Digitisation of Cultural Heritage and Interoperability in the Context of Competences of the Culture Industry Human Resources

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Abstract. The competencies of the cultural domain workforce related to the Cultural Heritage (CH) digitization standards and the standardization process in general are crucial to the success of any digitalisation initiative. Based on some research and surveys conducted among specialists in the cultural domain, the article provides information on the current situation in terms of the extent to which the professionals who are expected to present and preserve digitally CH are familiar with the digitization-related standards and the processes of their application. The paper also presents an approach and solution for improving the knowledge and competencies of current and future cultural professionals regarding the standards related to the digitalization of CH.

Keywords: Digitalization, Cultural Heritage, Standardization, Standards, Culture Industry Human Resources.

1   Introduction

Eurostat and DESI published their updates about the digital skills of European citizen (Eurostat, 2021) (DESI, 2020). Digital skills indicators are composite indicators that are based on selected activities related to internet or software use performed by individuals. According to the Eurostat data, 71% of the Bulgarians (the people involved in the cultural and creative industry domain are not an exception) lack necessary digital competencies. The average for the same indicator for Europe is 42% which is also quite low. In this regard, the improvement of digital competencies and the equipping workforce with relevant digital competencies as well as with knowledge and skills regarding standardization and the international standards related to the corresponding performance domains has become a topic of international concern (EU Science Hub, n.d.). In response to the European Council Conclusions, a 'Joint Working Group on Education about Standardization' was established by the three European Standardization Organizations, namely the European Committee for Standardization, the European Committee

for Electrotechnical Standardization and the European Telecommunications Standards Institute. At the European level, a strategy for promotion of education and training in standardization was developed (European Commission, 2016). The next section presents summarised information on the current situation, in terms of the extent to which the professionals who are expected to present and preserve digitally CH are familiar with the digitization-related standards and the processes of their application.

2 Digitisation and the Awareness of Cultural Domain Work Force about the Related Standards and Standardization

In 2020, two different studies were conducted. One of the goals of the first study was to determine the level of knowledge on the topic of standardization among students of different specialties. The second survey was conducted primarily among museum workers and one of its objectives was to take a snapshot of the respondents' skills, knowledge and competencies for preparing, recording and publishing digital presentations of ritual food recipes. In the questionnaire prepared for this purpose, several of the questions are related to the topic of standardization. This section will briefly present the results obtained.

2.1 Investigation of the Current Situation regarding the Awareness about the Standards and Standardization

The survey was based on closed-ended questionnaire and available online to the users. The questionnaire was answered by a total of 365 respondents from five European countries: Bulgaria, Finland, Greece, Latvia, Romania. 40 % of the respondent study in bachelor's programs in the field of humanitarian sciences (STUNED, n.d.). The last group of questions from the survey determines the level of knowledge in standardization of the respondents. The answers to this group of questions indicate awareness of the respondents and the lack of knowledge of the subject standardization. As the chart shows (Fig. 1), predominate students' groups of are not familiar with the international and the European standardization system. 51% of respondents indicate the "No" option in response to the question "Are you familiar with the International and European standardization system?".
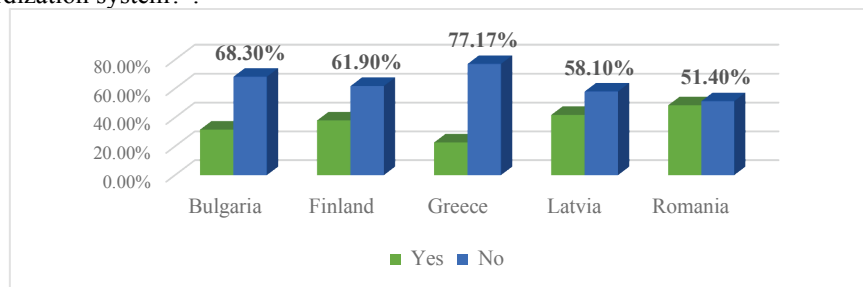

Fig. 1. Assessing the degree of awareness of international and European standardization system

As can be seen from Fig. 2, attention of the respondents from Bulgaria, Greece, Latvia and Romania on the provided advantages of the standards as options is focused on three of them: Higher quality and safety; Economic development; Facilitated international trade. The second classified group of advantages of the standards according to respondents from these countries includes: Product and service compatibility and interoperability; Spread of innovation; Platform of knowledge transfer. They had the opportunity to choose one of the given options, while the respondents from Finland had the opportunity to choose several of the given options and therefore their result is presented separately. On the provided advantages of the standards as options Finland students are focused on two of them (Fig. 2), which were mentioned more than half of the respondents: Higher quality and safety (86%); Compatibility and interoperability of products and services (75%).
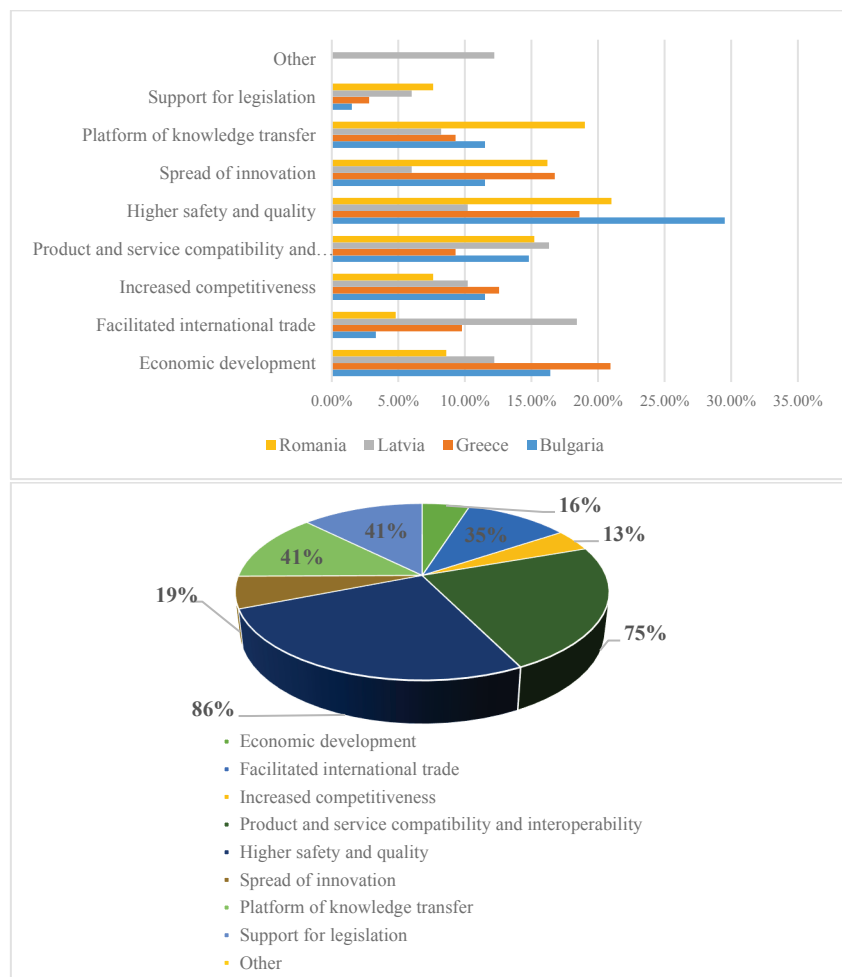

Fig. 2. Opinion for advantages of standards

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The open-ended question „*What standards organizations do you know (international, European, national)? Please list.* " was answered by 238 respondents. Because of that, just the list of the standards organizations, referred to as such by the students, will be provided without any quantitative insights. The following have been named: ISO, IEC, ANSI, GOST, NEK, BDS, SGI, TUW, CEN, CENELEC, ELOT, ETSI, CYS, C, Universal Postal Union, FGH, National Standards, IEEE-SA, WHO, W3C, ASRO, EN ISO, EOQ.

The following conclusions are drawn from the conducted survey:

- The results' analysis shows that the of students' knowledge on standardization is rather average than high.
- Survey participants are aware of the need for knowledge in the field and would engage in blended learning training.

2.2 Investigation of the Current Situation regarding the Digitization of the Intangible Cultural Heritage

The digitization of cultural heritage is carried out according to strictly defined standards, graphic formats, metadata standards and structural models of digital libraries. To ensure quality, long-term preservation, semantic and contextual search, their knowledge by museum workers and their observance is important. For this reason, in the framework of the international project EURICA, the survey to assess the skills, knowledge and competences for the preparation, recording and publication of digital cultural heritage documents included a set of questions on the technical standards to be used in digitization (Nikolova, Zhelev, & Monova-Zheleva, 2020). The survey was based on questionnaire consisting multiple choice questions, Yes/No questions and open-ended questions. The survey was conducted in five European countries: Bulgaria, Austria, Italy, Latvia, and Portugal. More than 140 respondents took part in it, of which 80% are museum workers. From all Bulgarian participants in the survey the registered museum workers are 25.

The open question to specify the format used for cataloguing and storage of digitized intangible cultural heritage received a response only from 60% of the respondents, of which 33% could not answer. Table 1 presents the answers given by the respondents.

Table 1. Participants' known digital/non digital formats for the cataloguing and storage of intangible assets

video
I cannot answer.
I have not used such.
I am not familiar with this issue
non-digital
camera, telephone, Dictaphone, computer, laptop
Recipe notebook.
JPEG, TIFF, PDF, MP3 audio file, MP4 video file
for intangible heritage - none
audio recording

The main form of work is the use of surveys, personal observations, field collection, photo and audio material, scanning, archiving.
we have not used foreign assets. we own such
Different formats
I have no information.

The next question provides respondents with a choice from a list of file formats used for digital presentation of cultural heritage. The results of the answers of the respondents from Bulgaria are presented in Figure 3.
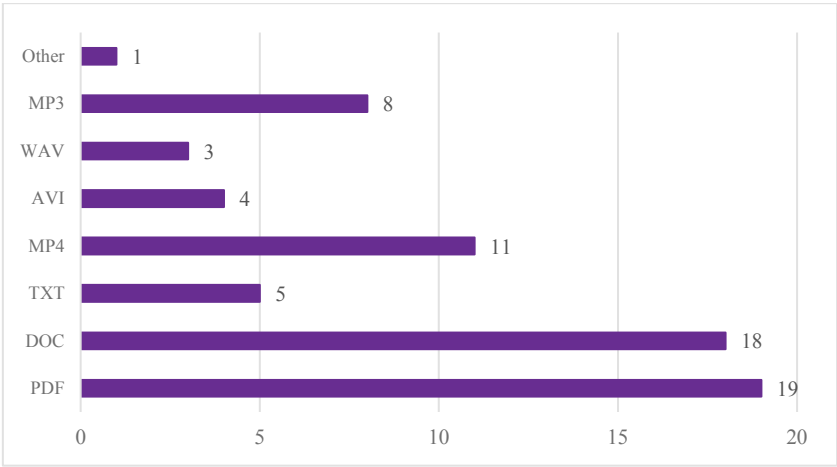

Fig. 3. Formats used for the digital representation of the cultural heritage

Table 2 presents the answers to the open-ended question for compression methods used from respondents. 20% of respondents answered "I do not know" or "I have no information".

Table 2. Compression methods used from respondents

Winrar
ZIP
We do not use at this stage.
I have no information.
I do not know.

Table 3. The respondent's familiar media formats

Text	Microsoft Word, Libre Office, .doc, .docx, PDF
Images	Paint, Corel Paintshop, Irfanview, Photoshop, Adobe photoshop
Video	Filmora, Windows media player classic
Audio	Audacity, Windows media player classic

About half of the respondents answered the open question "*Which software for working with the media formats listed below are you familiar with?*". A Table 3 presents the

answers of the respondents. There are participants who answered: "I can't answer.", "I have no knowledge.", "I don't know.".

Slightly more than half of the respondents (Fig. 4) claim that their organization has enough space to store digitized objects, as the majority believe that the preservation of the data obtained will be implemented on the server of their organization (Fig. 5). But there are still a large percentage who think there is no place - 48%. Most of the respondents answered "Yes" to the previous question, could not answer the open question "*How much space in MB can you allocate for an object*?" (Table 4).
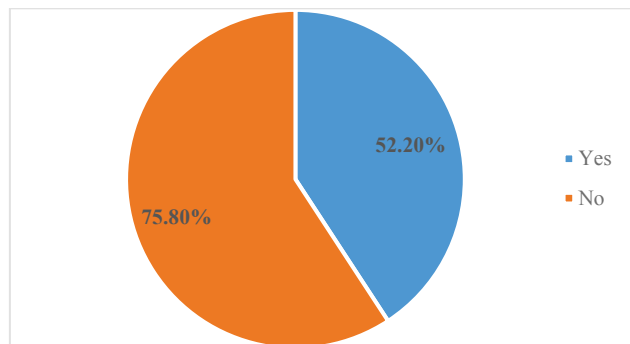

Fig. 4. Possibilities of the respondents' organizations for storage of digitized objects
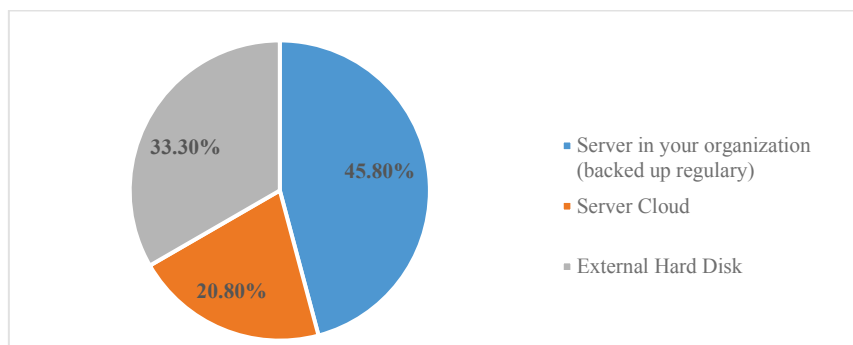

Fig. 5. Where will you store the acquired data?

Table 4. How much space do you have per object in MB?

I do not know
300000 MB
500 MB
I have no information.
I do not have the necessary information.
I cannot answer.

With an open question, the respondents were given the opportunity to explain how they imagine the digitalization of intangible cultural heritage in detail. 64% answered the

question with various answers. Similarly, the open-ended question "Describe the successive steps that should include the digitization of intangible cultural heritage" was answered by 52% of respondents. Based on all data and information collected and analysed in the framework of the presented survey could be concluded that the respondents' knowledge on standards and standardization in the field of digitalization in the cultural domain are partial and rather insufficient.

3 Approach and Solution

Taking into consideration the importance and the urgent need outlined by the creative and cultural industries for a workforce equipped with relevant digital competencies as well as knowledge and skills regarding standardization and international standards in the framework of the STUNED project was developed a digital library with open educational resources (OERs) about international standards. The work started with a comprehensive research, lead by Institutes of standardization of Bulgaria and Romania, among university lecturers from the involved countries. As result were selected sets of key international standards related to the university disciplines included in the curricula of the humanitarian, IT, engineering, and business university specialties. Standardization Institutes developed more than 20 e-training modules (for the selected standards) addressed to the university lecturers. The self-paced e-training in English was delivered to the university lecturers via tailored virtual learning environment (VLE). The core technologies behind the VLE are Open-Source and include PHP, MySQL Database, Apache Web service and RED5 Media Server. The object-based and modular nature VLE and the services built on it allow for flexible combining of the available modules as well as cost-efficient creation of new ones. The proposed technology infrastructure is developed to accessibility compliance standards. The e-learning portal is web 2.0 compliant. Each lecturer successfully passed the training, developed on national language, training modules about the selected and discipline-specific standards. The modules were developed considering the specific s of the discipline, the context and the students' educational background. The developed modules were integrated by the lecturers into their existing university courses and piloted with students. The successfully piloted modules were included into the digital library as OERs which could be re-used by all registered lecturers from the same or from other University in the country.

Thus, the students who are the future cultural sector specialists will be better prepared for the labour market as well as the sectoral needs and requirements which is a guarantee for their successful personal realization but also for a cultural sector development and sustainability.

4 Further Work

The results of the experimental phase, where the developed training modules related to standards and standardization were tested with students, are quite good and this gives us reason to work towards adapting these modules in order to properly include them in

VET and C-VET training programs to improve and develop the professional qualification of the specialists working currently in the creative and cultural sector.

Acknowledgements

References

DESI. (2020). *The Digital Economy and Society Index*. Retrieved from https://digital-strategy.ec.europa.eu/en/policies/desi

EU Science Hub. (n.d.). *DigComp*. Retrieved from https://ec.europa.eu/jrc/en/digcomp

European Commission. (2016). EUROPEAN STANDARDS FOR THE 21ST CENTURY, COM(2016) 358-EN-F1-1. Brusseles. Retrieved from https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-358-EN-F1-1.PDF

Eurostat. (2021). *Individuals' level of digital skills*. Retrieved from https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_sk_dskl_i&lang=en

Nikolova, E., Zhelev, Y., & Monova-Zheleva, M. (2020).) Integrating the Training in Standardization In University Curricula – European Dimensions and Challenges. *6th International Scientific Conference ERAZ – Knowledge Based Sustainable Development* (pp. 217-222). Association of Economists and Managers of the Balkans.

STUNED. (n.d.). *STUNED*. Retrieved from http://stuned.eu/