strengthenING diGital pEdagogy skills aNd competencIes Of edUcatorS

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Table of Contents

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Abbreviations and Acronyms

Abbreviations and Acronyms:	

1-1. IMPLEMENTATION OF ASSESSMENT PROCEDURE

1-1.1 Determining the boundaries of the test group

The INGENIOUS project focuses primarily on the enhancement of the digital skills' background of a specific group, also by making use of the key aspects of the Green Economy. For that reason, the target groups to be reached include: - VET educators - VET providers (both private and public) - Entrepreneurs and companies related to Green Economy (related to the educational material and the pilot action planned in the project) - Local/Regional/National authorities related to education and training - Professionals/ employees interested in expanding/upgrading their digital skills - Organizations, associations and institutes involved in adult education.

The idea behind the project, relies on the fact that the level of familiarization and the digital skills of VET educators vary from severe digital illiteracy to full and effortless functionality in virtual classes and courses, and the aim of the project is to educate and enhance their digital skills. It will be a legacy for the future: the establishment of a more stable, concrete, ready to react and adapt to the new reality educational system. And the sustainability of educational systems is the key point.

Vocational education shows great diversity in terms of the specializations it offers. There is also a difference in the accomplishment of digital skills among VET educators. They are a role model for the trainees that constitute the future workforce. The digital competence of educators offers additive value to their professional and pedagogical competencies. Integrating digital tools at the educational procedure could not only be a more creative, flexible, convenient and engaging way of transferring knowledge but could also promote the familiarization of the trainees with the digital tools, which is an extremely valuable asset for a modern employee. Moreover, an educator eager for enriching and updating his/her skills can deliver the message of continuous and life-long learning.

Stepping on all these arguments, knowing the key role of the VET educators in preparing future employees, well trained and ready to start their working path and understanding the urgent need of rising digital skills, the present assessment tool addresses the issue of digital illiteracy among VET educators.

Having a clear idea of the aim of the project and the assessment needs for its implementation it was easy to define the boundaries of the testing group. We were focused on VET educators from Vocational schools, Vocational centers and Experts. To amplify the results obtained we wanted to cover all International Standard Classification of Education (ISCED-2011) teached, so we targeted an extensive testing group. To make the results more objective, we reached VET educators with different years of employment in VET.

That way we assure our assessment variety in answers, expertise and experience which makes the results reliable and sustainable.

1-1.2 Definition and formation of criteria and instructions for conducting a survey

Cleantech Bulgaria along with Confederation of Employers and Industrialists of Bulgaria (KRIB) are working jointly on conducting the survey and gathering answers from the target group.

On the one hand Cleantech Bulgaria in its capasity of business network connecting SMEs and large enterprises, experts, NGOs, entrepreneurs, government and international institutions, working on projects in the field of digital and green copmetences, has access to VET educators either working part-time or self-employed. On other hand KRIB is “The voice of the Bulgarian business” uniting over 11 000 companies from all sectors of the economy. The majority of them having Vocational centers or the employees themselves are experst in different areas, working as lecturers. Thus giving us, the Bugrian partners, accest to vast network of VET educators within the country who are professionals from various areas of expertise, experience, background, konwledge in digital and green skills.

The survey was desisminated via e-mail containing information about INGENIOUS project, current progress and future outcomes ftom the intellactual outputs which will be beneficial for the target audience, also the aim of the questionnaire and its important role in the whole process of creating learning content later. Further clarifications about each question and section are given within the form in order to ensure proper colection of data.

1-1.3 Collecting and storing survey data

Ensuring the collection of data and survey responses both organizations had personal approach towards the VET educators. The primerely sent e-mails were followed up by calls toward the recipients aiming to give further details considering the survey and INGENIOUS project.

Primerely survey data was stored in the google drive folder of the project, as the questionnaire itself was generated using google forms. With the creation of the report the data is being inserted and analysed in 1-2. Evaluation of Assessment Procedure s’ Feedback, also attached as appendix to the report.

1-2. EVALUATION OF ASSESSMENT PROCEDURES' FEEDBACK

1-2.1 Calculation of quantitative data and analysis of the information received

General information about testing group in Bulgaria

Big part of the testing group - 44% are Lecturers. Most of the VET educators, almost 30% are teaching Upper secondary education, 59 % are working on full-time employment, all are currently working in education. Almost half – 48% well experienced with more than 11 years employment in VET.

Teaching digital competences

According to the self assessment of the VET educators their teaching digital competences are high, they evaluate themselves as Leaders C1 – 29% and Experts B1 – 33%. They evaluate the digital knowledge acquired as Upper intermediate C1 in the following areas: creating, customizing and updating contents of training courses, incl. Presentations – 44%; creating engagement with learners and colleagues – 40%; facilitating students' independent learning – 33%; conducting formative and summative assessment – 44%

General digital greening competences (GDGC) for sustainability

Here the general evaluation is still high, though that it is lower than the teaching digital competencies. Results in the areas show the following picture:

- AREA 1. DATA COLLECTION AND USE 30% of VET educators asses their level of use as Intermediate B2
- AREA 2. WORKFLOW MANAGEMENT FOR EFFICIENCY AND TRANSPARENCY the level of knowledge of VET educators is Pre-intermediate B1 – 26%
- AREA 3. COMMUNICATION the participants in the assessment feel themselves more comfortable and almost 30% say that they are Upper intermediate C1
- AREA 4. FINANCIAL AND LEGAL ASPECTS the results are almost equal 20% evaluate themselves as Intermediate B2, almost the same percentage 19,7% are Basic A1-A2, and again 19,7 % are Upper intermediate C1.
- AREA 5. RESEARCH AND DEVELOPMENT the largest part of the VET educators asses their knowledge in the are as Upper intermediate C1 – 24%

In this section as opposed to the previous **Teaching digital competences**, almost 9% of VET educators mention lack of knowledge.

Specific digital green competences (SDGC)

The results in this section show lack of knowledge regarding this specific topic - almost 28% of the participants in INGENIOUS assessment consider that they don't have knowledge in specific digital green competences.

1-2.2 Collation, comparison and systematization of information

Having in mind that the number of participants are 27, the results and conclusions have to be treated with caution. The quantitative results of the assessment show the following:

1) Most of the VET educators feel comfortable while using digital instruments in their daily work, in preparing and presenting the training content, assessing the knowledge acquired, facilitating and engaging the audience.

    - There is no difference in **Teaching digital competences** according to the years of employment in VET.

    - It is interesting to mention that contrary to the general high evaluation of the teaching digital competences, 29% of the participants have Basic (A1-A2) knowledge regarding the use of digital tools for copyright and licensing

2) Once introduced the Green topic, the confidence gets lower, but VET educators still feel comfortable using **General digital greening competences (GDGC) for sustainability,**.

    - The biggest gap that the participants report in their answers is regarding AREA 5. RESEARCH AND DEVELOPMENT - 17%, followed by AREA 4. FINANCIAL AND LEGAL ASPECTS - 16%

    - We supposed that there will be a connection between the level of International Standard Classification of Education (ISCED-2011) that the participants teach at/ work in and the knowledge in GDGC, but we didn't find any.

    - The higher level of digital teaching competences corresponds to better knowledge in GDGC.

3) And most of VET educators demonstrate lack of knowledge in **Specific green digital competences.**

    - Lowest level of knowledge is reported in AREA 2. SUPPLY CHAIN AND TRANSPORT, INCLUDING DRONES - 33% and SUB-AREA 6.4. MANAGEMENT OF RECYCLED MATERIALS - 33%

1-2.3 Generating a report with visual diagrams

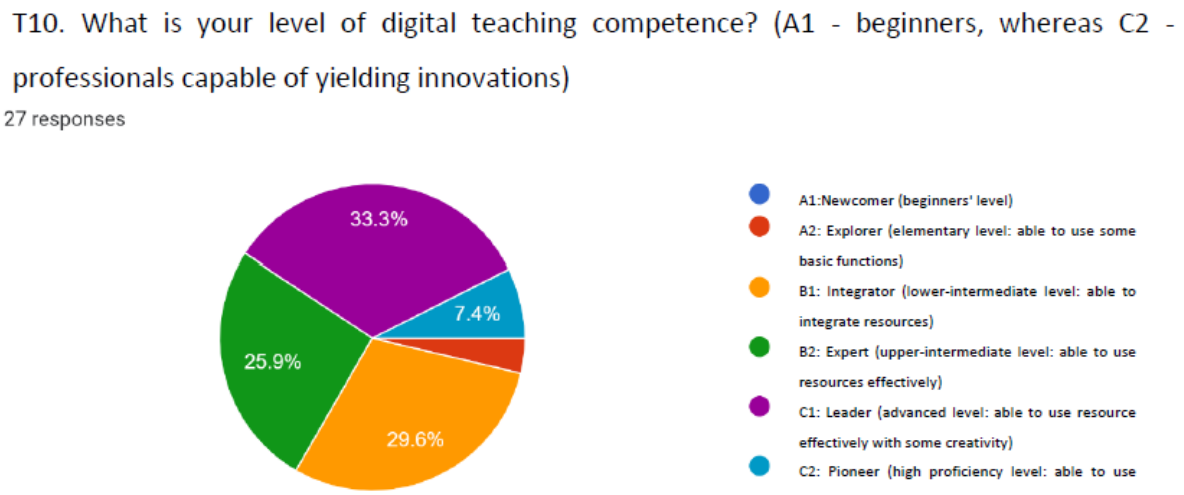
The survey was launched on 16.11.2021 and within 2 weeks the VET educators had the opportunity to answer the questions.

It was divided into 4 main sections: General questions about you - **Teaching digital competences, General digital greening competences (GDGC) for sustainability and Specific green digital competences (SGDC).** Before pointing out some conclusions, we had to state a premise that the number of participants is 27. Therefore, we must assume that the results presented have to be treated with caution.

For the purposes of the project INGENIOUS - enhancing VET educators digital and green skills and competencies through the VOOC platform, developed on the basis of the assessment, we will focus our report on the gaps discovered, relevant to the Bulgarian context.

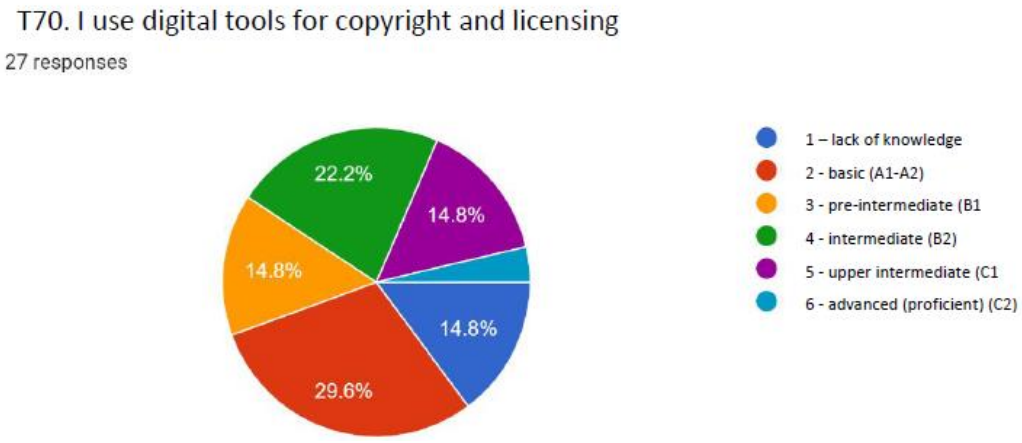
Important starting point is that we build our report on self-assessment of educators' own knowledge and skills. To assess yourself is a critical skill for making progress. However, there are some pitfalls that should be taken into consideration - underestimating or overestimating and misinterpreting.

We will start with the visualisation of the question T10. What is your level of digital teaching competence? As previously mentioned all VET educators that filled in the questionnaire assess their digital teaching competencies very high.

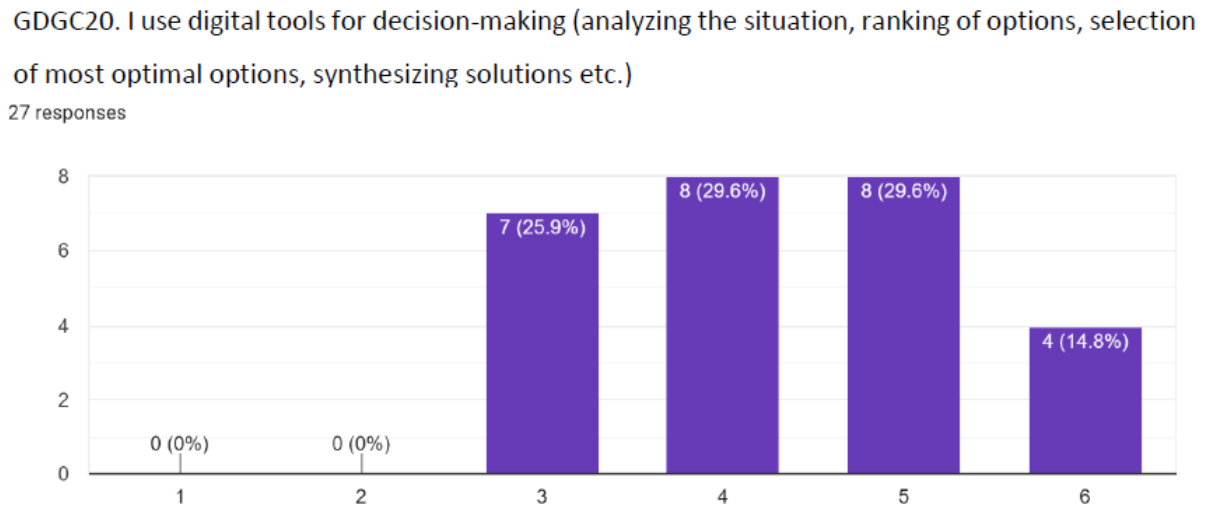


Lack of knowledge or basic knowledge are reported regarding question T70. I use digital tools for copyright and licensing. We can make the assumption to interpret this result that in Bulgaria VET educators are not

used to protecting their content when it refers to their daily work. It is common for books or any scientific work.



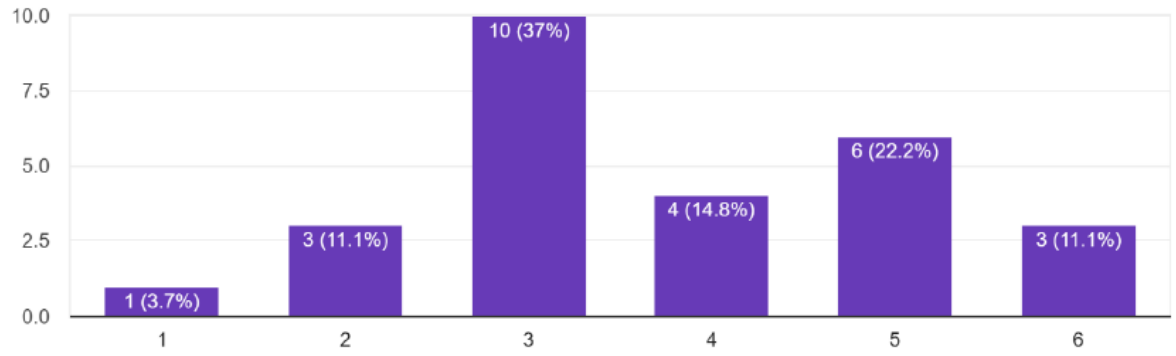
When we take a look at the General digital greening competences (GDGC), in AREA 1. DATA COLLECTION AND USE higher knowledge is reported for question GDGC20. I use digital tools for decision-making (analyzing the situation, ranking of options, selection of most optimal options, synthesizing solutions etc.).



In our training course we should pay attention to the GDGC80. I use digital tools for risk management (analyzing various degrees of risks of decisions, distributing risks between options, suppliers, etc., making business more visible and stable, etc.). This is a business and management oriented question and we can consider this reason for the low level of knowledge of our target group.

GDGC80. I use digital tools for producing and using integrated quality management systems (quality measuring and quality assurance, assessment of performance and processes, customizing options and solutions, designing and mapping of processes, etc.

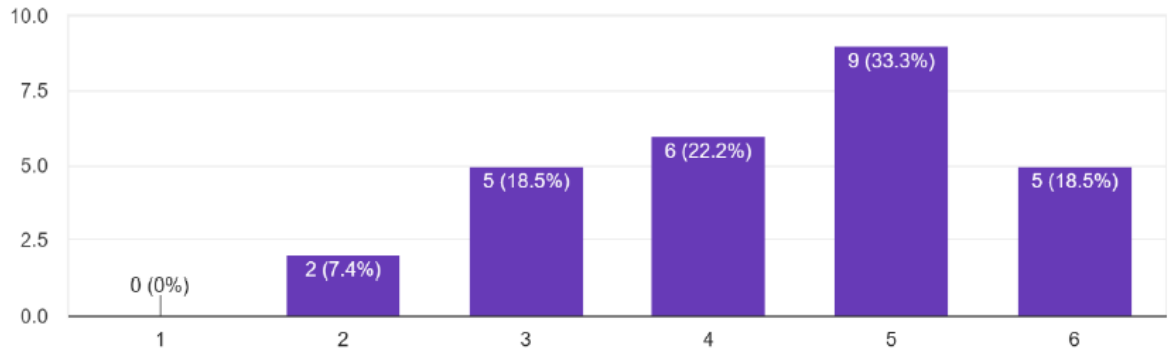
27 responses



In AREA 2. WORKFLOW MANAGEMENT FOR EFFICIENCY AND TRANSPARENCY VET educators feel most comfortable regarding GDGC100. I use digital tools for document creation and management (preparation, updating, managing, etc.).

GDGC100. I use digital tools for document creation and management (preparation, updating, managing, etc.)

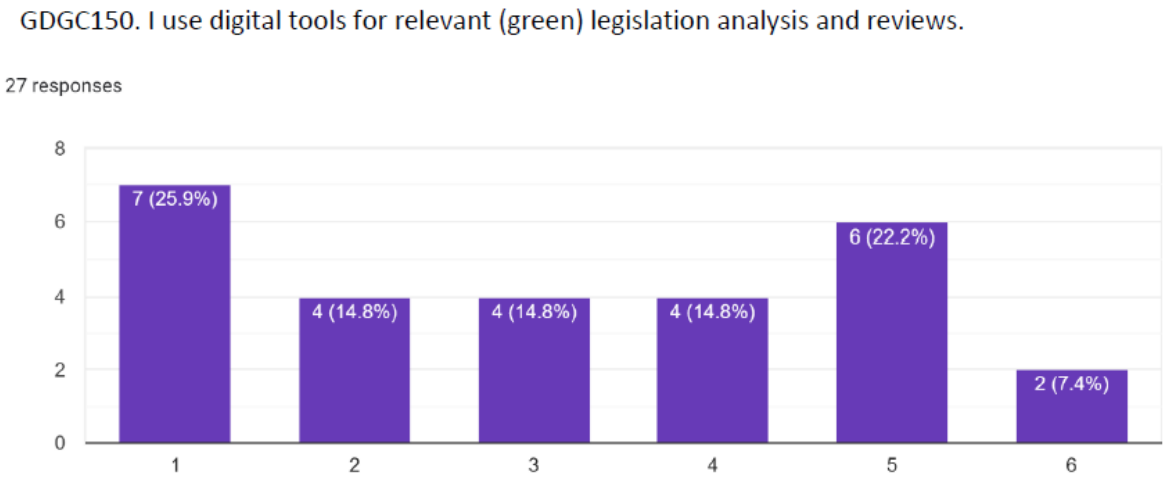
27 responses



In AREA 3. COMMUNICATION, all participants feel equally skilled in the 2 topics we are interested in GDGC110. I use digital tools for acquiring, engaging and sustaining customers (creating and maintaining e-billing, customer self-service, customization of offers, increasing transparency of operations, boosting sales,

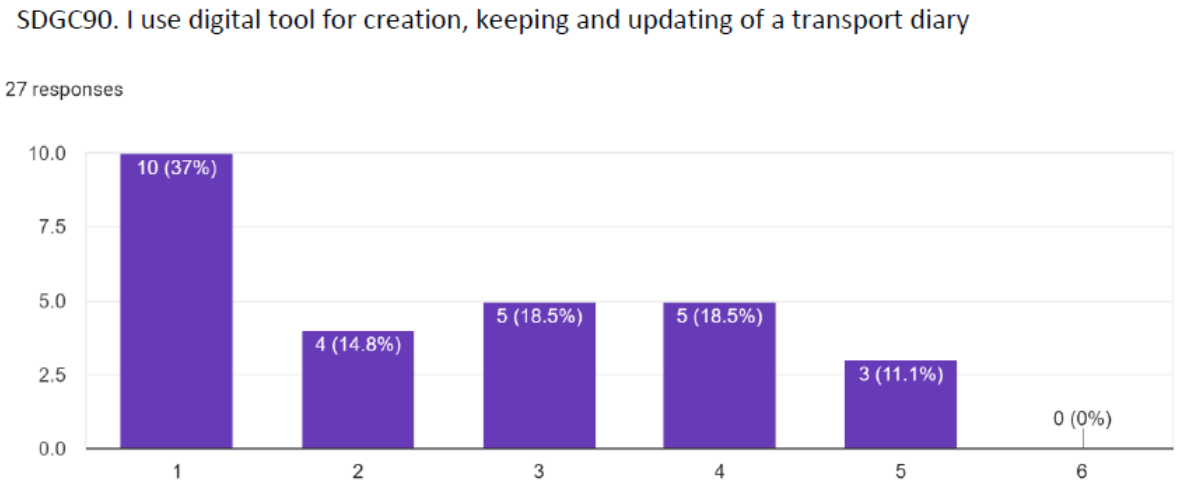
etc. and GDGC120. I use digital tools for effective communication with colleagues and partners (collaborative work, transparent and effective oral and written communication, incl. professional presentations, road-maps, timely obtained data for decision-making, dashboards for workflow automation, etc.)

AREA 4. FINANCIAL AND LEGAL ASPECTS is again an area more connected with the business and we see more answers lack of knowledge. Good examples of this are the answers to the question GDGC150. I use digital tools for relevant (green) legislation analysis and reviews. Here should also be mentioned the above described conclusion, that when deepening in Green topics, less knowledge and confidence is reported.

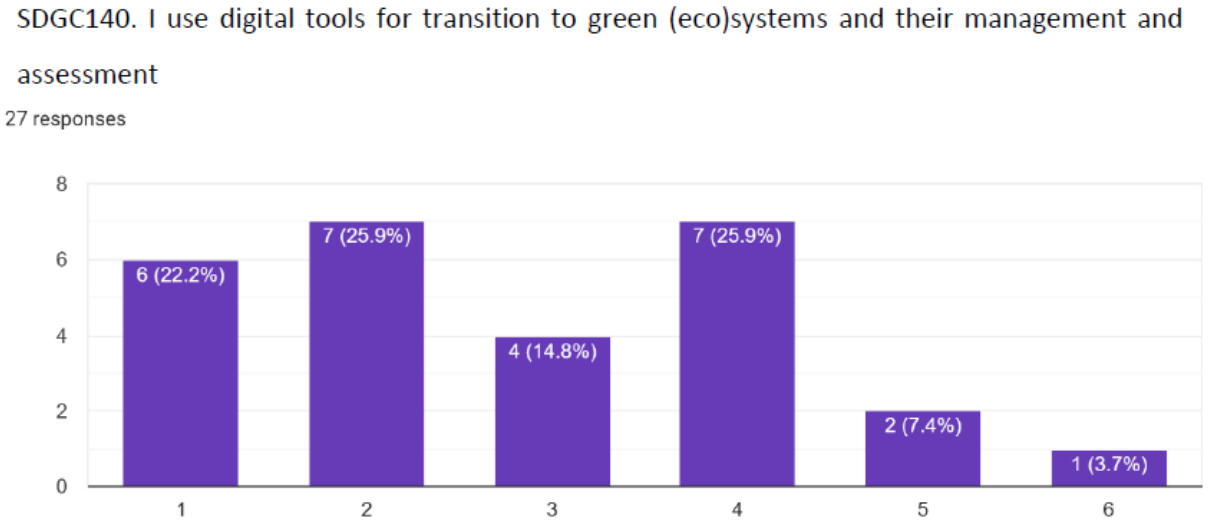


When we take a look at AREA 5. RESEARCH AND DEVELOPMENT, contrary to our assumption that knowledge here is more relevant to the scientific community, our VET educators show a high level of self-assessment.

Specific green digital competences are deeply focused on green areas and specific business sectors. Here in all areas is demonstrated a notably lower level of knowledge related to green transition and use of digital instruments in the business. Starting from AREA 2. SUPPLY CHAIN AND TRANSPORT, INCLUDING DRONES, which is one that most needs influence and rise of awareness. SDGC90. I use digital tool for creation, keeping and updating of a transport diary.



Passing through AREA 3. MANUFACTURING, SDGC140. I use digital tools for transition to green (eco)systems and their management and assessment



AREA 6. USE OF RESOURCES and its sub areas follow the same line of lack or low levels of knowledge and competencies. Some examples will be given in the Waste management sub area, SDGC340. I use digital robotics for waste sorting and non-hazardous waste use, recycling, recovery, treatment, reducing waste, green disposal, prevention / minimizing of waste accumulation (circular economy)

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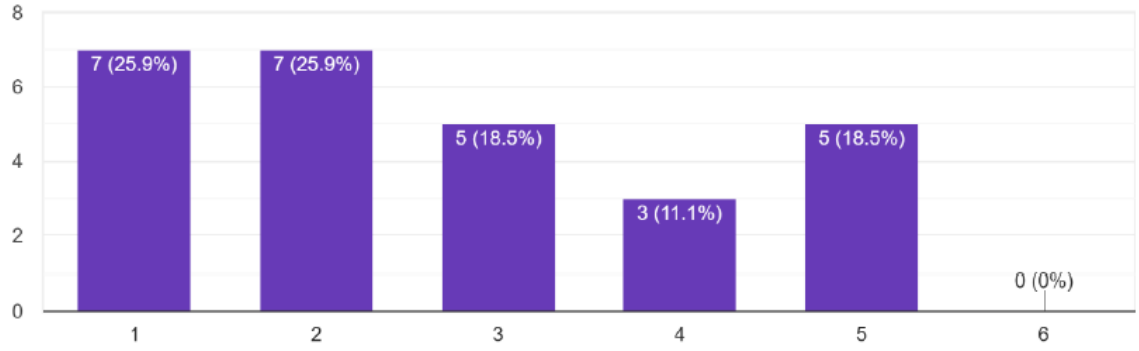
Project Number: 2020-1-EL01-KA226-VET-094871
Project Duration: 01/03/2021 - 28/02/2023

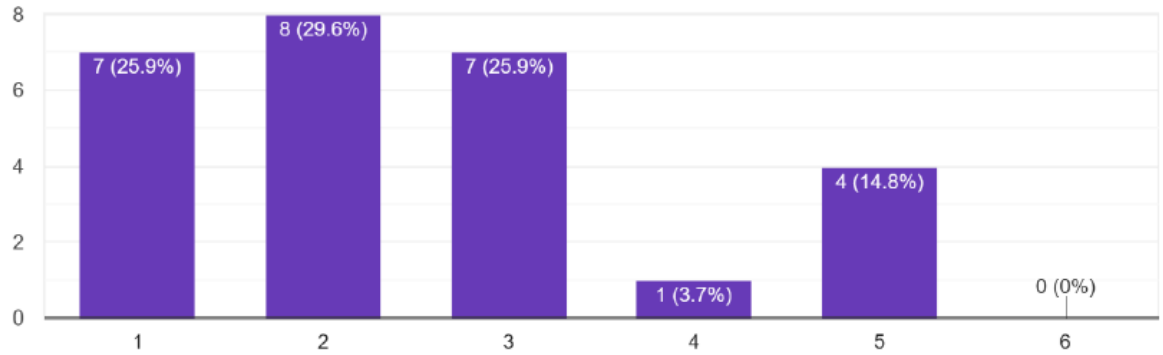
SDGC340. I use digital robotics for waste sorting and non-hazardous waste use, recycling, recovery, treatment, reducing waste, green disposal, prevention / minimizing of waste accumulation (circular economy)



Management of integrated resources sub area, SDGC390. I use digital tools for integrated use of non-renewable resources (energy, water, materials, etc.) for greening purposes

SDGC390. I use digital tools for integrated use of non-renewable resources (energy, water, materials, etc.) for greening purposes

27 responses



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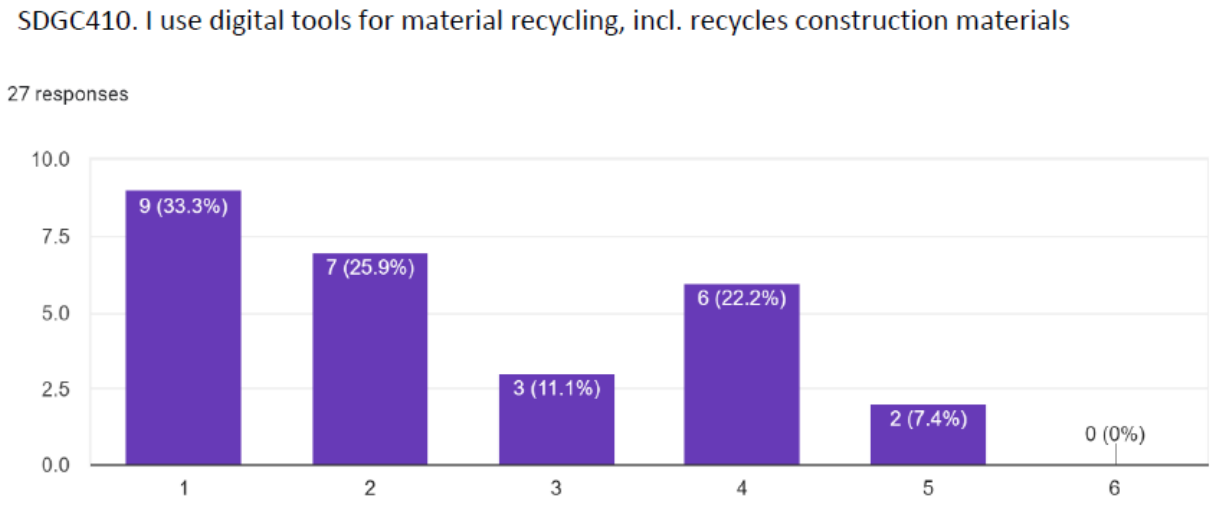
Project Number: 2020-1-EL01-KA226-VET-094871
Project Duration: 01/03/2021 - 28/02/2023

And management of recycled materials sub area



We can conclude that Bulgarian VET educators have a high level of digital competences and lack of knowledge on green digital competences. This could be attributed to the general low awareness in Bulgaria regarding Green Economy and green transition. We are at the beginning and we have a long way to go.

The feedback that we received from our participants is that some of the questions are not related to education and are more business oriented. This demonstrates very clearly the misunderstanding among Bulgarian VET educators that business is not part of the education. All quantitative results also confirm that statement. This is a direction that our VOOC platform should follow - strengthening business knowledge of VET educators in order to get closer to the business needs and transfer knowledge and skills needed for the future realisation in the labour market.

All above described results demonstrate that VET educators need strong influence and support to raise their awareness in the Green economy, and gain relevant to the European requirements knowledge and skills in Specific green digital competences. When it comes to teaching general subjects and presenting general information even related to green content, the VET educators evaluate themselves as capable and confident. But when we talk about deeper details and more specific information and knowledge, the situation changes.

With the survey implemented within the INGENIOUS project, we confirm the need for development of training courses addressing green sectors. We consider that the aim of the project to develop a VOOC

platform in order to fill in existing gaps, is coming on time in accordance with the European policies and requirements for twin digital and green transition.

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Project Duration: 01/03/2021 - 28/02/2023

APPENDICES

1. Survey aim and justification

The aim of the survey was to assess greening and green digital skills of VET instructors. The following reasons justified the aim: to determine the readiness of VET staff for teaching online, to identify gaps in VET skills for further professional development, to recruit properly qualified VET staff, to assess VET instructors' professional and teaching competences, to design new courses on circular economy and specific green courses developing general greening competences and specific green competences of students through the spreading activation processes from teaching-to-student, etc.

2. Survey design

The survey was designed on a set of courses administered by VET instructors in Greece, Italy, Bulgaria and Slovenia (table 1).

Table 1. Countries and course descriptions

Country	Institution	Courses
Italy	Higher Technical Institute "Territory Energy Building Foundation"	Energy Supply
	Higher Technical Institute "Territory Energy Building Foundation"	Waste Management
	High Technician Institute "Ignazio Calvi"	Agri Food Systems
Slovenia	University of Maribor	Ecology Problems of Vehicle and Internal Combustion Engines
		Sensible Use of Energy
		Technological and Waste Waters
	University of Nova Gorica	Environment and Agriculture
		Environmental Impact Assessment
		Land Ecosystems
		Environmentally Friendly Technologies
	Environment Protection College	Waste Management
		Rational Energy Use
		Development of Sustainable Products, Services and Processes
		Waste Water Treatment
Bulgaria	Cleantech Bulgaria	Waste Management in the Construction Industry
	Cleantech Bulgaria	Transition towards Circular Economy as a New Business Opportunity

Almost all course descriptions contained skills, knowledge and competences that could be applied to any course and any profession, on the one hand, and on the other hand, courses that were specific to the given

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course and profession. The former courses laid the foundation for competences labelled as *general greening digital competences*, whereas the latter courses provided the information on *specific green digital competences*. These different types of competences were introduced into two separate sections of the survey – Sections 4 and 5, respectively, bearing identical labels. Section 4 "General Greening Digital Competences" was partly consistent with the European framework "Digital Competences" (DigComp), which was designed for commercial applications.

The survey also contained other sections. Section 1 provided general information on the survey, such as the survey goal and data processing information. Section 2 collected general information on participants, such as their work experience and country of teaching. Section 3 focused on obtaining general information on teaching competences. This section was designed by integrating general provisions of the European framework "Digital Competences for Educators" (DigCompEdu) and the obtained course descriptions.

The summary of the survey blocks is provided in table 2.

Table 2. Survey blocks

Block #	Block title	Block areas	Number of questions
Section 1	General information about the survey	• Survey goal • Data privacy statement	0
Section 2	General questions about you	• Work experience	4
Section 3	Teaching digital competences	• Designing the teaching content • Creating engagement with students and colleagues • Facilitating students' independent learning • Communication • Assessment • Copyright and licensing	7
Section 4	General digital greening competences for sustainability	• Data collection and use • Work flow management for efficiency and transparency • Communication • Financial and legal aspects • Research and development	20
Section 5	Specific digital green competences	• Overall agriculture management • Supply chain and transport, including drones • Manufacturing • Energy production and management • Reducing pollution and negative effects of climate change • Use of resources (water management, waste management, management of integrated	49

		resources, management of recycled materials, land and soil management)	

The answers were collected via the multiple choice or Linkert scale questions. The Linkert scale questions ranged from 1 to 5 and 0 to 6 and were aligned with the level of competences (table 3).

Range of competence levels	
1 - 5	**0 - 6**
1 - lack of knowledge 2 - basic (A1-A2) 3 - pre-intermediate (B1) 4 - intermediate (B2) 5 - upper intermediate (C1) 6 - advanced (proficient) (C2)	0 – lack of knowledge 1 – basic (A1) 2 - elementary (A2) 3 - pre-intermediate (B1) 4 - intermediate (B2) 5 - upper intermediate (C1) 6 - advanced (proficient) (C2)

3. Design of country-specific questionnaires

Since some questions of the survey were irrelevant to the needs of some countries, institutions and courses, each participant selected a set of questions for their unique course requirements. This resulted in shorter questionnaires. Each questionnaire contained all information and questions from Sections 1-3. These were Sections 4 and 5 that were not used in full. The resulting questionnaires were translated into local languages., whereas the master copy was translated into Latvian. More information on country-specific questionnaires and their results is available in country-specific appendices.

4. Roles of participating institutions in the survey

To represent the European scale of responses, a set of countries, represented by specific institutions, created and administered the survey (table 1).

Country	**Institution**	**Responsibilities**
Latvia	Transport and Telecommunication Institute	Creation of the surveys, translation of the surveys into Latvian
Greece	University of Ioannina	Reviewer of the surveys, translation of the surveys into Greek, administration of the selected surveys to VET instructors
Italy	Sistemi Formativi Confindustria	Reviewer of the surveys, translation of the surveys into Italian, administration of the selected surveys to VET instructors
Bulgaria	Cleantech Bulgaria	Reviewer of the surveys, translation of the surveys into Bulgarian, administration of the selected surveys to VET instructors

Slovenia	Styrian Technology Park	Reviewer of the surveys, translation of the surveys into Slovenian, administration of the selected surveys to VET instructors

APPENDIX II. Result data of surveys

- Excel files of surveys
  See the excel file representing the answers of the assessment as attached file to the report Appendix II -BG Excel files of surveys

- Tables and charts from Google.Drive surveys
  See tables and charts extracted from Google.Drive survey as attached file to the report Appendix II – BG Tables and charts from Google.Drive surveys.

- Charts, diagrams, etc., displaying the analysis of results from section 1.2.
  Included in section 1.2.

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APPENDIX III. Requirements for the VOOC platform

- Requirements for the implementation of the surveys by the digital platform