**Guidelines for improving online and blended teaching and learning in educational systems in Bosnia and Herzegovina in the context of quality (and) inclusive education**

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# Acronyms

**BD**  Brčko District of Bosnia and Herzegovina

**BiH**  Bosnia and Herzegovina

**COVID-19** Corona virus disease

**EU**  European Union

**FBiH**  Federation of Bosnia and Herzegovina

**ILO**  International Labour Organisation

**ICT**  Information and communication technologies

**OER** Open Education Resources

**RS**  Republika Srpska

**SiTO** Vocational and technical schools

**UN**  United Nations

**UNESCO** United Nations Educational, Scientific and Cultural Organisation

**UNICEF** United Nations Children's Fund

**LAN** Local Area Network

**WLAN**  Wireless Local Area Network

# Introduction

The emergency situation caused by the Covid-19 pandemic significantly affected the implementation of the educational process.[[1]](#footnote-2) The transition from the traditional model of teaching in the classroom to teaching in a virtual environment brought numerous challenges that had to be faced by all actors of the educational process: pupils/students, teachers, parents and even educational policy makers and competent authorities in the field of education.

In the context of Bosnia and Herzegovina (BiH), the process of changing the legislative framework, i.e. by-laws, which would ensure the possibility of conducting online teaching and learning, while still ensuring the quality of educational work, was complex and recorded differences at the level of administrative units. An overview of amendments to by-laws at the level of administrative units is available in the Overview study on the quality of distance teaching and blended teaching and learning in primary and secondary education (and SiTO) in Bosnia and Herzegovina during the coronavirus pandemic (UNICEF, 2021a) and the Overview study on the quality of distance learning in higher education in Bosnia and Herzegovina during the COVID-19 pandemic (UNESCO, 2021). The studies indicate that the competent educational authorities enabled teaching to be established relatively quickly when it comes to the legal-administrative aspect and that most obstacles were promptly removed to a large extent thanks to the quick interventions of the competent educational authorities and governments aimed at ensuring the continuity of education.

According to the results of the referenced research (UNICEF, 2021a), learning outcomes in the past two school years are estimated to be significantly weaker compared to previous years. As many as 82.9% of teachers and 72.5% of the surveyed school management representatives estimate that there has been a significant decline in mastering educational outcomes in the past two school years. This especially applies to marginalised groups of children who had difficult access to quality inclusive education, which caused additional educational inequalities. The teachers themselves did not express satisfaction with the inclusion of children from marginalised groups in online classes (children with developmental disabilities, Roma children, children from socio-economically disadvantaged families) and stated that in practice there were many problems and unfulfilled plans. When it comes to higher education, practically every other teacher (48.5%) states that achievement was significantly lower.

Among other things, the abovementioned results lead to rethinking the role of teachers and their competencies for the implementation of quality inclusive education. This is also supported by the stated needs of teachers for additional training. Namely, 68.2% of primary and secondary school teachers believe that there is still room for improvement when it comes to pedagogical and methodical competences for conducting online classes, and the interviewed representatives of the competent educational authorities, pedagogical institutes, and experts in the field of education share the same opinion. The needs of teachers and students were also analysed concerning the realisation of online teaching and learning process. In addition to the advantages and limitations recognised by both of them, there is also a recommendation to introduce contents into the professional training of teachers to develop and/or strengthen the pedagogical and digital competences of teachers. It is about the inclusion of elements of online teaching that relate to the application of different technologies, different Internet sources in teaching, to proven effective methodical approaches such as, for example, flipped classroom, and special attention should be focused on the values of blended teaching and learning, which in the future could be a dominant form of learning and teaching in higher education.

The findings of the research and the identified obstacles and challenges indicate that the current educational practice needs to be rethought without diminishing the importance of the represented traditional pedagogical approach. Namely, we are primarily talking about the progress of information and communication technology (ICT), which in recent years has been incorporated into all spheres of human activity, including education. The emergency situation caused by the Covid-19 pandemic, during which the entire teaching process in primary, secondary schools and higher education institutions still took place thanks to ICT tools, only accelerated the changes in education, which officially started the global transformation of education.

The analysis of the situation and needs at all levels of education in Bosnia and Herzegovina shows that it is necessary to reconceptualise professional development programmes for teachers (as well as initial education) in order to align them with modern competence frameworks, which, in addition to pedagogical competences, also emphasise the importance of digital competences. Hence the need to create a document that will provide guidelines for the improvement of online and blended teaching and learning to the competent educational authorities in the context of quality inclusive education with special reference to the pedagogical and digital competences of teachers.

# 1. Basic terms[[2]](#footnote-3)

This chapter elaborates the basic terms related to the application of information and communication technology (ICT) in education. Namely, the existing non-uniformity of terms in documents that treat education in newly created circumstances and virtual environment, often result in numerous questions about their mutual difference. In order to explain and understand the essence of the terms, which are represented in the current documents, the relevant professional and scientific literature was consulted and a short theoretical overview of the most frequently used terms was given.

The term *quality inclusive education*, which is part of the title of the document and extends throughout the entire content, emphasises the concept of education available and accessible to all, that is, education for all. Considering the numerous vulnerable groups and their (non)involvement in the regular education system, regardless of the existing legal assumptions that address the right to education, in practice there are still numerous barriers that prevent the execution of these rights. Talking about quality education means talking about equality and education without discrimination on any ground, which implies that quality education is simultaneously inclusive. However, in the educational context of Bosnia and Herzegovina, there is no clear understanding of quality education as inclusive education - education for all. Bearing this in mind, the title of the document uses the conjunction (and) with the intention of pointing out, on the one hand, the inseparability of quality education from inclusive education, while on the other hand it emphasises the existing challenges in the theory and practice of education in Bosnia and Herzegovina.

The document also uses the term teacher, which refers to any person involved in the educational process, who performs the role of a class or subject teacher, a professor in a high school and a professor in a higher education institution. The term teacher is used in a gender-neutral form and refers equally to men and women.

The term pupil is used for every participant in the teaching process, whether it is primary or secondary school, while the term student is used for participants in higher education. The terms used for participants are also gender neutral and apply equally to male and female pupils, that is, male and female students.

The term educational institution refers to primary and secondary schools and higher education institutions (universities and colleges).

## Teaching method

## Online teaching and learning

Online teaching is a form of learning and teaching in which the physical presence of teachers and pupils/students is not necessary, but the learning and teaching process takes place in a virtual environment with the support of digital technologies. Therefore, it is teaching and learning that can take place at any time and in any place, provided that pupils/students have access to the Internet. It can be divided into three main categories: learning and teaching based on the application of the platform, teacher-led process through live transmission and learning and teaching through the application of video tools (UNESCO and ITU, 2021).

In a similar way, online teaching is defined by UNESCO (2022). It is a course that includes online learning and teaching, flexible learning and massive open online courses (MOOCs), and distinguishes the characteristics of all forms of electronic learning:

* separation of teachers and pupils in space or time, or both in space and time, and
* the use of media and technology, which enable communication and exchange during the teaching process despite this separation.

According to the ILO (2021), online teaching and learning is a way of delivering a curriculum or training programme at a distance. It can include, but does not necessarily require, simultaneous interaction between teacher and pupil, as it can be realised through content that is stored in digital form and, as such, can be downloaded. That is, we can talk about synchronous learning and teaching that takes place in real time, and about asynchronous learning and teaching that takes place through network channels, but without real-time interaction. The contents of online classes can be of different formats, as well as the level of interaction between teachers and pupils, which ranges from fully autonomous, independent learning at your own pace, through a combination of independent learning and teaching, to classes that take place exclusively via the Internet. The advantage of online classes is access to a larger number of pupils/students, including those who, due to various circumstances, do not have access to traditional classes and training so as to acquire new knowledge and skills (ILO, 2021).

## Blended teaching and learning

Blended teaching and learning is a combination of online teaching and regular and/or occasional direct contact between pupils and teachers. This model contains elements of pupil control over the time, pace, path and/or place of learning, enabling the pupil/student to (self)-oriented acquisition of experience (iNACOL, 2015). Well-organised blended teaching and learning has numerous advantages, which are reflected in the fact that pupils/students are not just passive participants, who receive information and the role of the teacher changes. Namely, by blending online teaching and classroom teaching, teachers mentor and support pupils/students through individualisation, which affects greater autonomy of pupils/students, their motivation and participation, and the improvement of learning skills and digital competences as well. Research shows that pupils who have access to a combination of online and face-to-face teaching stand out compared to their peers who are exposed to only one teaching model (iNACOL, 2015).

## Hybrid teaching and learning

The hybrid model of teaching incorporates different pedagogical approaches and technologies, and enables learning and teaching in a more flexible way, online and/or in the classroom, and in accordance with the circumstances and capabilities of the participants, and as such it is also applied in crisis and/or emergency situations (UNESCO and ITU, 2021). Hybrid teaching and learning is a model that combines online and classroom teaching in such a way that one group of pupils/students is in the classroom while the other group participates in the teaching process through available digital tools, and everything takes place in the same time frame. Thus, blended and hybrid teaching are not synonymous, considering that this model implies the simultaneous learning and teaching of a group of pupils/students in the classroom and another group of participants, who attend classes virtually through the use of various video conferencing tools.

## Distance learning

Distance learning is defined as learning specially designed for participants (pupils, students, adult participants) who are physically distant from the teacher, and is carried out through the Internet and web technologies (Kumar Basak, Wotto and Belanger, 2018). Although present to a lesser extent, distance learning also includes other media such as TV and the mail used to send learning materials. Therefore, it is a model related to the realisation of the educational process (within formal and/or informal education) regardless of the geographical and temporal distance of its participants, teachers and pupils/students. The process is led by the teacher, which means that there is a clear structure and articulation in its performance.

## Learning styles

## Digital learning

Digital learning is a term that refers to the use of information and communication technologies (ICT) in learning in general and in distance learning. In addition, digital learning is a technical solution to support learning and teaching (Suhonen, 2005) and it can also be educational software, digital learning tool, online study/educational programme or learning resource (Anohina, 2005).

Namely, digital learning involves combining technology, digital content and instruction (Kumar Basak, Wotto and Belanger, 2018), whereby:

* technology is understood as a tool, a mechanism that enables the delivery and reception of content by the learner (includes access to the Internet and adequate hardware);
* digital content refers to educational content delivered through the application of technology and can appear in different forms such as PDF, text, PowerPoint presentation, as well as in all other forms of interactive and adaptive software, classical literature, video lessons, games, etc.
* the instruction refers to the changed role of the teacher in the context of supporting and helping students' learning.

Digital learning, therefore, means any learning practice that effectively uses technology to enhance the learning experience and encompasses a wide range of tools and practices. Kumar Basak, Wotto and Belanger (2018) state that they are under the umbrella of digital learning:

* Interactive learning resources, digital learning content, software or simulations related to educational content;
* Access to online databases and other primary sources and documents;
* Use of data and information to personalise learning and provide targeted additional learning instruction;
* Online evaluation and evaluation with computer application;
* A learning environment that enables rich collaboration and communication, which may include collaborative relationships of pupils/students with experts from specific fields, and with their peers as well;
* Hybrid or blended learning.

Therefore, digital learning can be understood as a term superior to any form of learning that implies the application of various digital tools.

## E-learning

The prefix E - (electronic) generally implies certain learning activities that take place through the application of learning content and methods, which are delivered via the Internet or Intranet[[3]](#footnote-4), but also via other electronic devices such as audio and video cassettes, satellite broadcasting and interactive TV.[[4]](#footnote-5) E-learning, unlike distance learning, is understood as a learning style and does not have to be related to a specific educational programme, but the overall programme can also be implemented using e-learning. Most often, these are created modules, stored on Internet pages that are completed within a certain period of time, but based on the user's free choice of when to master these modules.

# 2 Creating an environment for quality (and) inclusive education

## Understanding the concept of quality inclusive education

Quality (and) inclusive education is based on equality and equity and is most closely related to the model of fundamental human rights regardless of skin colour, race, disability, gender, language, etc. and is focused on the prerequisites for realising the right to education. The right to education belongs to every human being and it finds its place in the most important document, which contains the idea of the promotion and protection of human rights and freedoms at the international level, the United Nations General Declaration of Human Rights from 1948. It became a platform for the development of numerous documents and strategies with the aim of ensuring and protecting the right to education, especially of members of marginalised groups such as children with developmental difficulties, people with disabilities, the Roma ethnic minority, children and youth in families of lower economic status, etc. Pursuant to Article 28 of the [Convention on the Rights of the Child (1989)](https://www.unicef.org/bih/media/676/file/Konvencija%20o%20pravima%20djeteta.pdf?fbclid=IwAR0CMNHt4iz3GL1pX4OgswiM4xY_n3DBgvt1sBO0jj6Nd5Xv67lSKQdcysc) , the right to education is recognised to every child, and with a view to achieving this right State Parties are committed to creating equal opportunities for all children and their inclusion in all levels of education.

However, the right to education as a legal presumption is only the first step towards creating opportunities for inclusion in the regular education system and refers to access, i.e. input factors related to school, which facilitate or hinder the access of marginalized people.

The multidimensionality of the right to education is also operationalised through the so-called 4A, which enable its understanding (Tomaševski, 2001):

* **Availability:** is there a sufficient number of adequately equipped educational institutions and are they regionally distributed?
* **Accessibility:** are the institutions physically and economically accessible, i.e. is access equal for everyone?
* **Acceptability:** do educational programmes enable quality education; are the conditions of education acceptable and in accordance with minimum international standards?
* **Adaptability:** is the system flexible, does it correspond to the interests of pupils/students, parents, minorities, the wider social community and the labour market; whether the system is adequately adapted to persons with disabilities, minorities and other marginalised groups?

The abovementioned dimensions of the right to education are very closely related to the *right in education*, which ensures the *participation* of all. It refers to the process factors, which enable or threaten the sense of belonging, the sense of competence and the sense of independence in pupils. Participation is meaningful, purposeful and is shared with colleagues of the same age group and is oriented towards goals important for the individual and society (Osmić, 2020).

Participating and exercising *rights through education* also ensures a certain achievement operationalised through the learning and teaching outcomes. The goal of quality inclusive education is for everyone to be successful and, upon completion of formal education, competitive on the labour market and ready for active social participation.

Quality and inclusive education is also defined by Sustainable Development Goal 4 of the 2030[[5]](#footnote-6) Agenda. It refers to the improvement in the field of universal primary education, the reduction of the rate of early school leaving, the increase of literacy, which promotes the possibility of lifelong learning. According to this goal, all girls and boys will complete free primary and secondary school by 2030, and this is possible if prerequisites are created for affordable and accessible education for all, including vulnerable groups. Special emphasis is placed on the importance of equal opportunities in terms of affordable professional education, and overcoming disparities in terms of gender and wealth with the aim of achieving universal access to quality higher education. Achieving inclusive and quality education for all children confirms the belief that education is the most powerful and proven means of sustainable development.

In achieving Sustainable Development Goal 4, the [Convention on the Rights of Persons with Disabilities (2008)](http://www.mhrr.gov.ba/PDF/Konvencija_bos.pdf), plays an important role and obliges the signatory states, including Bosnia and Herzegovina, to apply it. According to the General Commentary on Article 24, inclusive education implies a transformation in culture, policy and practice, a commitment to removing barriers and strengthening the capacity of the education system in order to achieve full and effective participation, accessibility, attendance and achievement of all students without discrimination on any basis (General commentary on Article 24 of the Convention on the Rights of Persons with Disabilities: the right to inclusive education). It is clear that this is a demanding and complex process of systemic reform that includes changes and adaptation of content, teaching methods, approaches, structures and strategies.

## Universal design for learning – UDL

Universal design for learning (UDL) is a concept that has its roots in universal design originally created in America in the 1970s with the aim of removing architectural barriers and adapting the physical environment to all people in accordance with their specific needs. Therefore, it is about removing obstacles, adapting and enabling access for everyone, which is recognised as a concept that can be integrated into education, i.e. the learning and teaching process, with its fundamental principles. According to the definition of the Centre for Applied Special Technologies (CAST), universal design for learning is "a set of principles for creating a curriculum that provides equal opportunities for all individuals to learn“.[[6]](#footnote-7) According to the Convention on the Rights of Persons with Disabilities, universal design means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design.

Conceived in this way, UDL is based on a philosophy of education aimed at the realisation of fundamental human rights, ensuring the participation of all pupils/students. By applying it, it is possible to create a stimulating educational environment that contributes to the quality of education in all five dimensions, which at the same time represent indicators and/or predictors of a quality education system and which relate to pupils/students, environment, content, procedures and outcomes (UNICEF, 2000).

Properly planned and implemented UDL minimises obstacles to learning, taking into account the needs of all pupils/students and potential obstacles that may arise through differences in learning styles, thinking styles, language, sensory information, perception, culture, level of prior knowledge, self-confidence. This approach means the proactive action of teachers because it allows learning to take place in different ways and teachers have far more chances to provide access to learning that brings success in learning and acquiring knowledge (UNICEF, 2014).

In order to plan a lesson based on universal design for learning, teachers must keep in mind that it is a cyclical process, which starts from the following elements (UNICEF, 2014):

1. Content: selection of content to be taught?
2. Lecturing: Are there students who require a different approach?
3. Response: is there flexibility in how pupils/students can demonstrate what they know?
4. Interest: how to make pupils/students become interested in and stimulated to learning?
5. Grading: how grading can minimise the impact of certain interferences.

The foregoing indicates the key components of the universal design for learning, which answer the questions of what, how and why to learn, and which instruct teachers to apply the following principles in the learning and teaching process: ensure different ways of presenting the content, ensure the possibility of different pupil expressions and ensure participation and motivation in learning.

Universal design for learning is a framework for quality education and a pointer for the development of a flexible learning environment that can be adapted to individual differences in learning (Bjelan - Guska and Manko, 2020: 31), but it does not exclude the importance of the individual plan and programme (IPP), where it is needed, nor the possibility and need for reasonable adjustment.[[7]](#footnote-8)

## Support for learning and teaching in online and blended learning and teaching

Successful learning and teaching in online and blended learning and teaching requires teachers to develop and improve their competencies in various areas. The European framework for educators' digital competences (DigCompEdu) in the area of pedagogical competences in the context of the application of digital tools recognises learning and teaching as an important competence area and operationalises it through: teaching, guidance, collaborative learning and self-regulated learning (DigCompEdu).[[8]](#footnote-9)

In the field of teaching, competences are necessary for planning and applying digital tools in the teaching process in order to improve the effectiveness of teaching interventions, and the application of different digital teaching strategies and experimentation in the development and application of new teaching methods and/or models.

Competence in the field of guidance implies the use of digital technology and services to improve interactions with pupils/students, individually and at the group level, and in and outside the teaching process, but also the application of digital tools for timely and expedient support and the creation of new guidelines and forms of support.

The application of digital technology is possible to encourage and improve collaborative learning among pupils/students, whereby digital tools are used as means to improve communication, cooperation and collaborative knowledge creation. Digital technology enables pupils/students to plan, monitor and reflect on their own learning, provide feedback on progress and develop creative solutions.

Bearing in mind the competences listed in the area of learning and teaching, it is evident that online teaching that implies the use of digital tools changes the paradigm of the traditional school and shifts the focus from the teaching process led by the teacher to the process directed at the pupil/student. Therefore, the role of a digitally competent teacher is to be a mentor and guide for pupils, especially students, in their independence in the learning process. In this sense, digitally competent teachers must be able to devise new ways, supported by digital technologies, to provide guidance and support to pupils/students, individually and collectively, and to initiate, support and monitor both collaborative and self-regulated learning. Online teaching conceived in this way, with adequate application of digital tools and pedagogical/digital competence of the teacher, contributes to the creation of an inclusive environment for the realisation of the potential of each pupil/student.

Modern teaching models, unlike traditional ones, are aimed at diversity and heterogeneous groups of pupils/students with regard to their different abilities and potentials, previous knowledge and experiences, origin, ethnicity and other characteristics. The most common modern teaching models are differentiation, individualisation and personalisation.

### Differentiation, individualisation, personalisation

*Differentiation* in teaching implies the division of a heterogeneous group into smaller homogenous groups of pupils/students with similar characteristics (e.g. according to the category of success into above average, average, below average) so that adequate materials are provided in accordance with the needs, possibilities and abilities of the group. Namely, it is about differentiating the goals, content, methods and pace of work for a particular group (Stropnik Kunič, 2012 according to Malina, 2008). The teaching goals are aligned with the minimum standard/norm that each student should achieve, and the content and materials distributed to the pupils/students are diverse and respond to the specifics of the group. However, the observed shortcoming of this model is that, due to the absence of an individualised approach, some pupils/students do not realise their full potential. Therefore, it is important to complement it with an individualisation model.

*Individualisation* as a teaching model encourages the teacher to notice and respect the individual potential of the pupil/student, selects tasks according to the cognitive assessment and abilities of the pupil/student, selects contents that are a means of successfully achieving educational outcomes, positively directs expectations, monitors and evaluates success more often and connects the material with experience from everyday life (Bray and McClaskey). All pupils/students are presented with challenges and equal opportunities to achieve certain results. However, the danger and deficiency in the application of this model can occur in the case of a wrong assessment of the abilities and possibilities of pupils/students by educators and/or parents, which is further overcome by the personalisation model.

*The personalised model* implies the active participation of pupils/students in the educational process. That is, pupils/students are participants in its creation, editing, realisation and modification, which includes adequate and adapted methods, pace of work, but also the goals of each individual pupil/student (Bray and McClaskey). Personalisation is, therefore, the adaptation of instructions to the preferences, needs, and interests of an individual pupil/student and at the same time appreciation and respect of pupils/students by teachers. This approach implies not only the right to, in and through education but also the associated responsibilities arising from these rights.

The application of ICT in the process of learning and teaching through online and blended teaching and learning models provides new, more flexible approaches to quality teaching, learning programmes and other educational resources. It enables learning and teaching based on the principles of UDL (different ways of presenting the content, opportunities for different expressions of pupils/students and participation and motivation in learning) as well as the implementation of modern teaching models. Online and blended teaching implies learning and teaching that is less dependent on the synchronisation of teachers and pupils/students with regard to time and place, and the use of different digital tools as well. The effectiveness of the learning and teaching process is linked to the outcomes, i.e. the educational achievements of pupils through monitoring, evaluation and assessment procedures.

## Monitoring, evaluation and assessment of pupils/students' achievements in online and combined classes

Monitoring, evaluation and assessment of primary and secondary school pupils is regulated by the rulebooks of the competent educational authorities in administrative units. They generally envisage different ways of measuring pupil learning, mainly in the classroom (e.g. oral, written and practical assessment), the frequency and timing of assessment and the procedures for assessing and providing feedback to pupils and their parents. On a positive note, many of the rulebooks refer to key principles of assessment, such as the importance of using both numerical and descriptive assessments and conducting "base checks" or diagnostic testing at the beginning of the school year. However, formative evaluation is generally not an integral part of the rulebook on evaluation, nor is the evaluation process itself related to the improvement of curricula and pupil achievement standards.[[9]](#footnote-10) Thus, in Bosnia and Herzegovina there is no formative evaluation that explains how to diagnose pupil achievement in relation to expected learning outcomes and how to use this information to differentiate and adapt teaching to the needs of individual pupils. It is noticeable that in practice there is a gap between what, on the one hand, constitutes the framework of curricula and programmes based on competences and the evaluation of achievements, on the other hand, because there are no clear and balanced evaluation instruments focused on outcomes or competences.

In the context of online and blended teaching and learning during the Covid-19 pandemic, the aforementioned shortcomings were intensified, and the focus of evaluation continued to be on the content and knowledge of pupils/students, that is, summative evaluation, and not on the learning process and feedback, which can be a prerequisite for improving teaching practices and achieving better pupil/student results.

In most administrative units, there were no specific guidelines for monitoring, evaluating and grading pupils in online and blended teaching and learning during the Covid-19 pandemic. However, Republika Srpska stands out, where [Instructions on monitoring, evaluating and grading pupils during distance learning (*Official Gazette of RS*, No. 39/2020)](https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mpk/PAO/PublishingImages/Pages/Osnovno_obrazovanje/%d0%a3%d0%bf%d1%83%d1%82%d1%81%d1%82%d0%b2%d0%be%20%d0%be%20%d0%bf%d1%80%d0%b0%d1%9b%d0%b5%d1%9a%d1%83%2c%20%d0%b2%d1%80%d0%b5%d0%b4%d0%bd%d0%be%d0%b2%d0%b0%d1%9a%d1%83%20%d0%b8%20%d0%be%d1%86%d1%98%d0%b5%d1%9a%d0%b8%d0%b2%d0%b0%d1%9a%d1%83%20%d1%83%d1%87%d0%b5%d0%bd%d0%b8%d0%ba%d0%b0%20%d0%bf%d1%80%d0%b8%d0%bb%d0%b8%d0%ba%d0%be%d0%bc%20%d0%b8%d0%b7%d0%b2%d0%be%d1%92%d0%b5%d1%9a%d0%b0%20%d0%bd%d0%b0%d1%81%d1%82%d0%b0%d0%b2%d0%b5%20%d0%bd%d0%b0%20%d0%b4%d0%b0%d1%99%d0%b8%d0%bd%d1%83%20%20%28%d0%a1%d0%bb%d1%83%d0%b6%d0%b1%d0%b5%d0%bd%d0%b8%20%d0%b3%d0%bb%d0%b0%d1%81%d0%bd%d0%b8%d0%ba%20%d0%a0%d0%a1%2039-20%29.pdf)**, and Sarajevo Canton with its** [Methodology for the implementation of online classes in Sarajevo Canton with guidelines for creating digital educational content and monitoring, evaluating and grading pupils (2020)](https://mo.ks.gov.ba/sites/mo.ks.gov.ba/files/metodologija-2020.pdf) were developed.

The practice of monitoring, evaluating and grading student achievements at higher education institutions is defined by laws at the level of administrative units. Given that Bosnia and Herzegovina is a signatory to the Bologna process and as such part of the European area of higher education, the procedure for checking knowledge and evaluation is theoretically aligned with the Bologna principles. Namely, it is about the continuous awarding of points for every form of student activity during the semester, which certainly presupposes elements of formative evaluation. During online and blended teaching and learning in the situation caused by the Covid-19 pandemic, teachers and students faced numerous difficulties in the process of evaluating achievements, so accordingly, teachers estimated that the achievements of students during online classes at the time of the pandemic compared to earlier generations, who were taught in the usual way, were poorer, that is, practically every other teacher (48.5%) stated that the achievement was poorer (UNESCO, 2021). Such findings point to the importance of rethinking and improving the practice of (especially formative) evaluation in higher education as well, given that the digital transformation of education is an imperative for the development of society regardless of emergency situations (such as the Covid-19 pandemic) as a result of which the shortcomings of existing practices have become more visible.

Viewed through the prism of contemporary aspirations and the development of 21st century skills (such as 4C skills: critical thinking, creativity, collaboration and communication), the process of monitoring, evaluating and grading pupils/students must be shifted to a process and an outcome that manifests itself in acquired competencies at all levels of education. In the context of online and blended teaching and learning, there are opportunities for the application of various digital tools for the purpose of collecting and digitally recording data on the progress of students, and they include: dynamic presentation of multimedia content and interactive simulations, adaptive testing, savings in the preparation and distribution of paper materials, monitoring of additional parameters tests, except for final answers, automated processing of test results, providing feedback, accessibility and the possibility of ranking (Petrović, 2017).

Therefore, one of the assumptions for the implementation of monitoring, evaluation and grading in the context of online and blended teaching and learning with the use of digital tools is the existence of ICT infrastructure in an educational institution as well.

# 3. Creating assumptions for the effective use of ICT in online and blended teaching and learning

Modern learning and teaching implies that schools are adequately prepared for the challenges of 21st century education. This, among other things, also refers to the use of information and communication technologies (ICT)[[10]](#footnote-11), and its importance was actualised by the situation caused by the Covid-19 pandemic, when the teaching process was moved to virtual space. However, ICT is a great support to all actors in the educational process, regardless of whether the teaching is carried out in the classroom, online or is blended. It provides numerous facilities, especially those related to access to information, the creation of appropriate connections between people, and the creation of conditions for effectively organised learning and teaching process.

ICT in education implies several perspectives (UNESCO, 2022):

* the use of ICT as a service delivery medium by educational programme service providers to enable or expand access to learning opportunities;
* the use of ICT as a pedagogical tool by teachers and students to improve the relevance and quality of the learning and teaching process and
* development of ICT/digital competences necessary for living, learning and working in our world, which is increasingly rich in technology.

In 2021, Bosnia and Herzegovina published a document entitled [Basic technical standards for information and communication technology tools in educational systems in Bosnia and Herzegovina](http://www.mcp.gov.ba/Content/Read/obrazovanje-dokumenti), which set only minimum standards which are recommended for all educational institutions and relevant ministries of education. The minimum standards aim to determine the lower limit of acceptable ICT equipment, by category, which will enable unhindered use and be able to meet the requirements set before educational institutions. In this way, educational institutions and competent ministries are given the opportunity to go further than the referenced specification, depending on readiness, resources and requirements. Educational institutions that do not comply with the said norms and standards are obliged to explain to the relevant ministries of education the reasons for non-compliance with the recommended practices.

Guidelines for the improvement of online and blended teaching and learning for the educational system in Bosnia and Herzegovina in the context of quality (and) inclusive education take the above standards as a basis for defining recommendations for the improvement of ICT infrastructure in education.

Assumptions for the effective use of ICT in online and blended teaching and learning can be operationalised through three supports with associated elements: ICT infrastructure, rules that follow its application and digital competences of educators.

## ICT infrastructure

Information and communication technology (ICT) is a technology that covers any product or service that is designed to store, download, manipulate, transmit or receive information electronically in digital form. These can be personal computers (PC), cloud service providers, social media, TV, radio, Internet, etc. (UNESCO, 2022). ICT infrastructure, therefore, implies equipping an educational institution with both hardware and appropriate software for learning and teaching. It is also acknowledged that the adequate use of ICT in education includes certain stages or elements related to the planning and procurement of ICT infrastructure (network structure, hardware and software), maintenance of equipment and provision of technical assistance, a place to store digital tools and security. A high-quality and well-planned ICT infrastructure enables educational institutions, both teachers and pupils, to use all the resources needed for the implementation of online and blended teaching and learning without interruption.

### Hardware infrastructure

Hardware infrastructure refers to ICT equipment in the school, i.e. equipping classrooms with presentation and interactive devices (smartboards, projectors, PCs and laptops), certain assistive technology devices, and ICT equipment for teachers and other school staff (PCs and laptops).

During the Covid-19 pandemic, numerous deficiencies were observed in education at all levels in Bosnia and Herzegovina, whether it was a complete lack of ICT equipment or the inadequacy of existing equipment in educational institutions. Thus, 36.5% of teachers stated that they had an inadequate computer that they used in online classes, and 38.8% indicated a lack of auxiliary equipment such as cameras, microphones, headphones (UNICEF, 2021a). A similar situation existed in higher education, where it is stated that the technical conditions for access to tools and platforms for learning and teaching, both for students and lecturers, were not satisfactory, and this primarily refers to the unavailability of computers and/or mobile devices and network access (UNICEF, 2021b).

In support of the inadequacy of the existing ICT infrastructure in Bosnia and Herzegovina, there are data according to which 19.9 students have one computer at school level (UNICEF, 2022), while the OECD average is 1.2 students per computer. Aiming at the average of OECD countries, and based on the data obtained in the study Mapping ICT Resources of Primary and Secondary Schools in Bosnia and Herzegovina (UNICEF, 2022), it is estimated that schools in BiH need more than 340,000 computers, the purchase of which requires several hundred million convertible marks. At the same time, it is a prerequisite for the realisation of (quality inclusive) online and blended teaching and learning.

### Network infrastructure

Network infrastructure or local network (wired and/or wireless) with all accompanying active equipment is one of the basic segments of ICT infrastructure in educational institutions. Unhindered, stable and high-quality access is extremely important in the context of online and blended teaching and learning. Details on the specifications of the Internet connection and supporting devices for maintaining stable networking based on the number of pupils/students in the educational institution are defined in [Basic technical standards for information and communication technology tools in educational systems in Bosnia and Herzegovina](http://www.mcp.gov.ba/attachments/bs_Migrirani_dokumenti/Sektori/Obrazovanje/Obrazovanje-ostalo/Osnovni_tehni%C4%8Dki_standardi_IKT_alata_u_obrazovanju_BOS.doc).

### Software infrastructure

The software infrastructure consists of an installed and updated operating system with installed drivers for the use of existing hardware (eg: web camera, printers, scanners, etc.). In addition to the operating system, the basic application package also includes an office package (word processing software, spreadsheets, presentations).

Educational institutions can use one of the freely available e-learning platforms, under the conditions that it has a unique educational domain and a website where it can set up a web presentation with basic information about the educational institution. All its users (teachers and pupils/students), who can access the platform and the applications and resources it offers through their user account (e-mail), can access the platform.

The platform can be chosen by the educational institution, individually or at the level of one administrative unit (one domain for all teachers and pupils/students).

Existing platforms at the disposal of educational institutions are subject to updating and continuous improvement of tools and resources and, if necessary, transition from generic platforms and tools to versions that follow the latest trends in learning and teaching, which will ensure better learning outcomes.

When choosing a platform, it is necessary to pay attention to the following (Begić, Smajić and Alić, 2020):

* that the platform is available 24/7;
* that it has all the necessary standard security of the online educational platform;
* that it is available and adapted for use on all devices (mobile phone/tablet/computer/laptop);
* that it is available on all OS versions (Windows/Android/iOS/MacOS);
* that it can be used in one of the official languages and scripts in Bosnia and Herzegovina;
* that it offers the possibility of administration of user accounts at the level of the school domain (creation of new users, password reset, etc.);
* that it enables creation and review of basic files (text document, tabular calculations, multimedia presentation);
* that teachers have the possibility to create groups/channels for departments/classes;
* that the materials are available in real time;
* that it enables online classes in real time (video, audio, screen sharing);
* that it offers the possibility of recording an online class/content and form of video that can be made available to all pupils/students on demand (VoD – Video on Demand);
* that it enables teachers to create quizzes/forms for evaluating teaching content;
* insight into the digital activities of pupils/students (presence at online meetings, involvement in creating tasks);
* to have a cloud storage space for teaching materials and student works;
* that it has the possibility of using other web solutions that can be integrated with the platform itself (e.g.: LMS, other educational platforms and applications);
* E-accessibility - the platform should be supported for use by pupils/students with difficulties/disabilities[[11]](#footnote-12).

The use of platforms for the realisation of online and blended teaching and learning enables communication in a digital environment via e-mail or one of the applications it contains. Communication is possible on a teacher-teacher, teacher-pupil, pupil-pupil basis, and can be 1:1 or group. In addition, it is possible to use applications for content production (e.g. applications for word processing, spreadsheets, making presentations) which ensures that teachers and pupils/students develop collaborative skills, i.e. create collaborative learning communities. The digital tools contained in the platforms enable the development of creativity and critical thinking through discussions, forums, groups and individual expression of one's own creativity.

The platform can be used for online and blended teaching and learning in a manner that educators prepare and place digital materials for pupils/students in a certain space (cloud storage) or a certain website, which pupils/students access through a selected device (computer or mobile device) while are in class at the time determined by the assignment or at a time that suits them best. One of the advantages of using the platform is that students can continue their work at home, because the platform is web-based and allows access from anywhere and at any time. Each of the e-learning support platforms also contains a set of applications that can be used depending on the needs for a specific subject, area and way of working (individual, pair work, group work).

Different platforms also offer different programming tools, which enable the realisation of the learning and teaching process consistent with the specific needs of teachers, pupils/students at different levels of education. Therefore, a list of open educational digital tools for interactive teaching is available for teachers and pupils/students.[[12]](#footnote-13) They are categorised through:

* Solutions for LMS,
* Collaboration applications,
* Applications for production,
* Online resources for coding and programming,
* Educational video channels,
* Selection of useful YouTube channels.

LMS is a learning management system and its purpose is to ensure the realisation of the learning and teaching process by enabling access to digital content. It can be used at the level of an educational institution or at the level of an administrative unit.

Some of the LMS features are:

* Ability to access contents at any time,
* Use of digital materials (text, presentation, video, audio),
* The possibility of unlimited repetition and use of content,
* Possibility of self-evaluation,
* The possibility of evaluating and monitoring the work and progress of students,
* Possibility of communication by direct message or in a group;
* Exchange of experiences on forums;
* Creation of massive open online courses for pupils and teachers (MOOC).

When choosing an LMS, you should pay attention to the following minimum features:

* 24/7 access options,
* Ability to connect with the implemented platform (SSO, OpenID conncet),
* Compatibility with SCROM (Sharable Content Object Reference Model),
* Installation of electronic learning material in various digital formats,
* The possibility of organising synchronous and asynchronous courses,
* The possibility of insight into the digital activities of pupils.

Other application software is chosen by the educational institution based on its needs. Specialised application software is applicable for all levels of education and can be installed on computers used in offices, libraries, classrooms, IT cabinets, vocational courses for vocational and technical secondary schools (SiTO) and higher education institutions. Some of the specialised software are listed below:

* Document management software,
* Library management software,
* Programming software,
* Database management software,
* Software for developing mobile and desktop applications,
* Photo processing software,
* Video processing software,
* Software for drawing and modelling, etc.
* Other software used in SiTO schools,
* Software - communicators for working with children with developmental disabilities,
* Other software used at higher education institutions.

### A place to store digital materials

Teaching materials that are prepared and placed on the platform should be carefully selected and created in order to achieve the most effective learning and so that pupils/students can better understand the specific content they access through the platform. Choosing the right method of accessing certain content is important, as it cannot be changed and adjusted in real time like in the classroom.

Through the application of the platform, it is possible to create a repository of teaching content that can be used at the level of educational institutions, or the creation of a repository of verified teaching materials by the competent Ministry of Education. In this way, all pupils/students would be able to use the available materials and learning opportunities. In addition to teaching materials for students, the repository can also be used by teaching staff to share examples of good practice and to have access to specific courses and resources to improve digital and professional competences.

### Equipment maintenance and technical assistance

Equipment maintenance is important so that classroom, online or blended teaching and learning can be conducted using ICT without difficulty. It is necessary to continuously monitor the state of the available ICT infrastructure at the level of the educational institution, so that all deficiencies and difficulties that arise can be eliminated in time. This includes regular review of hardware, software and operating system, regular updating of operating software and antivirus programme. Continuous planning for the improvement and acquisition of ICT infrastructure in accordance with the needs and current technologies ensures the creation of a stimulating environment for learning and teaching and refers to all elements of the infrastructure found in the Standards[[13]](#footnote-14).

Technical support in terms of using ICT for all users in an educational institution may be available within the institution or administrative unit (support centre/department). Providing support to all users (teachers and pupils/students) can be realised directly, through remote computer management, creating tutorials and video instructions.

### Safety

A safe online environment is a prerequisite for quality inclusive education. Safety means protecting access, monitoring the work and devices of the entire infrastructure in the educational institution, and preventing identity abuse and unauthorised use.

In order to create a safe virtual environment for learning and teaching, it is necessary to provide the appropriate hardware and software infrastructure. When it comes to hardware, the computer network in the educational institution (LAN and/or WLAN) must have an appropriate firewall for content filtering and traffic control when accessing the Internet, either from a computer or a mobile device. The software should be licensed (licensing for educational institutions) or OpenSource so that users can use all applications in their full capacity. The selected platforms and/or LMS solutions must also meet security measures such as protection against identity theft, any analytical tracking of users, etc.

Teachers can also significantly contribute to the creation of a safe environment through the filtering and selection of content within a certain teaching subject, which is intended for pupils/students, which, in addition to IT literacy, also implies the teacher's information literacy.

## Integrating the online and blended teaching and learning model into the legal regulations on education in all administrative units in Bosnia and Herzegovina

One of the challenges that educational systems in Bosnia and Herzegovina faced during the Covid-19 pandemic is the lack of clear guidelines and instructions for the implementation of the teaching process in virtual environment. Relevant educational authorities made various decisions, rulebooks, instructions, decrees, which regulated teaching in changed circumstances at the level of administrative units. In Republika Srpska and Sarajevo Canton, compared to others, more significant steps have been taken towards streamlining online and combined teaching with its specificities in legal and by-law regulations. In other administrative units, the experiences are different and it is mainly about recommendations, letters, instructions.[[14]](#footnote-15)

However, in teaching practice, there are still numerous doubts and inadequacies in the understanding of all elements of teaching in the context of its online and blended performance. The need for regulations to more clearly define the terms related to the application of ICT in education was expressed, given the noted inconsistency of the terms and concepts of online and combined teaching, which often leads to misunderstandings, as well as to their implementation. Thus, for example, teachers express uncertainty regarding the implementation of teaching content/classes through the use of digital tools and platforms, which provide an interactive learning and teaching process and do not necessarily include lectures by the teacher. The question arises whether the exam, consultative work with students, written instructions to students for the realisation of individual and/or group tasks, teaching preparations, etc. they can be an integral part of teacher norms in the context of online and combined teaching. The dilemma arises in the context of the recognition of the activities and work of teachers in the online and/or combined model, even though it is not about the synchronised activities of teachers and pupils/students. Teachers also state the need for clearer instructions regarding the monitoring and evaluation of student achievement, especially formative. As one of the shortcomings, the lack of indicators for the analysis of the situation in the implementation of online and combined classes, on the basis of which action guidelines would be created, stands out. It was also recognised that it is necessary to incorporate online and blended teaching and learning with its specificities into annual work programmes and academic calendars in order to ensure the continuous application of ICT in the educational process. Professional training of teachers on the application of ICT in teaching in the context of quality inclusive education should also be legally regulated. It was stated that standardization (at the level of administrative units) of online and combined teaching is important in all phases of the teaching process - planning, preparation, organisation and realisation.[[15]](#footnote-16)

The need to supplement the existing legislation with contents related to the implementation of online and/or blended teaching and learning classes is present, but also absolutely justified, taking into account the changes that are happening at the global level and in the field of science, technique and technology, and, accordingly, and education and the changed roles of teachers and pupils/students. Therefore, it is necessary to more clearly define the possibility of online and/or blended teaching and learning, the application of digital tools in the teaching process, bearing in mind the specifics of the programme and educational institution, and professional training of teachers for the application of ICT in the teaching process.

# Developing the concept of teacher professional development

In the context of numerous social changes, especially bearing in mind the situation caused by the Covid-19 pandemic and the temporary transfer of the formal education process to a virtual environment, there are numerous challenges that need to be answered. In this regard, we are talking about the improvement of pedagogical and digital competences of teachers, whereby competence is defined as a set of related knowledge, skills and attitudes, as well as associated responsibilities. Competence, therefore, does not only mean knowledge and skills, but also includes the ability to respond to complex demands by using and mobilising psychological resources (including skills and attitudes) in a specific context (OECD, 2005).

The modern conception of upbringing and education and the application of digital technology in the implementation of quality inclusive education impose the need for innovation and/or the creation of professional training programs for teachers at all levels of education that focus on improving the pedagogical and digital competences of teachers, as well as monitoring and evaluating their work.

## Improvement of pedagogical and digital competences of teachers

The need to develop and/or improve teachers' pedagogical and digital competencies stems from the importance of strengthening teachers' capacities, with which they can support the development of pupils' competencies. On the one hand, we are talking about the possibility and importance of using available digital tools in the process of learning and teaching pupils and, accordingly, supporting pupils in developing their own digital competencies. While on the other hand, the digital transformation of education must not ignore the fundamental right to quality inclusive education - education for all. This is also elaborated in the [Action plan for digital education (2021-2027)](https://education.ec.europa.eu/focus-topics/digital-education/action-plan), which is a renewed European Union (EU) policy initiative that sets a common vision for high-quality, inclusive and accessible digital education in Europe, and aims to support the adaptation of member states' education systems to the digital age.[[16]](#footnote-17) The Action Plan defined two strategic priorities, Encouraging the development of a high-performance digital education ecosystem and Improving digital skills and competencies for digital transformation, which were further operationalised through 14 different actions. Common guidelines for teachers and educators to encourage digital literacy and address misinformation through education and training clearly stand out among them.

For the purposes of creating this document, the backbone for thinking about teacher competencies is the Educators' Digital Competency Framework EDC, 2021, developed by UNICEF in Europe and Central Asia, a document that takes into account the European Digital Competency Framework for Teachers ([*European Framework for the Digital Competence of Educators:* DigCompEdu, 2017](https://publications.jrc.ec.europa.eu/repository/handle/JRC107466)), UNESCO's ICT Competence Framework for Teachers, and builds on the Sustainable Development Goals in the 2030 Agenda. As such, it offers a holistic approach to developing teachers' digital competencies in the following areas: inclusion, diversity, pedagogy and digital literacy (UNICEF EDC, 2021: 7). It is evident that the abovementioned areas of professional development meet the requirements of the quality inclusive education practice. The application of digital tools, which transforms the learning and teaching process and makes it more accessible to all pupils/students, has an added value, especially from the aspect of the possibility of using assistive technology. The Educators' Digital Competency Framework (UNICEF EDC, 2021), therefore, starts from the need to integrate digital technologies into the learning and teaching process, ensuring an inclusive approach, that is, the participation and achievement of all pupils/students. Therefore, it can be said that, in fact, it is about the pedagogical use of digital technology. In addition, this document was created as a result of an analysis of the situation and needs of the Western Balkan region (Montenegro, Bosnia and Herzegovina, Serbia, Kosovo[[17]](#footnote-18) and North Macedonia) which makes it additionally valuable in the creation of guidelines for the improvement of online and combined teaching in all administrative units of Bosnia and Herzegovina.

The Educators' Digital Competency Framework (UNICEF EDC, 2021: 5) includes competences organised in four areas answering the questions a) "What" i.e. which teacher competencies are needed in the application of digital technologies and educational innovations in the field of inclusive education and b) "How", that is, how to offer practical knowledge about creating a learning environment that can foster competence in the four proposed areas: knowledge development, knowledge application, knowledge exchange and knowledge and communication (Figure).

Figure: Areas of digital competence of teachers (UNICEF EDC, 2021)

The competence area **Knowledge development** refers to pedagogical competences of teachers related to digital learning and teaching and their connection with educational policy, inclusive approach and evaluation and assessment.

The competence area **Application of knowledge** refers to the pedagogical competences of teachers that ensure the promotion of the development of digital competences of pupils/students, the responsible use of digital technology and problem solving.

The competence area **Knowledge exchange** refers to the development of communities of practice that will enable professional engagement and continuous professional development of teachers, reflection on existing and research of new professional knowledge, and training and mentoring.

The competence area **Knowledge and communication** includes digital communication with pupils/students and other participants in education and the safe and responsible use of digital resources.

The review of the foregoing areas of digital competences of teachers clearly indicates their interconnection and interweaving, where the basic starting point is the development of knowledge. Namely, the acquisition of knowledge, skills, beliefs in the field of using digital tools (and ICT in general) in education also enables their application. The digital and pedagogical competences of teachers must be directed and connected to the development of competences of pupils/students related to learning and teaching outcomes. This means that a digitally competent teacher creates conditions for the development of pupils' digital competences. Given the importance of mutual cooperation and collaborative learning, teacher practice communities enable the creation of platforms for the exchange of experiences, knowledge, and ideas with the aim of improving teacher competencies, but also practice as a whole, both at the individual and community level. In addition, education, in addition to teachers and pupils/students, also includes other actors and participants who directly and/or indirectly contribute to the educational process. These can be parents, educational authorities, pedagogical institutes, non-governmental organisations, etc. Therefore, it is important to think about the competences of teachers, which are related to digital communication with different participants in education.

An overview of the competences within the above four areas is given in the rest of the text, and they are operationalised through the defined goals proposed in the Educator’s Digital Competency Framework (UNICEF EDC, 2021).

The level of **competence** refers to the set of knowledge, skills, beliefs and associated responsibilities of teachers with regard to a specific area, that is, it implies the outcome of teacher education/training/capacity building. The **goals** defined within each set of competencies within a certain area represent specific assumptions for the development of said competencies.

Below is a tabular overview of competencies within all four areas with associated goals.

### Development of knowledge - Pedagogical competences of teachers

|  |
| --- |
| **Digital learning and teaching and the connection with educational policies** |
| Competence:   * Understand the ways in which teaching practice is linked to educational policies * Understand how to connect existing curricular standards with the use of technology in education to support pupil/student learning. |
| Goals   * Identify the key ICT elements of educational systems and state those points that influence their practice * Question institutional educational policies and propose revisions, design improvements and consider the impact of these changes. * Identify the broader system of culture and policies of educational institutions at all levels that influence inclusive education. * Consider the specific learning objective, context, pedagogical approach and pupil group when designing digital resources and planning their use. * Identify software packages, applications, and open educational resources (OER) that meet specific curriculum standards. * Create or upgrade new digital educational resources. |

|  |
| --- |
| **Digital learning and teaching with an inclusive approach** |
| Competence   * Research, plan and integrate different digital tools and resources to improve the effectiveness of inclusive teaching practices * Understand how to integrate student-centred learning and collaborative learning to ensure multidisciplinary curricular standards. * Select digital resources * Use digital technology in providing guidance to pupils/students * Guide students towards the development of self-regulated learning skills in a collaborative and student-centred learning environment * Apply inclusive teaching approaches * Use self-assessment techniques |
| Goals   * Plan and integrate digital devices, tools and resources into the teaching process to improve the effectiveness of learning and teaching. * Create and manage digital instructional strategies for online and classroom learning. * Experiment and develop new teaching methods * Understand the diversity of pupils and adapt learning and teaching methods to their specific needs and competencies * Know how to connect different digital tools and resources to create an integrated digital learning environment that supports the development of pupils' higher-order thinking and problem-solving skills. * Use presentation software and other digital resources to support teaching practice. * Develop text documents using Microsoft Word and prepare presentations using Microsoft PowerPoint. * Analyse curriculum standards to identify opportunities for students to master skills such as problem solving, critical thinking, analysis, collaboration, communication, and understanding others' points of view. In addition, develop the ability to use ICT, which is a key tool for managing information and complex cognitive skills, taking into account learning styles, abilities and sociolinguistic skills. * Identify, evaluate and select digital resources for the learning and teaching process. * Identify safe and accessible ways of using ICT in education. * Consider specific learning objectives, context, pedagogical approaches and pupil groups when selecting digital resources and planning their use. * Understand how to use digital tools and services to improve interactions with pupils – individually and collectively – in and out of the teaching process. * Use digital technologies to provide timely and targeted guidance and assistance. * Experiment and develop new forms of guidance and support. * Guide pupils to make logical ICT choices and acquire appropriate skills for searching, managing, analysing, evaluating and using information relevant to the curriculum. * Guide pupils to the application of appropriate ICT and the development of skills with the aim of managing, analysing, evaluating and using information relevant to the content of the curriculum. * Guide pupils to use appropriate ICT to achieve curriculum standards that support thinking, planning, reflection and knowledge acquisition. * Guide pupils to the use of ICT for the development of communication and collaborative learning skills. * Help pupils/students develop assessment strategies to test their own understanding of key topics and ICT skills, including peer assessment. * Combine a variety of digital tools and resources to create a digital learning environment that supports higher order thinking and problem solving for all students. * Model thinking, problem solving and knowledge creation in the learning and teaching process. * Create online materials and activities that engage students in collaborative problem-solving research. * Help pupils design project plans and activities that involve them in collaborative research, problem solving, or artistic creation. * Help pupils create digital media resources that support their learning and interaction with others. * Help pupils reflect on their learning and provide evidence of progress, share insights and produce creative outcomes. * Understand the concepts of inclusive education. * Expand your view of the differences between pupils. * Promote the academic, social and emotional learning of all pupils. * Cooperate with professionals from other educational institutions and from other disciplines in order to develop multi-sector cooperation. * Apply online tools that will contribute to the improvement of inclusive practice. |

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| **Digital assessment and evaluation** |
| Competence   * Apply formative and summative evaluation |
| * Goals * Discover how digital assessment tools can improve formative and summative assessment strategies and monitor development. * Use digital assessment tools to monitor and improve learning performance. * Discover the applicability and variety of digital and non-digital forms of assessment and understand their strengths and weaknesses based on pupil/student strengths and limitations. * Have a critical approach in the application of digital tools in evaluation and adapt strategies according to the characteristics of personalised learning in inclusive environments. |

### Application of knowledge - Competences of pupils/students

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| **Improvements in the development of pupils/students' digital competences** |
| Competence   * Incorporate learning activities, assignments, and assessments that encourage pupils/students to articulate needs, identify resources in the digital environment, and organise, process, analyse, interpret, and critically evaluate information and the reliability of their sources * Develop a pedagogical approach that encourages pupils/students to effectively use digital technology for communication, collaboration and community participation. * Develop learning materials and implement teaching practices that help pupils/students express themselves by creating digital content in a variety of formats. |
| Goals   * Include learning activities that require pupils/students to capture, communicate and meet information and content needs through a digital environment * Understand the ways in which pupils can create and inform online search strategies depending on the quality of information found * Help pupils understand how to organise, analyse, compare and critically evaluate the credibility and reliability of data sources and digital content * Teach pupils/students how to organise, store and retrieve data, information and content in a digital environment * Teach pupils/students how to organise and process information in a structured environment. * Present to pupils/students the possibility of interaction through an online environment. * Help pupils/students understand how to communicate in a given context and share data and digital content with others through digital technologies. * Help pupils/students understand the importance of adequate referencing. * Guide pupils/students to the application of digital technology for collaborative purposes. * Understand how pupils/students can use digital technology to co-construct and create resources and knowledge. * Explain to users how to use data generated through different digital technologies, environments and services. * Help develop an understanding of how to support vulnerable pupils/students and offer guidance or resources for the use of ICT for these purposes * Develop materials that encourage pupils to create, edit, and enhance digital content in a variety of formats * Encourage pupils/students to express themselves through digital tools. * Understand how to guide pupils/students to create original knowledge and content, as well as to modify, refine, improve and integrate content into existing knowledge. * Encourage pupils/students to plan and develop a sequence of understandable instructions for solving a given problem or performing a specific task. * Enable pupils/students to look for opportunities and create self-development strategies in order to follow the digital evolution and use it for their own needs. |

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| **Responsible use of digital technology** |
| Competence   * Ensure the safe use of ICT by pupils/students |
| Goals   * Understand how to develop pupils/students' skills for responsible and adequate use of the Internet in order to avoid risks and threats (e.g. cyber-bullying) and protect their physical and psychological well-being. * Explain to pupils/students how to adapt communication strategies with a specific audience. * Describe to pupils/students how to protect their reputation, personal data and privacy in the digital environment. * Help pupils/students understand how copyright and licenses apply to data, information and digital content. * Enable pupils/students to protect their work and digital content, as well as to understand risks and threats in the digital environment. * Describe to pupils/students how to share personal information, but to protect themselves and others * Enable pupils/students to understand how digital technologies can affect social well-being and social inclusion |

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| **Problem solving** |
| Competence   * Enable pupils to identify and solve technical problems or creatively transfer technological knowledge to new situations. |
| Goals   * Enable pupils/students to recognise technical problems when using devices, digital environments and problem solving. * Help pupils/students in identifying, evaluating, selecting and using digital technologies. * Teach pupils how to adapt the digital environment to personal needs. * Develop self-assessment strategies for pupils to understand areas that may require them to improve or update their skills. |

### Knowledge exchange - Communities of practice

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| **Professional engagement and continuous professional development** |
| Competence   * Connect with other teachers to share knowledge, ideas, communicate challenges and discover new ways of professional development |
| Goals |
| * Use digital technology to collaborate with colleagues locally and internationally on specific content or tasks. * Use digital technology to share knowledge, share ideas, discuss challenges, distribute resources and materials. * Use communities of practice to share their professional experience with colleagues and co-create new professional content. * Use professional collaborative networks to support and maintain well-being. * Use networks of professional collaboration to discover new opportunities for training and professional development. * Use professional collaborative networks to update subject-specific knowledge and skills. |

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| **Thinking about existing and researching new professional knowledge** |
| Competence   * Use the online environment for reflection and research of pedagogical practices and development of professional knowledge |
| Goals   * Use professional collaborative networks to research and reflect on new pedagogical practices and methods. * Use professional collaborative networks to critically reflect on personal pedagogical inclusive practices. * Use professional collaborative networks to co-create new pedagogical approaches and practices. * Use networks of professional collaboration to identify areas for further professional development. * Use professional collaborative networks to reflect on education policies and provide critical feedback. |

### Knowledge and communication - Organizational communication

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| **Digital organisational communication with pupils/students and other participants in education** |
| Competence   * Contribute to the development and application of technology to improve communication with pupils/students and other participants in the educational process. |
| Goals   * Understand the benefits of sharing organisational procedures (e.g. rules, registration dates, events, meetings) through technology. * Know how to use digital technologies or the organization's website to communicate with pupils/students, staff members and other participants in the educational process (and parents where applicable) to develop effective ongoing dialogue and inclusive consultation. * Inform pupils/students (and parents where applicable) about progress. * Understand ways to share learning resources and information. * Understand the benefits of providing comprehensive access to wider educational resources, inclusive learning tools, content and support for pupils and their families in all formal and informal learning situations. * Help in improving organisational communication strategies and providing equal support to all pupils/students. * Develop a leadership role in the development of a digital technology strategy to transform the educational institution (school/faculty) into a learning organisation. * Learn about the cultural and social background and perspectives of parents and families of primary and secondary school pupils. * Understand the ways in which interpersonal relationships influence the achievement of learning goals. |

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| **Training and mentoring** |
| Competence   * Use communities of practice to gain guidance and offer support to others |
| Goals   * Utilize professional collaborative networks to seek help from others and maintain high-quality teaching practices. * Use professional collaborative networks to model and help others develop their own digital and inclusive pedagogical practices. |

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| **Safe and responsible use of digital resources** |
| Competence   * Manage, organise, protect and share digital resources |
| Goals   * Organise digital content and make it available to pupils/students (and if necessary, parents of school-age children) * Effectively protect sensitive digital content. * Respect and comply with privacy and copyright rules. * Understand the use and creation of open licenses and open educational resources, including their attribution. |

## Monitoring, evaluation and professional development of teachers

Numerous changes in science, technique and technology present formal education with new tasks in terms of preparing future generations for active social participation. In this sense, it is clear that teachers are also constantly exposed to the challenges of professional development in various areas, both narrow professional ones and generic, general ones. Their professional development is accompanied by the evaluation of their work, and as such, evaluation is also an integral part of their professional development.

In Bosnia and Herzegovina, the evaluation and monitoring of teachers' work is carried out by the competent educational authorities. However, it is notable that regular evaluation is done mainly with the aim of career advancement, in contrast to OECD countries that use regular formative evaluation to provide teachers with essential feedback on the competencies they have acquired and those they need to further develop. Such an approach allows teachers to reflect on the learning and teaching process and encourages them to take responsibility for their professional development. A major obstacle in the evaluation of teachers' work in Bosnia and Herzegovina is the lack of standards for teachers based on the modern requirements of the teaching career, which directly and indirectly affects the quality of educational work in primary and secondary schools.

Professional development and advancement of primary and secondary school teachers

In the Overview study on the needs of teachers in distance learning and blended learning and teaching in primary and secondary (and SiTO) schools in Bosnia and Herzegovina during the coronavirus pandemic (UNICEF, 2021b), continuous teacher training is highlighted as a strategic recommendation, which should offer the following training modules: development of digital competences that include the use of ICT equipment, application of various software solutions in teaching for the purpose of adequately encouraging the acquisition of knowledge and skills by pupils, planning of online classes, continuous monitoring and evaluation of pupil achievements using formative and summative evaluation, providing individual support to pupils who attend online teaching, working with pupils who belong to marginalised groups in online and combined classes, preserving the mental health of pupils and professionals during the educational process, developing socio-emotional competencies in pupils, developing a partnership with pupils' parents, developing an inclusive school culture and school policies, and the development of inclusive practices in the classroom. When it comes to the development of digital competences of teachers, it is also stated that attention should be paid to the following areas:

* Development of professional competences - which include improvement of organisational communication with pupils, parents and colleagues, use of digital technologies for the purpose of professional development, exchange of knowledge and innovation of pedagogical knowledge and development of awareness of the need for continuous training in this area.
* Development of pedagogical competencies - which include knowledge and skills in identifying and selecting adequate digital tools and resources for teaching and learning, creating digital content for pupils and sharing it with pupils, understanding copyright and how to use other people's digital content while respecting copyright, encouraging collaborative learning among pupils with the help of digital technologies, encouraging self-regulation of learning among pupils with the help of digital technologies and content they exchange with pupils, using digital technologies for the purpose of formative and summative evaluation, providing feedback, and using digital technologies in working with children who belong to marginalised groups.

The importance of developing the competencies of primary and secondary school teachers is defined by Article 45, according to which "competent educational authorities also determine other standards and norms in education, regarding the educational and professional competencies of teachers." Accordingly, each administrative unit in Bosnia and Herzegovina created a regulation on monitoring, evaluation and professional development of teachers. In some administrative units, all three areas are combined by rulebook, and in some, the rulebook on professional development is separate from the monitoring and evaluation of teachers' work.

Analysing the content of the aforementioned regulations, it is possible to see similarities related to the degree of advancement of teachers to teacher mentors and teacher advisors and/or senior advisors. The areas in which monitoring and evaluation are carried out mainly relate to success in educational work with pupils, extracurricular professional work and professional development. The rules also specify the development and improvement of pedagogical-psychological and didactic-methodical competencies. However, the majority of cantons do not explicitly state the contents and programmes related to the improvement of competences in the field of ICT.

Bearing in mind the aforementioned findings of the Overview Study as well as the efforts of the authorities to bring education systems in Bosnia and Herzegovina closer to contemporary trends based on respect for diversity and fundamental human rights, i.e. creating assumptions for the implementation of quality inclusive education, it is necessary to rethink the areas of teacher professional development. Bearing in mind the challenges they faced during the Covid-19 pandemic, and in the context of the realisation of online classes and the application of digital tools, it is evident that the digital competences of teachers, along with pedagogical ones, have become an imperative for professional development. Therefore, it is advisable to harmonise the existing regulations on monitoring, evaluation and professional development of teachers with the needs of practice and the changed role of teachers and pupils when it comes to the application of information and communication technology.

Professional training and advancement of educators in higher education

Professional training of educators and advancement in higher education is specific and conditioned by the selection criteria for a higher academic title. Scientific-teaching titles that are acquired at a higher education institution are assistant, senior assistant, assistant professor, associate professor and full professor, and the promotion criteria are primarily related to achievements in the scientific-research sphere, while the evaluation of teaching work, i.e. the success of the implementation of curricula is carried out by the higher education institution/organisational unit after the end of each academic year, which is more precisely regulated by the Statute. The higher education institution/organisational unit is obliged to evaluate the work of the academic staff and students after each semester, and before the final exams. However, when it comes to the advancement of educators at a higher education institution, the evaluation of teaching work is secondary in relation to scientific-research work and, in connection with that, pedagogical-psychological and didactic-methodical competence.

When it comes to the pedagogical and digital competences of educators at higher education institutions and their needs for additional training, a clearer picture is provided by the Overview study on the needs of lecturers for remote teaching in higher education in Bosnia and Herzegovina during the COVID-19 pandemic (UNESCO, 2021).

Namely, the results of the research, the answers of lecturers and students, indicate that the digital competencies of educators are insufficient and limited in the application of digital tools, which was reflected in the forms of teaching that did not differ significantly from the ex-chair or frontal form of work, i.e. teachers realized lectures and delivered materials. A very small percentage of educators used the advantages of specialised virtual environments related to the possibility of creating films, tutorials, audio and video materials, digital simulations, and especially tools that increase student involvement and interaction in the teaching process, such as e.g. dividing students into smaller work groups, through breakout rooms options in Zoom and Teams software. Also, in the same Study, it is stated that two-thirds of the surveyed educators (69.9%) are motivated to improve their pedagogical-methodical knowledge and skills in the future in terms of online teaching, and almost half of the educators (45.7%) stated that they were highly motivated to include online teaching activities in their subjects even after the epidemiological situation improves and teaching begins in classrooms.

Bearing in mind that since 2005, higher education in Bosnia and Herzegovina has been part of the unique European area of higher education and, in this regard, follows the principles of the Bologna process and contemporary trends, including various teaching models, it is important to create programmes to improve the pedagogical and digital competences of teachers. The reason is that, due to the nature of the subject area, many teachers at higher education institutions did not have the opportunity to acquire knowledge and skills in the field of pedagogy, psychology, didactics and methodology. Although there are numerous professional development programmes that deal specifically with the improvement of teachers' competencies in this area, it should be noted that they need to be supplemented with content related to digital competencies. The situation caused by the Covid-19 pandemic and the related implementation of online classes has given birth to new educational needs of educators.

# Establishing mechanisms for quality assurance in education

Ensuring the quality of educational programmes and the educational process is possible only through the establishment of quality assurance mechanisms, which presupposes a systemic approach aimed at achieving the (best) outcomes of the learning and teaching process.

Quality assurance mechanisms can be external or internal. External mechanisms refer to evaluation from the level of relevant ministries of education and relevant educational institutions, while internal ones include self-evaluation of school work, (self-)evaluation of teacher work and student achievements. The synergy of external and internal mechanisms is important for quality assurance in education. The establishment of mechanisms implies the application of various tools, processes, and actors, and it can also be said that they are contextual, that is, related to a specific educational and social space.

Information systems for education management (abbr. EMIS; Eng. Education Management Information System) play an extremely important role in monitoring, evaluating and ensuring the quality of work in educational institutions. They enable the functional monitoring of relevant and predefined quality indicators in education.

## (Self) evaluation in primary and secondary schools

For the purposes of quality assurance in primary schools, APOSO created the Instrumentation for evaluation and self-evaluation of the primary school performance quality[[18]](#footnote-19). The instrument covers the most important areas of the organisation of school life and work: school climate, cooperation with the pupil council and the parent council, school management, intercultural and inclusive education, teacher competencies, curriculum, pupil achievements.

However, as for the aspect that includes the application of ICT in the educational process, it is mentioned only once in the referenced instrument and it concerns the virtual networking of the school with other school communities via the Internet. It is also important to note that in practice this instrument is not often applied, but the (self) evaluation of the quality of school performance takes place with the use of instruments developed separately within administrative units.

A similar practice is present in the area of evaluating the quality of work in secondary schools, although in this case there is no instrument developed by the Agency. The existing reports on the (self) evaluation of school work on the official websites of relevant ministries, indicate that it is performed continuously with the application of various instruments and mechanisms at the level of administrative units.

However, the deficiency of the applied instruments in the context of contemporary events and digitisation in education is reflected in the fact that they do not include content that explicitly treats the application of digital tools in the educational process, the digital competence of teachers or the ICT infrastructure in general.

Considering the changed paradigm of learning and teaching and the inevitable use of digital tools in the educational process, the establishment of mechanisms and creation of instruments to follow modern practice requirements should certainly be considered. One such instrument is the so-called The SELFIE method, which has found its useful value in primary and secondary schools in European countries, both because of its comprehensiveness and practicality, as well as of its contextuality against the specific needs of the country/educational institution in which it is used.

### The SELFIE method[[19]](#footnote-20)

SELFIE is a tool used to examine the digital maturity of a school, and can contribute to making informed decisions based on examination and continuous improvement of the use of digital technologies in the process of learning, teaching and evaluation. It was created as a result of the cooperation of teams of experts from schools, ministries of education and scientific institutes from all over Europe. The tool is free, customizable, available in more than 30 languages, easy to install and use, anonymous (does not collect personal data) and tested in schools across Europe. The application of the SELFIE tool implies evaluation in the following areas: management, collaboration and networking, infrastructure and equipment, continuous professional development, pedagogy: support and resources, pedagogy: introduction in the classroom, evaluation practices and digital competences of pupils (Figure).

*Figure: Areas of (self) evaluation of the school's digital maturity through the application of the SELFIE tool*

The purpose of its application is to identify areas in the mentioned areas that are functioning well, but also those that need improvement, including identifying priorities. It allows an anonymous survey of the views of pupils, teachers and school principals on how technology is used in their school. This is done through short statements and questions and a simple agreement scale with ratings from 1 to 5. The procedure takes about 30 minutes. The questions are adapted to each group. Based on the collected data, the tool generates a report - a picture ("SELFIE") of the strengths and weaknesses of the school in the context of the use of digital technologies for teaching and learning.[[20]](#footnote-21)

The generated report answers the following questions:

* In which areas does the school effectively use technology, and which areas need improvement?
* Does the school have a vision of how it wants to use technology and has it communicated that vision to staff and pupils?
* What type of training do the teaching staff find most useful?
* In which direction it is necessary to allocate funds with the aim of strengthening digital maturity?

The results and knowledge obtained within the SELFIE tool are intended only for the school and are not shared with others, unless the school wants to exchange and/or compare them for the purpose of exchanging and improving practices.

## (Self)evaluation of the quality of work in higher education institutions

(Self) evaluation of the quality of work in higher education institutions is specific with regard to the characteristics of higher education. Bosnia and Herzegovina, as a signatory to the Bologna process, committed itself to quality assurance in the European area of higher education. The framework law on higher education in BiH (2007) regulates: the organisation of higher education in BiH, the responsibility of competent authorities in this area, bodies for the enforcement of laws and international obligations of BiH and *the way to ensure quality in the field of higher education*. In this regard, documents and guidelines were adopted that regulate the said processes, thus also regulating the quality assurance. One of them is Standards and Guidelines for Quality Assurance in Higher Education in Bosnia and Herzegovina (2007)[[21]](#footnote-22) based on the adoption of European Standards and Guidelines for Quality Assurance (ESG) by all countries involved in the Bologna process, and covers three main areas:

* Internal quality assurance organised within institutions of higher education, which refers to the creation, implementation and monitoring of quality assurance processes and structures;
* External quality assurance and relevant activities that generally deal with what should be examined within institutions of higher education, and the manner in which activities related to external quality assurance should be carried out;
* Work of agencies for external quality assurance in terms of their establishment, organisation and recognition.

The aforementioned document was adopted by the competent educational authorities at the entity and state level. The main objectives of the proposed set of standards and guidelines for quality assurance are:

* Promote and support the continuous improvement of quality and standards for the provision of higher education programmes
* Ensure that the public has access to clear and accurate information about the quality and standards of higher education and training provision;
* Apply international best practice in the evaluation and revision of higher education and training programmes.

Defined standards, which refer to internal and external quality assurance in institutions of higher education, are clearly operationalised and monitored by appropriate indicators.

In the context of monitoring the quality of the work of the Higher Education Institutions, it is important to mention the criteria for accreditation in Bosnia and Herzegovina, which cover the following ten areas: quality assurance policy, development and approval of programmes, student-oriented learning, teaching and evaluation, enrolment and advancement of students, recognition and certification, teaching staff, learning resources and student support, information management, public information, continuous monitoring and periodic revision of the programme, periodic external quality assurance.

Therefore, it is possible to see that with clear guidelines, standards and criteria for monitoring the quality of work of higher education institutions in Bosnia and Herzegovina, there are prerequisites for quality assurance, and the process is carried out at the level of the educational institution. However, when it comes to the digital competences of teachers and the material assumptions related to ICT infrastructure, which is available and accessible to teachers and students, there are no separate indicators.

The advancement of teachers is conditioned primarily by the results achieved in scientific and research work, and the part related to previous experience in the teaching process does not explicitly treat pedagogical and/or digital competencies.

Bearing in mind, on the one hand, the legal provisions related to quality assurance, and the results of recent research (UNICEF, 2021a; UNESCO, 2021; UNICEF, UNESCO, ILO and UN volunteers, 2021), on the other hand, the creation of an instrument for monitoring and evaluating quality in the field of higher education should be considered. In doing so, it is important to focus on the digitalisation process and the development of digital competences of teachers and students, in order to achieve the best learning and teaching outcomes.

## Education Management Information system

EMIS (Education Management Information Systems)[[22]](#footnote-23) is a generic term for education management information systems. They enable the storage of data, which is obtained in the process of work, monitoring and evaluation in education, in one place, and offer the possibility of managing basic modules:

* Data on education,
* Data on pupils/students and their achievements,
* Data on teachers and other employees.

EMIS means information systems to support the improvement of the quality of the teaching and learning process and education through evaluation by defined variables and associated indicators. Thus, in addition to the basic modules that information systems have, they also offer the possibility of expanding the modules where, in addition to the basic ones, additional modules on the mapping of ICT infrastructure in educational institutions could be added, as well as other data related to the use of digital tools in the educational process, etc. In this way, a faster and simpler overview of the state of educational institutions would be enabled, and with the additional use of artificial intelligence (AI), it is possible to create different types of reports.

### Primary and secondary education

Information systems are indispensable support in pre-university education, especially in the segment of monitoring and evaluating the quality of the educational process. The user can access information systems from anywhere and from any device using a unique user account. By defining user roles in the information system, teachers, class teachers, management, educational authorities can quickly and easily access all information and create the various reports that are needed.

Each information system has its own modules that can be improved and/or added, depending on the needs of the educational institution. Systems can be integrated or separate. For example, e-diary, e-teaching, e-courses platform, enrolment of students in high school/college, external graduation, internal and external evaluation of the school and, if they are separate, it is necessary to ensure safe access, integrity, connection, communication and data exchange.

Various separate solutions can be integrated into the information system in order to provide all users with easier access to all resources with a unique user account.

In addition to teachers, parents and students also have access to basic data such as student achievements, absences, announcements of written knowledge tests, announcements of parent-teacher conferences, communication with teachers and other notifications.

### Higher education

Higher education institutions are obliged by law to create a unique information system that contains sets of data about students, employees and hired persons, the teaching process and scientific research work, as well as property, spatial and material and technical resources. Such a system should provide an integrated data resource, which is organised in the most effective and efficient way in accordance with the basics of software engineering, and for the purpose of successful task performance by the relevant educational authorities, as well as competent bodies of higher education institutions within their established competences. There are examples of good practice of established information systems in BiH, and also of those that need revitalisation and updating. [[23]](#footnote-24)

For the smooth functionality of EMIS, as well as of any other information systems used, it is necessary to continuously monitor the work and to work on making proposals for improving and developing its functionalities.

# Recommendations

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| **Creating an environment for quality inclusive education** |
| 1. **Include *quality inclusive education* as a version of *education for all* in the educational regulations**   Quality inclusive education is aimed at exercising the right to education in the context of inclusion in the regular education system at all levels, as well as exercising rights in and through education with the aim of ensuring equal participation and achieving educational outcomes planned by the curriculum. Quality inclusive education must be understood through the prism of the inclusion of everyone, regardless of the individual differences of participants (pupils/students), at all levels of education and by no means reduce this concept (only) to the inclusion of children with developmental difficulties/persons with disabilities in regular education system   1. **Make educational institutions accessible by removing communication and all other barriers**   Removing existing barriers is an important factor in the systemic approach to the realisation of the right to education, which refers to the creation of a learning and teaching environment suitable to all. The application of assistive technology is particularly important in order to respond to the specific educational needs of pupils/students in the process of learning and teaching, as well as monitoring and evaluating their achievements. The application of assistive technology based on information and communication technology enables students with developmental disabilities to express themselves, work and learn in situations where their abilities can be expressed. It is necessary to assess the needs of all educational institutions to improve accessibility and continuously invest in removing the identified barriers.   1. **Apply the standards of adequate equipment of the educational institution in the context of inclusive education, which includes assistive technology**   In the context of modern learning and teaching, and especially for the needs of online and blended teaching and learning, every educational institution must have an ICT infrastructure in accordance with basic technical standards (hardware, software, network, platforms and LMS).  With the aim of creating conditions for inclusive education, educational institutions should also have adequate assistive technology to respond to the specific needs of pupils and students. It includes any product, piece of equipment or system, which is used to maintain, increase or improve the functional capabilities of persons with disabilities, which allows them a greater degree of independence and autonomy in the processes and activities in which they participate. Assistive technology enables access to contents that would otherwise be completely inaccessible or difficult to access for people with disabilities.   1. **Train and/or empower teachers to apply universal design for learning**   The application of UDL is necessary in quality inclusive education, considering that it is a concept aimed at removing barriers in learning and teaching. It is a proactive approach focused simultaneously on pupils, environment, content, processes and outcomes.   1. **Provide an ICT infrastructure that will support the application of universal design for learning**   Considering the specifics of the UDL concept and the possibilities it offers through differentiation, individualisation and personalisation in the teaching process, ICT infrastructure represents significant support in its implementation and refers to hardware, software and network infrastructure[[24]](#footnote-25) and assistive technology.   1. **Support collaborative teacher relationships for and through the application of universal design for learning**   The collaborative community of teachers is important for the mutual exchange of experiences in the application of UDL in a specific teaching area, and beyond, with the aim of improving one's own competences and existing learning and teaching practices. Support can be provided through the establishment of collaborative teams of teachers, either interdisciplinary or within the same subject area; by providing mentoring to teachers and/or by teachers in and for the application of UDL; by connecting teachers among different levels of education so that the exchange of ideas and examples of good practices fluctuates; by supporting teachers in the implementation of action research in the area of UDL application by including critical friends (from other educational institutions, local communities, etc..).   1. **Include universal design for learning in initial teacher education programmes**   In the study programmes of initial teacher education, incorporate contents related to UDL, which train students, future teachers, for its application, and encourage teachers at higher education institutions to work according to the principles of UDL.   1. **Allow pupils subjected to long-lasting medical treatment to follow regular classes online in order to ensure their participation and achievement of educational goals.** |

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| **Monitoring and evaluation of pupil/student achievements** |
| **Improve the by-laws on the evaluation of pupil achievements in order to emphasise a balanced set of evaluation practices, including the application of ICT in the said process.**  The improvement of the by-laws on valuation should:  respect the already prescribed standards of pupil achievements or to create new ones;  clearly emphasise the application of evaluation for different purposes, that is, the rules should contain comparative definitions of formative and summative evaluation and an explanation of their interrelationship and synergistic purpose;  adapt methods related to summative evaluations (improve qualitative descriptors in evaluation systems)  collect examples of good practice (establishing a community of practice can be an important platform for collecting examples that can be further distributed for the purposes of monitoring the quality of evaluation by the competent authorities, and as a support to other teachers as well)   1. **Improve the coverage and content in initial teacher education programmes related to the evaluation of pupil achievements, including the application of ICT in the evaluation process** 2. **Create and/or update modules for monitoring and evaluating the achievements of primary and secondary school pupils (e.g. e-diary), which can be integrated into, or separated from (existing) information systems**   Such a module enables easier recording and monitoring of pupil progress, ensures transparency and availability of information to pupils, parents and teachers, as well as to the relevant ministries.   1. **Develop and/or improve existing platforms/information systems for monitoring student achievements [[25]](#footnote-26)**   In accordance with the obligations of continuous monitoring and evaluation of student achievements and transparency, availability and transfer of information related to student achievements, higher education institutions are obliged to create platforms for monitoring and evaluation, while already existing platforms should be innovated and updated in accordance with contemporary trends in the ICT area and in the context of monitoring and evaluating achievements. The improvement of platforms can take place at the level of administrative units or universities.   1. **Create standardised systems for formative and summative evaluation of pupil/student achievements.**   The creation of a standardised system, which would contain qualitative and quantitative descriptors of formative and summative evaluation of the achievements of pupils/students is necessary for teachers, and it contributes to the standardisation of evaluation criteria by all teachers and the understanding of criteria by students. The system is standardised at the level of the educational institution and in accordance with the level of education. They can be created as a table and applied/used by existing online platforms, LMS solutions, etc.   1. **Establish websites dedicated exclusively to the promotion of NPP based on competences and related evaluation practices as a resource for reflection and exchange of practices and as a digital library of communication to help teachers in making curricular and pedagogical decisions.**   Websites can be created at the level of administrative units so that they include all levels of education within one administrative unit. The space conceived in this way provides a significant support to collaborative communities of teachers, whether it is an approach focused on a specific teaching area, or an interdisciplinary approach. It also provides insight into the inter-subject transfer of content, and the passability of information and examples of good practices among different levels of education, which can have a good predictive value in making certain pedagogical decisions.   1. **Promote continuous verification of knowledge through the use of digital tools regardless of the teaching model**   Digital tools provide numerous opportunities for interactive knowledge verification, while ensuring transparency, feedback, effectiveness of knowledge verification in the context of its improvement, given that the process is relatively individualised. Assessment is possible through the application of the platform, e-mail, streaming media, interactive knowledge quizzes, independent research tasks.   1. **Harmonise the evaluation of achievements with the optimal workload of pupils/students**   Operationalise the optimal load of pupils/students and, if necessary, reconceptualise the currently valid regulations that regulate the evaluation of pupil achievements. At higher education institutions, this part is regulated by ECTS points, which define the workload of students. |

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| **Creating assumptions for the effective use of ICT in online and blended teaching and learning** |
| 1. **With the aim of successful realisation of online and blended teaching and learning process, it is necessary to include all of its elements in laws/rulebooks/decrees:**  * verify online and blended teaching and learning in the existing legislation * include electronic record and documentation keeping * include online classes in the school's annual work programmes and academic calendars in order to ensure continuity in the use of all ICT tools and platforms,  1. **Harmonise pedagogical standards with basic technical standards in the context of online and blended teaching and learning, related to ICT infrastructure (ICT equipment, platforms, LMS, maintenance, support, E-diary, EMIS, etc.)** 2. **Create quality standards for digital educational content, including quality standards for digital textbooks, create digital educational content and make it available to pupils/students**   The availability of educational content in electronic format creates greater opportunities for learning and teaching, thus improving pupil/student achievement. In addition, digital educational contents and their application contribute to inclusivity, since e-material with its specificities is more accessible and can respond to the individual needs of pupils/students and learning.   1. **Define codes of conduct for pupils/students, teachers/professors and other actors of the educational process in the online environment by bylaws.** 2. **Ensure the protection of personal data in accordance with the applicable regulations, i.e. the General Data Protection Regulation (GDPR).** 3. **Provide adequate computer equipment at the level of the educational institution in accordance with the defined** [**Standards and set goals of sustainable development for BiH until 2030.**](https://zamisli2030.ba/bs/okvir-ciljeva-odrzivog-razvoja-u-bih/)  * For teachers: in accordance with the specific teaching area and teachers' needs * For primary school pupils: four pupils per one computer * For secondary school pupils: three pupils per computer * For the needs of students: establish an information centre with adequate equipment in relation to the specificity of the study programme and the number of students * For the needs of management and other staff  1. **Regularly update data on schools equipped with ICT equipment and Internet connection in accordance with** [**Basic technical standards for information and communication technology tools in educational systems in Bosnia and Herzegovina (2021)**](http://www.mcp.gov.ba/attachments/bs_Migrirani_dokumenti/Sektori/Obrazovanje/Obrazovanje-ostalo/Osnovni_tehni%C4%8Dki_standardi_IKT_alata_u_obrazovanju_BOS.doc)**, and** **identify vulnerable schools that will be prioritised for ICT infrastructure improvement.** 2. **Provide a high-quality network infrastructure, which enables the connection of digital devices to faster (most often optical) Internet via a local wired and/or wireless network (depending on the architecture of the building)** 3. **Equip classrooms with presentation and interactive devices (smartboards, projectors, PCs and laptops)** 4. **Plan budget for:**    * ICT infrastructure in educational institutions at all levels  * purchase of software packages, tools and platforms for online learning and teaching and * equipment maintenance protocol * acquisition and maintenance of assistive technology.  1. **Create public-private partnerships and special contractual benefits between Internet service providers and educational institutions**   It is important that benefits are defined in accordance with the needs of educational institutions, that is, that service packages are created in accordance with the parameters of the educational institution that defines the need for a specific service package. Parameters may include: the area of the educational institution in square meters, the number of pupils/students, teachers, etc. In order to promote the opportunity for public-private partnerships in this area, it is necessary to identify the needs of educational institutions and potential service providers.   1. **Provide technical support to teachers at the level of the educational institution**   Technical support stands out as particularly important in the implementation of online classes. It can be implemented by a separate IT service or informatics teacher in an educational institution or with the help of a teacher from the community of practice. The support does not have to come exclusively from IT experts, instead, interdisciplinarity should be provided that will combine knowledge from the ICT area and the teaching profession (e.g. graphic designers, video producers, etc.).   1. **Provide a place for safe storage of digital content, i.e. a repository at the level of the administrative unit**   The repository provides availability and access to digital content for teachers and pupils/students. It consists of educational contents in digital format that are used or can be used in the educational process. The repository may also contain teaching preparations of examples of good practices.   1. **Create systems of information security and protective measures that will ensure protection of access, monitoring of work and devices of the entire infrastructure in the educational institution, and prevention of identity abuse and unauthorised use.** 2. **Enable the use of licensed software (system and application/utility software for a specific purpose) for educational institutions or free replacement software.** 3. **Map the software packages that are most useful in teaching (with regard to the level of education and the subject of teaching), recommend them to teachers and create teacher training programmes for the use of these tools** 4. **Encourage the development of own digital tools at the level of administrative units or at the level of education or educational institution**   The development of own digital tools ensures economy, considering that it involves resources even after it has been put into use (hosting, maintenance, etc.), and it could also be used for teacher training. This can be realised through encouraging partnerships with universities and within the scope of scientific and research work and through public-private partnerships.   1. **Investigate the advantages and disadvantages of existing information systems and improve and remove obstacles in their application**   Carry out continuous monitoring of the application and possible upgrades of solutions with the aim of their improvement.   1. **Promote and advocate for the use of open education resources (OER) in educational institutions** 2. **Research and document examples of good practices at all levels of education regarding the application of digital tools** 3. **Create unique student ID numbers for the purposes of statistical monitoring of educational achievements at the level of administrative units** |

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| **Developing the concept of improving the pedagogical and digital competences of teachers** |
| 1. **In the study programmes of initial teacher education, include contents related to the application of ICT in education, either cross-curricular or through a special subject**   It is important to incorporate contents related to the application of ICT in education into the initial teacher education programmes in order to ensure adequate preparation for inclusion in the teaching process. The contents can be implemented through a separate subject or all subjects with adequate didactic-methodical adaptation and application (cross-curricular approach).   1. **Inform teachers about the Educators' Digital Competency Framework (UNICEF EDC, 2021) and make it available.** 2. **Create a catalogue of professional development of teachers for all levels of education and in accordance with the Framework of digital competencies of teachers (UNICEF EDC, 2021)** 3. **Create a professional development programme for teachers in relation to the specific professional development needs of teachers (at the level of the educational institution, administrative unit and/or level of education), which assumes continuous monitoring and evaluation**   In addition to the competencies defined by the Framework, the professional development programme for teachers should follow the specific needs of teachers. This presupposes the identification of professional development needs and continuous monitoring of the professional development of teachers[[26]](#footnote-27) given that there is a recognised discrepancy between the content of the professional development programme and the needs of the practice, i.e. teachers [[27]](#footnote-28). In this regard, teacher professional development programmes can be developed at the level of the educational institution or considering the level of education, bringing together teachers with similar/same educational needs.   1. **Create instruments for self-evaluation of the quality of teachers' work in relation to the Digital Competence Framework and encourage teachers to apply it** 2. **Increase budget allocations for various forms of professional development of teachers in the area of digitalisation of the educational process (seminars, courses, professional exchanges, publication of papers, etc.)** 3. **Additional teacher training for the application of digital tools in the process of monitoring and evaluating the achievements of pupils/students (e.g. creating rubrics with concrete categories and explanations)** 4. **Redefine the conditions for the promotion of teachers to higher positions at higher education institutions at the level of administrative units, where it is necessary to take into account the results of evaluation by students at higher education institutions concerning pedagogical and digital competencies** 5. **Plan and implement teacher training for the application of assistive technology in the educational process**   The application of assistive technology should be part of the professional development of teachers at all levels of education, including the content of initial education and training of students - future teachers.   1. **Initiate the establishment or strengthen the existing communities of practice of teachers in educational institutions (schools/faculties) with the aim of improving the teaching process, and their own competencies**   Creating a community of practice and a supportive school culture enables the exchange of knowledge through communication and discussion with the aim of improving professional development. It is possible to use online platforms, LMS and other channels to exchange information and ideas. Communities of practice contribute to the development of pedagogical and digital competences, mental empowerment of the teacher through mutual support, ideas on the application of modern methods and forms of work in the teaching process, adaptation of content in an inclusive educational environment, but also opportunities for everyone involved to offer their own support and mentoring in the areas of with which he feels competent.  Communities of practice can also be interdisciplinary in order to provide comprehensive support for the promotion and application of digital tools, the development/improvement of teachers' pedagogical and digital competences (e.g. monitoring the needs of teachers' professional development, responses to crisis situations, etc. (which does not exclude the work of mobile teams as support inclusion of children with developmental disabilities/persons with disabilities).  Communities of practice can also be used for the exchange of experiences and knowledge in the area of evaluating the achievements of pupils/students.   1. **Select and/or create examples of good practice in the context of applying a modern approach to learning and teaching with the use of digital tools and make them available to teachers**   Examples of good practice can be shared on already existing platforms where they are established during the implementation of online and combined classes or planned within the repository and/or website that will be developed based on recommendations for improving online and blended classes. It is possible to share them through different communication (digital) channels.   1. **Support the introduction of minor innovations in education and foster a culture of innovation and creativity with the partnership of educational authorities and the wider community (NGO sector, international sector, etc.)**   Innovations can refer to a specific subject area, and to the possibility of introducing different teaching practices that are reflected in modern learning and teaching methods, action research, and the possibility of involving different actors from the wider community in the implementation of planned activities. In this way, the connection of formal education institutions with the social community is ensured, with the aim of preparing actors for active social participation.   1. **Create programmes to improve the partnership between the school and parents with special reference to the implementation of online and blended classes [[28]](#footnote-29)**   Parents are important partners in the work of the school, and their role is even more pronounced in the implementation of online and blended teaching and learning, given a certain part of the time in which the teaching process takes place online while the children are at home. The parents' council, as a formal body, has an important role in mediating between the needs of children and teachers/schools, and also in creating an environment for the possibility of individual engagement of parents either at the school level or related to their own child's achievements. It is necessary to bear in mind the different competences of the parents with regard to the level of education, the socio-economic status of the family and the ICT infrastructure available to the pupil in his/her household. In addition, parents need clear instructions when it comes to their support for improving children's achievement, especially when it comes to encouraging independent work at home. The partnership could be strengthened through communication through various communication channels and digital tools (telephone, e-mail, online platforms, etc.), exchange of available online materials, information and resources for digital learning.   1. **Support the development of parents' digital competences (especially parents of children from vulnerable groups** [[29]](#footnote-30)**)**   Parents are important actors in the education of pupils and the realisation of partnership with an educational institution, for the best interest and well-being of pupils. In the context of changes in the field of formal education, parents also face new challenges of supporting children, and teachers/schools as well, in order to reach educational goals. In this sense, the digital competences of parents are also important, especially in a situation where children/pupils need additional support in learning (such as children with developmental disabilities). It is possible to organise various forms of informing and training parents for the use of ICT at the level of the educational institution (differentiated according to the needs of parents, at parent meetings, etc.).   1. **Strengthen cooperation with pedagogical institutes and other relevant institutions in order to ensure adequate support in planning, preparation, organisation and realisation of online and blended teaching and learning** 2. **Strengthen networks of cooperation and support among educational institutions at different levels of education in order to improve pedagogical and digital competences for quality inclusive education**   It is important to strengthen existing cooperation and support mechanisms among educational institutions at different levels of education. This is extremely important for the transition from primary to secondary school, from secondary school to college, from college to the labour market. In this process, pedagogic-psychological services in schools and offices/centres for student support at universities play an important role in the context of identifying the specific needs of teachers for additional professional training in order to understand the importance of collaboration and the preparation for the transition to a higher level of education, and to provide adequate support within system. It is about improving pedagogical and digital competences.   1. **In the process of selection and employment, evaluate the basic digital competences of teachers as well as knowledge of the English language, considering that the insufficient knowledge of the English language by the teaching staff is one of the obstacles to the use of digital solutions and open-source tools.** 2. **Establish support, reward and stimulation funds for the best pedagogical/teaching practices in online/blended teaching and learning.** |

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| **Establishing mechanisms for quality assurance in education in the context of digital maturity** |
| (Self)evaluation in primary and secondary schools   * + 1. **Integrate the SELFIE method into bylaws on primary and secondary education while respecting the autonomy of the educational institution for selecting evaluation elements**     2. **Identify and clearly define indicators, descriptors, components and goals of (self) evaluation of digital maturity in all procedures/methods in application**     3. **Provide periodic reporting at the level of schools and administrative units with the aim of monitoring the application of the SELFIE method**     4. **Introduce a unique information system for education management at the level of administrative units with the possibility of networking and/or improve existing EMIS systems where they already exist**     5. **Train and encourage teachers to continuously (self) evaluate the quality of their work**   Ensure that during initial education, teachers are trained for (self) evaluation of the quality of work, use of various tools in that process, and encourage them to improve their competencies through continuous professional development.   * + 1. **Ensure continuous participation in international research in education dealing with digital maturity such as the International Computer and Information Literacy Study (ICILS) and provide adequate support**   Participation in research such as ICILS enables participating countries to monitor their national targets for pupils' digital competences and provides information to monitor progress towards UNESCO's Sustainable Development Goals. It also provides evidence of how pupils' computer and information literacy skills and pupils' computational thinking skills relate to contexts outside the classroom the role of which is to support the learning process. Participation in ICILS can be marked as an integral part of preparing for life in the digital age.[[30]](#footnote-31)   1. **Transform the role of the school headmaster in order to strengthen the leadership in the teaching process and empower him to apply different tools (including digital) for self-evaluation** 2. **Inform teachers about the importance of using an information system for monitoring and evaluating pupil work** 3. **Encourage/oblige teachers to regularly use the information system, and to provide the necessary professional and technical support as well** 4. **Provide continuous support to teachers in the application of digital (self) evaluation tools** 5. **Strengthen the capacities of expert advisors to support schools in (self) assessment of digital maturity**   Competent educational authorities should support pedagogical institutes or equivalent institutions by creating jobs and hiring experts, who would be responsible for supporting vulnerable schools and helping schools in self-evaluation.   1. **Use the obtained data on (self) evaluation of the quality of school work to identify and support vulnerable schools in order to provide more intensive practical support** 2. **Encourage schools to conduct regular self-evaluation using indicators of the quality of school work for the sake of their own development**   It is important that all school employees internalise the quality standards so that they are ready to make efforts to improve the school's work and overall development on a personal and collective level. In this sense, it is necessary to introduce self-evaluation of schools as an integral part of the regular cycle of school development planning.   1. **Create an online platform to support the improvement of school work according to the set quality standards at the level of administrative units with the possibility of networking and data exchange within established communities of practice** 2. **Promote schools that have made progress or are doing well according to various indicators**   In addition to educational authorities, communities of practice can play a significant role in promotion.  (Self)-evaluation of the quality of work in higher education institutions   1. **Supplement the standards and criteria for quality assurance in higher education in the context of digitalisation through amendments to standards and normative for higher education in terms of meeting the requirements of higher education institutions** 2. **Introduce a unique education management information system at the level of an educational institution/university with the possibility of networking at the level of administrative units and/or Bosnia and Herzegovina and/or between educational institutions** 3. **Provide continuous professional development of teachers for the application of digital tools and existing platforms for evaluating student achievements** 4. **Include people from teaching practice and IT experts in the expert teams that create the platforms - provide an interdisciplinary approach** 5. **Create communities of practice and networking with the aim of exchanging ideas, experiences, and knowledge in the area of evaluating the quality of work at higher education institutions - networking among the faculties of one university and/or networking among universities** 6. **Regularly update information systems and monitor the needs of the educational institution** 7. **Inform educators about the importance of using an information system for monitoring and evaluating student work** 8. **Encourage/oblige teachers to regularly use the information system and to provide the necessary support as well** 9. **Involve the Rectors' Conference of Bosnia and Herzegovina/Rector's Council of Bosnia and Herzegovina to support the digitalisation of the monitoring and evaluation process in all areas (student achievements, professional development of teachers, and assessment of the institution's digital maturity - ICT infrastructure)** 10. **Formation of an IT department within the educational institution with a clearly defined description of work tasks - maintenance (hardware and software), as well as work on establishing, maintaining and improving the information system, which is used within the educational institution/university**   The position of expert associates in the IT department, who handle teaching techniques and technology (hardware and software), work on the establishment, maintenance and improvement of information systems that are used within the educational institution/university, must be resolved by collective agreements, the systematization of workplaces, standards, as well as individual contracts.[[31]](#footnote-32)   1. **Involve teachers in the process of evaluation and the quality of work of the educational institution** |

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1. Considering [the results of the PISA 2018 survey](https://aposo.gov.ba/bs/pisa-2018-izvjestaj-za-bosnu-i-hercegovinu/) according to which every other 15-year-old in BiH does not master the basic levels of reading literacy and according to which students in BiH are on average three years of schooling behind their peers from OECD countries, it is clear that the loss in learning caused by the Covid-19 pandemic is even greater than that in developed countries. [↑](#footnote-ref-2)
2. The chapter conceptualises terms that are most often the subject of dilemmas in educational practice and relate primarily to forms of learning and teaching with various applications of information and communication technology. All other terms, such as ICT infrastructure, LMS, EMIS, etc., are defined within the chapters to which they primarily belong. [↑](#footnote-ref-3)
3. The Internet is a global public network that establishes a connection and enables communication, information gathering and data transfer between different computers and is available to everyone. An Intranet, on the other hand, is a part of the Internet that is privately owned by an organisation/firm, connects all computers and provides access to files and folders within the network, and only authorised users have permission to access the network. [↑](#footnote-ref-4)
4. Interactive TV is a kind of integration of traditional TV technology and data services. It is a two-way system, allowing users to interact through commands and feedback. It is changing the way viewers "consume" content by allowing users more choice (more channels), greater control over viewing (when and how users watch), more portable media (where people watch) and greater ability to interact with content (Roberts and Herrington, 2005 according to Varan, 2004). Interactive TV enables the implementation of TV classes. [↑](#footnote-ref-5)
5. The Sustainable Development Goals (SDGs), also known as the "Global Goals", represent a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and well-being. The objectives (17 in total) are interrelated and often the key to success in one will involve solving problems that are more commonly associated with another.For more information see:

   <https://bosniaherzegovina.un.org/bhs/sdgs> (visited on 8 April 2022). [↑](#footnote-ref-6)
6. For more information, see: Centre for Applied Special Technologies (n.d.). *About UDL*. <http://www.cast.org/udl/> (visited on 08/04/2022**)**  [↑](#footnote-ref-7)
7. Reasonable adjustment means appropriate changes and adjustments needed in the specific case, which do not impose a disproportionate or inappropriate burden, in order to ensure that children with developmental difficulties and persons with disabilities enjoy and exercise all human rights and basic freedoms on an equal basis with other persons (Kafedžić , Bjelan-Guska, Šušnjara, Osmić and Zukić, 2018: 4). [↑](#footnote-ref-8)
8. See Chapter 4. [↑](#footnote-ref-9)
9. *Formative assessment* of student achievement is an assessment that takes place during learning and teaching in order to provide information on progress and improve future learning and teaching, to encourage reflection on learning, to recognise deficiencies in learning, to recognise pupil/student strengths and to plan their future learning and teaching. [↑](#footnote-ref-10)
10. Information and communication technology means a set of technologies developed for more efficient information and communication. [↑](#footnote-ref-11)
11. For example, it offers the possibility of contrasting content display, enlarged text, audio conversion of a text record, and the like. [↑](#footnote-ref-12)
12. For more information, see: <https://www.unicef.org/serbia/otvoreni-obrazovni-digitalni-alati-za-interaktivnu-nastavu-i-ucenje-preko-interneta> (visited on 24/04/2022) [↑](#footnote-ref-13)
13. It is a document titled Basic technical standards for information and communication technology tools in educational systems in Bosnia and Herzegovina available at: [http://www.mcp.gov.ba/Content/Read/obrazovanje-dokumenti](http://www.mcp.gov.ba/Content/Read/obrazovanje-dokumenti%20) (visited on 28/04/2022.) [↑](#footnote-ref-14)
14. For more information about the representation of online teaching in the Overview study on the quality of distance teaching and blended teaching and learning in primary and secondary education (and SiTO) in Bosnia and Herzegovina during the coronavirus pandemic (UNICEF, 2021a), see the laws at the level of administrative units. [↑](#footnote-ref-15)
15. Shortcomings and needs were presented during the Consultations with civil society organisations, the academic community and the private sector, on 6 June 2022 in the UN building in Sarajevo. The consultation was one of the preparatory activities for participation in the Summit on the education transformation in 2022. [↑](#footnote-ref-16)
16. For more information, see: <https://education.ec.europa.eu/focus-topics/digital-education/action-plan> (visited on 10/08/2022) [↑](#footnote-ref-17)
17. Defined by UNSCR 1244 in 1999 [↑](#footnote-ref-18)
18. For more information, see: [https://aposo.gov.ba/sadrzaj/uploads/Instrumentarij-za-samovrednovanje-BOS-final1.pdf](https://aposo.gov.ba/sadrzaj/uploads/Instrumentarij-za-samovrednovanje-BOS-final1.pdf%20) (visited on 01/06/2022) [↑](#footnote-ref-19)
19. SELFIE is an English abbreviation of Self-reflection on Effective Learning by Fostering the use of Innovative Educational Technologies) [↑](#footnote-ref-20)
20. An example of a school report available at: <http://os-slatine.skole.hr/upload/os-slatine/images/newsimg/677/File/SELFIE-report%20(1).pdf> (visited on 02/06/2022) [↑](#footnote-ref-21)
21. This document was prepared as part of the joint project of the European Commission and the Council of Europe "Strengthening higher education in Bosnia and Herzegovina" and was approved by the Management Board in 2007. For more information, see: <http://hea.gov.ba/Kvalitet/dokumenti/?id=1229> (visited on 10/06/2022) [↑](#footnote-ref-22)
22. EMIS is, therefore, a unique name for education management information systems, therefore it also includes specific information systems such as, for example, EDUIS in Republika Srpska. [↑](#footnote-ref-23)
23. Modules used in higher education such as, for example ISSS (University of Sarajevo) or ISS (University of Mostar) can be added to EMIS, which would provide a unique base of vertical and horizontal insight into the evaluation process in education. [↑](#footnote-ref-24)
24. See chapter 3 for details. [↑](#footnote-ref-25)
25. Student information systems are software that enable students, teachers, student service representatives to register for exams, enter grades, and access other relevant information related to the administrative basis of studies and teaching. Designed in this way, student information systems are part of the modernisation and computerisation of the study process and are an important prerequisite for studies in accordance with the Bologna principles. In different organisational units, they may be called differently and be technically created differently, but the concept and purpose remain the same. [↑](#footnote-ref-26)
26. Especially primary and secondary school teachers, given that there are clearly prescribed criteria for the promotion of educators at higher education institutions. They need to be supplemented with content related to the digital transformation of education and, accordingly, digital competencies. [↑](#footnote-ref-27)
27. This position was expressed at the meeting of the Working Group. [↑](#footnote-ref-28)
28. [↑](#footnote-ref-29)
29. Applicable to parents of primary and secondary school pupils. [↑](#footnote-ref-30)
30. For more information, see: <https://www.ncvvo.hr/medunarodna-istrazivanja/icils/> (visited on: 29/08/2022) [↑](#footnote-ref-31)
31. The recommendation arose from problems recognised in practice and refers to the inadequate status of IT service employees within educational institutions. It is important to emphasise that this phenomenon cannot be completely generalised, however, considering the instructions of the RG members, it is still important to include it among the recommendations for improving online and blended teaching and learning. [↑](#footnote-ref-32)