



DIGITAL FACTSHEET DECEMBER 2019

# DIGITAL SKILLS AND ONLINE LEARNING IN BOSNIA AND HERZEGOVINA



## DIGITAL SKILLS FOR VET STUDENTS

### Policies, strategies, initiatives, practices

In accordance with the constitution, the jurisdiction for education and training in Bosnia and Herzegovina falls within different levels of governance.

At the country-wide level:

- Ministry of Civil Affairs with its Department for Education;
- Agency for Pre-primary, Primary and Secondary Education (APOSO) with its VET Department.

At the entity/district level:

- Federation of Bosnia and Herzegovina (FBiH):
  - Ministry for Education and Science;
  - 10 cantonal ministries of education;
- Republika Srpska: Ministry for Education and Culture;
- Brčko District: Department for Education.

While stakeholders at all levels declare that digital skills and competences (DSC) are of great importance for education and training in Bosnia and Herzegovina, such skills and competences are still in the development phase. The Framework Law on Vocational Education and Training<sup>1</sup> (VET) also includes a reference to the importance of developing DSC. Each level of governance has its own legislation on VET and, to a general extent, they all address DSC as being important for VET<sup>2</sup>.

The state-level working document 'Priorities in integrating entrepreneurial and digital competence into education systems in Bosnia and Herzegovina 2019–2030'<sup>3</sup> (hereafter 'Priorities 2019–2030') aims to bring DSC in line with the European Digital Competence Framework (DigComp) with a short-term goal of integrating DSC into International Standard Classification of Education (ISCED) levels 1, 2 and 3. The Priorities 2019–2030 should be a basis for the development of policy and reference documents at the different governance levels.

### CoderDojo, a country-wide initiative

CoderDojo free programming school has been organised at 16 locations in 11 cities (Sarajevo, Sokolac, Travnik, Banja Luka, Gračanica, Tuzla, Maglaj, Zenica, Mostar, Konjic, and Istočno Sarajevo) by the IT association Bit Alliance. Over 700 elementary and high school students from Bosnia and Herzegovina have so far attended the free coding programme. The school is organised with partners on an ongoing, voluntary basis upon demand. It provides mentoring that enables children and young people to master software programming languages.

### Digitalisation as part of educational reform in Republika Srpska

In 2019 Republika Srpska started a reform of education with a view to modernising VET and making it more responsive to labour market needs. The reform will include the digitalisation of teaching and learning materials and the purchase of IT equipment for 500 schools.

<sup>1</sup> <https://epale.ec.europa.eu/hr/resource-centre/content/okvirni-zakon-o-srednjem-strucnom-obrazovanju-i-obuci-u-bosni-i-hercegovini>

<sup>2</sup> Law on Secondary Education of Republika Srpska, *Official Gazette of Republika Srpska*, No 41, 16 May 2018; Law on Secondary Education of Zenica-Doboj Canton, *Official Gazette of Zenica-Doboj Canton*, No 09/17; Law on Secondary Education of the Department of Education of Brčko District, *Official Gazette of Brčko District*, No 10/08; Law on Secondary Education of Una-Sana Canton, *Official Gazette of Una-Sana Canton*, No 17/12; Central Bosnia Canton, *Official Gazette*, No 11-01; Law on Secondary Education of Posavina Canton, *Official Gazette of Posavina Canton*, No 4/11; Law on Secondary Education of Tuzla Canton, *Official Gazette of Tuzla Canton*, No 17/11; Law on Secondary Education of Bosnia-Podrinje Canton Goražde, *Official Gazette of Bosnia-Podrinje Canton Goražde*, No 10/11 and 5/16; Law on Secondary Education of West-Herzegovina Canton, *Official Gazette of West-Herzegovina Canton*, No 22/13; Law on Secondary Education of Sarajevo Canton, *Official Gazette of Sarajevo Canton*, No 23/17.

<sup>3</sup> Ministry of Civil Affairs BiH, 2018.



When it comes to integrating DSC in curricula, four modules<sup>4</sup> were formulated under the EU VET II programme (2000–2014). The initial VET (IVET) system in Bosnia and Herzegovina, in which a modular approach has been implemented to some extent, includes four years of education in technical schools (ISCED 3A), with vertical transition towards the next educational level, and three years of education in vocational schools (ISCED 3C), with no direct vertical transition towards the next level. Digital competence is mainly acquired through traditional information and communication technology (ICT) courses. In IVET, informatics/computer science is a general subject with an allocation of two hours per week, usually in the first grade (Priorities 2019–2030). DSC is also included in other subjects if the necessary conditions for its development are in place.

In Republika Srpska various subjects in IVET schools include DSC<sup>5</sup>, while the digitalisation of teaching materials in primary schools has also started. The FBiH Ministry for Education and Science supports projects focused on the development of DSC, while Sarajevo Canton also supports improvements in the digital competences of IVET teachers and students on an annual basis<sup>6</sup>.

Based on learning outcomes, the Common Core curricula<sup>7</sup> provides a comprehensive approach to integrating DSC into all components of IVET. DSC is one of the key competences in the Guidelines for the implementation of the Common Core curricula in Bosnia and Herzegovina.

## Facts and trends

- At least 44 IVET and technical schools in Bosnia and Herzegovina offer training for ICT-related occupations<sup>8</sup>, and at least 20 schools offer ICT technician as a qualification at ISCED level 3A.
- The largest number of ICT-related qualifications are available in schools in Tuzla Canton.
- Employment in the ICT sector in the country is increasing by approximately 15% annually (Priorities 2019–2030), while the ICT qualification that is most in demand is web and application programmer with Java programming knowledge.
- The total income of the 382 registered software development companies was over EUR 400 million in 2017<sup>9</sup>.
- Given the growth of the ICT sector, it is projected that there will be a deficit of around 6 000 employees in the field over the next five years.
- However, the country spends only 0.04% of its GDP (gross domestic product) on the ICT industry, which is far below the global average of 2.7%<sup>10</sup>.

## Electro-technical School Sarajevo awarded five medals for ICT innovations

In 2019 Electro-technical School Sarajevo participated at the 44th International Invention Show in Croatia with five DSC-related innovative projects. Students won two gold medals, two silvers and one bronze.

<sup>4</sup> Basics of computer systems, computer communication, introduction to the professional use of computers, and professional use of computers (standard use of computers).

<sup>5</sup> ICT, business informatics, software development, entrepreneurship in IT, management of ICT systems, informatics and programming.

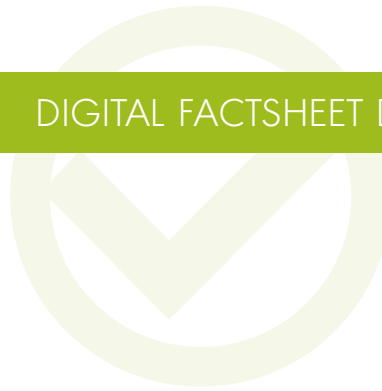
<sup>6</sup> The Ministry of Education, Science and Youth of Sarajevo Canton prepared 'The framework for digital competences – Teacher's guide', which was to be published and implemented in 2019.

<sup>7</sup> <https://aposo.gov.ba/hr/publikacije/zajednicka-jezgra-npp/>

<sup>8</sup> Source: [www.eduinfo.ba/privatne-srednje-skole/sarajevo](http://www.eduinfo.ba/privatne-srednje-skole/sarajevo). The information was not provided by national institutions, so there may be more schools and IT programmes.

<sup>9</sup> Bit Alliance, [The IT sector in BiH](#)

<sup>10</sup> [The strong rise of the IT sector in BiH](#)



- In the computer programming sector, the number of employees increased from 1 250 in 2010 to 4 249 in 2017<sup>11</sup>.
- 51.6% of employees in information technologies (IT) have a university diploma and 7.8% have secondary education.
- In the next two years, 56% of IT companies in the country will need up to five new employees and 2% will need more than 20 employees.
- 32.7% of IT companies provide paid apprenticeships and 19% provide unpaid apprenticeships.

## Challenges

Each level of governance needs to develop its curricula based on the Common Core curricula, which should increase the quality of DSC in IVET. The absence of established and reliable monitoring and assessment mechanisms<sup>12</sup>, at both the state and the entity and Brčko District levels, prevents constructive policy development and tracking of the effectiveness of existing DSC programmes. This is coupled with a lack of funding, as a result of which the general infrastructure in schools for advanced DSC education relies mainly on donor investments, and is therefore inadequate. There is also a deficit of ICT workers in the labour market.

<sup>11</sup> Bit Alliance, [The IT Sector in BiH](#)

<sup>12</sup> The Department of Statistics of the Ministry of Civil Affairs BiH does not collect any data on DSC (such as indicators/index, progress vs. relevant national policies), as it still focuses only on studying computer science subjects in schools.



## DIGITAL SKILLS FOR VET TEACHERS AND TRAINERS

### Policies, strategies, initiatives, practices

The education legislation for the various governance levels in Bosnia and Herzegovina defines minimal standards for entering teaching positions, namely a university degree and the professional teaching exam. In addition to these requirements, teachers of vocational subjects are required to have a degree in the respective field and additional education in pedagogy, methodology, psychology and didactics. DSC is not explicitly defined as a general requirement for IVET teachers<sup>13</sup>. Teachers of practical subjects require a certain level of experience in the respective field.

Continuing professional development (CPD) for VET teachers is provided as mandatory by the legislation that regulates IVET at different governance levels. The legislation in Republika Srpska, the 10 cantons and Brčko District is equally vague regarding the requirement for DSC within teachers' CPD, so the implementation of such programmes is left to schools and teachers. CPD takes place during the school holidays in January and August and lasts up to three working days<sup>14</sup>.

The pedagogic institutes and, in some cantons, the ministries of education, are responsible for teachers' CPD, which is based on annual planning. DSC courses are included in the CPD training list on the websites of some pedagogic institutes. The offer of CPD depends mainly on the capacities of each institute and the financial resources available.

CPD on DSC has been implemented periodically in different parts of the country, but there is no official country-level data on the number or rate of VET teachers who have participated in such training<sup>15</sup>. This research could not identify examples of digital and online learning (DOL) in the CPD programmes for VET teachers provided by the relevant ministries. In 2018 in Central Bosnia Canton, of the 1 000 secondary school teachers in 24 schools, 250 attended registered courses dedicated to the development of DSC<sup>16</sup>. In 2019 Tuzla Canton Pedagogic Institute provided numerous courses on DSC, and in the same year Western Herzegovina Canton provided CPD on DOL and the use of Moodle for its secondary education teachers. There is an adviser for DSC at the Pedagogic Institute of Republika Srpska who organises annual group training for all ICT teachers. The FBiH Ministry for Education and Science supports annual CPD programmes for teachers, with an emphasis on improving key competences, including digital competences.

Several online platforms for teachers (eTwinning<sup>17</sup>, EPALE<sup>18</sup> and Moodle) are used in the country. These enable teachers to exchange teaching materials and experiences and to participate in networks of European educators.

### ICT teachers on the move

The Association of ICT Teachers (EduIT) of Sarajevo Canton organised conferences on teachers' digital competences in 2018 and 2019, and plans to continue with these events. The aim is to promote the importance of quality ICT education for both teachers and students.

The second of these international conferences, 'Education and Information Technologies – new perspectives and challenges' was held on 29 October 2019 in Sarajevo. It focused on the digital competences of teachers and the digital transformation of education. ICT companies in the country supported the event.

### Training on the use of e-classrooms

In 2017 and 2018 the Ministry of Education, Science and Youth of Sarajevo Canton introduced training and education for teachers on the use of e-classrooms in the delivery of the curricula for ICT courses, the preparation of teachers for lifelong learning, updates on digital developments, and strengthening teachers' competences to implement these developments in the classroom.

<sup>13</sup> Data provided by the competent authorities in Posavina Canton, Central Bosnia Canton and Brčko District.

<sup>14</sup> Ibid.

<sup>15</sup> A new initiative by Swiss Development Cooperation and GIZ, which should be implemented from 2020, places the focus on the improvement of IT and digital aspects of certain VET occupations. The project should also include CPD on DSC for VET teachers.

<sup>16</sup> Data provided by the competent authorities of Central Bosnia Canton.

<sup>17</sup> <https://aposo.gov.ba/bs/erasmus/etwinning/>

<sup>18</sup> <https://aposo.gov.ba/bs/erasmus/epale/>



## Facts and trends

- About 51.1% of VET teachers received training in DSC in 2015, according to the teacher survey run by the ETF. The overwhelming majority of respondents (98.2%) were from Republika Srpska.
- VET teachers believed that training, including DSC, had a moderate positive impact, with relatively few stating the impact was minor or irrelevant<sup>19</sup>.

## Challenges

There is no specialised higher education for ICT teachers. Instead, they usually acquire their qualifications through a combination of ICT degrees and pedagogical exams, as defined in the laws on secondary education at the entity (cantonal) and Brčko District levels. In general, a traditional approach to teachers' education is still followed, with no emphasis on practical training or use of technology in teaching. ICT teachers are only required to conduct one lesson and to observe ten other lessons during their initial teacher training<sup>20</sup>. DSC provision within CPD for VET teachers is usually limited in scope and it focuses more on analysing students' results for the specific subject than on increasing teachers' competences in innovative, digitally oriented teaching methods<sup>21</sup>. ICT teachers usually provide the main support for maintenance of equipment in IVET schools, which is an additional burden on their main teaching role.

<sup>19</sup> ETF (Brankovic, N.), *Continuing professional development for vocational teachers and trainers in Bosnia and Herzegovina*, 2016, p. 15.

<sup>20</sup> Centre for Policy and Governance, *Initial competences of teachers*

<sup>21</sup> Based on analysis of the report from the IT adviser from the Pedagogic Institute of Republika Srpska and a meeting with three advisers from the Pedagogic Institute of Sarajevo Canton: [www.rpz-rs.org/709/rpz-rs/Analize/grupnog/savjetodavno/-/instruktivnog/pedagosgog/rada#.Xd-o5S3MwXo](http://www.rpz-rs.org/709/rpz-rs/Analize/grupnog/savjetodavno/-/instruktivnog/pedagosgog/rada#.Xd-o5S3MwXo)



## DIGITAL AND ONLINE LEARNING IN INITIAL VET

### Policies, strategies, initiatives, practices

No strategic or policy documents specifically regulating DOL in IVET in Bosnia and Herzegovina have yet been adopted. However, DOL in formal education is recognised through the Priorities 2019–2030 working document, which should be adopted and subsequently implemented through various policies and within different levels of education governance in the country.

The APOSO office in Sarajevo provides support for the development and implementation of IT systems in IVET. Some education ministries (for example, in Sarajevo Canton and Republika Srpska) have an IT department<sup>22</sup>, while in some cantons (Tuzla Canton and Sarajevo Canton) an IT teachers' association provides additional support for digital education in schools, such as support for e-classrooms. While the role of ICT school coordinator at the school level in IVET does not exist, IT-related IVET schools have a dedicated DSC coordinator for practical classes.

The number of computers required in schools is defined differently in the pedagogic standards for secondary education at each governance level<sup>23</sup>. In some cases it is defined at the school level and for specific subjects (Sarajevo Canton)<sup>24</sup>, while in others the number of computers is not defined at all (Tuzla Canton<sup>25</sup>, Una-Sana Canton<sup>26</sup>). Insufficient equipment for the implementation of practical DOL is another problem for IVET. Most computers in vocational schools do not include advanced software configurations.

Moodle<sup>27</sup> has been used in some IVET schools, but there is no data on its effectiveness or frequency of use. Some schools have used Google Classroom<sup>28</sup>, and the e-classroom has also been introduced in IVET (for example in Tuzla Canton and Sarajevo Canton). Other initiatives include an online learning week in Sarajevo Canton; a process of digitalisation of teaching materials in Republika Srpska; and various projects on the digitalisation of IVET supported by the FBiH Ministry for Education and Science, the Republika Srpska Ministry for Education and Culture<sup>29</sup> and other education ministries<sup>30</sup>.

One of the priorities for the integration of DOL in education in Bosnia and Herzegovina (Priorities 2019–2030) is to create a web platform for the co-creation of digital resources and the collection and exchange

### Online Learning Week in Sarajevo Canton

Since 2017 there has been an Online Learning Week in secondary schools (first week of November) in Sarajevo Canton. This is currently implemented in only 18 secondary schools, 11 of them vocational schools, owing to the lack of technological capacities. The schools that participate in the event use online platforms such as Google for Education, Moodle or FileZilla, and some vocational schools have developed their own programmes.

### Interactive whiteboards for more dynamic learning

In the 2018/19 school year the FBiH Ministry for Education and Science supported the purchase of interactive whiteboards, which have been used in a number of vocational schools in FBiH from 2019. Interactive whiteboards allow teachers to respond to the needs of contemporary teaching, make lessons interactive and support critical thinking among students. The vocational school in Fojnica uses them for mathematics, while the vocational school in Travnik makes the subject of geometry more interesting and interactive through the GeoGebra digital tool.

<sup>22</sup> Department for Digitalisation, International Cooperation and EU Integration, Ministry of Education of Sarajevo Canton; Department for Information and Information Technologies, Ministry of Education and Culture of Republika Srpska.

<sup>23</sup> Pedagogical standards and norms for secondary education, Sarajevo Canton

<sup>24</sup> Pedagogical standards and norms of Sarajevo Canton

<sup>25</sup> Pedagogical standards and norms of Tuzla Canton

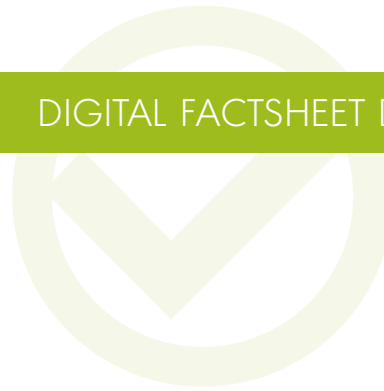
<sup>26</sup> Pedagogical standards and norms of Una-Sana Canton

<sup>27</sup> <http://moodle.vetbih.org/>

<sup>28</sup> Google Classroom enables teachers to set up material in a digital classroom, work with it and assign a role to a particular student.

<sup>29</sup> By 2020 Republika Srpska should have 500 digital classrooms as part of a donation from the Government of Serbia.

<sup>30</sup> Data provided by the competent authorities of Republika Srpska.



of good practices and positive experiences in the integration of digital competences by 2021. The Instrument for Pre-accession Assistance (IPA) 2016 supports the development of programmes for pedagogical advisers to create online training for teachers. According to the Priorities 2019–2030, by 2021 the pedagogical advisers should start online training for teachers for a cross-curricular approach in priority digital competences (security, and communication and collaboration), as well as online training for IT teachers in all five areas of the European Digital Competence of Educators Framework (DigCompEdu)<sup>31</sup>. Through IPA 2016, training for management and pilot school teachers should be implemented. Tools for improving vocational school digital readiness (such as SELFIE<sup>32</sup>) are still not in place.

## Facts and trends

- The number of computers in the secondary education system overall covers 8.4% of the student population, but there is a lack of statistics on the exact number of computers in VET secondary schools.
- The number of computers with an internet connection in the secondary education system overall covers 6.8% of the student population.
- 42.8% of IT companies in Bosnia and Herzegovina are dissatisfied with the content of the IT curricula and learning processes.

### Availability of computers and internet connection in secondary schools in Bosnia and Herzegovina

Number of students in secondary education	<b>124 148</b>
• Technical schools	67 895 (54.7%)
• Vocational schools	22 819 (18.4%)
Number of computers in secondary schools	<b>14 192</b>
• For employees in school	3 753
• For students	10 439
Number of computers with internet connection in secondary schools	<b>11 690</b>
• For employees in school	3 230
• For students	8 460

Source: Agency for Statistics of Bosnia and Herzegovina, Demography and social statistics, education, 2017/18

## Challenges

DOL has been used to varying degrees in different parts of the country, mainly depending on the infrastructure of vocational schools, the financial support available from relevant ministries, and the capacities and competences of VET teachers. There is a lack of a clear systematic approach to DOL in IVET. The adoption and implementation of the Priorities 2019–2030 will be a positive start to the improvement of DOL in the country.

<sup>31</sup> <https://ec.europa.eu/jrc/en/digcompedu>

<sup>32</sup> [https://ec.europa.eu/education/schools-go-digital\\_en](https://ec.europa.eu/education/schools-go-digital_en)



## DIGITAL AND ONLINE LEARNING IN CONTINUING VET

### Policies, strategies, initiatives, practices

Lifelong learning has been emphasised as an important pillar for ensuring economic growth and fighting unemployment in most of the relevant strategic documents in Bosnia and Herzegovina. There are no separate policy or strategic documents providing for a structured approach to DOL in continuing VET (CVET) and adult learning. The Principles and Standards for adult education in Bosnia and Herzegovina were adopted in 2014<sup>33</sup>, while the Strategic platform for the development of adult learning in the context of lifelong learning in Bosnia and Herzegovina for the period 2014–2020<sup>34</sup> emphasises the key role of lifelong learning in the development of a competent workforce and also stresses the need to focus on the improvement of DSC skills through adult learning and lifelong learning programmes. Most laws on adult education in Bosnia and Herzegovina have fully incorporated the Principles and Standards into their CVET provisions, with some modifications relative to the local community, and DOL has been addressed as a method of adult learning. All cantonal governments were to adopt the adult education legislation by October 2019. Adult learners can enrol in CVET and on completion of the programme, students acquire a diploma of secondary vocational education<sup>35</sup>.

The Strategy for the Development of Education for Republika Srpska 2016–2021<sup>36</sup> states that achieving the full potential of educational reform requires the education of adults, including DSC literacy. DOL is not a criterion for the accreditation and evaluation of CVET and adult learning centres. However, the Principles and Standards define certain conditions that should be met by the providers of adult education, including a specialised classroom for computer class with at least 3.5 square metres per work station (computer) and a computer with an internet connection for each student and educator. The classrooms should also contain audio and video equipment<sup>37</sup>.

The country's Civil Service Agency provides DOL courses in the form of webinars (online distance learning in real time) and self-paced training (online learning in which the trainee determines the pace of learning) in DSC and administration and governance, but these are mainly only for civil servants. The Institute for Adult Education in Republika Srpska<sup>38</sup> offers programmes adapted to labour market needs, though without

### IT Academy, online and distance learning

IT Academy is a training institution located in FBiH and Republika Srpska. It has an online learning platform and a distance-learning programme and provides a broad range of certified online and distance-learning programmes in 6 main departments with 31 sections: basic internet programming, training in 24 software tools, administration, complex networks, IT business, and the development of mobile applications. Each learner uses an individual laptop and software package.

### Software Academy

ITivity Software Academy is based in Republika Srpska and enables talented people to keep in touch with the most important aspects of the software industry and programming through CVET. It focuses on those who have successfully completed high school, have an interest in programming, possess some basic IT knowledge and have a basic knowledge of English.

### Future IT professionals in Republika Srpska?

In 2019, 100 individuals with university diplomas who had not found a job in their profession attended the first IT adult training programme organised by the Republika Srpska Ministry of Science and Technology Development, the Higher Education and Information Society of Republika Srpska, and the Innovation Centre in Banja Luka.

<sup>33</sup> The Principles and Standards are based on 21 key international instruments, including the European Qualifications Framework for Lifelong Learning, the Council Resolution on a renewed European agenda for adult learning (2011) and the Council Recommendation on the validation of non-formal and informal learning (2012).

<sup>34</sup> Council of Ministers BiH, [The strategic platform for the development of adult learning in the context of lifelong learning in Bosnia and Herzegovina for the period 2014–2020](#), 2014.

<sup>35</sup> Ministry of Civil Affairs BiH.

<sup>36</sup> [Strategy for the Development of Education of Republika Srpska for the period 2016–2021](#)

<sup>37</sup> Council of Ministers BiH, Principles and Standards for adult education in Bosnia and Herzegovina, 2014, Article 3.3.3.3.

<sup>38</sup> [www.mpoo.org/sr-rs](http://www.mpoo.org/sr-rs)





specific DOL programmes for adults<sup>39</sup>. Within the FBiH Civil Service Agency, an online platform ([www.obuke.adsfbih.gov.ba/](http://www.obuke.adsfbih.gov.ba/)) provides some e-learning courses, mostly in the administration domain.

The country's Agency for Employment provides adult learning courses through its donor-supported portal<sup>40</sup>. Some higher education institutions provide DOL solutions to the wider community<sup>41</sup>, while some training centres provide DOL for foreign languages, business skills, programming, web design and graphic design. For example, Akademika provides online basic and advance ICT courses, IT Academy has an online learning platform and a distance-learning programme, and SmartLab provides online and offline training for various purposes. IT Girls, a United Nations initiative that aims to make girls and women more visible in ICT, organises Arduino workshops ([www.arduino.cc/](http://www.arduino.cc/)).

## Facts and trends

- More than 80% of companies invest in education and training of their employees, with 7% investing more than EUR 25 000 annually.
- 67.5% of IT companies rely on their in-house training.
- 9% of IT companies in Bosnia and Herzegovina are providing various adult training courses.

## Challenges

While the relevant legislation has been in place from 2019, DOL in adult learning is still not a focus. Numerous agencies provide some adult learning programmes on DSC, including the use of DOL, though a systematic approach is lacking in the country. The non-governmental organisation sector is not particularly active in this area, but private ICT companies and academies offer custom-made programmes on demand on a commercial basis.

<sup>39</sup> The institute includes a list of certificated adult learning providers who mostly offer formal education and CVET programmes.

<sup>40</sup> Under the auspices of its Adult Education Project (2010–2016), GIZ, Swiss Development Cooperation and SIDA created a registry of adult education providers.

<sup>41</sup> For example, University of Sarajevo, Tuzla University, IUS, 'Logos Centre' Mostar, Vitez University, Travnik.