement of teaching processes.

Based on the feedback analyzed and listed below, we can conclude that there is a need for substantive conditions in the classrooms and educated teachers for the easy application of appropriate digital technologies in the daily teaching process.

1.3 Substantive conditions

The conditions under which competences are acquired are prescribed by the State Pedagogical Standard of the Secondary Education System (Official Gazette No. 63/2008 and 90/2010)[1], the Ordinance on the Method of Organizing and Conducting Classes in Vocational

1 State Pedagogical Standard of the Secondary Education System, OG 63/2008, OG 90/2010. Retrieved September 28, 2023 from https://narodne-novine.nn.hr/clanci/sluzbeni/2008_06_63_2128.html

Schools (Official Gazette No. 140/2009 and 130/2020)[2], and the Adult Education Act (Official Gazette No. 144/2021)[3].

Substantive conditions include a standard classroom equipped with a projector, a screen, a computer for the teacher containing the necessary software, access to the Internet and/or a local network, and writing equipment (whiteboard).

Given the fact that such a standard classroom is in question, we can immediately notice the appropriate technical equipment of teachers for the implementation of new technologies in RCK's educational programs. From the teacher's point of view, the classroom contains everything they need in order to use appropriate digital tools in the teaching process on a daily basis and thus make it easier for themselves and the students to carry out their daily activities. Although this is not a description of a computer classroom that contains computer equipment for every student, it does not mean that students in a standard classroom do not need to use digital tools. If the school is not able to provide tablets, laptops, or desktop computers in every classroom, the teacher should use teaching methods and tools that will allow students to access the teaching content through personal mobile devices.

One of the simplest ways is to use QR codes. QR code or Quick Response is the most famous type of barcode, which gained popularity with the development of smartphones. It was created in Japan in 1994, in one of the branches of Toyota, in order to more easily track parts for vehicle production. The goal was to create a barcode that can be loaded at high speed, as this is extremely important in production, especially in the automotive industry.[4]

Figure 1 *QR code for URL article page* All about the QR code and how to read the QR code on the Bug portal[5]

In order to generate a QR code, online tools are needed, such as *QR Stuff*, *QR Code Generator*, *QR Code Monkey*, *UnitagQR*, *QR Code Tec-it,* and the like, and a printer that will print it.

When it comes to the application of QR codes in the teaching process, there are countless possibilities. From gamification purposes such as quizzes, surveys, or questionnaires for knowledge testing to processing new teaching content, practice, and reviews – all of which can be done in a simple way. All it takes is a student's mobile device, which then scans the QR code with one of the above-mentioned online tools, which then enables access to the teaching content set by the teacher. Therefore, the possibilities of using the QR code in the teaching process are unlimited. It doesn't matter whether there is one mobile device, one tablet, or more of them in the classroom.

Technical equipment should be simple and accessible; that is, it should enable smooth learning and teaching processes.

In order for this process to be smooth and uninterrupted, it is necessary to check the following components:

- The network – the most important thing is to ensure the best possible quality of the network so that there is no maximum load due to the large number of daily users. In the "Guidelines for Digital Learning and Teaching," it is stated that "practice has shown that Internet connections of 50 Mbit/s are suitable for primary schools, while a faster connection is required for secondary schools. Depending on the size of the data, transfer rates of 100 to 200 Mbit/s are required. If mobile devices are used in the class, higher transmission rates are required"[6]. Thus, the school network must bear the load of modern computer networks so that its users can access it through different devices. Certain knowledge, i.e., the support of experts, is needed so that such networks can be installed and run smoothly. Also, not every room in the school is suitable for server installation. These should be rooms that have a ventilation system, a constant and uninterrupted power supply system, and an extended network cable, as well as protection against water and unauthorized access. Bearing in mind the fact that teachers cannot influence the procurement of hardware such as servers, this problem needed to be solved through the students' use of mobile devices in class. CARNET's "e-School" project, which covers most schools in Croatia, enables the sharing of Wi-Fi connections in schools. In this way, every student, through their mobile devices, was able to connect to the Internet and use digital applications that require an Internet connection.
- Hardware – in the long term, the best option is to invest, i.e., to purchase the so-called business or corporate hardware. The most common advantages are longer warranty periods, the possibility to deliver identical hardware and spare parts even after a longer period, longer service life, and less frequent replacement cycles. It is important to note that students

2 Ordinance on the Method of Organizing and Conducting Classes in Vocational Schools, OG 140/2009 and OG 130/2020. Retrieved September 28, 2023 from https://narodne-novine.nn.hr/clanci/sluzbeni/2020_11_130_2473.html

3 Adult Education Act, OG 144/2021. Retrieved September 28, 2023 from https://narodne-novine.nn.hr/clanci/sluzbeni/2021_12_144_2460.html

4 Gračanin, M. (2021). The "Bug" portal. All about the QR code and how to read the QR code. Retrieved September 27, 2023 from https://www.bug.hr/savjeti/sve-o-qr-kodu-i-kako-procitati-qr-kod-21435

5 Ibid.

6 Guidelines for Digital Learning and Teaching (no date). Retrieved September 27, 2023 from https://edufutura.hr/wp-content/uploads/2023/02/edge_edufutura_smjernice_za_digitalno_ucenje_i_poucavanje_1.pdf

tend to be more cautious when using higher-quality devices, and such devices can be supplemented or partially replaced by private ones. As stated in the "Guidelines for Digital Learning and Teaching," device coverage among high school students and college students amounts to almost 100 percent.

There are two ways in which devices can be used in schools:

- Heterogeneous concept (BYOD[7]) – the school allows the use of students' private devices for the purpose of monitoring the teaching process. The advantage of this concept includes reduced costs of purchasing and maintaining devices. The disadvantage is certainly higher costs in the field of technical integration, educational concepts, and security of the information system.
- Homogeneous concept – the school determines which devices will be purchased, which facilitates the didactic and technical integration of the school's work, while on the other hand, the costs of purchasing and maintaining the devices are higher.[8]Software – by using the same paid piece of software, a common knowledge base is developed in the school, which is a source of mutual support. Central procurement, supply, and administration take charge of reduced procurement costs, as well as monitoring of licensing issues. By using open source and free software, problems can arise as soon as the need for technical support and maintenance arises (professional technical support is limited or non-existent), although in this case, the necessary updates are readily available, and no additional costs are incurred. In addition, it is important to take care of the issue of data privacy and its protection. As stated in the "Guidelines for Digital Learning and Teaching," users often need to provide their personal data in order to be able to use applications or certain pieces of software. The software used in the school should be regularly updated since outdated software is most often one of the causes of security breaches.[9]

7 Ibid.

8 Ibid.

9 Ibid.

Chapter 2

Application of new technology in teaching

Chapter 2

Application of new technology in teaching

The future is now! Things we thought were unimaginable are now part of everyday life. Of course, we are talking about digital tools and their application both in everyday life and in everyday application in the teaching process. ICT changes and develops on a daily basis according to our needs. Every day, we develop and apply the digital tools that we started using in the teaching process in numerous ways, all for the purpose of facilitating the acquisition of new knowledge and skills for students.

All participants in the teaching process are aware of the fact that daily efforts are needed in order to successfully adapt to constant changes. Teachers are faced with the challenges of creating innovative approaches and teaching methods. Students expect new and interesting ways of adopting new teaching content in classes that will be adapted to their interests and needs to the greatest extent possible, but that will also be interesting and attractive to their generation.

Educational institutions themselves use digital tools to improve their marketing activities. The number of students decreases with each generation. Therefore, it is extremely important for secondary schools to strengthen their marketing activities in order to make certain professions attractive to as many students as possible. This is when the importance of the proper use of digital technology comes into play.

Although digital technology has been present in our schools for a long time, we cannot say that it has fully coexisted with the term *digital learning*. Many teachers try to apply ICT in the teaching process, but most have done it by replacing the chalk and blackboard with presentations, the contents of which the students copy into their notebooks. Instead of chalk and blackboards, some use smart boards on which they write using a pencil, and the students copy such content. Thus, progress can be seen in the desire and motivation of teachers to make certain changes. However, teachers need education in order to acquire new knowledge and skills in ICT. It is necessary to make all participants of the educational process aware that the learning process itself is as important as the end result of learning, i.e., grades. Only when will we be able to talk about digitization of the teaching process.

Digital tools help teachers motivate their students during the teaching process. They should be interesting and interactive to attract and retain students' attention. In addition, they should allow the students to store teaching content so that they can access it at any point. They should also make the teaching process interesting, interactive, and attractive.

There are many digital tools that can help students during the teaching process. From tools for writing, creating presentations, learning by playing games, and solving quizzes to calculations and other teaching methods. Precisely because there is a large number of available tools, teachers often do not know what they need in order to use a tool and whether they can even use it for educational purposes without purchasing a corresponding license. Therefore, it is extremely important to conduct an analysis of existing resources that includes the level of technical and software equipment and the knowledge and skills of educational staff necessary for working with new technologies. In addition to the above, based on the identified problems in teaching, it is necessary to provide an overview of possible technical solutions for improving teaching processes and explain the procedure for monitoring progress and establishing a quality system for introducing technologies.

We will tackle these and other doubts below, using examples of the most commonly used digital tools in teaching today: *Office 365*, *Google Drive*, *Google Docs*, *Mentimeter*, *Zoom*, and *Kahoot!*.

Standard classroom teaching is increasingly being replaced by teaching enriched with multimedia content that attracts and retains students' attention and encourages them to participate more actively in the educational process. The acceptance of new digital technologies and their introduction into the educational process, the continuous education of teachers for the implementation of digital tools in everyday teaching content, and the necessary investment in the material resources of educational institutions will lead to a simpler, more interesting, and modern way of achieving the necessary learning outcomes.

When it comes to ICT equipment, most of the standard classrooms in Croatian schools are equipped with only one computer and a projector used by the teacher. Only a small part of these classrooms has a smart board or an interactive screen. Even though the above resources may lead to discouragement of teachers, it is all they need to modernize the teaching process. For this reason, numerous studies have been conducted on this topic.

When it comes to innovations, they have not been strictly defined in terms of school practice and pedagogy. They carry the aspect of the novelty of the innovation and the potential effectiveness of new practices or measures. They distinguish true educational innovation from mere reform or change. When it comes to introducing innovative approaches, this requires fundamental changes in school culture, not simply introducing or changing isolated practices. In order to succeed, school innovations must be flexible, respond to local needs, be embedded in the local context, and be open to their environment. Innovative approaches must also be culturally sensitive and involve multiple actors – there is no "one size fits all" model. In a culture of innovation, the primary goal is to learn so that the organization or system as a whole can be improved. This means fostering a collaborative learning environment that encourages learning from failure, diverse ideas, and ways of thinking and translates them into action to address specific challenges and better meet the needs of different types of learners. Innovation can take place at many different levels. It can range from the continuous improvement of the existing pedagogical and organizational practice in a certain class or school to the transformation of the way in which educational goals are achieved. Governments, individual schools, school networks, civil society organizations, or the private sector can drive innovation.

Today's educational system is focused on the acquisition of skills and competences that students need for easier entry into the labor market. Teachers must also be educated in order to be able to convey this knowledge to students and help them develop these skills. Continuous education is needed for the development of personal competences and abilities to perform a certain job. In addition to the development of competences that are needed to master business skills, it is necessary to develop the competences for moral and ethical behavior when using information and communication technologies.

The knowledge and skills of teachers for the 21st century, as listed by Topolovec, Marinović, and Pavlić (2006), are focused on learning and teaching processes with the aim of stimulating the intellectual effort of students. Below are four areas of knowledge and skills that a teacher should master.

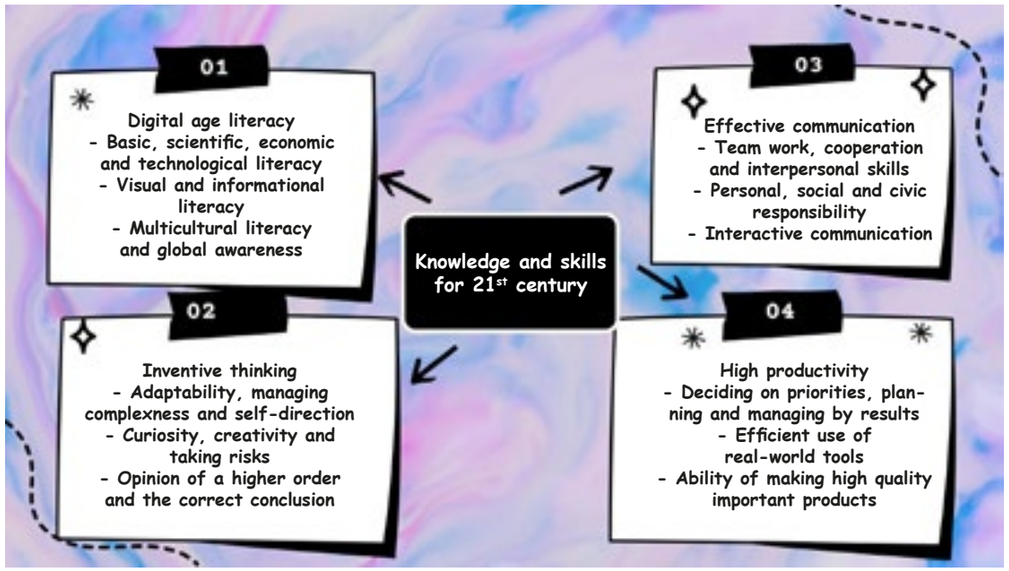


Figure 2 *Knowledge and skills for the 21st century according to Topolovec, Marinović, Pavlić (2006)*

According to Vrkić Dimić (2014), there are two types of competences necessary for a teacher to integrate modern technology into the teaching process:

- Basic computer/IT literacy implies the use of information and communication technology at the user level (use of multimedia, search engines, auxiliary functions, etc.).
- Multimedia didactic competences imply the use of more developed information and communication technology in class (starting a printer through a specific application, restarting a computer, etc.).

The teacher is not expected to participate in the troubleshooting process when using information and communication technology in teaching, and it is necessary to ensure technical support in the event of major difficulties. In certain situations, the teacher can resort to didactic strategies, such as instructing the students to work in groups, or for the student to independently try to find appropriate ways to complete tasks.

Technological competences are related to basic IT literacy that teachers can acquire in courses and individual use of computers and other information and communication technologies. In this case, the needs related to teachers' knowledge of the use of computers and other information and communication technologies do not differ from the needs of other social groups. Nevertheless, for the development of multimedia didactic competences, teachers need professional education and training, as well as guidance on how to use information and communication technology in the teaching process. The goal of such training is for teachers to master the technique of implementing and using a particular digital tool in the teaching process, depending on the reason for implementing information and communication technology (evaluation of what has been learned, evaluation as learning, or evaluation for the purpose of learning, or in the teaching process when acquiring new knowledge).

According to Vrkić Dimić (2014), teacher competences for the effective use of information and communication technology in learning and teaching processes are some of the most frequently mentioned but also the most complex types of competences. Teacher competencies for the use of ICT in the teaching process should be developed through teacher education programs, whereby, in addition to the skill of using certain technologies, it is also necessary to acquire skills for a critical attitude towards these technologies in the teaching environment. By developing information and communication skills in teachers, it is important to focus on achieving and ensuring education in the spirit of the 21st century, as well as teaching methods that will enable the development of information and communication skills and competences in students.

The availability of technology in classrooms does not necessarily reflect the quality of its application in the learning and teaching processes. Due to the unprofessional use of information and communication technology, the IT equipment often remains unused, and the level of quality of the teaching process remains unchanged. The correct use of information and communication technology is the only way to ensure progress in the learning and teaching processes, the development of critical thinking in students, and students' ability to acquire new knowledge and skills in the information environment. Over the years, with the increasing use of technology in society, there has been a rise in expectations for integrating technology into the teaching process. Thus, the once sufficient use of a computer for the purposes of word processing has become the minimum for the use of any type of information and communication technology. The basic level of technological use of information and communication technology in the teaching process consists of the teachers' use of computer technology to perform administrative tasks (electronic register, electronic master data, etc.), word processing, e-mail, and database searches. Modern forms of integration and implementation of information and communication technology in teaching also imply the active involvement of students in the use of computer technology for the purpose of tasks and exercises. For such an application, it is necessary to use information and communication technology on a higher level in order to adapt individual digital tools and computer equipment to the requirements of an individual task or exercise.

2.1 Development of digital educational content

In the majority of primary and secondary schools in the Republic of Croatia, summative (numerical) evaluation is still much more common than formative (descriptive) evaluation. Possible reasons include the limited time capacity of the teacher (descriptive monitoring requires a good knowledge of the students and is carried out individually for each student), insufficient education (descriptive monitoring should be written in such a way that it has a motivating effect on the student for whom it is written), but also the focus of educational institutions on the learning results (numerical

grades are still an indicator of the mastery of the content on the basis of which certificates are issued) instead of on the learning process. Formative student evaluation does not imply using numerical grades, but descriptive monitoring of the student's work, which aims to provide students and parents with detailed feedback on the student's progress and encourage them to continue working hard. Digital technology supports the development of formative assessment through the use of various digital tools that collect data on student achievements, thus making the teaching process more attractive and substantial.

Digitalization of student progress monitoring is the process of introducing new digital technologies, in the form of various digital tools, into the process of monitoring and evaluating students.

Digitalization of student progress monitoring has a number of advantages, such as:

- Increased effectiveness of teachers – they can automate some tasks for monitoring and evaluating student achievements, which leaves teachers more time for other activities in the teaching process (processing of new teaching content, revisions, practice, etc.).
- Improving the accuracy of monitoring results – they can help reduce human errors because, when using certain tools, the evaluation results are automatically displayed to students.
- Increasing transparency of monitoring results – digital data on monitoring and evaluation can be easily shared with students, parents, and other actors.
- Increasing adaptability – they can be adapted to the individual needs of students, which is a great advantage when evaluating students with special needs.

The use of digital tools in the process of monitoring and evaluating student achievements evokes positive reactions in students, removes the fear of oral and written tests, awakens the competitive spirit in students, and develops self-evaluation and peer evaluation.

The advantages of using digital tools in the teaching process for the purpose of learning, teaching, and monitoring the progress of student achievements are the following:

- faster and easier achievement of the desired learning outcomes
- developing different skills and acquiring the necessary competences in students
- encouraging the desire for personal progress in the form of developing a competitive spirit
- self-evaluation, monitoring of one's own progress, and peer evaluation.

The use of digital technologies is increasingly common in today's educational process. The number of digital tools that can be used for the purpose of learning and teaching, monitoring, and evaluating student work is continuously increasing, which enables teachers to prepare dynamic and interactive teaching content that increases interest in teaching content. When deciding on the use of a particular digital technology and a specific tool, teachers should consider the resources they have at their disposal to ensure the possibility of applying and reproducing teaching content created using certain digital tools.

Today, there are many digital tools and educational platforms, which differ according to the ways of use, the type of digital materials that can be created using them, and the virtual environment to which they belong. When choosing a particular digital tool, it is important to analyze what can be monitored and evaluated with each tool. In addition, it is important to keep in mind what is being evaluated and in which way it is to be evaluated (evaluation of what has been learned, evaluation as learning, or evaluation for the purpose of learning). The use of any digital tool should be adapted to the age of the students.

For the purposes of these Guidelines, the tools *Office 365*, *Google Drive*, *Google Docs*, *Mentimeter*, *Zoom*, and *Kahoot!* have been selected, which are presented in theory in Chapter 2 and supported by examples of good practice.

2.1.1 Office 365

In order to implement *Office 365* in the teaching process, the following is required:

- teacher's computer with Internet access
- students' computers with Internet access
- AAI@Edu user account for free access to *Office 365* (for both the teacher and the students).

Office 365 is a service that provides free access to all educational institutions, allowing their employees and students free access to all *Office 365* tools with their AAI@Edu user accounts in the format firstname.lastname@skole.hr. With their AAI@Edu user account, each user receives an accompanying password. All *Office 365* services can be used on a computer, tablet, or smartphone. What makes *Office 365* different from the vast majority of other digital tools is that it can be installed on a computer and used even when it is not connected to the Internet.

The home screen for signing into *Office 365* is shown in Figure 3, and the registration is to be carried out using an e-mail address in the form firstname.lastname@skole.hr.

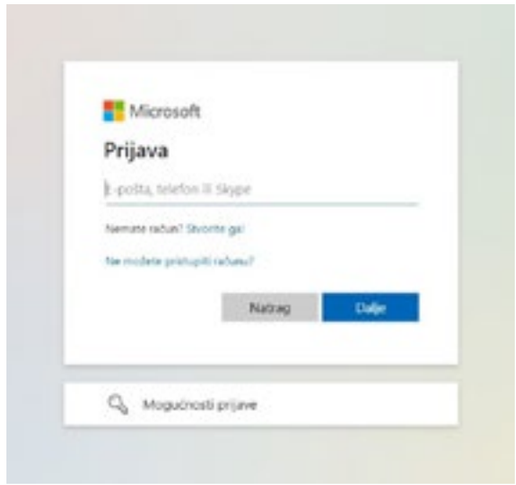


Figure 3 *Initial interface for signing into Office 365*

After entering the e-mail address, another screen for logging into *Office 365* appears, which is shown in Figure 4, and the registration is to be carried out using an e-mail address in the form firstname.lastname@skole.hr and the accompanying password.

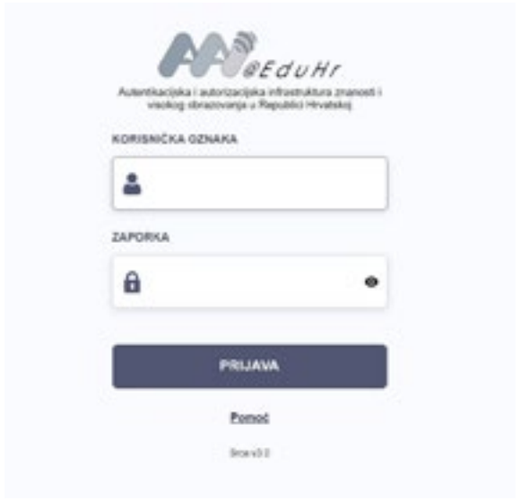


Figure 4 *Login interface for signing into Office 365 from AAI@ Edu.hr*

Internet is required to install and activate all the latest applications and services in all subscription plans for *Microsoft 365*. Likewise, Internet access is required to access documents stored on *OneDrive*, except in cases in which *OneDrive* is installed on the computer. A regular Internet connection is also required to take advantage of the application's automatic updates. If there is no connection to the Internet for 31 days, the application switches to the reduced functionality mode, which results in reduced capabilities of the application, which are reflected in the inability to edit and create new documents, while old documents can be displayed and printed. To reactivate the applications, the application needs to be reconnected to the Internet.

To use applications *Word*, *Excel*, and *PowerPoint*, no Internet connection is required as these applications are fully installed on the computer and can be used offline. After signing into *Office 365*, there is a whole range of different applications that can be used for the purpose of creating learning and teaching materials and for monitoring and evaluating student achievements.

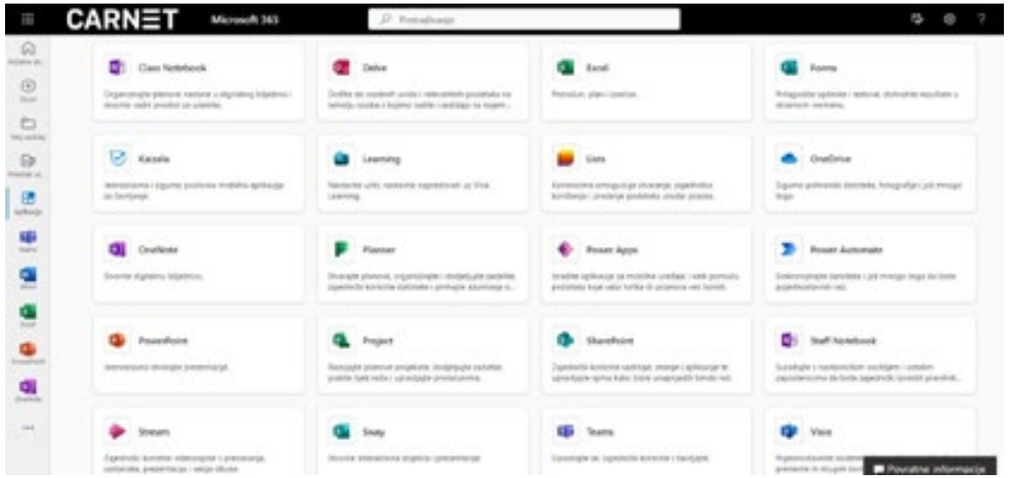


Figure 5 *Available applications in Office 365*

Office 365 enables the use of the following applications:

- *SharePoint*
- *OneDrive*
- *Yammer*
- *Forms*
- *OneNote*
- *Class Notebook*
- *Teams*
- *PowerPoint, Word, Excel*
- *Sway*
- e-mails containing a calendar – *Outlook*.

Before deciding on the use of a particular application in the teaching process, for the purpose of learning and teaching, or monitoring and evaluating student achievements, it is important to know which purpose the tool is needed for. Does digital material need to be created that is intended for an individual student (individual level), a group of students (class–group level), or at the school level (e.g., conducting a survey or research)?

Brief instructions for the use and application of individual *Office 365* applications are shown below.

SharePoint is a collaboration intranet platform developed by Microsoft. It can be used to share information and documents when it is necessary to highlight and ensure the flow of certain information and to automate business processes. *SharePoint* can serve as a substitute for bulletin boards and school portals because it enables the sharing of information, which can positively affect communication between team members and thus improve cooperation and efficiency.

OneDrive is a service provided by Microsoft that is used to store data in the cloud. *OneDrive*

is accessed by signing into the application *Office 365* with the corresponding AAI@Edu user account and password. *OneDrive* is available for personal use, where the user can store documents up to 5 GB, and for business use, with a storage capacity of up to 1 T. When using *Office Online* applications, such as *Word*, *PowerPoint,* or *Excel*, a big advantage is the automatic storage of created documents on *OneDrive*. Prepared documents in the *Office Online* application can be downloaded to a personal computer and used even when there is no connection to the Internet. All documents and created files stored on *OneDrive* are private. If certain documents or files are to be shared with colleagues and allow others to access or edit and share documents, it can be set in such a way in the document or file sharing options.

OneDrive can have a variety of applications in education, for example:

- It can be an extremely useful tool for sharing materials between the teacher and students. The teacher can store materials from classes or additional educational materials and share them with students via a link. Students can access shared materials through computers, tablets, or mobile devices, which greatly facilitates the process of learning or completing certain collaborative tasks.
- It can have a very practical application in cases where students work together on various projects and activities. All participants of a certain team or group of students working on collaborative projects are given the ability to edit shared documents, which gives them the opportunity to work together and make corrections on documents, presentations, and other assigned tasks. In this way, teachers can monitor students' progress and give them feedback.
- It is a very useful tool for storing and organizing tasks. Students can save their tasks and assignments on *OneDrive* and access them from any device whenever they want. *OneDrive* can be used to organize their tasks and documents by subject, date, or some other criteria.
- It can be a useful tool for creating a digital student portfolio. Students can save their works on *OneDrive* and share them very easily with teachers, other students, or potential employers.

Yammer is a Microsoft application that serves as a free social network for business users. It can be used to connect teachers and students, exchange ideas and opinions, share information, facilitate project collaboration, and generally for two-way communication between members of a certain team. *Yammer* is a widely used application when it comes to teamwork. It enables the creation of a team space for collaboration where it is possible to store documents, share information and consult on further steps in planning certain projects or tasks. *Yammer* is a social network; it is safe for use in educational institutions because the sign-in is possible only with an AAI@Edu user identity in the form firstname.lastname@skole.hr and the accompanying password. The basic purpose of the *Yammer* network is to provide teachers and students with a safe and controlled environment for learning, information exchange, collaboration, and collaborative work on projects and tasks.

The possibilities the *Yammer* network offers are the following:

- creating and editing personal *Yammer* profiles
- writing posts (*Update*)
- inclusion of all participants in group discussions
- collaboration and exchange of knowledge through *Yammer* groups
- collaborative work on documents
- public praise by awarding *Yammer* badges (*Praise*)
- creating *Yammer* polls (*Poll*)
- collaboration in the creation of common *Yammer* notes (*Notes*)
- searchability and content cataloging (*Search*)
- permanent storage of data published on the *Yammer* network.

Collaboration between network members takes place within *Yammer* groups that can be private and public. Any member of the *Yammer* network can create *Yammer* groups. Groups allow members to connect according to their interests through posting, commenting, sharing, and liking. Documents such as *Word* and *PDF* documents, *Excel* tables, *PowerPoint* presentations, web links, videos, and photos can be stored and exchanged inside the group. The advantage of working on documents stored in groups is that the documents can be edited online, which enables other users to instantly see the changes made and edit documents together in real time. All conversations and documents published in a particular group remain permanently stored and can be searched later using the *Search* option.

Yammer can be a very useful tool in teaching, and the reasons are the following:

- All teachers and students are inside one social network where they can easily find each other via profile search.
- The *Yammer* network is secure and controlled because all users access the network using their AAI@Edu user account.
- The *Yammer* network can be accessed via mobile and tablet devices, which makes it possible to keep up with news and changes at any time.
- There is no limit to the number of published documents and materials on the network.
- All materials and conversations remain permanently stored and are easily searchable.
- Students can collaborate on school projects, share materials, edit documents, and learn how to work in teams.
- Using *Yammer* badges, students, classes, or groups can showcase their successes and thus influence the students' motivation and eagerness for further work and collaboration.
- Teachers can use the network to inform students about important notices and deadlines for completing assignments or to provide additional guidelines and instructions when completing a specific assignment.
- Private group teachers can collaborate with other colleagues within their profession in creating teaching materials, exchanging teaching materials,

exchanging experiences, and sharing examples of good practice.

- Through their online activity, teachers can promote their work, share examples of good practice, and thus be recognized and respected by their colleagues as experts in certain fields.
- Using *Yammer* polls, teachers can check the completion of the learning outcomes of individual teaching contents or use them as a means of evaluating the lesson.

OneNote Class Notebook is a digital notebook that allows teachers to create a workspace in the form of workbooks that they can use for class projects, assignments, creation of class notes, and for obtaining quick feedback on student work and activities. In the *OneNote Online* program, teachers can add students to a shared subject notebook to create a virtual space to add teaching materials and assignments and track student progress. Students can collaborate on common projects and assignments, with teachers providing them with real-time feedback.

The home screen of the *OneNote* program is shown in Figure 6 below.

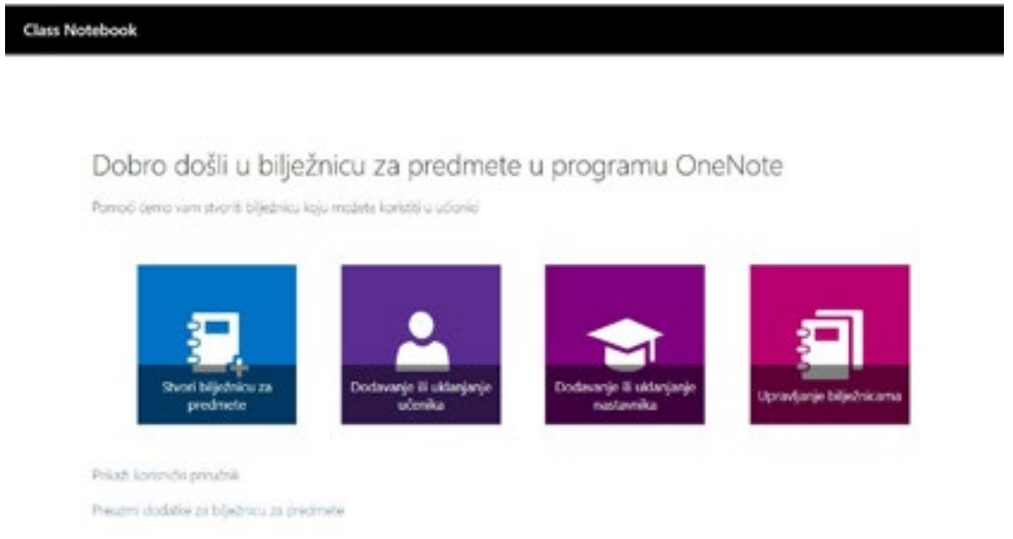


Figure 6 *OneNote Class Notebook*

Exchange Online and Outlook are applications developed as part of the *Office 365* package, which enable sending and receiving e-mails, creating and managing folders, and sorting and filtering e-mails. *Outlook* is a popular tool both for personal and business purposes. In addition to e-mails, *Outlook* offers the possibility to create contacts and groups of contacts in order to speed up the flow of information and shorten the creation time. It also enables the possibility to create events such as meetings and various tasks, and to create reminders of assigned tasks and create notes (e.g., meeting notes).

2.1.2 Google Drive

In order to implement *Google Drive* in the teaching process, the following is required:

- teacher's computer with Internet access
- students' computers with Internet access
- AAI@Edu user account or Gmail account for free access to *Google Drive* (for both the teacher and the students).

Google disk is used for storing and synchronizing files. It makes it easy to save or create new files. The most important thing for viewing and editing files is Internet access through any suitable device. What sets it apart from others on the market is its seamless connection with other Google services and easy-to-use tools.

Access to *Google Drive*:

1. Opening a Google account (free service) so that we can access all Google services easily and for free. If the user needs more than 15 GB of storage space, they must pay a fee.
2. Once signed in, Google Drive can be

accessed via a browser or mobile application currently available for Android and iOS.

3 After signing into your Gmail or skole.hr account, click on the menu in the upper right-hand corner to open a tab that allows you to access Google Drive. (Figure 7)

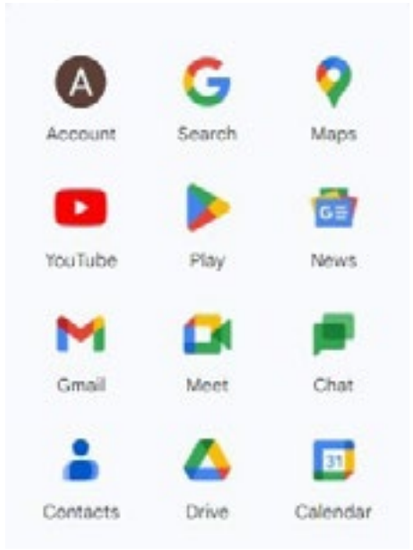


Figure 7 Menu of available applications

Once signed in, click the blue *New* button in the upper left-hand corner or *My Drive* located toward the center of the screen. If you are signing in through the mobile application, you need to click on the blue/white circle with the + sign in the lower right-hand corner. This opens a menu that allows you to create or transfer a file to the Drive.

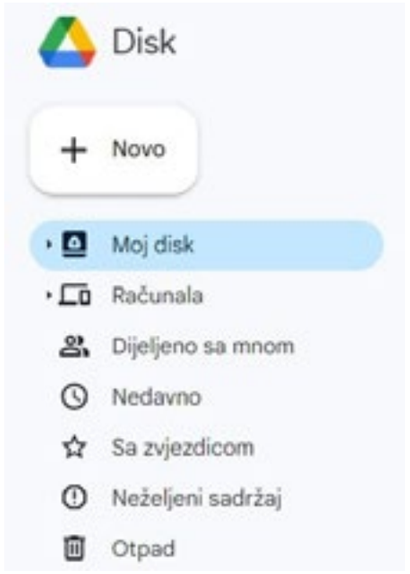


Figure 8 *Start menu after logging into a Gmail or skole.hr account*

There are numerous possibilities for creating different types of documents, from spreadsheets, documents, presentations to content creation forms that can be edited simultaneously on multiple open tabs or devices.

The Drive options are simple and easy to use. When the user is not sure what they should do, they can simply move the mouse pointer and a pop-up window will appear explaining the functions. Software for using spreadsheets, documents, and presentations is very similar to the *Microsoft Office Suite*, i.e., to *Excel*, *Word,* or *PowerPoint* tools. The big difference between these two pieces of software is that *Microsoft Office* contains more advanced features, while Google Drive is free of charge.

Given that there are numerous content creation options, the main screen may become messy. In order to avoid this, it is recommended to

create folders in which all created tables, presentations, or created documents can be stored. In order to successfully create the folder, it is necessary to click the *New* blue button in the upper left-hand corner. Then you need to click on the *Folder* icon and name it. Finally, you can simply drag the created file to a folder of your choice from the main page of the Drive. If you decide to use the option of marking created files that you want to access later, then you only need to click *Add star* on the menu of that item. However, only the user who created or added them can view them, not the people with whom these items were shared.

In addition to creating folders, there is another option for easier navigation and finding appropriate content, which is the *Search Drive* function. The function is located at the top of each page as an empty field in which the name or type of file to be searched can be entered. By clicking on the downward-facing arrow in this field or by clicking on *More search tools*, an additional file search can be performed based on other criteria (date or user with whom the file was shared).

When it comes to **document transfer** to the Drive, you need to select *New* or *My Drive*, click on the *Upload files* button, and select the file.

When it comes to personal use, Drive is the ideal solution as it is a powerful collaboration and sharing tool. When there is a need to collaborate on the same document or folder, it can be simply shared with all users so that all the necessary activities are entered in real time. After the document or folder is created, the ***Share* option** located in the upper right-hand corner needs to be selected. The participants are then added by entering their e-mail addresses and selecting the blue *Done* button at the bottom of the window. After access is granted, the document or folder should appear on the *Shared with me* card on the Drive dashboard. A link to the shared document automatically arrives in their inbox to notify them that the document has been shared. While working on a shared document, it is possible to monitor which user is working on and editing that document in real time. Each user will be displayed in the upper right-hand corner in different colors, sometimes with their photo, in order to distinguish them more simply and easily. In order to find a user, simply hold the mouse cursor on the image and the name of the user will be immediately displayed on the screen.

If the file is to be sent as text or using some other option, the share link in the upper right-hand corner of the menu can be used (*Share with others*).

Downloading documents and accessing files offline: when you are away and you have no Internet access for a few hours, there is the possibility to browse and edit files, which is another advantage that Drive has to offer. To enable it, you need to download the Google Docs offline extension for *Google Chrome* and enable it in the Drive settings. Afterward, certain files (documents, tables, and presentations) can be accessed. A gray circle will appear in the file window, right next to the name of that file. This is a sign indicating the offline mode. In addition to the above advantages, there is also one disadvantage. In an offline system, you can access only those files that you have personally created and that you have not shared.

Adding more collaborators via Google Groups: when it comes to multiple-user collaboration, such as group work or teamwork, it is preferable to share the same document with all users. A document can easily be shared with an entire Google Group so that everyone in that group, as well as those who join later, can access what has been shared.

In addition, there is a possibility to send a link of the same document to each user. If the users have created a group in one of the digital forms, a link can be sent to that group and then each user can access that document by simply clicking on the link.

Sharing multiple files at once: sometimes activities require the creation of multiple files. In such a case, it is recommended to put all created files in the same folder and share that folder with all users in the same way as previously described. The principle of sharing and using a shared document is the same as that of a shared folder.

Converting documents created using other programs: if the activity required the creation of documents in another, similar program, and the collaborating group works using the Drive, then it is necessary to convert these documents into Google Docs, which enables sharing and editing. The documents need to be in the correct format.

The first step is to upload the selected file to open it using Drive. Select *File* and *Open with*. Google itself offers suitable programs to open such a file depending on the type of file. Finally, there is the file format that can be converted to Google Drive.

Uploading and downloading documents: files can be easily uploaded to Google Drive from the user's computer, edited, and re-downloaded to their computer. This implies uploading and downloading an entire folder or a single file. Google Drive transfers uploaded files in a special format. When downloading files to the user's computer, one of the standard formats can be selected depending on the file being downloaded:

- word processing document – .doc, .odt, .rtf, .pdf, .txt, .html
- presentation – .pptx, .pdf, .svg, .png, .jpg, .txt
- spreadsheet – .xls, .ods, .pdf, .csv, .txt, .html
- drawing – .pdf, .svg, .png, and .jpg.

When it comes to Google Drive, word-processing documents, presentations, spreadsheets, forms, and drawings can be created or added. All of them can be shared with a large or unlimited number of users and they can be assigned access levels to the document. As previously described, shared documents can be edited by multiple users at the same time, i.e., in real time, which is practical because you can always keep track of what has been edited by which user and when.

As for the Google Drive word processing application, it is very similar to other word processing programs. It contains the same functions and options, which is why it is extremely easy to use. A text document can be created and edited according to one's own wants and needs thanks to a large number of options. The toolbar contains basic text editing options, such as specifying fonts, styles, text positioning, adding images and links, and print settings. If more advanced options are needed, they are available in the menus above the toolbar.

Mathematical equations are also an integral part of Google Docs, which greatly facilitates the preparation and implementation of the teaching process for mathematics teachers, especially in terms of the creation of written tests and various forms of testing of acquired materials. In terms of mathematical symbols, Greek letters, general operators, comparison and association operators, variable operators, and arrows are available.

In order to add a mathematical equation to the selected document, select the *Equation* option inside the *Insert* menu. An equation is entered in the small square, while at the same time, another menu appears offering additional mathematical symbols that can be used, which are located below the main menu.

Application of Google Drive in teaching

Example of use in project-based teaching: Google Drive provides great opportunities for project-based teaching. It gives students the opportunity to keep up with the changes and improvements made to joint documents at any time, and the teachers can continuously monitor the progress of all members working on a joint project assignment. A significant advantage of using Google Drive for students is that they can do assignments at home and communicate with other students in real time through chat windows. The disadvantage is that teachers do not have insight into the amount of individual student's effort, and at the end of the project they have to evaluate all students' work.

Quizzes and surveys for students: using Google Forms, teachers can create quizzes and surveys for students and thus conduct evaluations of what has been learned, evaluation as learning, or evaluation for the purpose of learning. Created surveys and quizzes can be modified and adapted by teachers according to the student structure.

High school final paper: when creating the final paper, the student can share the document with the teacher via Google Drive. The teacher can comment on the work and, if necessary, communicate with the student in real time. This greatly facilitates the preparation and evaluation of the final paper because all changes made to the document are immediately visible to the teacher.

2.1.3 Kahoot!

In order to implement *Kahoot!* in the teaching process, the following is required:

- technical devices (computers, laptops, hybrid tablets, tablets, and Android mobile devices) for the teacher, with Internet access
- technical devices (computers, laptops, hybrid tablets, tablets, and Android mobile devices) for students, with Internet access
- AAI@Edu user account for free access *to Kahoot!* (for both the teacher and the students).

According to the Profil Klett portal, *Kahoot!* is a simple digital tool intended for learning through play, i.e., creating and playing quizzes, discussions, and questionnaires. Gamification in teaching, i.e., the application of *Kahoot!* tools encourage motivation and competitive spirit in real time. It is suitable for all age groups, from primary school to secondary education (Gustović Ljubić, 2016).

In order to create tests or simply for everyday work with students, a network connection is required. *Kahoot!* supports the latest versions of Internet browsers, of which the most recommended ones are *Google Chrome* and *Mozilla Firefox.* The tool can be accessed by mobile devices that support HTML5, i.e., Apple iOS version 4 or later, *Google Android* version 2.3 or later, and Windows Phone version 7.5 or later.

You must first type *Kahoot!* in the search engine or enter a website https://kahoot.it to access it as a student. In order to create a profile, visit https://kahoot.com.

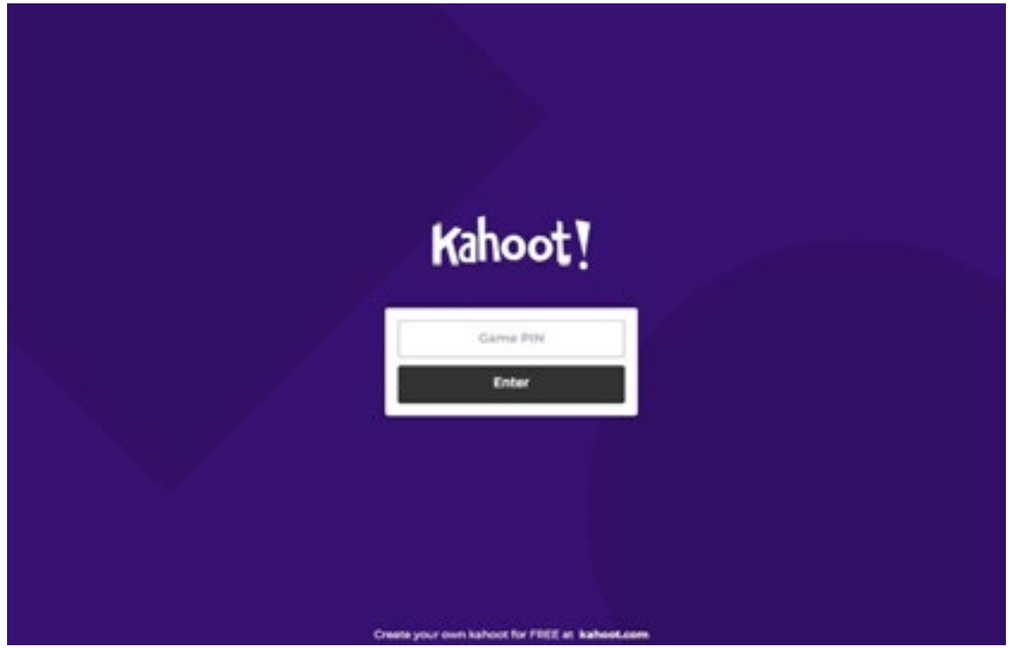


Figure 9 *Kahoot!'s home page for students*

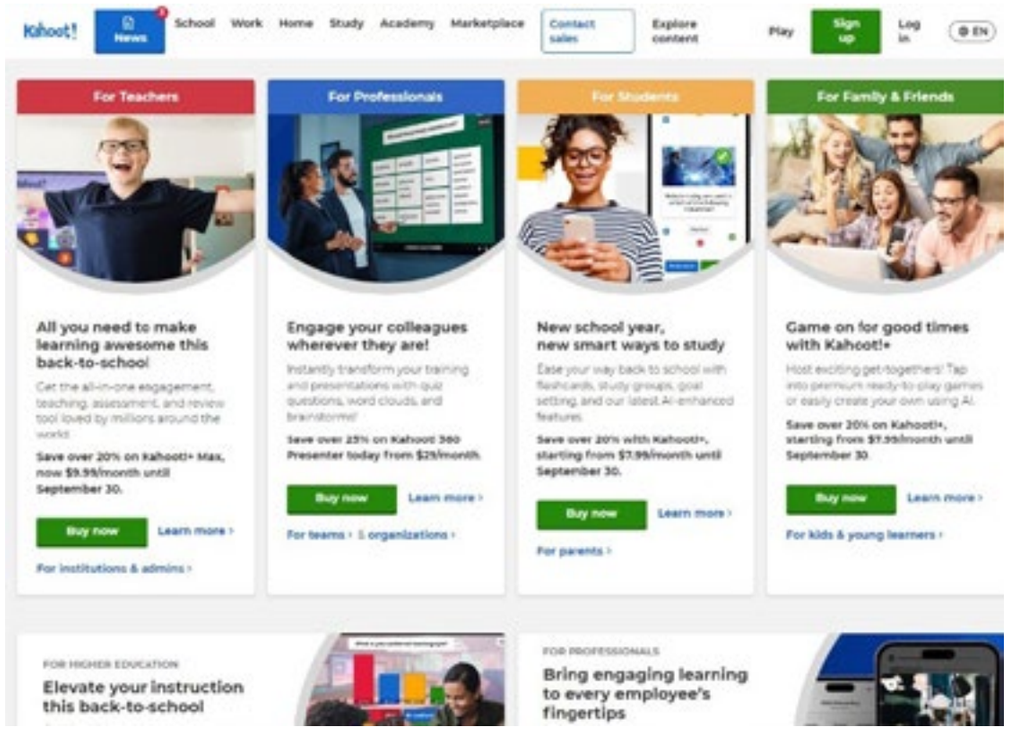


Figure 10 *Home page for creating a Kahoot profile*

Home screen for signing into *Kahoot!* is shown in Figure 10, and the registration is to be carried out using an e-mail address in the form firstname.lastname@skole.hr.

To access the game via *Kahoot!*, students do not need to create user accounts. However, teachers should register as follows:

1. In the upper right-hand corner of the interface, there is the *Get my free account* option, click on *Log in* (if there is already a user account) or *Sign up* (if the person is registering for the first time). Afterward, there is a page with user roles – log in as a teacher, log in as a student, and social and business use.

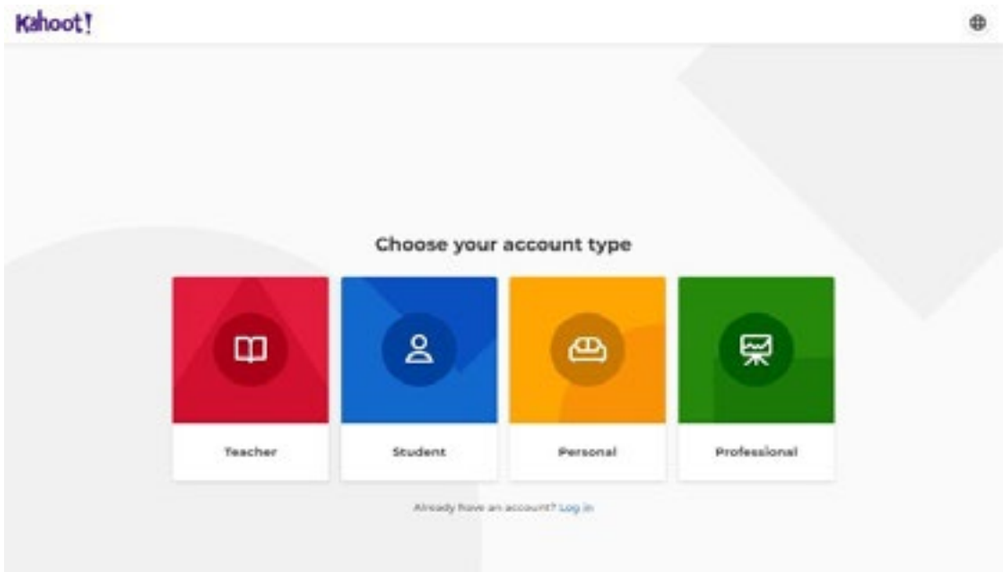


Figure 11 *Choosing how to use Kahoot!*

2 After selecting a role, a page appears where you need to log in, via a Google user account or via an e-mail address. Then you need to enter Google data or user e-mail, which redirects the user to registration.

In order to create a user profile, the following is required:

- name of the employment institution
- nickname
- answer the question about previous experience with work in *Kahoot!*
- confirm data.

After filling out all the fields, the created account is confirmed and the teacher can continue working, i.e., create tests, questionnaires, and discussions necessary for the verification and evaluation of student achievements, but also for monitoring other *Kahoot!* news and activities created by other users.

According to Negulić, on CARNET's e-Laboratory portal, if a teacher wants to carry out certain teaching activities in which students will independently create their own quizzes, questionnaires, and discussions, the students must also go through the registration process. However, if students will only participate in quizzes, questionnaires, and discussions, they do not need to create user accounts. The only thing they need to do is enter the personal identification number (PIN) of the teacher in the browser

of the selected device after visiting the website www.kahoot.it,

Age restrictions are extremely important when it comes to the students' use of *Kahoot!*. For students who are 16 years old or younger, the tool supports some social elements, i.e., when creating a user account, they must enter the date and year of birth. Furthermore, they do not have the option of publishing the created content and accessing content created by other users. Students who are over 16 years of age can create user accounts in the same way as teachers and do not have active restrictions compared to students under 16 years of age.

Quiz: On the website www.create.kahoot.it it is necessary to select the option to create a quiz. By clicking on the blue mark with the term *Create* in the upper right-hand corner, a selection option opens.

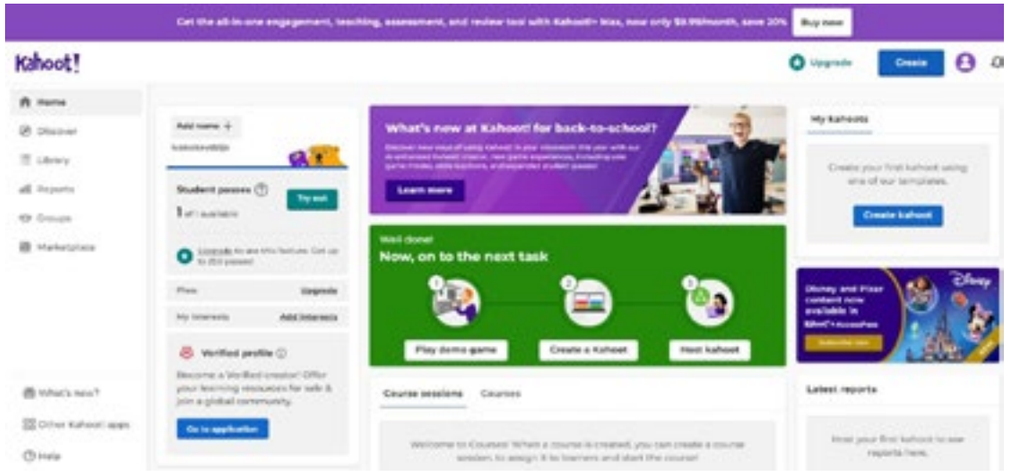


Figure 12 *Home page for creating a quiz*

After the quiz creation option is selected, the quiz template opens.

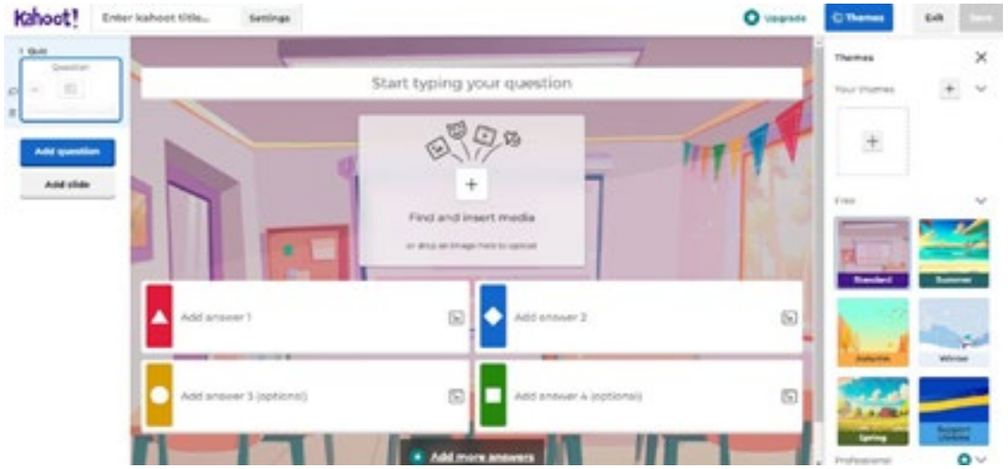


Figure 13 *Quiz template*

In order to create a quiz, it is necessary to go through several steps:

- enter the name (shown in Figure 13)
- enter questions and answers
- text input is limited (questions are limited to 95 characters and answers to 60 characters)
- input of the offered answers – the maximum number of answers is four, which means that there is the possibility of multiple correct answers š. The correct answer is indicated by clicking on the red *Incorrect* button which turns green and says *Correct*. The quiz creator determines whether the questions will be scored or not and determines the time within which it is necessary to click on the answer (minimum 5 seconds, maximum 120 seconds)
- image and video inserts
- quiz saving.

After all the above steps are completed, the quiz is saved. It can be tested using a *Preview* option before publishing it. Only after the creator of the quiz is content with what has been created is it necessary to press the *Done* button.

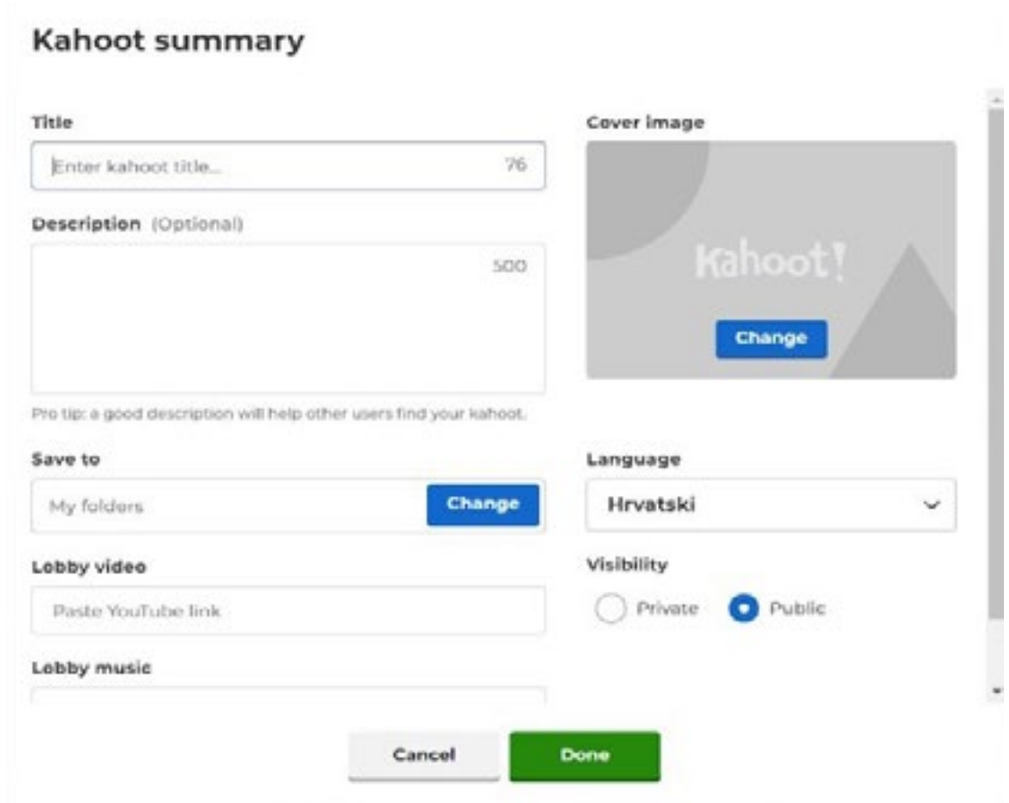


Figure 14 *Entering the quiz name, description of the quiz, the location of saving the quiz, the possibility of inserting videos and music, images, choosing the language of the quiz, and the method of publication*

Once you are, press *OK, go* in order to choose a type, and create questions.

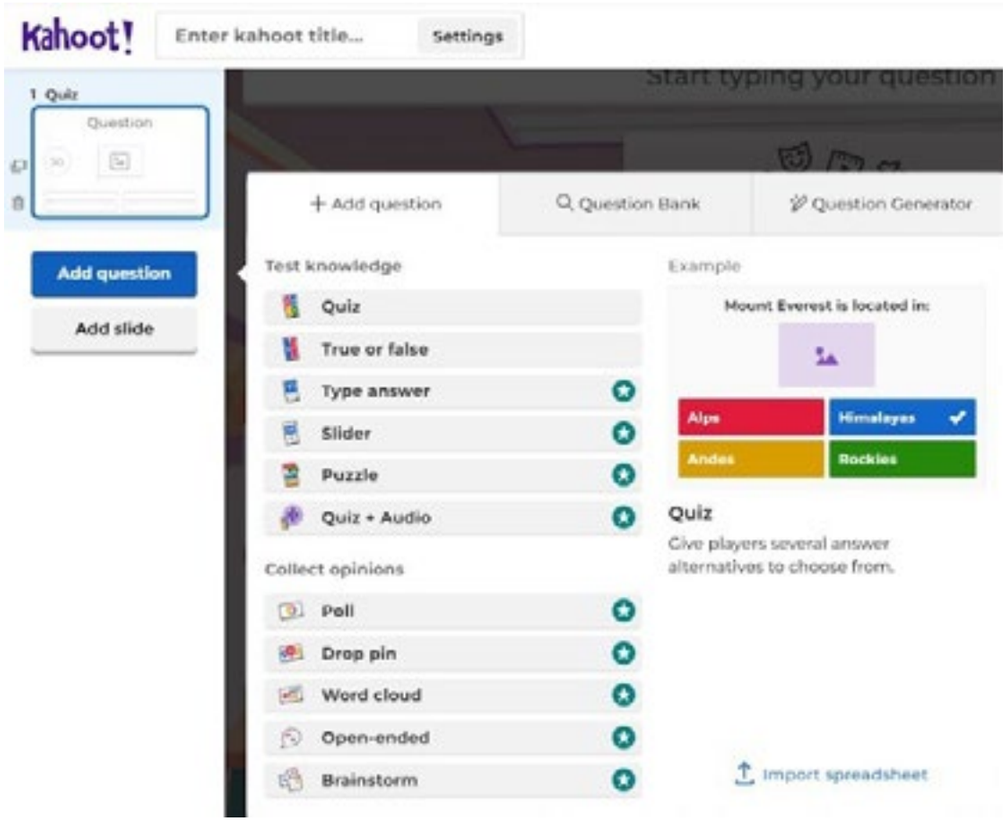


Figure 15 *Options for adding questions by question type*

Questions with a green star next to them are only available in the paid version. Everything else, without the above mark, can be used and applied in the creation of the quiz in the free version.

Discussion: creating a discussion starts with entering a topic. The topic refers to discussion questions. Then the answers are added. Considering that the discussion refers to attitudes and opinions on a topic, it is possible to create only one question. When creating a discussion, there is no possibility to mark correct answers. Here, it is not possible to determine the scoring of the question, but it is possible to set the time for the answer, add a video or an image.

2.1.4 Google Docs

In order to implement *Google Docs* in the teaching process, the following is required:

- technical device (computer, laptop, hybrid tablet, tablet, or mobile device) for the teacher, with Internet access
- technical device (computer, laptop, hybrid tablet, tablet, or mobile device) for students, with Internet access
- AAI@Edu account or Gmail account for free access to Google tools (for both the teacher and the students).

Google Docs enables working with text files in real time. By connecting your colleagues to work on a document, you can edit, compile, and use it together. No need to save files on your computer. You can work on a document wherever and whenever you want with the devices you have.

The advantages of using Google Docs are as follows:

- documents are stored online, which means they can be accessed at any time from any computer after signing in
- creating and sharing Google Docs is free of charge
- documents can be shared with multiple people, which enables joint work and editing of documents at the same time
- every change made to a document is automatically visible to everyone, making it easier to edit documents and work together on them

To work with Google Docs, you must log into your @skole.hr or Gmail user account.

How to create a Google Doc:

1 On the Google home page, click the services icon (Figure 16), click *More* and select *Documents*. In the displayed window, you will see all the text documents that you will create.

Figure 16 *Google applications*

2 Press the big red + button in the lower right-hand corner of the screen to start working with a new document.

3 Now you can create and edit the file as you would in any text editor; the only difference is that you do not have to save the document – it is saved automatically.

If you want to save the original document, click *File*, *Create a copy*.

4. Now set access settings for other users. Click *Access settings*, as shown in the above figure. If the file does not have a name, you will be asked to specify it.
5. Click the drop-down list and specify what users who can receive the link can edit, view, or comment on. Click *Done*.

How to share a Google Doc with others: files and documents stored on Google Drive can be shared with collaborators, colleagues, and students. A document can be shared by opening it and selecting the *Share* option in the upper right-hand corner. The document can be shared with other users who have an AAI@Edu user account, and if the document is shared with people outside the skole.hr domain, the system provides a warning stating that the recipient is outside the skole.hr domain and urges caution when sharing documents with external domains. Another way to share documents is by right-clicking on the document you want to share and selecting the *Copy link* option. The copied link is easily sent to the desired user by pasting it into a separate document or via e-mail. The file can be shared by right-clicking on the file and selecting the *Share* option. In this way, the recipient has the possibility to access all the documents that are in the shared file.

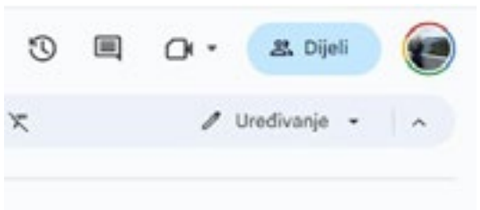


Figure 17 *Google Docs sharing option*

People with whom we share Google Docs may act as document reviewers, commentators, or editors. We grant such authorizations to people when sharing documents.

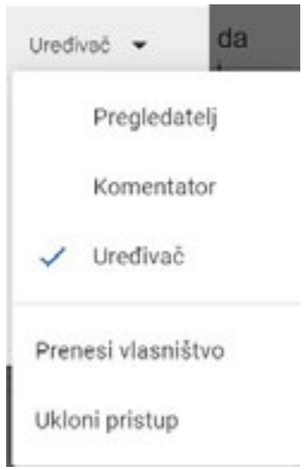


Figure 18 *Possible options when sharing Google Docs*

Editing a document in Google Docs: Google Docs offers a wide variety of options for editing and tracking document edits. If the document is shared with a colleague or student, the *Track changes* and *Edit* options can be selected. These indicate the person made changes to the document, when they made the changes, and what text preceded the changes made.

Adding a comment: in Google Docs, comments that are visible to other collaborators on the document can be added. Comments in Google Docs serve as suggestions for modification of certain words, sections, and units, expressing observations about the written text, asking other collaborators questions, adding URLs of various websites, and making suggestions for improving certain parts of the document.

How to add a comment in a Google Doc:

1. open the document in which you want to write a comment
2. mark the text or image that you want to comment on
3. on the toolbar, select the *Add a comment* option.

Google Sheets: Google Sheets is a great tool for creating spreadsheets, graphs, lists, or plans. A created graph in Google Sheets can be inserted into any document. Created Google spreadsheets can be downloaded to a computer and continued to be used in Excel.

Google Forms: *Google Forms* are an extremely valuable Google tool that can be widely used in the teaching process. *Google Forms* can serve as a tool for creating quizzes that can be used in the evaluation of what has been learned or evaluation for the purpose of learning. Forms provide the possibility of creating various types of questions, which makes it an ideal tool for monitoring the progress of student achievement. The advantage of such a method of evaluation for students is automatically receiving feedback on the adoption of certain teaching contents. The created forms can be easily shared with students by selecting the *Send* option after opening the document.

2.1.5 Zoom

In order to implement *Zoom* in the teaching process, the following is required:

- technical device (computer, laptop, hybrid tablet, tablet, or mobile device) for the teacher, with Internet access
- technical devices (computer, laptop, hybrid tablet, tablet, or mobile device) for students, with Internet access
- AAI@Edu user account for free access (for both the teacher and the students)
- operational computer camera.

Zoom is a free desktop platform that offers the possibility of video communication between two or more people. *Zoom* offers the possibility of online meetings, trainings, webinars, and the like. It enables the sharing of documents, photos, and videos. It also enables the possibility of video and audio recording of the meeting for the subsequent review of the recording, as well as screen sharing which facilitates online presentations or work on joint documents and has the writing board option. The application is free of charge, easy to use, and facilitates long-distance communication.

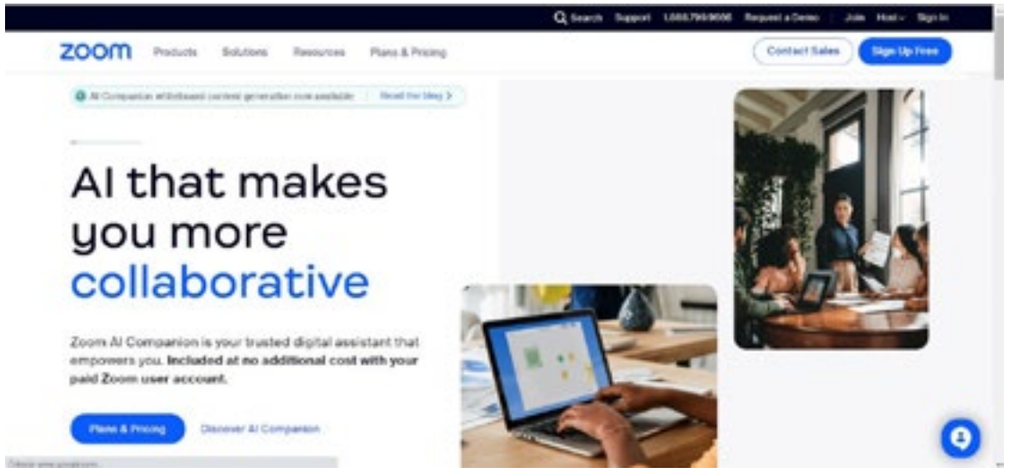


Figure 19 *Initial interface of the Zoom application*

If you want to arrange a meeting, a webinar, or any other online form of communication, it is necessary to register and download and install the *Zoom client* on your computer, tablet, or another device.

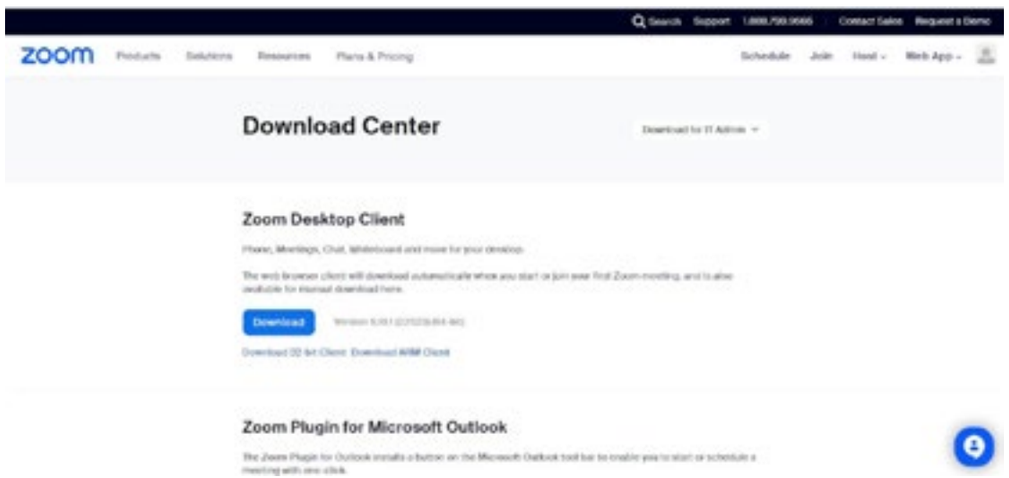


Figure 20 *Initial interface of the Zoom application before installation*

After a successful installation process and logging into the system, the initial interface offers several options to start using the application.

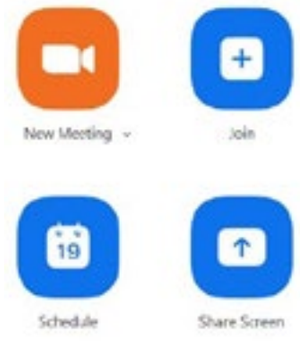


Figure 21 *Initial interface after logging into the Zoom application*

To start a meeting, you need to select the *New Meetin*g option and join the meeting with or without audio (*Join with Computer Audio*). Turning the sound on or off during a meeting can be changed multiple times by clicking the *Mute/Unmute* button on the lower left-hand side of the window. Settings related to video (on or off) can also be changed during a meeting by clicking on *Start Video/Stop Video* in the lower left-hand side of the window. In order to invite the participants to the meeting, you need to click on *Invite* and send the meeting link and meeting ID to participants so they can join the meeting.

How to join a webinar as a participant: if you want to join a meeting, a webinar, or a conference as a participant, registration in the system is not necessary. In order to access the meeting, it is necessary to obtain a link to access the meeting from the meeting organizer. However, before accessing the meeting, *Zoom* needs to be installed on a computer, tablet, or mobile device. After installing and launching the application, you need to enter your name, which will be visible to the host and other meeting participants. By clicking on *Join Meeting,* you can access the meeting and it is necessary to pay attention to the on and off audio and video options.

2.1.6 Mentimeter

In order to implement *Mentimeter* in the teaching process, the following is required:

- technical devices (computer, laptop, hybrid tablet, tablet, and Android mobile device) for the teacher, with Internet access
- technical devices (computer, laptop, hybrid tablet, tablet, and Android mobile device) for students, with Internet access
- AAI@Edu user accounts for free access (for both the teacher and the students).

As stated by the e-Laboratory portal, *Mentimeter* is a digital tool that allows the teacher to ask questions and collect feedback during the presentation of the teaching contents (Valčić, 2017).

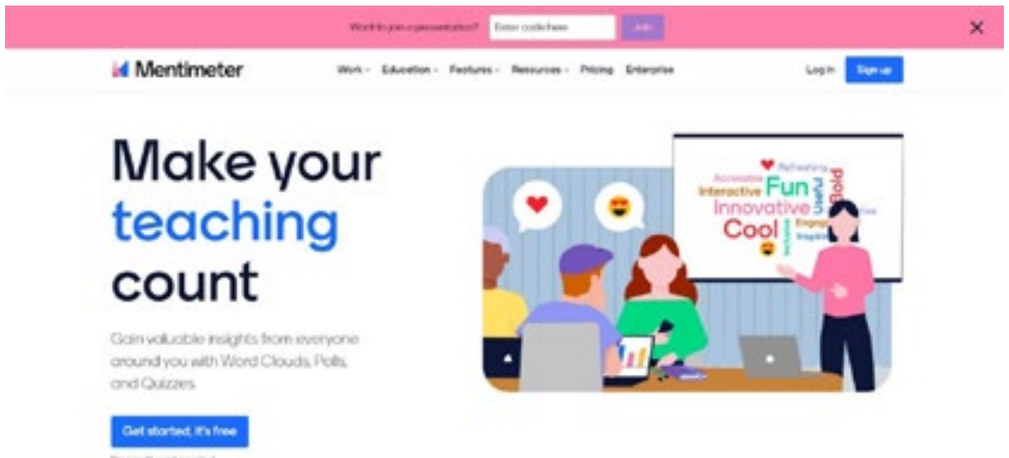


Figure 22 *Mentimeter home page layout*

Students use their mobile devices to enter answers. All they need is a code and a link to enter their answer. This is exactly why it is similar to the previously mentioned digital tool *Kahoot!*. *Mentimeter* is available in the latest versions of Internet browsers, such as *Google Chrome*, *Mozilla Firefox*, *Safari*, and *Internet Explorer*.

In order to create content, it is necessary to create a user account. However, no user account is needed if it will only be used to answer questions. The available version of the user account for education is important for RCK, i.e., for all teachers. There are two versions of the user account – the free version and the paid version. For the user to register, it is necessary to enter an e-mail address and password or connect through an existing *Facebook* or *Google* user account.

Following the registration, and before using the application, you can select the purpose for which this digital tool is used – business, education, or for other purposes (Figure 23).

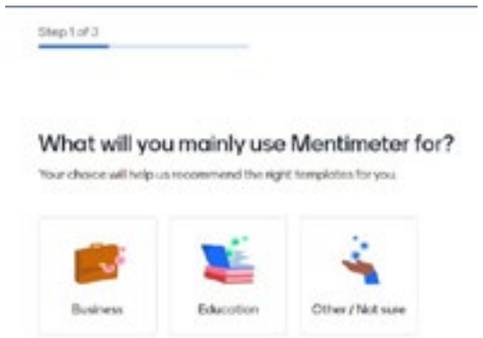


Figure 23 *Page on which you can select the purpose of use*

The advantages of a free teacher user account are manifold. In addition to an unlimited number of participants, it is possible to vote anonymously on a topic or quizzes to evaluate students' knowledge or review what they have learned. The only limitation when it comes to creating presentations and quizzes is the entry of two questions per presentation and five questions per quiz.

After the user registration, the user interface appears with a clear overview of all created presentations, publicly available content, as well as the user account settings.

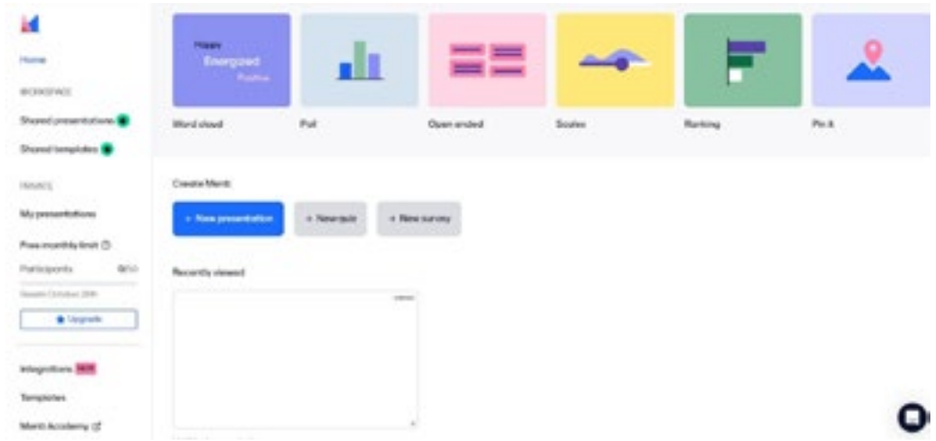


Figure 24 *Mentimeter user interface*

The user, teacher, or student can create new presentations or simply download one of the offered templates and adapt it to their needs. When creating new content, defining the name and method of answering questions is necessary. There are multiple types of questions that the user can add to the presentation, which are multiple answers, image selection, word cloud, ratio input, open-answer type, 2D matrix, 100-point division, and quiz.

Figure 25 *Interface display when selecting a template*

When the teacher sets the evaluation of the lesson that the students must pass before the end of the lesson, it takes place in several steps:

1 Students, using their own mobile devices, scan the QR code on the presentation, whose URL takes them to the evaluation sheet shown in the figure below:

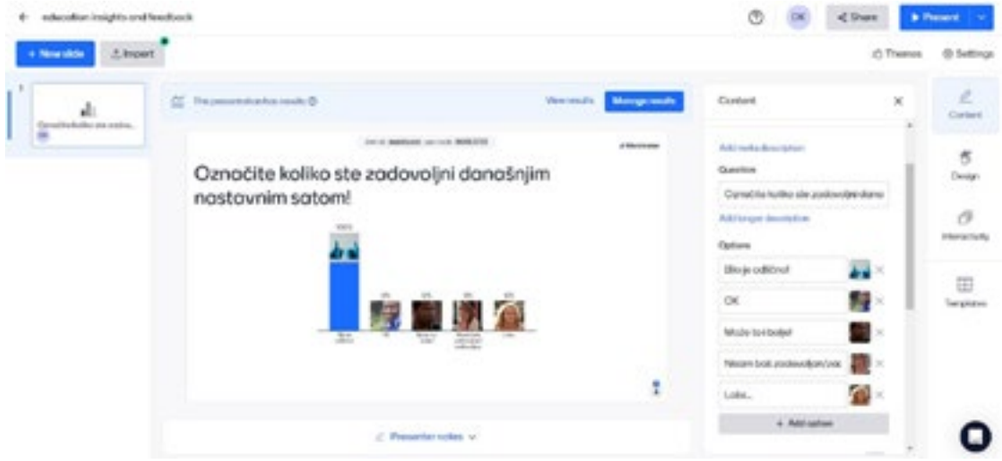


Figure 26 *Evaluation sheet in Mentimeter*

2 After the mobile device has loaded the QR code, the students are presented with answers on their screens, from which they must select one answer by touching the mobile device's screen with their finger, and press the word *Submit* to submit their answer.

3 At that moment, the presentation shows the percentage of answers for each offered answer, and in this way, the teacher receives real-time feedback.

There are many publicly available instructions on how to use *Mentimeter*. Some of them can be found in a practical guide on *YouTube* (Figure 27):

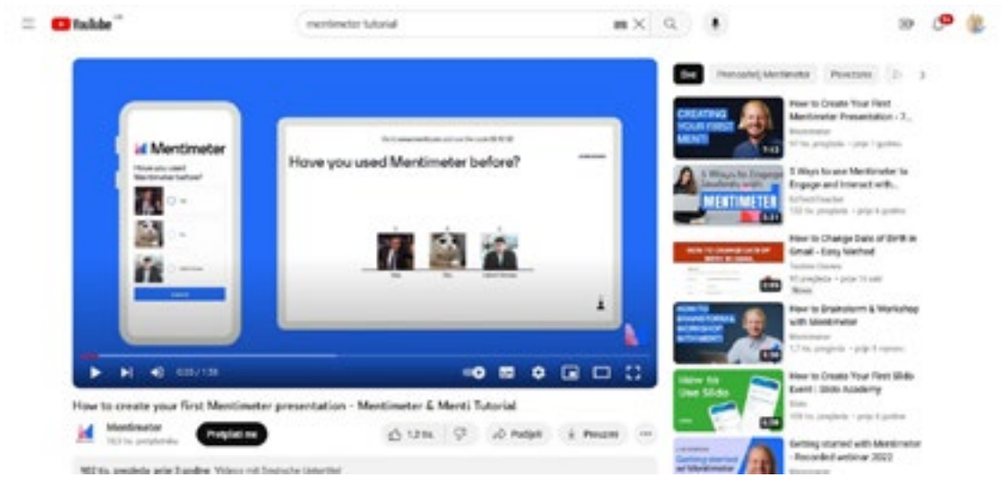


Figure 27 *Beginners Guide to Mentimeter on the YouTube channel*

Advantages:

- for students – easy to use, no need to create a user account to answer questions and enter feedback, which is practical because they do not need to provide their personal information
- for teachers – easy to use, display of results in real time, which means that the teacher automatically receives feedback from students; such feedback can, if the teacher so chooses, be presented in the form of a graph (pie chart or bar chart); there is no limitation to only one classroom with a computer, all that is needed is network access to access it from any device.

Disadvantage:

- impossibility of asking more than two questions per presentation, although this can also be avoided by making as many presentations as the teachers need for all the planned content, given that they can have unlimited presentations.[10]

10 Valčić, J. (2017). Mentimeter – ask a question and collect real-time feedback. e-Laboratory. CARNET. Retrieved September 28, 2023 from https://e-laboratorij.carnet.hr/mentimeter-postavite-pitanje-i-prikupite-povratne-informacije-u-realnom-vremenu/

Chapter 3

Monitoring of implementation and quality assurance

Chapter 3

Monitoring of implementation and quality assurance

Monitoring progress and establishing a quality system for the introduction of technology into teaching requires careful planning and implementation. Modern education requires adaptation to digital tools and resources to ensure competitiveness and compliance with global trends. This initiative – the introduction of monitoring and quality assurance – will not only improve learning outcomes but will also empower teachers and students to face the challenges of the digital age. The introduction of technology into teaching is not only a technological process, but also a pedagogical one, therefore it requires careful planning and monitoring. This chapter will refer to the basic procedures, strategies, and guidelines for the successful implementation of this transformational process in high schools.

It is important to note that the steps described here follow or are in accordance with some activities that have already been carried out as part of RCK, however, it is certainly important to be aware that any circular introduction of new technologies in the context of quality assurance should be regularly monitored, evaluated, and reevaluated. Technologies are developing at an incredible speed, so even new technologies that we may have introduced into

the teaching process in one academic year can become obsolete as soon as during the same academic year. That is why it is important to re-analyze what we have at our disposal, i.e., to always start from the first point stated in this chapter. Only with the circular implementation of all the points proposed here can quality assurance come to life in the school environment. In this sense, it is important to implement the so-called PDCA methodology – *PLAN – DO – CHECK – ACT*. This type of methodology can be used at several levels: institutional and departmental, but also at the individual level. For instance, teachers can use this methodology at the end of the month to evaluate how content they are with the implementation of planned activities in each grade in which they work. We can explain this methodology using the following illustration:

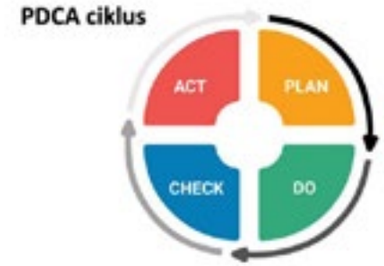


Figure 28 *PDCA cycle*

*3.1 Analysis of needs and resources (in the PDCA methodology, it is part of the **PLAN** element)*

Before implementing any changes related to the use of ICT, digital educational content, or technologies, it is important to thoroughly analyze the school's needs and resources. This implies the identification of existing infrastructure, available devices, and the educational needs of students and teachers.

*3.2 Defining goals and strategies (in the PDCA methodology, it is part of the **PLAN** element)*

Defining goals and strategies for introducing technology into teaching plays a key role in guiding the entire process of introducing technology into teaching. Forming a school team that will take responsibility for these processes is important. This is when school personnel, including principals, teachers, and other relevant actors, should define together what they want to achieve by integrating technology into the educational process. Here are some key steps in this process:

- Identification of educational goals: Firstly, the team responsible for introducing technology must clearly identify educational goals. Simply put, they need to identify the final results they want to achieve. These can be, for example: improved learning outcomes, development of certain skills, or better understanding of certain concepts.
- Considering the needs of students and teachers: The needs and perspectives of students and teachers should be taken into account. This implies understanding how technology will support their teaching needs and how it will integrate into their daily work.
- Defining success measures: It is crucial to define how the success related to the introduction of technology will be measured. This includes setting specific criteria for evaluating the achievement of goals. For example: test results, student engagement, or feedback from teachers and students.
- Resource planning: Consider which resources, including financial and human resources, will be needed to achieve the goals. This includes budget planning for the acquisition of technological equipment, staff training, and infrastructure maintenance. If there are no financial resources, keep in mind that information is the only resource that multiplies if shared, i.e., in this context, teacher training can significantly contribute to the entire team starting to implement newer technologies in their teaching process.
- Development of implementation strategies: Define strategies for implementing technology in the teaching process. This includes an implementation schedule, a training plan for teachers and students, and ways in which technology will be integrated into the existing curriculum.
- Alignment with pedagogical approaches: It is crucial to ensure that the integration of technology is aligned with pedagogical approaches and teaching methods. Technology should serve as a tool to improve teaching and encourage active learning and critical thinking.
- Creating a support plan: Think about how you will support teachers and students in the process. This may include staff training, technical support, and the establishment of problem-solving systems.

*3.3 Quality control (in the PDCA methodology, it is part of the **DO** element)*

Only when you have made a needs analysis and defined the goals you want to achieve can you start introducing a quality system that will be focused on the introduction of technology in teaching. Quality control plays a key role in ensuring the effective use of technology in teaching and achieving the desired educational goals. This process helps schools identify challenges, focus their efforts on improvement, and ensure students' well-being by integrating technology into the educational process. Quality control in larger or smaller educational institutions consists of several steps.

- Introduction of evaluation and monitoring system: The first step in quality control is to set up a system for evaluating and monitoring the use of technology in teaching. This system can include various methods, e.g., questionnaires, surveys, assessment of student achievement, and evaluation of teaching activities that involve technology.
- Defining success criteria: Define clear performance criteria so you can measure teacher and student achievement related to the use of technology. For instance, using technological tools, you can set goals to improve learning outcomes or increase student engagement. The criterion can be as follows: *Seventy-five percent of teachers regularly use digital educational content in their teaching.* It is evident that the criterion is measurable and clear, and for the purposes of introducing technology and monitoring the entire process, it is not advisable to have more than 10 to 15 such criteria.
- Regular collection of feedback: Regularly collect feedback from teachers, students, and other relevant actors. Feedback can be obtained through surveys, focus group interviews, or teaching observations. It is important to ensure that feedback is collected continuously in order to monitor progress. For instance, the criterion given as an example in the previous point can serve as a topic for a focus group interview with teachers and students.

*3.4 Analysis of results and identification of problems (in the PDCA methodology, it is part of the **CHECK** element)*

Analyze data collected from surveys and focus group interviews to identify areas for improvement. This includes identifying the problems and challenges that teachers and students face in relation to the use of technology. All analyses and results must be presented and analyzed at expert and teacher councils to make all processes public and transparent. Continuously monitor the progress of teachers and students when it comes to the use of technology. Conduct assessments and evaluations to verify if set goals are being met.

*3.5 Creation of an improvement plan (in the PDCA methodology, it is part of the **CHECK** element)*

Based on the identified problems, create an improvement plan. The plan should contain concrete steps and strategies for solving problems and improving the quality of the introduction of technology.

3.6 Adaptation and upgrading of strategies (in the PDCA methodology, it is part of the ACT element)

Continuously monitor progress in the implementation of the improvement plan and adjust strategies as needed. Flexibility is essential to be able to respond to changes and challenges related to the introduction of technology. Provide the necessary support to teachers and students to help them cope with the challenges and changes that come with the integration of technology. This includes organizing workshops, trainings, and technical support.

Additional tips when implementing these steps:

1. Communication and transparency: It is important to communicate the results of quality control and improvement plans to all relevant stakeholders, including principals, teachers, students, and parents. A transparent quality control process strengthens trust and collaboration.
2. Continuous learning and adaptation: Introducing technology into the educational process is dynamic. Therefore, it is important to continuously learn from experiences, follow the latest trends in technology, and adapt strategies to maintain high quality.
3. Innovations in educational research: Encourage research in the field of digital education and the introduction of technologies to contribute to the scientific community and improve school practices.
4. Building the repository (optional – depending on resources): Set up a local school resource base of digital materials and tools that teachers and students can use in class.
5. International cooperation (optional – depending on resources): Consider opportunities for international cooperation and exchange of experiences with other schools or educational institutions in the introduction of ICT or technologies in the educational process.
6. Individualization of learning: Technology enables individualization of learning. Encourage teachers to use technology to adapt their teaching process to the diverse needs of students.
7. Legal and ethical guidelines: Ensure that you adhere to legal and ethical guidelines for the use of technology in education, including data privacy and security issues.

Chapter 4

Proposal of a small innovative activity

Digitalization of monitoring and evaluation of student achievements has a number of advantages compared to traditional forms of monitoring and evaluation. This primarily refers to a more flexible evaluation by reducing expenses for the time and resources of teachers. The use of various digital tools for the purpose of monitoring and evaluation provides the opportunity to quickly provide the students with feedback on the results of the adoption of learning outcomes, which can positively affect their motivation and engagement. It is up to the teacher to choose the appropriate digital tool with which they will establish the adoption of the learning outcomes in the best possible way, adapt it to the available resources, and thus positively influence the student's further development and approach to learning.

In this chapter, three less innovative activities (hereinafter: "MIA") are presented, along with defined implementation steps, estimated costs, and implementation schedule.

4.1 MIA 1

In order to find out what your fellow citizens think about the current tourist offer of your area, or whether there is a need for a new and innovative tourist product, you will create a survey as a Google form on Google Drive, which you will conduct on a sample of 20 respondents.

In order to successfully perform the activity, the following is required:

- verify if there is an electricity connection in the classroom
- provide technical devices (computer, laptop, hybrid tablet, tablet, or mobile device) for the teacher, with Internet access
- provide technical devices (computer, laptop, hybrid tablet, tablet, or mobile device) for students, with Internet access
- AAI@Edu account or Gmail account for free access (for both the teacher and the students).

Once the prerequisites for performing the activity have been met, you need to access your @skole.hr or Gmail user account and create a new form in the offered Google applications. Subsequently, you need to create a survey with questions stating the need to introduce new and innovative tourist products in your area. During the process, it is important to include different types of questions.

After the questions are created, you need to give the survey a name in the upper left-hand corner and share the it with 20 respondents.

Since access to Google applications is free of charge, there are no additional costs for the implementation of this digital tool in the teaching process for this activity.

4.2 MIA 2

Based on the collected data, you will analyze your surveys and present the research results in a presentation using the Google presentations tool.

In order to successfully perform the activity, the following is required:

- verify if there is an electricity connection in the classroom
- provide technical devices (computer, laptop, hybrid tablet, tablet, or mobile device) for the teacher, with Internet access
- provide technical devices (computer, laptop, hybrid tablet, tablet, or mobile device) for students, with Internet access
- AAI@Edu account or Gmail account for free access (for both the teacher and the students).

After logging into your @skole.hr or Gmail user account, you will access the created Google forms in order to analyze the conducted survey. Open Tables in Google applications and display survey results using tables and graphs. Afterward, you need to access Google presentations and enter the created tabular and graphic representations into the presentation in which the results of the conducted survey will be presented and explained in more detail. The prepared presentation must be shared with the teacher, give them the opportunity to comment on it and present it in class.

Since access to Google applications is free of charge, there are no additional costs for the implementation of this digital tool in the teaching process for this activity.

4.3 MIA 3

After the oral presentation of all the created materials, you will choose the most interesting, the best, or the most creative work by voting using *Mentimeter*.

In order to successfully perform the activity, the following is required:

- verify if there is an electricity connection in the classroom
- provide technical devices (computer, laptop, hybrid tablet, tablet, or mobile device) for the teacher, with Internet access
- provide technical devices (computer, laptop, hybrid tablet, tablet, or mobile device) for students, with Internet access.

The teacher will project a QR code that the students will scan using their smartphones. The scanned code will take them to the evaluation sheet in *Mentimeter* where they can choose the research and presentation they consider to be the best, most interesting, and most creative. After they load the QR code by selecting the offered options and clicking the *Submit* button, the answers appear in real time, where both the teacher and the students will immediately be able to see which work was chosen as the best, most interesting, and most creative one.

Since access to *Mentimeter* is free of charge, there are no additional costs for the implementation of this digital tool in the teaching process for this activity.

References

/ Bring your own device (BYOD). Guidelines for digital learning and teaching (no date): https://edufutura.hr/wp-content/uploads/2023/02/edge_edufutura_smjernice_za_digitalno_ucenje_i_poucavanje_1.pdf

/ *Digital technologies as support for monitoring and evaluation* (2018). https://pilot.e-skole.hr/wp-content/uploads/2018/03/Prirucnik_Digitalne-tehnologije-kao-potpora-pracenju-i-vrednovanju.pdf

/ State Pedagogical Standard of the Secondary Education System, OG 63/2008, OG 90/2010. https://narodne-novine.nn.hr/clanci/sluzbeni/2008_06_63_2128.html

/ European Education Area. Digital Education Action Plan (2021 -2027). https://education.ec.europa.eu/hr/focus-topics/digital-education/action-plan

/ Gorr, W. L., Nagin, D., & Szczypula, J. (1994). *Comparative study of artificial neural network and statistical models for predicting student grade point averages. International Journal of Forecasting*, 10, pp. 17-34.

/ Gračanin, M. (2021). Portal Bug. All about the QR code and how to read the QR code: https://www.bug.hr/savjeti/sve-o-qr-kodu-i-kako-procitati-qr-kod-21435

/ Gustović Ljubić, H. (2016). *Kahoot! quizzes in class*: https://www.profil-klett.hr/kahoot-kvizovi-u-nastavi

/ Hardgrave, B. C., Wilson, R. L., & Walstrom, K. A. (1994). *Predicting graduate student success: A comparison of neural networks and traditional techniques*.

/ Mlinarević, V. (2016). Implicit messages in the hidden curriculum of the contemporary school. Life and School: Journal of Theory and Practice of Education, 62(2), pp. 13-26.

/ Negulić, T. (2015). *Kahoot – a game-based answering and quiz system. e-Laboratory*. CARNET. https://e-laboratorij.carnet.hr/kahoot-game-based-sustav-za-odvorvanje-i-kvizove/

/ OFFICE 365 for Beginners – Collaboration and Communication Tools (2020). CARNET.

/ Ordinance on the Method of Organizing and Conducting Classes in Vocational Schools, OG 140/2009 and OG 130/2020. https://narodne-novine.nn.hr/clanci/sluzbeni/2020_11_130_2473.html

/ Rogošić, S., Baranović, B., Šabić, J. (2020): *Application of ICT in the process of learning, teaching, and evaluation in secondary vocational schools: qualitative analysis*. Zagreb: Faculty of Teacher Education, University of Zagreb, Institute for Social Research in Zagreb.

/ Guidelines for Digital Learning and Teaching (no date). https://edufutura.hr/wp-content/uploads/2023/02/edge_edufutura_smjernice_za_digitalno_ucenje_i_poucavanje_1.pdf

/ Topolovec, V., Marinović, M., Pavlić, M. (2006). *Information and communication technologies (ICT) and the transformation of learning and teaching processes for the 21st century*, Paper presented at XIII International Scientific Conference Society and Technology, June 28 -30, 2006, Zadar.

/ Valčić, J. (2017). *Mentimeter – ask a question and collect real-time feedback*. e-Laboratorij. CARNET. https://e-laboratorij.carnet.hr/

mentimeter-postavite-pitanje-i-prikupite-povratne-informacije-u-realnom-vremenu/

/ Vrkić Dimić, J. (2014). *Competences of students and teachers for the 21st century*. Zadar: University of Zadar, Department of Pedagogy.

/ Adult Education Act, OG 144/2021. https://narodne-novine.nn.hr/clanci/sluzbeni/2021_12_144_2460.html

/ Zekić-Sušac, M., Frajman-Jakšić, A., Drvenkar, N. (2009). *Neural networks and decision trees for predicting academic performance*. Ekonomski Vjesnik/Econviews: Review of contemporary business, entrepreneurship and economic issues, 22(2), pp. 314-327.

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PART III

Guidelines for the application of new technologies – communication and evaluation

group of authors (Algebra)

Introduction

The tourism and hospitality industry is at a turning point in the modern age, characterized by incredible technological breakthroughs that constantly change our reality. This rapid technological progress poses numerous challenges as well as opportunities. In such an environment, it is important to understand that the tourism and hospitality sectors must be agile and ready to adapt in order to remain relevant. Educational institutions and programs must move forward in the global market, where the competition is constantly changing and improving. Vocational and adult education, especially in the domain of tourism and hospitality, are becoming key points of adjustment.

Considering this dynamic and the need for constant evolution, this part of the Guidelines has been carefully designed as a comprehensive guide. It aims to provide support to those directly involved in educational reforms – dedicated educators. These experts, who work with young people every day, are key to shaping the future of tourism and hospitality.

To better understand how educators can make the best use of technology tools and resources, we need to consider the concept of collaboration with key actors. The Regional Center of Competence takes center stage in this process. Its role is to connect teachers, students, participants in adult education, external partners, mentors, and business community representatives in a synergistic relationship. Each actor contributes with their experience, knowledge, and perspective. Additionally, it is important to understand that each participant has a unique role and contribution.

Communication, as an essential part of this process, must be flawless. Internal communication between teachers, students, and administrative staff should be transparent, consistent, and regular. On the other hand, there needs to be two-way external communication with mentors, representatives of the business community, and the wider community, which means that educational institutions should listen to feedback and take it into consideration.

Evaluation is also a key component of this process. Through systematic measurement and evaluation, educational institutions can get a clear insight into the efficiency of new technologies and pedagogical methods. Evaluation also serves as a platform for continuous improvement, allowing teachers to adapt their methods and approaches to the needs of students.

Small innovative activities stand out as a special segment of this part of the Guidelines. Since we live in a world of rapid change in terms of technology, it is precisely these “small” changes that can have the greatest impact. The authors provide a series of examples that can be easily integrated into everyday educational activities, offering practical advice and strategies for their implementation.

The aim of this text is to equip educators with the tools, knowledge, and strategies needed to navigate the challenges and opportunities of modern education. By combining traditional methods and new technological solutions, educational institutions can provide top-quality education that will ensure the continuous introduction of relevant technological innovations in the tourism and hospitality sectors.

Chapter 1

Collaboration with key actors in RCK

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Collaboration with key actors in RCK

1.1 Definition and recognition of key actors of RCK

According to the Ministry of Science and Education, regional competence centers (RCK) are: "places of excellence, vocational education, and training in which programs of mainstream vocational education, professional development, and lifelong education, as well as other forms of formal and informal education (work-based learning, competitions, presentations of knowledge and skills, etc.), are implemented"[1].

The purpose of regional competence centers is to continuously carry out secondary vocational education for students, adult participants, and university students, but also for teachers and mentors at employers. In addition to the above, the centers will enable the acquisition

1 Ministry of Science and Education (no date). Regional centers of competence. Retrieved September 29, 2023 from https://mzo.gov.hr/istaknute-teme/odgoj-i-obrazovanje/srednjoskolski-odgoj-i-obrazovanje/reforma-strukovnog-obrazovanje/regionalni-centri-kompetentnosti/989

of the necessary skills and competences for employed and unemployed persons, persons with disabilities, and students with disabilities who have specially adapted programs, all with the aim of social inclusion and preparation for the labor market.

When it comes to the basic characteristics of competence centers, the Ministry of Science and Education lists the following characteristics:

- innovative learning models
- excellence of teachers, lecturers, and mentors at employers
- high-quality infrastructure
- constructive and creative cooperation with all actors in the regional competence center system (social partners, public sector, business entities, and other interested institutions of the wider community).

The Ministry of Science and Education, based on the provisions of the Vocational Education Act, created and adopted the document entitled "Network of regional centers of competence in vocational education"[2], and in accordance with the parameters and criteria from the Network, carried out the procedure of appointing regional centers of competence in priority (sub)sectors of vocational education and training.

Based on the adopted document of the Ministry of Science and Education, a total of 25 regional centers of competence were established. According to the Ministry of Science and Education, the centers have access to the EU structural funds in the form of financial support for the following:

- reconstruction, renovation, expansion, and alteration of established regional centers of competence
- procurement of specialized equipment
- development of personnel and professional capacities
- development and modernization of different types of programs that will be implemented at the level of the center
- other activities aimed at establishing the organization of work and development of regional centers of competence.[3]

The entire concept of regional centers of competence is based on learning by doing. In this concept, the key partners of vocational education institutions are employers. They are the ones who, based on their work experience, can give feedback to educational institutions about the necessary knowledge and skills, i.e., the competences that a student needs in order to be ready for the labor market. The basis of the centers' sustainability is long-term

2 Ministry of Science and Education (2018). Vocational Education Act. Network of regional centers of competence in vocational education, OG 45/2018. Retrieved September 29, 2023 from https://narodne-novine.nn.hr/clanci/sluzbeni/2018_05_45_854.html

3 Ministry of Science and Education (no date). Regional centers of competence. Retrieved September 29, 2023 from https://mzo.gov.hr/istaknute-teme/odgoj-i-obrazovanje/srednjoskolski-odgoj-i-obrazovanje/reforma-strukovnog-obrazovanje/regionalni-centri-kompetentnosti/989

cooperation with economic entities (employers) and timely response to the needs of the labor market. Therefore, it is necessary to constantly monitor the needs of the labor market and change ways, methods, and means accordingly so that students acquire the required knowledge and skills.

In the tourism and hospitality sectors, regional competence centers (Dubrovnik, Split, Opatija, Pula, Zabok, and Osijek) represent a new approach to the education system in the Republic of Croatia. This modern and innovative approach to education implies a combination of high-quality human potential, modern education, and modern technology that will prepare students for the labor market after completing the educational process.

Vocational education in the Republic of Croatia is carried out in educational institutions for vocational education, but also at employers, where knowledge is acquired in the working environment. This is exactly the purpose of work-based learning, i.e., acquiring knowledge and skills in the work environment and performing various activities and tasks.

According to the Ministry of Science and Education, vocational schools implement three forms of vocational programs, i.e., vocational curricula:

- combined programs or apprenticeships
- at school, with periods of training at employers
- integration in the vocational education and training program.[4]

Precisely due to this approach has vocational education been able to be brought closer to current and future students. Vocational education will enable students to acquire knowledge and skills for easier and faster employment. In recent years, schools have been moving to the so-called traditional model of education for crafts and industry. According to this model, a greater number of hours of practical classes are conducted at the employer and a greater number of exercises are performed in schools.

According to the statement of the Ministry of Science and Education, the advantages of regional centers of competence are as follows:

- conducting and ensuring the quality of practical classes and exercises for each educational program in priority (sub)sectors
- more solid and frequent cooperation with external collaborators, i.e., employers where practical classes will take place, and with universities
- greater emphasis on the importance of the curriculum and its implementation
- higher quality work-based learning, i.e., the acquisition of important practical skills, for both students

4 Ministry of Science and Education (2019). Publication of a limited and temporary Call for submission of project proposals: Establishment of regional centers of competence in vocational education in the following (sub)sectors: mechanical engineering, electrical engineering and computing, agriculture and health. Retrieved September 29, 2023 from https://mzo.gov.hr/istaknute-teme/natjecaji-196/2020

and adult participants in vocational education

- the establishment of program and personnel conditions that will improve opportunities for work-based learning for students and adult participants of vocational education.[5]

The key actors in the introduction of new technologies in RCK are:

- Students and participants of adult education are the central actors of the teaching process. Their needs, interests, and feedback are invaluable for the successful implementation of these processes when introducing new technologies. According to the Ministry of Science and Education, adult education is "aimed at the acquisition and development of key competences as part of lifelong learning and at the acquisition of knowledge and skills necessary for the acquisition of sets of learning outcomes or qualifications." In accordance with the Adult Education Act (OG No. 144/2021), adult education is part of the education system of the Republic of Croatia. In addition, it is based on the principles of lifelong learning, the right to education, free choice of the type and method of education, inclusivity, and accessibility.[6]

5 Ibid.

6 Ministry of Science and Education (no date). Adult education. Retrieved September 30, 2023 from https://mzo.gov.hr/istaknute-teme/odgoj-i-obrazovanje/obrazovanje-odraslih/131

Figure 1 *Students and participants of adult education*

- Teachers' role is not only manifested in the transfer of knowledge; when using new technologies, their effective interpretation and adaptation of the method to students and participants of adult education also plays an important role. A modern teacher is a person who implements the curriculum, meaning that they should promote the values prescribed by the curriculum and enrich the content of the curriculum for students in an interesting way, which will encourage them to think critically, research independently, and acquire new knowledge and skills in order to prepare them for lifelong learning.

Figure 2 *Teacher*

- External collaborators and mentors are industry specialists who can provide practical knowledge and skills when introducing new technologies. Mentors have the responsibility toward other actors in various ways: toward students during the application of knowledge in work processes and the development of self-awareness; toward the company by harmonizing pedagogical and economic needs, organizational goals, and strategies; and toward society by developing a qualified workforce and conveying socially responsibility.

Figure 3 *Mentor at the employer*

- Representatives of the business sector are employers who offer internships, scholarships, and future employment to students who should be, at least in some way, involved in these processes. In order for future employees to be trained at a high level, in accordance with the needs of the labor market, it has become important for economic entities to be involved in the educational process. In the traditional and dual education models, the student experiences a sense of success by learning at the workplace, which provides them with a certain source of motivation, thus developing their independence and sense of responsibility, which is necessary to ensure quality in a developed economy. By solving specific tasks in real-life working conditions, the student can prove the acquired knowledge and skills, which makes learning at the workplace more than a process of institutionalized and organized learning.

Figure 4 *Employer supervision of the work of students and mentors*

1.2 Establishment of cooperation

In order to establish effective cooperation with key actors when introducing new technologies, it is necessary to meet certain conditions. In this sense, open communication channels and building trust play an important role.

- Open communication channels: the concept of lifelong learning has become a business norm today, and employee education is considered a key factor in business development and profit making. In order for all actors to receive all the necessary information on time and to carry out the necessary training, it is advisable to organize regular meetings, workshops, and seminars. It is precisely the education of actors and the development of new knowledge and skills that encourage a sense of value and self-esteem and increase the motivation to work because actors contribute to the overall business with their business growth and development. Nowadays, when the emphasis is placed on developing digital skills, digital platforms like those aimed at conducting webinars and virtual meetings enable flexibility and availability. One of the objectives of the European Parliament is explained in the article "Shaping the digital transformation: EU strategy explained" (2021): "The pandemic has demonstrated how important digital skills are for work and interactions, but has also accentuated the digital skills gap and the need to increase digital education. Parliament The Parliament wants the European skills agenda to ensure people and businesses can take full advantage of technological advancements."[7] This is precisely why the emphasis is placed on one of the competences of lifelong learning – digital competence. The second part of these Guidelines is dedicated precisely to the aforementioned topic.
- Building trust: transparency in decision-making and communication with actors creates a foundation for long-term and high-quality cooperation. In such a relationship, one needs to be cautious so that one group of actors does not have priority over the others. That is why it is extremely important to identify connecting threads with all actors and turn them into successful cooperation. All information that is shared should be true, which is extremely important nowadays when all information is easily available on the Internet. In order to make this happen, it is necessary to share as much information as possible, but also strive for counter-arguments.

Figure 5 *Establishment of actor cooperation*

7 European Parliament (2021). Shaping the digital transformation: EU strategy explained. Retrieved September 30, 2023 from https://www.europarl.europa.eu/news/hr/headlines/society/20210414STO02010/oblikovanje-digitalne-transformacije-objasnjenje-strategije-eu-a

1.3 Solving challenges together

In order to effectively solve the challenges of introducing new technologies in the Republic of Croatia, the following is required:

Figure 6 *Phases of effective problem-solving when introducing new technologies*

1. Problem identification: regularly collecting feedback from all actors when introducing new technologies can help identify challenges before they grow into larger problems. In doing so, the rights to protect data and individuals should be taken into account.
2. Brainstorming: once the problem is identified, it is necessary to assemble a team of key actors to develop possible solutions jointly.
3. Prototyping and testing solutions: once solutions are proposed, they need to be tested in a real environment, adjusted as needed, and retested.
4. Application of the solution: after the solution has been tested and adapted, it can be applied when introducing new technologies.

1.4 Continuous cooperation

Maintaining continuous cooperation with actors requires regular checks and meetings, flexibility, and continuous education.

- Regular checks and meetings: in order to stay up to date with the needs and challenges of the actors, it is necessary to organize regular checks and meetings. The Croatian blog "Trillian" lists several steps that need to be followed in order to successfully conduct a meeting:

1. Determine the type of meeting, i.e., its goal: we want to familiarize the actors with the upcoming activities and goals we want to achieve, with the activities that have already been carried out, and whether each actor will make a retrospective of what has been planned and carried out.
2. Determine the duration of the meeting, i.e., the time limit for the entire meeting, or each individual part of the meeting.
3. Determine the key roles at the meeting: determine the person responsible for keeping the minutes and the person who will be moderating, i.e., leading the entire meeting, etc.
4. Define the schedule of the meeting, that is, determine the duration of the meeting, the topics, the questions that need to be answered, and, if possible, the names of the persons who will be in charge of a certain topic.
5. The person designated as the moderator, and in most cases, it is the meeting organizer, should lead the meeting in a meaningful and acceptable manner based on the planned schedule.
6. The minutes need to be published after the meeting so that all of the present actors have an insight into the conclusions reached during the meeting[8].

8 "Trillian" blog (2021). *How to lead a meeting – agile techniques in six steps*. Retrieved September 30, 2023 from https://thetrillian.com/kako-voditi-sastanak-agilne-tehnike-u-6-koraka/#1_Odredi_tip_sastanka_Scrum_tipovi_sastanka

Figure 7 *Holding a business meeting*

- Flexibility: it is necessary to be ready for adjustments. Achieving flexibility in the daily implementation of the educational process is not easy, but it is necessary for success. Educational processes and businesses have the same foundations. There are certain rules prescribing when, where, and in which manner the work is to be carried out. Flexibility in business, whether it is an educational institution, a company, etc., implies having the willingness and ability to adapt those rules to unforeseen circumstances and be ready to accept changes that could lead to greater productivity. When we talk about flexible business, we talk about workplaces where more attention is paid to the result of the work instead of the rules prescribing where, when, and in which manner the work is to be carried out. The education sector, especially tourism and hospitality, is constantly changing but also adapting to modern trends.
- Continuous education: offer training and resources to keep all actors informed about the latest trends and practices. When it comes to teachers, in addition to preparing students for lifelong learning, they should constantly monitor and improve their knowledge and skills so that they can always be applied in accordance with everyday changes. They should develop their pedagogical competences,

such as knowing and applying modern teaching methods, communicating with students with respect and being sensitive to their problems, listening to students, and respecting their personality traits. The teacher is also responsible for the development of students' social competences and all other competences that will help them develop their personality and become content and successful people. Therefore, the teacher should be able to think in new and creative ways and acquire the ability to effectively manage the teaching process and lead students (Mlinarević, 2016). In addition to teachers, there is also a need for continuous education of business entities, so that they can educate their employees who will be mentors to students and training participants. A mentor is a person employed by an employer (or self-employed) whose responsibility it is to ensure that the student acquires the competences provided by the vocational qualification standard and the vocational curriculum during the apprenticeship. In cooperation with the teacher of the secondary school the student attends, the mentor's task is to manage and supervise the student's work at the employer, keeping in mind maximum safety and protection of the student's health. Regular education of teachers and mentors also includes regular and high-quality education of students and participants of adult education.

Chapter 2

Communication plan – internal and external communication with key actors

Chapter 2

Communication plan – internal and external communication with key actors

The art or skill of communicating or interacting with other people in a way represents the very art of living because humans are social creatures and, as members of social groups, are trying to prove themselves in the communication process. This is precisely why the skill of communication is reflected in accessibility, resourcefulness, and the ability to communicate with others. Communication is one of the key skills in life. It implies the ability to exchange ideas, information, thoughts, and feelings with others by transmitting messages from the sender to the recipient through communication channels. Good communication skills are important for all aspects of life, from personal to professional.

In personal life, good communication skills make it possible to build and maintain good relationships with friends and family and help us express our wants and needs, thoughts and feelings, but also understand other people's wants and needs.

In professional life, good communication skills are essential for success. They represent the basic skill needed to communicate with colleagues, superiors, partners, and students, but they also enable negotiation and the presentation of one's own work.

Communication skills represent a set of abilities, skills, and knowledge that an individual possesses and that can be developed throughout life, with the aim of improving them, but also improving social relations as a whole.

Educational institutions do not exist without people, and relationships between people cannot be built without communication between teachers or between teachers and students. Communication is a key part of the educational process because it enables the transfer of teaching content between teachers and students and the exchange of information, ideas, and opinions between students, teachers, parents, and other actors in the education system. It is important for building mutual relationships and creating a positive learning environment.

All organizations, including educational institutions, are created and organized through a communication process and are maintained by people who communicate with each other. Communication between people is necessary in order to be able to organize and then carry out the coordination and control of their activities. An organization or an educational institution represents the context in which communication takes place, and it determines what is being communicated and in which way. Internal and external communication are among the basic types of communication in organizations and educational institutions.

Business communication is the process of exchanging information between two or more people in a business environment. The goal of business communication is to effectively and clearly convey messages in an understandable way so that the information is useful to all participants in the communication process.

Business communications can be divided into the following categories:

- oral or verbal communication (meetings, conversations, and presentations where people communicate through speech)
- written business communication (e-mails, business letters, reports, etc.)
- visual communication (presentations, graphs, diagrams)
- non-verbal communication (facial expressions, gestures, body language).

Regardless of the type of business communication, there are certain characteristics that communication should meet in order for it to be successful for all participants in the communication process. To be successful, communication should be:

- clear and understandable to all participants in the communication process
- short
- concise
- correct/true
- timely
- professional.

Figure 8 *Communication*

On a daily basis, we are witnessing a high exposure to different information and stimuli from the screen, and due to this, in business communication, there are doubts about how to convey the desired messages to the public. Companies, organizations, or individuals are trying to find ways to reach their target group, how to present them with something new, an idea, or a topic, and how to call them to action. Such communication very often takes place without a plan, which can result in negative feedback from the target audience. Negative feedback is reflected in the misunderstanding of the message, the failure of the message to reach the target audience or the poor response of the public that is being addressed.

Communication plans in education are documents that define the purpose, goals, target audience, messages, and communication activities in the educational system. These are plans that should ensure effective and targeted communication with all actors in the education system: students, teachers, parents, the local community, and decision-makers.

Communication plans in education can be created for different purposes, such as:

- raising awareness of the importance and necessity of vocational education
- promotion of certain professions and qualifications
- improving communication between actors of the education system
- collecting feedback from individual actors of the educational system, e.g.,

when introducing new technologies into the teaching process

- informing parents about educational opportunities
- collecting feedback from current or former students related to the quality of education, etc.

When creating communication plans in education, they need to contain the following elements:

- Goals – they should be clearly defined, specific, measurable, achievable, relevant, and time-bound
- Target groups – it is important to precisely identify the key target groups with whom one wants to communicate, that is, which target group one wants to encourage to take action
- Activities – it is necessary to develop a schedule of activities that will be implemented in order to achieve the goals of the communication plan
- Budget – it is imperative to create a budget that is sufficient for the implementation of the planned activities
- Monitoring and evaluation – a methodology for monitoring and evaluating the implemented communication plan needs to be created in order to determine whether the set goals have been achieved.

Communication plans can be an extremely valuable tool for organizations, educational institutions, and individuals who want to effectively communicate with their target audience if they are created and structured appropriately. In such a way, the planned communication activities of an organization, educational institution, or individual can be aimed at achieving goals and their results can be measured and evaluated.

Before creating a communication plan on the introduction of new technologies into the teaching process, it is important to identify its goal. Goal may include the following:

- informing actors about these initiatives or changes related to the introduction of new technologies into the teaching process
- collecting feedback on teaching methods or curriculum and the current use of technology in teaching
- increasing engagement and participation of individual actors in individual educational programs.

Advice for writing a communication plan:

1. Start with a clear understanding of the goals you want to achieve. It is necessary to answer the following question: What do you want to achieve with the communication strategy?
2. Identify your target audience. It is necessary to answer the following question: Who makes up the group of people with whom you want to communicate, i.e., for whom are the messages intended?
3. Create clear, powerful, and unambiguous messages that will be sent to the target group. It is necessary to answer the following question: What pieces of information should the target group remember?
4. Choose communication channels and activities. It is necessary to answer the following question: Which communication channels can be used to reach our target audience the fastest?
5. Measurement and evaluation of results. It is necessary to answer the following question: How to measure the success of implemented communication activities?

2.1 Defining communication goals

Communication will be effective and successful if the set goals are achieved in the estimated time. Determining the goals of communication reduces uncertainty, increases certainty in the realization of planned activities, and facilitates the management of the organization. The most common communication goals of educational institutions are to create or improve relationships and cooperation and to improve the reputation and image of the educational institution among the target group (students, parents, and local community). In addition to the above, people choose to communicate with others for the purposes of discovery, help, persuasion, and entertainment. Through communication, we can help others by expressing empathy, providing constructive criticism, or helping to solve problems.

In an organizational context or in the context of an educational institution, persuasion is sometimes used to influence the behavior, attitudes, thoughts, and beliefs of the target group because one wants to create an image, be right, or realize a benefit.

Goals can be short-term, medium-term, and long-term. To achieve short-term goals, tactics are developed so that they can be achieved in less than a year, i.e., during one academic year. In order to achieve medium- and long-term goals, developing tactics is not enough – it is instead necessary to develop a strategy. The amount of time it will take to achieve medium- and long-term goals depends mostly on the opportunities within the environment. The goals that are set must be clearer because such goals are a prerequisite for creating key messages to be conveyed to the target group.

Communication goals can be personal and relational. Personal goals are achieved independently, and relational goals are achieved with others. Achieving relational goals is essential in any organization, as well as in educational institutions, due to the increasing importance of teamwork in achieving set goals and communication in the workplace. Teamwork in educational institutions is becoming increasingly important because it enables teachers to exchange ideas, share examples of good practice, and support and help each other, which results in increased work efficiency and joint achievement of set goals. Teamwork is the basis for establishing interpersonal relationships in organizations and educational institutions, as it brings together people of different profiles, professions, and occupations, all with the aim of achieving common goals. Finally, in order for communication to be effective, it is advisable not to separate the personal from the relational goals of communication. In addition to achieving their own individual goals, during interaction and communication with others, one should strive to achieve a certain level of their needs.

Communication goals in educational institutions can be divided into several groups:

- Educational goals – communication goals related to providing feedback to students or parents. The importance of communication in achieving these goals is reflected in the adoption of

teaching content, the development of critical thinking and problem-solving skills.

- Social goals – communication goals related to building relationships and creating a positive learning environment that will have a positive and motivating effect on students. The importance of communication in achieving these goals is reflected in the development of social skills, collaboration with other students, and teamwork.
- Administrative goals – communication goals related to informing all actors connected with the educational institution about the activities that are being carried out or will be carried out within the educational institution. Communication in achieving these goals plays a major role in building trust and transparency between all actors involved in the work of an educational institution.

The specific goals of communication in educational institutions differ from one institution to another, and depend on the specific needs and set goals of each individual institution. Below are examples of specific communication goals:

- providing information on teaching content and activities carried out in individual homeroom classes or professions
- helping students in understanding and adopting teaching content
- development of critical thinking
- solving students' problems
- improving students' communication skills
- building a positive learning environment
- improvement of relations between students, teachers, parents, and other actors
- informing students, teachers, parents, and other actors about activities and events in the educational institution
- building trust and transparency between all actors in the educational process.

In order for communication in educational institutions to be effective, it is important that all actors in the educational process develop and use effective communication skills.

2.2 Internal communication

Internal communication represents the exchange of information, opinions, messages, and ideas within an organization or educational institution. Messages can be exchanged in person, by phone, by e-mail, by intranet (a private internal IT network of an organization that can only be accessed by employees of that organization). Today, there is an increasing use of various digital tools, applications, and platforms for online communication (*Zoom*, *Teams*, *Google Meet*, and the like).

Internal communication helps employees in performing their work, ensures a faster flow of information between employees, and enables a faster response when potential problems arise. The realization form can be formal and informal.

The main goal of communication in organizations or educational institutions is their successful functioning.

Formal communication within an organization or educational institution can be realized in several directions – vertical, horizontal, and diagonal.

Vertical communication has two flows – top-down and bottom-up – and exists in hierarchically structured systems. It is based on the procedure of subordination (control and subordination).

Top-down communication starts from the top of the hierarchy, i.e., from the top managers, and continues through all the lower management levels to workers, who are at the bottom of the hierarchy. The main goal of this type of communication is to lead and manage individuals at lower hierarchical levels.

Bottom-up communication is achieved from lower to higher hierarchical structures, i.e., information is transmitted from workers who are at the bottom of the hierarchy through higher levels and all the way to top managers who are at the top of the hierarchy. Messages flowing in this direction usually contain information that managers need in order to do their jobs, such as data necessary for decision-making and the current status of various projects. The main goal of this type of communication is to inform individuals at higher levels about what is happening at lower levels. In this way, they can check the efficiency of their top-down communication, as well as the overall efficiency of the functioning of the organization below their level.

Unlike vertical communication, where parties are engaged at various hierarchical levels, **horizontal communication** refers to communication between individuals who are on the same hierarchical level and, as a rule, such communication is easier and more informal.

This is the most common communication flow within an organization. Among other things, this type of communication enables the coordination and integration of departments and sectors that perform relatively independent tasks.

The mechanisms of horizontal communication within an organization are usually not prescribed and are left to each individual participant. It usually takes place through informal meetings, phone conversations, messages, orders, etc. In the case of very complex tasks that require the coordination of large groups of people, special teams can be formed or special managers can be hired whose function would be to establish efficient horizontal communication.

Diagonal communication is a form of communication that takes place between people at different hierarchical levels and in different sectors. This form of communication is important because it encourages teamwork through mutual cooperation and information exchange between different teams and sectors. For instance, it can take place during a meeting of the director of an educational institution with teachers, non-teaching staff, and external collaborators in order to decide on project activities.

Within organizations and educational institutions, in addition to formal channels (top-down, bottom-up, horizontal, diagonal), there are also **informal ways of communicating**. This is a very important flow of information within an organization or educational institution.

People transmit information to people with whom they come into contact, thereby creating channels of communication through which messages are transmitted. Most often, people communicate with people within their age-bracket, or who have the same interests, occupation, or profession. They communicate and spend more time with them because they feel more comfortable with those similar to them compared to people who are different from them. The result is a tendency to form numerous informal networks within organizations which are often gender-specific. For employees, informal communication is the main source of information – this is how people get the most information about their organization.

Methods of informal communication are the following:

- conversations between employees (teachers)
- a network of personal and friendly contacts with employees from other parts of the organization or other occupations and professions, which enable a certain job to be done faster and more efficiently than through formal communication channels. Such a network is usually based on personal acquaintances, friendships, and affection, and exists in most organizations and educational institutions
- secret written material going around the organization – jokes, caricatures, etc.
- secret signs such as "watch out, the boss is coming," "the boss is watching you", etc.
- rumors that may spread throughout the organization.

Characteristics of information in informal channels:[9]

- the transmitted information is about 75% accurate
- information spreads faster through informal channels than formal channels
- only that information that seems important or interesting to the employees is transmitted
- employees rely on this information when they are uncertain, afraid, or faced with changes within the organization.

Internal communication refers to communication within an educational institution, and it can take place:

a) with students and participants of adult education (monthly or semi-annual reports: information on the progress, plans, and needs of students in the context of new technologies; virtual conferences: regular online meetings or chatting with students in the context of new technologies)

b) with teachers (monthly meetings: discussion related to the curriculum, challenges, and new initiatives in the context of new technologies; online platforms: forums and chats for exchanging ideas and resources)

c) with principals (meetings: teachers' councils, school board meetings, professional meetings; e-mails: a quick and simple way to exchange information with other actors within the educational institution)

d) with the administrative and technical staff of the educational institution (meetings: school board meetings, meetings with technical staff where certain questions or problems are discussed; e-mails: a quick and simple way to exchange information between the administrative and technical staff and other employees of the educational institution).

9 Mikić, A.: "The role of internal and external communication in the management of business organizations" (2010). Retrieved September 29, 2023. from https://meste.org/konf/Arhiva/Man_2010/pdf/1_Menadzment-Proces/Mikic.pdf

2.3 External communication

External communication refers to communication about the introduction of new technologies outside the educational institution.

With external communication, information comes into the educational institution and is share outside of it. Educational institutions constantly exchange information and messages with students, parents, journalists, representatives of local authorities, agencies, and the Ministry of Science and Education. External communication can also be formal and informal.

Formal external communication is given special attention in educational institutions. It can take place through business letters, e-mails, websites, telephone, social networks, or in other ways. Efficient and well-planned external communication is the first step in creating an appropriate image of an educational institution among the target group. Carefully crafted business letters, reports, presentations, websites and, in the last few years, carefully designed social networks that are appropriately edited and updated provide the external environment with an important message about the quality, activities, and engagement of a certain educational institution.

Unlike formal external communication in an educational institution, which is often carefully planned, **informal external communication** it is most often realized as part of everyday life, i.e., during informal conversations with acquaintances, friends, and family.

All employees within an educational institution represent an important informal channel of communication. During everyday activities, employees of educational institutions unconsciously absorb information that increases their overall knowledge about their own institution. Moreover, every time one of the employees talks about their educational institution, they send a certain type of message. Many people from the outside environment form their opinion about educational institutions based on subtle and unconscious signals of teachers and other employees of educational institutions, which contain a certain tone of voice and facial expressions, and non-verbal communication in general. Informal external communication can have numerous advantages for educational institutions (such as increasing the visibility of the school in the community), helping build relationships with the community, and helping raise awareness of the school and its programs. In order for external informal communication to be more effective, it is necessary to use language and terminology that the target audience understands, to be creative in communication approaches, and to measure the results of the communication in an appropriate manner. Obtaining feedback is a key phase of the communication process

that enables obtaining the necessary information about the wants and needs of the target group and achieving optimal positioning of the educational institution within the environment.

External communication refers to the communication of educational institutions concerning the introduction of new technologies that takes place outside the educational institution, and can take place with:

a) external collaborators and mentors (annual reviews: presentation of achievements, challenges, and future plans in the context of new technologies; monthly meetings: formal meetings with mentors-apprentices, informal visits of students during practical classes; e-mails: regular updates on important events and needs)

b) representatives of the business sector (annual meetings with employers' representatives; monthly meetings with mentors during practical classes; online surveys: collecting feedback on the skills and competences that sectors are looking for in the context of new technologies).

2.4 Tools and resources

Digital communications are becoming increasingly important, both in the business world and in educational institutions. They enable educational institutions to communicate more efficiently and quickly and transmit information in a very short period of time to a large number of participants (students, parents, teachers). Digital communications can also help educational institutions improve their collaboration and relationships with students, parents, and teachers and increase their productivity and public image.

Electronic communication, or e-communication, is a modern form of communication in organizations and educational institutions. The development of information and communication technology and the availability of numerous digital tools, platforms, and social networks make it possible to easily manage time and spatial resources. There are numerous advantages of e-communication, e.g., ease of use, low costs of use, an almost instantaneous exchange of messages with persons who are not physically present, and availability. The above made it possible for this method of communication to become an indispensable part of business communication within the educational institution, as well as outside of it. Today, educational institutions are replacing traditional communication by mail, telephone, fax, or face-to-face meetings with electronic communication based on modern information and communication technology (ICT) with the use of electronic means. Information and communication technology is based on the use of computers for information processing.

In order to make electronic communication possible and feasible, the educational institution must have the necessary resources, i.e., a developed information system that is supported by information technology. Information and communication technology requires human capital and knowledge. Information systems in everyday business make it easier for employees to perform daily tasks and exchange information. Additional advantages of using information systems include saving time, quickly and easily establishing contact with persons who are not physically present, and fast transfer of information. With the help of information and communication technology, new information is obtained, it is possible to process such information, save it for future use, protect it from unauthorized users, transfer the processed information to the intended recipients and to those who need it as soon as possible.

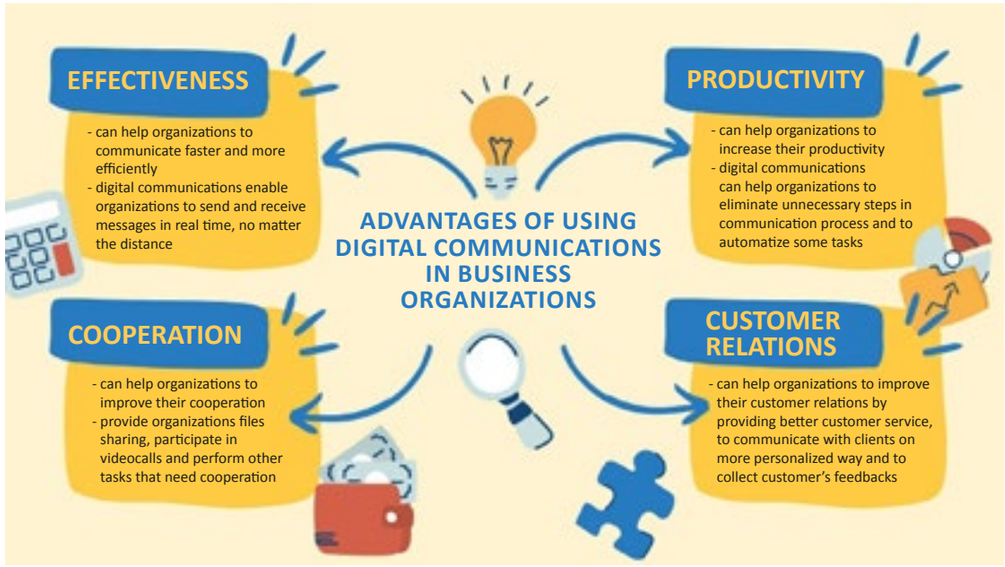


Figure 9 *Advantages of using digital communications in business organizations*

In addition to traditional methods of communication, there are also various digital tools that can facilitate and improve the communication process:

- Educational platforms (*Google Classroom*, *Office 365*, *Moodle*, and the like) – they provide students with additional resources for acquiring the necessary knowledge and skills through distance education or by providing opportunities for individualized learning as part of formal education. In non-formal education, they can be used to acquire new skills, improve existing skills, or expand acquired knowledge. A great advantage of educational platforms is their availability through the Internet, which allows students to access educational content when they want it and where they want it (available devices). They often include interactive elements, which make the teaching content more interesting and thus increase the students' interest in the teaching content.
- Social networks – they enable quick exchange of information and interaction with actors of the educational process. In communication with actors of educational institutions, traditional media are increasingly losing their importance and are being replaced by modern media developed thanks to

modern information and communication technologies. The use of the Internet on a global level has opened up previously unimaginable possibilities of communicating with a large number of people at the same time through blogs, digital tools, educational platforms, and social networks. Traditional communication tools underwent a transformation, adapted to modern media, and became interactive. Social networks have had such an impact on the modern way of doing business that they have initiated the transformation of not only communication but also marketing and business strategies. Investing in advertising with the help of new media and social networks has become a mandatory part of the distribution of communication budgets, and new media are an indispensable part of the media mix[10], of both small companies and large multinational companies.[11]

Social networks have become an integral part of our lives, including education. They open up numerous new opportunities for learning, teaching, monitoring, and evaluation and improve collaboration between students, teachers and students, and between teachers themselves, and can be used at all levels of education, from primary school to higher education.

Advantages of using social networks in education:

- Sharing information and material – they can be used to share information and teaching material such as presentations, assignments, tests, etc., making it easier for students to access the material when they need it and to easily share them with other students.
- Collaborative learning – they can be used to encourage collaborative learning. Students can collaborate on common projects and tasks, exchange ideas and opinions, and help each other.
- Communication with teachers and other students – they can be used to communicate with teachers and other students. This allows students to ask questions, ask for help, and participate in discussions.
- Access to information and resources – they can be used to access and search for information and resources that are not available in traditional educational environments (textbooks, manuals, magazines, etc.). This includes real-world information, such as news, events, and trends.

Disadvantages of using social networks in education:

- Addiction and distraction – social networks can create addiction among students and distract them from learning.
- Internet violence and abuse – they can be used for cyberbullying (abuse that takes place through digital devices) and peer violence.
- Privacy – they can threaten the privacy of students due to inappropriate content that may be available.

How to use the advantages of social networks in education without negative effects?

It is important to use social networks in a safe and responsible way:

- Set clear rules and expectations – it is necessary to inform students about how to use social networks for educational purposes and to set clear rules about what is acceptable and what is not.
- Monitor students – students need to be monitored on social networks so that they are aware of their behavior, and in the event of any problems, a prompt reaction is needed.
- Educate students about the risks – students need to be continuously educated and reminded of the possible risks of using social networks (addiction, abuse, cyberbullying).

Social networks can be a useful tool for learning and collaboration. However, it is important to use them in a safe and responsible manner.

10 It refers to a combination of various media used to promote a product or service, with the goal being to reach the target audience in the most efficient way possible. It can include traditional, digital, and offline media.

11 Ferenčić, M. (no date): Marketing communication in the digital world, Practical management, Vol. III, pp. 42-46. Retrieved September 29, 2023 from https://hrcak.srce.hr/file/142663

Figure 10 *Social networks*

Mobile applications: the great advantage of using mobile applications is immediate access to information and fast transfer of information in real time. Mobile devices have become a fast-growing marketing channel for a large number of business entities operating in markets all around the world. The mass use of mobile devices has enabled marketers to quickly transmit information and messages intended for target groups. Mobile applications are increasingly important and used in the learning and teaching process itself, both within business organizations and the education process. The purpose of implementing mobile applications in the teaching process is to provide students with innovative and different ways of working in order to increase interest in the teaching content. Through mobile applications, students can be offered interactive and fun ways of learning new teaching content, and they can use them as an aid when practicing and reviewing the acquired teaching content. Mobile applications can be used to facilitate communication and connection between teachers and students, and teachers can use them to monitor the progress of student achievement.

When planning the introduction of mobile applications into the teaching process, one needs to pay attention to the following:

- choose the mobile application that best suits the age and structure of the students
- test different mobile applications to find the one that best suits the needs of teachers and students
- teach students how to use the selected mobile application
- track student progress when using the application.

Advantages of using mobile applications in education:

- Accessibility – they are available at any time and in any place, which allows students to learn when they want and wherever they want.
- Personalization – they can be personalized according to the needs and interests of individual students, which allows them to learn at a pace and in a way that suits them best.
- Interactivity – mobile applications can be interactive and fun, which increases students' concentration and interest in acquiring teaching content.
- Collaborative learning – can be used to encourage collaborative learning among students, learn about teamwork, help each other, and solve tasks or projects together.

Disadvantages of using mobile applications in education:

- Addiction and distraction – mobile applications can cause distraction during the learning process and thus negatively affect the process of acquiring the necessary knowledge.
- Costs – certain mobile applications can be quite expensive.
- Inequality – not all students have the same financial background, i.e., not all students have a mobile device or access to the Internet at all times.
-

Figure 11 *Mobile applications in communication*

Chapter 3

Evaluation system for the introduction of new technologies in RCK

Chapter 3

Evaluation system for the introduction of new technologies in RCK

As vocational high schools and adult education centers adapt to the dynamic educational environment, it is important that they have a clear and comprehensive strategy for integrating new technologies into their programs. But how can we be sure that these changes bring tangible benefits? How can we measure the success of the introduction of new technologies and new digital tools? We answer these questions during the systematic evaluation process.

Evaluation is a procedure that enables us to systematically and objectively assess the efficiency and importance of a specific program or initiative. When we talk about the introduction of new technologies in educational institutions, evaluation is not only desirable, it is essential. In addition to providing us with feedback on what is working, evaluation allows us to identify challenges, adjust approaches, and ensure that resources are used in the most efficient way.

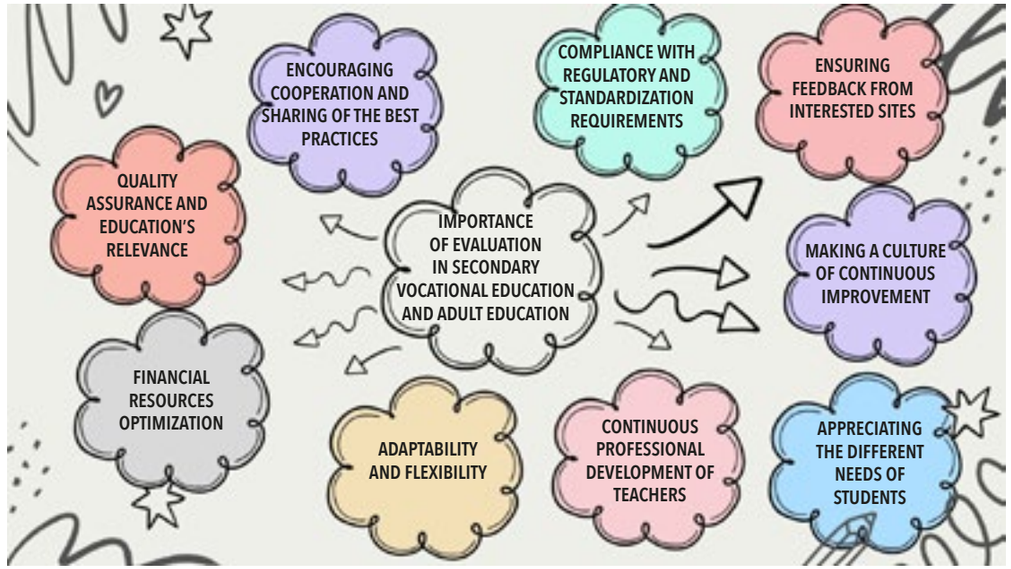
In secondary vocational schools, where students are being prepared for specific careers and occupations, it is important to ensure that technology serves as a bridge to the real world of work. For participants in adult education, who often seek flexible learning opportunities they can fit into their schedule, technology can provide access to the materials, resources, and support they need to succeed.

Although technology offers many opportunities, it also brings challenges. How to ensure that all students have equal access? How to train teachers to effectively use new tools? How to evaluate the quality of digital material and resources? These are all issues that must be taken into account when introducing new technologies.

This chapter provides instructions for establishing a system for evaluating the introduction of new technologies in secondary vocational schools and adult education. It serves as a guide to the complex evaluation process, covering seven key steps, from defining the purpose of the evaluation to re-evaluation. With detailed recommendations, practical advice, and real-world examples (Chapter 4), these tips will help you create a strong and sustainable evaluation system that will ensure your institution is future-proof. Finally, technology itself is not a magic elixir. But when properly integrated, guided by thoughtful pedagogy, and supported by systematic evaluation, it can transform education, making it more relevant, accessible, and effective for everyone involved.

In a world of rapid technological change, educational systems face the challenge of integrating new technologies in order to remain relevant and provide the best possible education to their students. While technology provides many opportunities to improve the quality of education, successful integration requires careful planning, implementation, and evaluation.

Figure 12 *Importance of evaluation in secondary vocational and adult education*



In the context of secondary vocational education and adult education, contemporary literature and research agree that evaluation is becoming crucial for the following reasons:

1. Ensuring the quality and relevance of education: the introduction of new technologies into the educational process must be implemented in a way that increases the quality and relevance of education. Improper use of technology can lead to superficial learning, confusion, or even disruption of the educational process. Systematic evaluation allows schools to determine whether the technology is working as expected and achieving the desired pedagogical (or other) goals.
2. Optimization of financial resources: the acquisition and introduction of new technologies often require considerable financial resources. Evaluation ensures that these resources are used efficiently, identifying technologies that provide the best value for money.
3. Adaptability and flexibility: as the technology landscape is constantly changing, schools need to be able to quickly adapt to new trends and tools. Systematic evaluation allows schools to quickly identify what is working and what is not, and to adapt accordingly.
4. Continuous professional development of teachers: successful integration of technology in the classroom often depends on the willingness and ability of teachers in terms of its use. Evaluation can reveal the need for additional training and support, ensuring that teachers have the skills and knowledge needed to efficiently use technology.
5. Appreciation of the different needs of students: students come with different prior knowledge, abilities, and experiences. Technology can be a powerful tool for tailoring educational experiences to individual needs. Evaluation can help schools better understand how technology can support various types of students.
6. Meeting regulatory and standardization requirements: in many countries, regulatory agencies and academic bodies set standards related to the quality and outcomes of education. Systematic evaluation helps schools align with these standards and demonstrate their commitment to quality.
7. Encouraging collaboration and sharing best practices: by introducing an evaluation system, schools and institutions can share their experiences, successes, and challenges with others in the educational community. This enables collective learning and dissemination of best practices.
8. Ensuring stakeholder feedback: involving students, teachers, parents, and other interested parties in the evaluation process helps ensure that their views and needs are taken into account.
9. Creating a culture of continuous improvement: systematic evaluation can help establish a culture where there is a constant search for opportunities for improvement. This helps schools stay at the forefront of educational innovation and ensure the best possible experience for their students.

In conclusion, establishing an evaluation system for introducing new technologies in secondary vocational schools and adult education is both desirable and necessary for the entire process to be successfully implemented in future cycles of the introduction of new technologies. It enables schools to ensure the quality,

relevance, and efficiency of their technological initiatives and adaptation in a dynamic technological landscape. As technology continues to change the shape of education, systematic evaluation ensures that the changes bring real benefits to students, teachers, and the wider educational community.

Step 1 – Defining the purpose of evaluation

Defining the purpose of evaluation is not only the initial step but the cornerstone of the entire evaluation process. Without a clear purpose, evaluation can become unfocused and inefficient. With careful consideration of each of the points listed below, the evaluation of the introduction of new technologies in secondary vocational schools and adult education can become an instrument that enables constant improvement and innovation. Generally speaking, we can say that the first step consists of the following eight sub-steps.

1 Understanding the general context – before establishing a clear purpose for the evaluation, it is essential to understand the context in which the new technology is being introduced. What are the goals of a secondary vocational school or an adult education program? How will technology be used to achieve these goals? If, for example, the goal of the school is to provide better practical training to students, technology might be used for simulations or virtual reality. If the goal of an adult education program is to enable more flexible learning, technology can be used for online teaching or mobile learning.

2 Identifying key questions – every evaluation should be guided by key questions that will help you focus your efforts in the right direction. In the context of technology, some of the questions may be: *How does technology affect student outcomes? How do teachers feel about new technologies and tools? Do all students have equal access to new technology?*

3 Identification of key actors – in the evaluation process, it is crucial to identify all actors involved or those who will be affected by the introduction of the new technology. These can be students, teachers, administrative staff, parents, the community, and partners from the business sector. Each actor has a unique perspective and it is important to take into account their needs and expectations.

4 Specifying the evaluation goals – after asking the key questions, it is important to define the specific evaluation goals. These goals should be SMART (specific, measurable, achievable, relevant, and time-bound). Below is an example of what a goal might look like: "Determining the impact of using digital tablets on the level of information retention among students of secondary vocational schools within six months."

5 Establishing a clear framework – in addition to setting goals, it is important to create a clear evaluation framework to help guide the process. This framework should include data collection methods, resources needed for the evaluation, responsibilities of individual team members, and a time frame.

6 Integrating feedback – in order for the evaluation to be successful, a feedback mechanism needs to be integrated. This means that there will be a systematic way to collect and process information from different sources – from surveying students to interviewing teachers.

7 Flexible approach – although it is important to have a clearly defined plan, any evaluation must be flexible enough to adapt to unexpected challenges or changes. If, for example, teachers report experiencing certain challenges that were not anticipated, the evaluation plan should be adjusted so that these challenges can be explored as needed.

8 Revision and regular updating – every evaluation is a dynamic process. As technology, pedagogy, or the school environment changes, it is important to regularly review and update the evaluation plan so that it remains relevant and efficient.

Step 2 – Selection and development of evaluation instruments

Once we have defined the purpose of the evaluation, the next key step is the selection of appropriate evaluation instruments. These instruments lay the foundation for the collection, analysis, and interpretation of data that will be used to make informed decisions. Selection and development of evaluation instruments is a key step in the evaluation process. The quality of the evaluation results depends on the quality and relevance of these instruments. Properly designed and implemented instruments enable reliable data collection, which is the basis for informed decision-making regarding the introduction of new technologies in the educational context. This step, the same as the first one, consists of several sub-steps.

Overview of existing instruments – before designing new instruments, studying the existing and available tools is useful. There may already be surveys, questionnaires, scales, or other tools that are relevant to the evaluation when introducing new technologies. By using existing tools, you can save time and resources.

Defining the measurement area –depending on the goals of the evaluation, it is important to define the specific areas that will be measured. If, for example, the use of interactive white boards in teaching is evaluated, some of the measurement areas may be student engagement, quality of teaching materials, or teacher satisfaction.

Development of instruments – the development of appropriate instruments takes place based on the defined areas of measurement. Here, it is important to ensure that the instruments are valid (measuring what they are intended to measure) and reliable (providing consistent results over time).

- Surveys: surveys can be a useful tool for collecting quantitative data from a large group of people. They can be used to measure attitudes, perceptions, or satisfaction with new technology.
- Interviews: interviews enable a deeper understanding of the experiences and perceptions of individuals. They can provide rich and detailed information that cannot be obtained through surveys.
- Focus groups: these groups enable interaction between participants, providing insight into collective attitudes and perceptions.

Instrument piloting – before the instruments are implemented on a larger scale, it is important to conduct a pilot study. This type of testing helps identify potential problems, such as unclear questions or technical difficulties. Based on pilot feedback, instruments can be adjusted and optimized.

Establishing a data collection protocol – in order to ensure consistent and systematic data collection, a clear protocol needs to be put in place. This includes sampling (who will be surveyed or interviewed), frequency of measurement and logistics (how the data will be

collected, who will collect it, where it will be stored).

Ethical guidelines – when collecting data, it is important to ensure compliance with ethical guidelines. This means informing participants about the purpose of the research, ensuring their privacy and confidentiality, and obtaining their informed consent.

Continuous revision – as the evaluation progresses, the instruments may need to be adjusted. Continuous review and adjustments of tools ensure that they remain relevant and effective in light of changes or new knowledge.

Step 3 – Data collection and analysis

Data collection and analysis are the core of any evaluation. This step allows you to identify the strengths and weaknesses of introducing new technologies, make informed decisions, and optimize processes for future initiatives. Correctly collected and analyzed data provide a solid foundation for decision-making and continuous improvement in secondary vocational education and adult education. In this step, our main purpose is to ensure that the data we collect provides insight into the efficiency and effects of new technologies in secondary vocational schools and adult education.

Planning data collection – in order to ensure the consistency and accuracy of the collected data, a detailed plan needs to be developed. Decide which instruments will be used, who will collect the data, when and where it will take place, and how the data will be stored.

Staff training – it is important to ensure that the persons who will collect the data are well-versed in evaluation instruments and procedures. Training can encompass ethical rules, how to ask questions in an unbiased way, and how to record answers.

Implementation of data collection – now, with proven instruments and trained staff, you can start collecting data. No matter if we are talking about surveys, interviews, or observations, it is crucial to adhere to pre-defined protocols to ensure data quality.

Data organization – after collection, the data must be organized in a way that facilitates analysis. If you use digital surveys, the software usually offers options to export the data. Otherwise, you can manually enter the data into the appropriate analysis software, such as *Excel* or SPSS (a statistical software package developed by IBM for data management).

Preliminary analysis – before a detailed analysis, it is recommended to conduct a preliminary analysis to identify gaps or inconsistencies in the data. For instance, check if there are any missing values or anomalies that stand out (e.g., in a survey, all respondents answered a question with the same score – this points to the fact that they did not read the question but filled out the survey without an intrinsic motivation).

Detailed data analysis – depending on the type of data and the purpose of the evaluation, the analysis may include different methods:

- Descriptive statistics: it summarizes and organizes data to make it easier to understand, such as averages, medians, and ranges. The advantage of this method is the simplicity and speed of the evaluation.
- Inferential statistics: it makes it possible to draw conclusions about a population based on a sample of data. For example, t-tests or ANOVA can be used to compare groups.
- Qualitative analysis: If qualitative data have been collected, such as interview transcripts, you can use thematic or content analysis methods to identify key themes or patterns.

Interpretation of results – data analysis is only the first step. Now, you have to interpret what this data actually means in the context of your evaluation goals. What are the main lessons when introducing new technologies? Are there challenges or issues that stand out when introducing new technologies? How do the results compare to your expectations?

Actor feedback – once you have preliminary results, it may be useful to share them with key actors. They may provide additional insights or context to aid interpretation.

Step 4 – Creation of reports and recommendations

After the data has been carefully collected and analytically processed, we come to the key step in the evaluation process – compiling a comprehensive report and creating informed recommendations. This report is not only a reflection of what was discovered during the research but also becomes a bridge of communication between the researcher and all interested parties. It provides fundamental information on how innovative technologies interact with existing school structures and practices. Thus, the report becomes an essential instrument that helps interested parties to get a clear picture of how technological innovation can be best utilized in the educational sector.

In-depth analysis of report structure – each report should be structured in such a way that the information flows in a logical sequence, making it easy to follow and understand:

- Introduction: at the start, it is important to provide an introduction to the purpose of the evaluation, the methods that were used, as well as an overview of the most important findings.
- Methodology: describes in detail the procedure by which the information was collected, the tools that were used to collect the data, and the methods of their analysis.
- Results: showcasing obtained results with the support of visual tools such as graphs, tables, and diagrams.
- Discussion: review of the results, placing them in context with similar studies or expectations, and discussing possible impact and implications for the future.
- Recommendations: based on the collected data, it is important to present concrete steps that should be taken.

Key importance of clear communication – the success of a report often depends on how clearly it is communicated. Considering the audience diversity, the report should be written in accessible language, with clear and easily understandable information. Visual elements, such as infographics, help convey key information in an easy-to-understand manner.

Integration of the opinions of key actors – during the preparation of the report, we must not forget the importance of consultation with all key actors. Their perspective and feedback

ensure the relevance and applicability of the report.

Process of creating informed recommendations – after analyzing the results, it is necessary to articulate meaningful recommendations that will have a tangible impact on educational practices. These recommendations may include new use of technology, additional training sessions, or modification of existing methods.

Review, revision, and improvement – before the final publication, the report should be reviewed and revised as needed. External reviewers or members of your team can provide constructive feedback that will contribute to the quality of the report.

Strategies for distribution and implementation of recommendations – after finalization, it is important to ensure that the report reaches all relevant actors. This includes considering the most effective distribution methods and developing strategies for implementing recommended changes.

Step 5 – Implementation of recommendations and continuous monitoring

Evaluation of the introduction of new technologies is essential to understand their efficiency and possible difficulties, but the evaluation itself is of limited value if its results and recommendations are not properly applied. In Step 5, the focus is on how to take responsibility for the implementation of these recommendations and ensure that the results of the evaluation are integrated into pedagogical practice.

Understanding recommendations – before implementing the recommendations, it is crucial that all actors understand and agree with them. This means identifying and understanding the underlying problems or challenges that the recommendations seek to address, as well as understanding the specific actions or changes that are proposed.

Creation of an action plan – for each recommendation, a detailed action plan must be created. This plan should contain the following:

- Goals: a brief description of what the plan seeks to achieve
- Implementation steps: a detailed list of activities to be carried out
- Responsible persons: persons or teams in charge of each activity
- Timeline: a realistic time frame for each activity
- Resources: funding, equipment, training, or any other resources needed for implementation.

Ensuring the necessary resources – ensuring the necessary resources can be a challenge, especially in educational institutions that often have a limited budget. However, it is important to understand that investing in the implementation of recommendations can bring savings and improvements in the quality of education in the long run.

Training and support – the introduction of new technologies into the education sector, as well as bringing about changes in pedagogical practice, represents a significant challenge for all actors involved in the educational process. These changes not only require adaptation to new tools or methods but also often require additional training so that teachers, pedagogues, and other actors are fully equipped for their implementation.

In addition, when thinking about training, it is crucial that it is not seen as a one-time event. Instead, it should be conceived as a continuous process that seeks to ensure that all actors have the timely information and skills needed to use new technologies or methods. For training to be effective, it is important that the content is relevant to the teachers' needs, adapted to their previous knowledge and experience, and provided in a format that is accessible and easy to understand. Interactive workshops, webinars, simulations, and mentoring programs are just some of the formats that may be used.

In addition to the training itself, post-training support also plays an important role. This type of support can include regular consultations, access to resources, or even platforms where teachers can consult each other and share their experiences. This is important because teachers often, after initial training, face practical challenges during the actual implementation of new methods or technologies in classrooms.

Finally, providing continuous support during the implementation process not only helps overcome challenges teachers may face but also fosters lasting change in pedagogical practice and the integration of technology. Such an approach ensures that investments in training and technology are maximized, leading to better educational outcomes for students.

Continuous monitoring and feedback – at the beginning of the process of implementation of recommendations, it is important to monitor their efficiency continuously. This includes regular checks with actors, monitoring performance indicators, and collecting feedback. This information can then be used to adjust or change the approach if necessary.

Revision and adjustment – it is important to understand the dynamic nature of the implementation process. As circumstances change and new information becomes available, it may be necessary to review the action plan or adjust some of the recommendations. Flexibility is essential to ensure that the teaching process is constantly improving.

Step 6 – Reflection and long-term planning: a look ahead

As we are getting closer to the end of the evaluation cycle of the introduction of new technologies in secondary vocational schools and adult education, it is necessary to pause and devote time to reflection and long-term planning. The question is not only how technology is currently affecting education but also how it will affect it in the years to come.

It is important to recognize that the process of introducing new technology is a journey, not a final destination. While many institutions focus on the initial phase – procurement and implementation – what follows is often just as important, if not more so. As the education sector evolves, as the needs of students and teachers change, and as technology itself advances, it is critical to ensure that these technology investments are constantly adapted and optimized.

Reflection allows educational institutions to look back on their decisions, recognize what worked well, but also identify areas that may require additional attention or revision. Through this introspective process, teams can understand how new technologies are integrated into the educational culture, how they are accepted by users, and what obstacles may have arisen during their implementation.

On the other hand, long-term planning is future-oriented. While reflection considers past and current actions, long-term planning considers what comes next. How will technology develop in the coming years? What potential innovations are on the horizon? How are educational needs changing, and how will the educational paradigm change? This type of planning does not only relate to the technology itself but also to how such technology will align with the mission, vision, and goals of the educational institution.

By considering both of these aspects – reflection and long-term planning – educational institutions need to ensure that their technology investments not only provide immediate value but are also equipped for future success, enabling a better experience for all actors.

Importance of reflection – it implies in-depth reflection about experiences, actions, and results. It is a process that enables individuals and organizations to:

- understand what worked well and what needs to be improved
- identify areas for improvement
- develop strategies to optimize future initiatives.

Methods of reflection

- Diary or log: teachers and administrators can keep journals of their experiences, observing how the technology is used and how students respond
- Debriefing sessions: regular meetings where teams come together to discuss what they have learned, challenges they have faced, and possible solutions
- Self-assessment: tools and questionnaires that allow teachers to assess their skills and competences in relation to new technology.

Consideration of feedback – collected feedback from previous steps should be a key part of the reflective process. By analyzing this information, schools and institutions can understand the following:

Efficiency of technology: *Has the technology achieved its goals? Where can it be improved?*

Community response: *How did students, teachers, and parents react? Are there concerns or challenges that need to be addressed?*

Needs for additional training: *Was there a need for additional training or support for users?*

Long-term planning and vision in the education sector – long-term planning is an essential segment in every educational process, especially when we talk about the integration and adaptation of technology in the teaching environment. This phase, which comes after reflective consideration and analysis of the current situation, requires a visionary approach and forward thinking. In this segment, we will take a detailed look at the key components of long-term planning:

- Development of future strategies: based on previous experiences and reflection on how the technology is currently implemented, the following question arises: What are the future visions and goals? Which strategies should be developed in order to effectively implement technology for the following generations of students? How will it adapt to new pedagogical approaches and the changing needs of students?
- Budgeting and financial planning: the financial component is an inseparable part of any planning. In addition to current costs, it is necessary to anticipate future financial obligations. How will funds be allocated to maintain, upgrade, or, if needed, replace the technology? How much funding will be needed for additional resources, software, or licenses?
- Planning the training and professional development: the introduction of new technology often requires additional training for teachers and other actors. As part of long-term planning, it is necessary to identify which trainings will be needed in the coming years. Also, how can we ensure that training is regularly updated and adapted to new versions of technology or new pedagogical approaches?
- Taking change and adaptation into account: we live in an age where technological innovation is becoming ubiquitous. New tools, platforms, and teaching methods are constantly being developed. In this context, how will the school or educational institution adapt? How can one be sure that students and teachers will feel competent and up-to-date? How to create a culture that encourages innovation, experimentation, and adaptation?

With all of the above aspects, long-term planning becomes not only a process of setting goals and objectives but also a strategic approach that ensures that educational institutions remain relevant, innovative, and successful in their efforts to provide the best possible education to their students.

Community involvement – while technology in education can represent a bridge to new opportunities and innovative approaches, it is necessary to understand that the changes it brings do not only have an impact on students and teachers but on the entire community.

The importance of transparency – community involvement begins with transparency about how and why technology is used in the educational environment. The community has a right to know how its children are being educated and how technology is being used to enhance their learning experience.

Dialogue with parents and guardians – parents and guardians are key actors in the educational process. Their understanding and support of technology initiatives can significantly influence the success of those initiatives. Schools can ensure that parents understand the benefits and potential challenges of introducing new technology by organizing regular meetings, workshops, and information sessions.

Cooperation with local entrepreneurs and industries – technology in education can be a bridge between schools and local industry. By partnering with local technology companies and industries, schools can ensure that their programs reflect the real needs of the labor market and provide students with relevant skills.

Designing joint programs – thanks to the involvement of traditional actors, schools can design programs that will encourage the involvement of the entire community. This can include workshops for senior citizens, courses for parents, or even technology fairs where students can present their projects and innovations.

Needs assessment and feedback – to ensure that technology initiatives remain relevant and useful, it is important to assess needs and collect feedback from the community regularly. Surveys, focus groups, and public consultations can be extremely useful tools in this process.

Step 7 – Baseline evaluation: a cycle of continuous monitoring and adjustment

In the world of education, changes are inevitable and constant. Considering the speed with which technology advances and changes the way education is delivered and experienced, it is necessary to constantly adapt and revise existing practices. Therefore, the re-evaluation step becomes a focal point in this continuous process of improvement.

When we talk about continuous improvement, we mean the constant striving to improve and achieve excellence in all aspects of the educational process. This is not a one-time task, but requires regular review and analysis of procedures and results. Re-evaluation is a key mechanism that allows us to achieve this goal.

Once the initial implementation phase is complete and the recommendations are adopted, the real work begins. While many feel that the job is done once the changes are in place, the truth is that it is just the beginning. Any change, no matter how well planned and executed, must be carefully monitored to ensure that it meets expectations and does not cause unintended consequences.

In order to understand the full effect of the implemented changes, we need to systematically collect data, analyze them, and interpret the results. Have teachers and students embraced the new technologies as expected? Have the desired pedagogical outcomes been achieved? Is there a need for additional resources or training?

It is also important to recognize that there are many variables in the world of technology and education. New technologies are being developed, pedagogical methods are changing, and the needs of students are being adapted. This means that even the best-designed solutions can become outdated or less efficient over time. Therefore, re-evaluation is not only a reaction to previous steps but also a proactive approach to ensure that educational initiatives continue to provide optimal results in a dynamic environment.

Taking all of the above into account, it becomes clear that re-evaluation is not only a step but also a cycle – a cycle that will be repeated for the purpose of continuous improvement, innovation, and adaptation to changing circumstances and needs.

Establishing a time frame for re-evaluation – first of all, define a time frame for re-evaluation. It can be six months, a year, or any other period you deem appropriate, taking into account the specific needs of your school or educational institution. It is important to ensure enough time so that implemented changes or investments in new technologies can have a visible effect.

Data collection – use the same methods and tools that you used in the initial phase of evaluating the introduction of new technologies. This may include surveys, focus groups, observation of teaching, and data analysis. Compare the new results with the initial data to determine the changes that took place.

Analysis of results – analyze collected data in detail to understand what worked well, which challenges are present, and how results differ from initial expectations. Include all actors in this analysis, from teachers and students to technical staff and management.

Reflection, consideration, and joint discussion – to get a complete picture of how the introduced changes and new technologies have affected the educational process, it is essential to organize thorough meetings or interactive workshops with key actors. These events should be structured to promote deep reflection and allow for broad discussion. The goal is to create a safe environment where everyone, regardless of their role or experience, feels they can openly share their thoughts, feelings, and perceptions. It is important to understand individual and collective perspectives to identify what has worked well and where there is room for improvement.

Analysis, changes, and adjustments for the future – once all the information has been analyzed and the reflections of key actors have been taken into account, it is time to carefully consider whether further changes or adjustments in approach or strategy are needed. This step requires a detailed analysis of the collected information in order to make informed decisions. You may find that some strategies or technology solutions did not produce the desired results or were not as effective as you originally anticipated. On the other hand, you may be surprised to find that some methods or tools have exceeded expectations and provided unexpected benefits. With all of this in mind, you can adjust your approach to ensure the most favorable outcomes in the future.

Documentation and archiving – when conducting each re-evaluation, it is crucial to document in detail all results, analyses, reflections, decisions, and steps taken. You should record quantitative and qualitative data and all relevant discussions, comments, and suggestions of key actors. This comprehensive documentation becomes a valuable source of information for future reference, providing deeper insight into the reasons and context of certain decisions. It is especially useful in cases of staff changes, the arrival of new team members, or when technology is upgraded or changed. By maintaining organized and accessible archives, you ensure the continuity of information and knowledge at different stages of a project or initiative.

Continuous monitoring – after re-evaluation, continue conducting regular monitoring to ensure the implemented changes are still efficient. This also provides an opportunity to identify and address new challenges as they arise quickly.

Sharing with the community – after completing the re-evaluation process, share your findings with the school, parents, and the wider community. This not only confirms your commitment to transparency and improvement but also provides an opportunity to receive feedback and suggestions that can help with future initiatives.

We can conclude that re-evaluation is not only about measuring success but also about continuous understanding and adaptation to ensure that newly introduced technologies are used in the most effective way for the needs of all students and teachers.

Chapter 4

Proposal of a small innovative activity

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Proposal of a small innovative activity

In this chapter, four small innovative activities (hereinafter: “MIA”) are defined along with their implementation steps, estimated costs, and implementation schedule.

4.1 Example of a small innovative activity 1: Promotional video for the purpose of promoting RCK

Description of the activity: Creation of a promotional video for the purpose of promoting RCK

Implementation steps:

1 Selection of a digital tool:
- Conduct research and select a free digital tool in which you will create a promotional video of RCK that will show all the advantages of education in that particular institution.

2 Video design:
- Define the key information to include in the video.
- Include interactive elements to increase its attractiveness.

3 Video distribution:
- Share the video via e-mail, educational platforms, or social networks.
- Consider the use of stimulating methods to encourage greater response (e.g., the opportunity to win a small prize for external actors who may not be sufficiently involved in the life of the school – for example, the ALUMNI community)

4 Analysis of results:
- Analyze the feedback received on each social network, e-mail, and educational platform.

5 Feedback and adjustments:
- Based on the results, identify areas that require additional attention or adjustment.
- Plan and implement the necessary changes.

Estimated costs:

Lower costs for promoting videos on social networks (optional): 50 EUR

Total costs: 50 EUR

Implementation schedule:

- week 1-2: researching and selecting a digital tool, defining key information to include in the video
- week 3: video design
- week 4: distribution of the video and collection of responses
- week 5-6: analysis of results and interpretation
- week 7: feedback, adjustment, and implementation planning.

This small innovative activity offers a modern and engaging way of collecting feedback, enabling schools and educational institutions to assess the efficiency and response to newly introduced technologies in detail.

4.2 Example of a small innovative activity 2: Promotion of new technologies in the educational process of RCK through social networks

Description of the activity: Implementation of social networks that can serve to inform external actors about the use of new technologies in the educational process of RCK.

Implementation steps:

1 Platform selection:
- Conduct research and select a social network that will allow you to reach the largest number of actors in the fastest and most efficient way in order to inform them about the use of new technologies in the educational process of RCK, depending on the target group (e.g., *Facebook*, *Instagram*, *TikTok*, *Twitter*, and the like).

2 Post design:
- Choose the information you will use when creating a post on the social network for the purpose of informing external actors about the use of new technologies in the educational process of RCK.
- Create a post in the form of a digital poster in a digital tool of your choice that you will post on the social network.
- Test the post on a small group of people to identify potential problems.

3 Post distribution:
- Share the post on other social networks to compare the amount of feedback received.
- Consider using stimulating methods to encourage greater response (e.g., the opportunity to win a small prize for external actors who may not be sufficiently involved in the life of the school – for example, the ALUMNI community).

4 Analysis of results:
- Use the analytical tools in the digital tool of your choice to analyze the collected data.
- Interpret the results obtained through the selected social network.

5 Feedback and adjustments:
- Based on the results, identify areas that require additional attention or adjustment.
- Plan and implement the necessary changes.

Estimated costs:

Registration and use of social networks is free of charge.

Lower costs for promoting videos on social networks (optional): 50 EUR

Total costs: 50 EUR

Implementation schedule:

- week 1-2: research and selection of a social network, definition of key issues
- week 3: designing and testing the post
- week 4: distribution of the post and collection of responses
- week 5-6: analysis of results and interpretation
- week 7: feedback, adjustment, and implementation planning.

This small innovative activity offers a modern and engaging way of collecting feedback, enabling schools and educational institutions to assess in detail the efficiency and response to newly introduced technologies.

4.3 Example of a small innovative activity 3: Digital evaluation through interactive surveys

Description of the activity: Implementation of digital surveys that use interactive elements (e.g., sliders, drag-and-drop questions, animated GIFs) to collect feedback on new technologies in the educational process.

Implementation steps:

1. Platform selection:
   - Conduct research and select a platform that allows you to create interactive surveys (e.g., *Typeform*, *SurveyMonkey*, *Google Forms* with plug-ins).
2. Survey design:
   - Define key questions that reflect the goals of the evaluation.
   - Include interactive elements to increase engagement of the actors.
   - Test the survey on a small group to identify potential problems.
3. Survey distribution:
   - Share the survey via e-mail, educational platforms, or social networks.
   - Consider the use of stimulating methods to encourage greater response (e.g., the opportunity to win a small prize for external actors who may not be sufficiently involved in the life of the school – for example, the ALUMNI community).
4. Analysis of results:
   - Use analytical tools within your chosen platform to review the collected data.
   - Interpret the results in the context of the evaluation goals.
5. Feedback and adjustments:
   - Based on the results, identify areas that require additional attention or adjustment.
   - Plan and implement the necessary changes.

Estimated costs:

Interactive survey platform license: EUR 50-200 per year (depending on the selected platform and subscription plan)

Rewards for the stimulating method (if any): 50 EUR

Lower promotion costs: 50 EUR

Total costs: EUR 150-300

Implementation schedule:

- week 1-2: research and selection of a platform, definition of key issues
- week 3: designing and testing the survey
- week 4: distribution of the survey and collection of responses
- week 5-6: analysis of results and interpretation
- week 7: feedback, adjustment and implementation planning.

This small innovative activity offers a modern and engaging way of collecting feedback, enabling schools and educational institutions to assess in detail the efficiency and response to newly introduced technologies.

4.4 Example of a small innovative activity 4: Digital evaluation through video interviews

Description of the activity: Using video interviews as a means of collecting feedback on how users experience and use new technologies in an educational setting. This method enables a deeper understanding of user experiences and their feelings toward new technology.

Implementation steps:

1. Selection of a tool:
   - Research and select video interview platforms (e.g., *Zoom*, *Microsoft Teams*, *Skype*).
2. Interview preparation:
   - Compile a set of questions focused on user experiences, benefits, challenges, and recommendations related to the new technology.
   - Conduct a pilot interview with one or two users to test the questions and the technical implementation.
3. Conducting the interview:
   - Invite users through e-mail or educational platforms to participate in a video interview.
   - Record interviews for later analysis and referencing (with previous consent).
4. Interview analysis:
   - Review recordings and create summaries of user responses.

- Identify the key themes, challenges, and benefits that users talk about.

5 Feedback and adjustments:

- Based on the findings from the interview, determine the necessary changes or adjustments related to the technology.
- Consider user recommendations when planning future innovations or changes.

This innovative activity provides an insight into the real feelings and experiences of users, enabling educational institutions to better understand how new technologies are applied in practice and how they should be adjusted.

Estimated costs:

Video interview platform license: EUR 30-150 per year (depending on the selected platform)

Equipment costs (if not already available): EUR 100-200

Transcription tools or services for audio-to-text conversion: EUR 50-100

Total costs: EUR 180-450

Implementation schedule:

- week 1-2: research and selection of a platform, preparation of a set of interview questions
- week 3: conducting pilot interviews and adjustments
- week 4-5: conducting video interviews with users
- week 6: analysis of recorded interviews and summarization of information
- week 7-8: feedback and planning of adjustments.

References

/ Bates, A. W. (2015). *Teaching in a Digital Age: Guidelines for Designing Teaching and Learning for a Networked World*. Vancouver, BC: Tony Bates Associates Ltd.

/ Trillian blog (2021). *How to lead a meeting – agile techniques in six steps*. https://thetrillian.com/kako-voditi-sastanak-agilne-tehnike-u-6-koraka/#1_Odredi_tip_sastanka_Scrum_tipovi_sastanka

/ Castaño-Muñoz, J., Kreijns, K., Kalz, M., & Punie, Y. (2017). *Does digital competence and occupational setting influence MOOC participation?* Evidence from a cross-course survey. Journal of Computing in Higher Education, 29(1), pp. 28-46.

/ Danielson, C. (2017). *Framework for teaching evaluation instrument*. The Danielson Group.

/ Dorčić-Kereković, V., Vinković-Kukolić, B. (2014*). Introduction to business management.* Textbook for the second grade of secondary vocational school – occupation: economist. Zagreb. Školska knjiga.

/ European Parliament (2021). *Shaping the digital transformation: EU strategy explained.* https://www.europarl.europa.eu/news/hr/headlines/society/20210414STO02010/oblikovanje-digitalne-transformacije-objasnjenje-strategije-eu-a

/ Ferenčić, M. (2012): *Marketing communication in the digital world, Practical management*, Vol. III, pp. 42-46. https://hrcak.srce.hr/file/142663

/ Golob, M.: *Mobile marketing as an integral part of integrated marketing communication*. Publication of the University of Rijeka, Vol. 4 (2016), No. 1, pp. 147-158. https://hrcak.srce.hr/file/236359

/ Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). *Smart tourism: foundations and developments*. Electronic Markets, 25(3), pp. 179-188.

/ Hattie, J., & Timperley, H. (2015). *The Power of Feedback*. Review of Educational Research, 77(1), pp. 81-112.

/ Hoic-Bozic, N., Mornar, V., & Boticki, I. (2016). *A review of the use of mobile learning in higher education*. Journal of Information and Organizational Sciences, 40(1), pp. 23-32.

/ Jurković Majić, O., Kliment, A. (2015). *Business communications 2*. Textbook for the second grade of the secondary vocational school – economist occupation, Zagreb: Školska knjiga

/ Jurković Majić, O., Majić, H. (2013). *Customer relations*. Textbook for the third grade of the secondary vocational school for the salesperson ocupation. Zagreb: Školska knjiga.

/ *How to make a quality communication plan that will help you in your daily communication with the public?* https://profitiraj.hr/kako-napraviti-kvalitetan-komunikacijski-plan-koji-ce-vam-pomoci-u-svakodnevnoj-komunikaciji-s-javnostima/

/ Kovač, V., Buchberger, I. (2013). *Cooperation between schools and external stakeholders*. Faculty of Humanities and Social Sciences in Rijeka. https://hrcak.srce.hr/file/170224

/ Lamza – Maronić, M.; Glavaš, J. (2008). *Business communication*. Osijek: University of J. J. Strossmayer in Osijek, Faculty of Economics in Osijek.

/ Mikić, A.: *The role of internal and external communication in the management of business organizations* (2010). https://meste.org/konf/Arhiva/Man_2010/pdf/1_MenadzmentProces/Mikic.pdf

/ Ministry of Science and Education of the Republic of Croatia (no date). *Adult education*. https://mzo.gov.hr/istaknute-teme/odgoj-i-obrazovanje/obrazovanje-odraslih/131

/ Ministry of Science and Education (no date). *Vocational Education Act. Network of regional centers of competence in vocational education*, OG 45/2018. https://narodne-novine.nn.hr/clanci/sluzbeni/2018_05_45_854.html

/ Mlinarević, V. (2016). *Implicit messages in the hidden curriculum of the contemporary school*. Life and School: Journal of Theory and Practice of Education, 62(2), pp. 13-26.

/ Neuhofer, B., Buhalis, D., & Ladkin, A. (2019). *Technology as a catalyst of change: Enablers and barriers of the tourist experience and their consequences*. The Routledge Handbook of Tourism Experience Management and Marketing (pp. 37-53). Routledge.

/ Pejić, Bach, Murgić (2013). *Business communications 2*. Textbook for the second grade of the secondary vocational school, occupation: economist and sales person. Zagreb: Alka script d.o.o.

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PART IV

Reviews

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Reviews

Excerpt from the review by prof. Bojan Ćulum, Ph.D.

In the first chapter, entitled "Purpose of introducing new technologies" **of the first part of the Guidelines** (group of authors, associate professor Slavica Šimić Šašić, Ph.D., assistant professor Maja Cindrić, Ph.D., and Robert Babić, B.Sc. soc.), through eleven carefully structured sub-chapters, the authors offer a broader framework of constructive and critical reflection on various aspects of education, teaching, and learning, with the ultimate focus on the role, possibilities, and contributions of digital technologies in teaching and the learning process itself. In addition to the relevant strategic and normative acts that direct or regulate education in the national and European context, the text refers to recent scientific and professional literature relevant to this topic.

In Chapter 2, entitled "Choosing new technologies – a view through the prism of innovative teaching methods," the authors present various innovative teaching methods with a focus on research-based learning, problem-based learning, project work, the flipped classroom concept, increasingly popular gamification, and distance education. In doing so, the authors critically consider the relevance of adequate or, to put it better, wise integration of digital tools into the teaching process, emphasizing the specifics of each of the mentioned teaching methods and the space for the constructive

contribution of digital technologies to the successful implementation of innovative teaching methods in everyday teaching. This chapter has the potential to stimulate interest in teachers, even inspire them, and constructively direct and encourage them to integrate and modernize their own teaching process and professional and pedagogical work with students. Along these lines, this chapter is very informative and has the potential to contribute to the improvement of teacher competences, more specifically, those of a didactic and methodical nature.

Chapter 3, entitled "Implementation for preparation – what should be taken into account when introducing digital content into classes," at a deeper level deals with phenomena such as digital learning, digital transformation, and digitalization of education in comprehensive positive and challenging (instead of resorting to the term "negative") aspects of their revival. In doing so, with their critical approach and reflections, the authors further deepen the already complex discussion about the quality of education, in the context of changes in educational policies, necessary professional and pedagogical standards, and ways of thinking about and defining learning outcomes. With such an approach, the authors "dissect" the changes and challenges of the educational sector and explain the possibilities and reach that such changes inevitably have on teachers, particularly on their pedagogical, i.e., didactic and methodical approach to teaching. In this chapter, it seems that the authors covered it all. They explain the key elements that should be taken into account when digital technology is introduced into teaching, offer a view of the goals and purpose of using digital technologies in teaching, and then present specific tools and resources that have the potential to contribute to the goals and the achievement of learning outcomes, while respecting the needs of key actors of the teaching process – students and teachers. What is very relevant and particularly admirable is the authors' reflection on strategies for ensuring access to new technologies, then on guidelines and policies for the safe use of the Internet and digital tools in the classroom with the aim of protecting students from potential risks and inappropriate behavior in the Internet world, and finally on the know-how in order conduct interactive classes with the help of digital technologies. The authors emphasize that all proposed guidelines and policies should be harmonized with normative acts and standards and adapted to the needs of the school and students, emphasizing that it is crucial to create a safe and stimulating environment for learning through digital technologies.

"Examples of small innovative activities," the fourth and final chapter of this part of the Guidelines, is focused on three examples whose content perfectly suits the target audience – food and health, the discovery of logarithms, and communication and creativity in presentation. By offering comprehensive "recipes" for a successful teaching process that integrates various digital tools, the authors cover not only the entire spectrum of programming, planning, implementation, and evaluation of the teaching process, but also, using illustrations and simple instructions for the use of digital tools, offer support to readers/teachers for the successful step-by-step application. I believe this chapter can inspire readers/teachers with examples, make them take action, and integrate a wide range of digital tools into their (daily) teaching practice.

Part 2 of the Guidelines – technological level (a group of authors from the Algebra University College), focused on the technological aspects of the integration and application of modern technologies and digital tools, is a part in which the authors address resources

– material (hardware and software) and human – as key aspects of the integration of new technologies into the educational system, more specifically in the field of vocational and adult education in the tourism and hospitality sector.

The authors start by presenting the findings/results of the analysis of existing resources in the national framework of the educational system, more precisely in the thirteen partner organizations of the "RCK RECEPT – Regional Center of Professions in Tourism" project. Each of the partner organizations conducted a combined methodological design research (quantitative survey questionnaire and qualitative focus groups) in the parent institution on the application of technology in the field of education in the tourism and hospitality sector with a focus on technical and software aspects of equipment and on educational workers' competences (knowledge and skills), which are considered crucial for working with new technologies. This research, in particular, was purposefully carried out with the idea of securing an empirical base on which the process of creating complete guidelines would be based. Respecting the scientific methodology, these guidelines represent evidence-based material – the created guidelines are based, among other things, on empirical evidence, which, naturally, enhances their content and internal validity, as well as their potency in encouraging positive changes. In addition to the fact that this approach provided a clear overview of the current situation and possibilities, certain challenging or problematic areas in teaching were identified that should be improved through the integration and symbiosis of innovative teaching methods and technological and digital solutions/tools.

In Chapter 2, the authors focus on the various resources necessary for the efficient application of technological solutions in classrooms and the teaching process, whereby, in order to avoid confusion, they do not deal (exclusively) with technical specifications but rather address aspects of the pedagogical approach so that the integrated technological solutions could systematically and qualitatively contribute to the enrichment of the teaching and learning process.

In Chapter 3 of this unit, the authors emphasize the need and importance of systematic monitoring of implementation success, that is, the integration of technological solutions into teaching and quality assurance. Along with critical reviews and reflections on the challenges of integrating ICT into the teaching process, the authors draw attention to the importance of establishing constant monitoring and evaluation mechanisms aimed at ensuring the adequacy of the implementation of technological, i.e., digital tools – supporting the teaching unit, the didactic and methodical abundance in the teaching approach and last but not least, the achievement of learning outcomes for students.

Similar to the previous unit, the fourth chapter presents concrete examples of small innovative activities that serve not only as examples and a sort of case studies but also as "recipes" for the application of technological solutions in the teaching process. Precisely because of its focus on the concrete and "active" aspects in practice, this chapter has the potential to inspire teachers for their own breakthroughs and the application of some of the presented innovative solutions.

At its core, this part of the Guidelines emphasizes the importance of timely, comprehensive, wise, and mature integration of technological (digital) tools in teaching with the aim of improving the educational process and enriching the learning experience. It is therefore

not surprising that the authors, apart from the digital tools and various aspects of their integration into the teaching process, in this section primarily focus on the cornerstone of the teaching process – teachers. The authors emphasize the importance of modern teaching that would be enriched with technological "ingredients" but with a clear message stating that teachers need to be conscious and educated.

In the third unit of the text – communication and evaluation (a group of authors from the Algebra University College), the authors leave the narrow framework of the teaching process and address aspects of the institutional level aimed at communication, i.e., the cooperation between educational institutions and other actors in the community, and aspects of evaluation – emphasizing the importance of monitoring and evaluating the efficiency of the integration of new technologies and innovative pedagogical methods into the teaching process in order to allow for changes, refinements, or improvements to take place in teaching situations a timely manner, or when such a need arises.

In a significant part of this unit, the authors thoroughly deal with the significant issue of (intersectoral) cooperation and its numerous aspects – the establishment of communication relations, power and cooperation dynamics, ways of achieving communication, the importance of creating communication plans, communication skills, business communication, specificities of communication in education institutions, internal communication and its modalities – hierarchical, vertical, horizontal, diagonal, formal, and informal; then external communication and its formal and informal modalities, to finally present a series of digital tools that can facilitate and improve the communication process. It is important to point out (and, once again, commend) that the authors very seriously deal not only with the positive but also with the negative and dangerous aspects of digital tools in communication and work with students, especially in the context of social networks and mobile applications, and offer practical advice on how to ensure integration such tools and continuously strive to create a safe and stimulating environment for students.

In the second part of this unit, the authors talk about the purpose and method of systematic evaluation of the introduction of new technologies in regional centers of competence, i.e., in the teaching process itself. From my point of view, the authors managed to successfully summarize and present the complex process of evaluation research and all of its phases – determining purpose and goals, developing adequate instrumentation for monitoring and data collection, data collection itself, data processing, analysis, and interpretation, writing a final report and making recommendations based on empirical data. The authors expand this "traditional" research framework and additionally focus on the implementation of the developed recommendations and continuous monitoring of their implementation, and finally emphasize the relevance of reflection and long-term planning of further changes.

As in the previous units, the final chapter also focuses on small innovative activities, which are popular as part of the Guidelines. In this part, the authors also successfully convey several practical examples, which they explain in more detail and according to an already proven "recipe." I believe that these examples also belong the category of those that can motivate and inspire teachers to "experiment" and enrich their own teaching, professional, and pedagogical aspects of their (daily) work with students.

In my opinion, the final unit, although certainly rich in material and examples that are aimed at teachers, communicates far more in its content with those in management positions, which is why this part of the text is particularly aimed at encouraging changes at the meso level.

In conclusion, in recent decades, few things have changed ways of doing business, informing, and learning in such a fundamental way as much as information and communication technologies. Therefore, there is almost no room for dilemmas and questions about whether educational institutions should keep up with the real-life aspects of life and business. Of course, they should. Naturally, I am aware that it is easier said than done and that everyday educational practice, which is full of external and internal challenges, is not always receptive to "keeping up with trends." This is exactly why this kind of literature is more than welcome because it is informative and comprehensive, yet so simple and full of "recipes" and illustrations that have the potential to "shake up" and inspire anyone who thinks about innovations in their teaching practice and encourage positive changes.

I, therefore, hope that these Guidelines will be an enjoyable read not only for secondary vocational school teachers and those in the adult education sector in the field of tourism and hospitality – to whom it is targeted – but also for all of those who work with young people in the formal educational system and the informal environment. In this regard, I believe this manual will find its way to all the teachers eager to experience digital, creative, innovative, and transformative novelties in their daily dynamic and interactive work with students.

Excerpt from the review by mentor professor Lovro Šverko

Part 1 – pedagogical level (group of authors; associate professor Slavica Šimić Šašić, Ph.D., assistant professor Maja Cindrić, Ph.D., and Robert Babić, B.Sc. soc.)

The first chapter, entitled *Purpose of introducing new technologies*, provides valuable guidance and considerations for teachers and educators to take advantage of technology to foster better student learning and development.

The second chapter, entitled *Choosing new technologies*, can serve as a useful resource for teachers and associates in the field of education. Since the emphasis is on the benefits of student involvement, the development of critical thinking, and increased motivation, this chapter can encourage teachers to experiment with the above-mentioned innovative approaches and improve their teaching methods and can serve as an informative and inspiring source to enrich and improve their pedagogical work.

The third chapter, entitled *Preparation for implementation*, deepens the understanding of the educational system and pedagogy, especially in the context of the development of learning outcomes, changes in educational

policy, and professional standards. The authors discuss the importance of reflection and adaptation of teaching according to learning outcomes, which is crucial for achieving specific educational goals. They highlight the complexity of teaching and the learning process, offering insight into various theories and education paradigms. Furthermore, this chapter thoroughly explains the challenges and changes in the education sector and how these changes are reflected in the pedagogical approach to learning and teaching.

Descriptions of innovative activities in the fourth chapter entitled *Examples of small innovative activities* illustrate how digital tools can be integrated into the educational process to make it more interactive, dynamic, and relevant for today's students who have grown up in a digital environment. They also emphasize the importance of practical learning, which allows students to apply their knowledge in the real world and encourages collaboration and teamwork among students, which is a skill that is valuable in all aspects of life. These examples of innovative approaches to education are important in their ability to encourage students' diverse competences and knowledge, provide practical experience, and promote collaboration, creativity, and analytical skills.

The authors are acknowledged for their significant contribution in providing guidelines and considerations for the application of new technologies in a pedagogical context. This part of the paper encourages teachers to experiment with innovative approaches and improve teaching methods.

Part 2 – technological level (group of authors, Algebra University College)

The second part of the paper deals with the application of new technologies in teaching and highlights the importance of their integration in order to improve the educational process. The content of the first chapter, entitled *Planning the implementation of new technologies in the educational programs of RCK*, points to the importance of modern teaching enriched with technology and emphasizes the need for teachers who are educated and informed and, at the same time, emphasizes the need to improve the technical equipment of schools. The authors describe the research carried out as part of the "RCK RECEPT – Regional Center of Professions in Tourism" project, which was carried out by the Opatija Catering School and its partners. The research dealt with the application of technology in education in the tourism and hospitality sectors at the Regional Center of Competence (RCK) level. The research aimed to analyze the degree of adoption of modern didactic tools, materials, and methods in the schools involved in the project, emphasizing pedagogical and organizational aspects. The results showed that there are considerable challenges in the use of technology in education. Respondents, teachers, and students are not always aware of the existence of digital platforms and educational content, and they often lack digital competences. Teachers believe that continuous education and improvement of classroom material conditions are necessary to apply suitable digital technologies in teaching. The research also points to the insufficient knowledge of students concerning the use of the Internet and digital tools for educational purposes, although they do well around using social networks and games. In conclusion, they suggest the need for additional training for teachers and students and to improve teaching processes.

In the second chapter of this part of the paper, entitled *Application of new technology in teaching*, the authors indicate the key aspects of formative assessment, the need for digital support in the educational process, and the role of digital tools in the modernization of teaching.

Furthermore, the authors presented several popular digital tools, such as *Office 365, Zoom, Mentimeter, and Kahoot!,* and offered simple instructions for the basic use of these tools. They also described tools such as Google Drive and Google Docs. Still, they did not explore in detail the possibilities offered by the set of tools entitled *Google Workspace for Education*, which covers a wide range of applications, including the above-mentioned tools, as well as the *Google Classroom* tool.

The part of the paper on implementation and quality assurance monitoring provides a detailed and structured presentation of the process of introducing technology in education, including key steps for implementation and quality assurance monitoring. They also note that the introduction of technology does not only consist of technical aspects but also encompasses the pedagogical aspect. The authors provide useful advice on practical steps and strategies to be applied to achieve the goals of introducing technology into the educational process. The text also contains additional useful guidelines, such as building a repository of digital materials, international cooperation, and individualization of learning, which can further enrich the process of introducing technology in schools. This part of the paper provides a comprehensive and useful framework for the introduction of technology in education and can serve as a valuable resource for educational institutions that wish to improve and ensure the quality of their digital education initiatives.

The proposed activities in the last chapter of this part of the paper entitled *Proposal of a small innovative activity*, contain clearly defined steps, free tools, and have a defined timeframe for implementation. The activities showcase an advanced approach to education by adopting digitalization and innovative methods to enhance the learning experience. They are in line with trends in education that emphasize the integration of technology to achieve better results.

This part of the paper, which refers to the application of new technologies in teaching, emphasizes the importance of modern teaching enriched with technology and emphasizes the need for educated teachers and schools that are well-equipped with technology. It also provides useful information about modern digital tools and their role in the modernization of education.

Part 3 – communication and evaluation (group of authors, Algebra University College)

This part of the paper entitled *Guidelines for the application of new technologies – communication and evaluation*, deals with communication and evaluation in the context of education, with a special emphasis on the integration of new technologies. The authors explore collaboration between educational institutions and other community stakeholders, emphasizing the importance of evaluating the effectiveness of technological innovations in teaching. They also consider the complex aspects of cross-sectoral collaboration and various aspects of communication, including digital tools to improve communication and safety in the use of technology.

The authors propose a systematic evaluation of the introduction of new technologies in educational centers, including goal-setting, development of tools for the collection of data, analysis, and formulation of recommendations.

They emphasize the need for implementation of these recommendations and long-term planning of changes. Moreover, they offer practical examples of innovative activities that can serve as inspiration for teachers.

This part of the paper lays the foundations for considering changes in education and collaboration with relevant stakeholders in order to keep the tourism and hospitality sectors competitive and respond to the challenges of the modern era, especially in the context of technological innovations.

In conclusion, the paper offers valuable guidelines and resources for teachers and education associates to improve the learning process and student development using new technologies. It also emphasizes the importance of student involvement, developing critical thinking and practical learning, with a focus on innovative approaches and digital tools.

The authors emphasize the need for changes in the education sector, including the development of learning outcomes and changes in education policy. Additionally, they provide useful guidelines for the introduction of technology in education and underline the importance of monitoring and quality assurance.

All the above components make this paper a useful resource for teachers and educational institutions who want to improve their pedagogical practices and ensure the relevance of education in today's digital age, especially in sectors such as tourism and hospitality.

I believe that the work described in this review is worth publishing since it provides valuable guidelines for the application of technology in education and supports the modernization of pedagogical practices, making it extremely useful for all educational actors.