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DIRECTORATE OF VOCATIONAL EDUCATION AND TRAINING

ACTIVITY REPORT

UPDATE INFORMATICS SUBJECT IN PREPARATION FOR DEVELOPING DIGITAL LITERACY TRAINING MODULE FOR COLLEGE STUDENTS AND PILOTING AT GIZ'S PARTNER COLLEGES

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- **Host organization:** Programme "Reform of TVET in Vietnam"
- **Collaborating organization:** GIZ's Partner TVET Institutes

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ABBREVIATIONS

Seq	Abbreviation	Explanations
1.	BMZ	German Ministry of Economic Development and Cooperation
2.	Cir.	Circular No.
3.	Dec.	Decision No.
4.	DoLISA	Department of Labour, Invalids and Social Affairs
5.	DVET	Directorate of Vocational Education and Training
6.	DX	Digital Transformation
7.	IT	Information technology
8.	GIZ	German Corporation for International Cooperation GmbH
9.	LO	Learning Outcomes
10.	MoLISA	The Ministry of Labour, Invalids and Social Affairs
11.	TVET	Technical Vocational Education and Training

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SUMMARY

In the context of rapid digital transformation, to meet the requirements of digital technology application at work as well as in life, students need to be trained and improved on digital competence at schools. In addition, on December 30, 2021, the Prime Minister approved Decision No. 2222/QĐ-TTg promulgating “the digital transformation program in vocational education for the period 2021-2025, with a vision to 2030”. Accordingly, training programs will be renewed and integrated with digital competences to suit the digital transformation and the development of science and technology. For the above reasons, it is extremely necessary to develop a module to train students on digital competence.

However, in order to develop and widely implement a digital literacy training module in the VET system, first and foremost, it is necessary to digitize the content of the Informatics subject and change its teaching and learning methods. The pilot implementation of the updated Informatics subject, the gained experience, and the consolidation of the content will be useful in developing and digitizing a digital literacy training module before mass deployment.

In order to propose an updated content of Informatics subject, the consultants have conducted research on popular digital competence frameworks in the world such as the European and UNESCO’s digital competence frameworks as well as those for university and high school students in Vietnam. The consultants also conducted a survey and analysis of the current situation of digital competence training for students at 11 GIZ's partner colleges in 10 provinces/cities through in-depth interviews and online surveys with representatives of the Rector Board, managers of training department, heads of IT department, teachers, learners, alumni and in-company trainers. In particular, the content of the Informatics subject was surveyed to figure out what needs to be revised to suit the requirements and needs of learners, teachers and the labor market.

Hopefully, the proposal on the updated Informatics subject will be piloted at some colleges and converted into a digital literacy module in the near future.

On this occasion, the research team would like to thank DVET, GIZ, cities/provinces, TVET institutions and enterprises who participated in this research for your cooperation and support.

1. GENERAL INTRODUCTION

1.1. The Programme “Reform of TVET in Vietnam”

The Programme “Reform of TVET in Vietnam” (the TVET Programme) was authorized by the German Federal Ministry for Economic Cooperation and Development (BMZ), implemented by the German Corporation for International Cooperation GmbH (GIZ) in collaboration with the Directorate of Vocational Education and Training (DVET), under the Ministry of Labour, Invalides and Social Affairs (MoLISA). The programme aims at an enhanced, better aligning TVET in Vietnam to the changing world of work, towards a greener and digitized future. It serves three outputs:

- Output 1: State actors, TVET staff, TVET institutes and the business sector are interconnected thanks to digital technologies.
- Output 2: The regulatory framework of TVET is aligned to the requirements of the changing world of work.
- Output 3: The concept of High-Quality TVET institutes is successfully implemented in selected TVET institutes.

1.2. Digital transformation in TVET in Vietnam

Digital transformation (DX) has become an inevitable trend. It has a holistic impact and brings in new business models, products and services to any organization. The Government of Vietnam has developed a regulatory framework to guide the implementation of DX. Among the legal documents, Decision No. 749/QD-TTg dated 06/03/2020, Directive No. 24/CT-TTg dated 05/28/2020 and Decision No. 942/QD-TTg dated 06/15/2021 by the Prime Minister are of crucial importance. In the TVET sector, DX may compel a new way of management, administration as well as learning and teaching. In addition, due to the changing world of work, increased autonomy and competitiveness in education, as well as the COVID-19 pandemic, TVET institutes need to initiate DX to develop a more adaptive, flexible, open, and responsive training system to rapidly cope with external factors.

DX is regarded as one of two breakthrough solutions in the draft Development Strategy of Vocational Education for the period 2021 - 2030, with a vision to 2045. On December 30 2021, the Prime Minister approved Decision No. 2222/QD-TTg on

approval for “the digital transformation program in vocational education for the period 2021-2025, with a vision to 2030”.

1.3. Reasons for the implementation of the activity

The impact of the 4th Industrial Revolution in general and digital transformation in particular has created many new occupations, and also makes lots of traditional occupations quickly disappeared. Due to the changes in technology, the knowledge and skills that students learn at school may no longer match with the requirements of the labor market upon their graduation. Thus, learners need to be equipped with knowledge and skills to enhance lifelong learning capacity. According to UNESCO, digital competence is the foundation for lifelong learning. Meanwhile, in TVET, there is a great need for training and retraining to improve vocational skills not only in schools but also in the workplace. Therefore, it is very important to develop digital learning platforms and to build a training module on digital literacy for students. This module provides learners with the knowledge, skills and attitudes related to digital capabilities to become digital citizens in the context that the world is entering the era of digital transformation. Upon completion of the module, students have the ability to access, manage, understand, combine, communicate, evaluate and create information safely and appropriately through digital technology to serve their study, work and life.

Besides, according to Circular No.03/2017/TT-BLDTBXH dated March 01, 2017 of the Ministry of Labor, Invalids and Social Affairs prescribing the procedures for development, appraisal and issuance of the curriculum; compiling, selection, appraisal of the textbooks for intermediate, college qualification training, the content of Informatics subject needs to be updated after 3 years of implementation. However, this update has not been done yet after 4 years. Then, it is necessary to re-evaluate the content and add digital knowledge and skills for students in the Informatics course.

1.4. Purposes of the activity

Overall, this assignment is to update the Informatics subject in the direction of developing a digital literacy training module for college students. In particular, the assignment aims to achieve the following specific objectives:

- Identify and update the contents of Informatics subject in the context of digital transformation

- Develop detailed guidelines for the implementation of the updated Informatics subject.

1.5. Implementation methodology

The pilot digital literacy training module is divided into 4 stages: 1) survey and assess the current situation of digital literacy training for college students, update contents and training methods of Informatics subject, develop implementation guidelines, pilot the training module at partner TVET colleges; 2) consolidate training contents and upgrade to digital literacy training module, adjust legal framework, digitize training materials; 3) pilot the training module at partner TVET colleges, continuously consolidate training contents; 4) scale up the training module.

At this stage, this assignment only focuses on the first stage: survey and assess the current situation of digital literacy training for college students, update contents and training methods of the Informatics subject, and develop implementation guidelines.

In order to have a theoretical and practical basis for developing the digital literacy training module, this assignment employed various research methods such as desk review, consultation meeting, in-depth interview, and online survey questionnaire to collect quantitative and qualitative data and information. The consultants have conducted research and surveys to figure out the current digital literacy training situation and needs for digital literacy training of schools, teachers, learners, alumni and enterprises. Based on the analysis of survey results, learning outcomes and contents of digital literacy training module are determined.

Research and survey are to clarify the following specific issues:

- Usage of digital competence frameworks developed by local and international organizations
- Assess the current status of students' digital competence
- Identify learners' needs for further digital competence training
- Identify the requirements of enterprises for digital competence of employees
- Evaluate the current situation of Informatics training at schools (contents that need to be updated/removed/added)
- Determine the school's strategy to improve students' digital competence
- Determine the legal framework for the development and implementation of the digital literacy training module.

1.5.1. Desk review

The consultants have reviewed following documents:

- Digital competence frameworks developed by local and international organizations
- GIZ's survey on digital competence (monitoring and evaluation)
- Guidance document related to the IT subject issued by MoLISA according to the Circular No. 11/2018/TT-BLDTBXH dated September 26, 2018 of the Ministry of Labor, Invalids and Social Affairs stipulating curriculum of Informatics in the block of general subjects in intermediate, college qualification training programs
- Similar syllabus of the digital competence training module developed by recognized TVET colleges in the world and in Vietnam.

1.5.2. In-depth interviews

The first activity is in-depth interviews with representatives of 11 GIZ's partner colleges, including: representatives of the Rector Board, managers of training department, heads of IT department, lecturers of Informatics and in-company trainers, from 10 provinces/cities, including Hanoi, Bac Ninh, Ha Tinh, Hue, Nha Trang, Ninh Thuan, Ho Chi Minh City, Dong Nai, An Giang, Long An.

The in-depth interviews were organized to determine 1) the current situation of training Informatics at schools and IT infrastructure for training digital competence module; 2) the school's strategies to enhance students' digital competence; 3) the obstacles and difficulties in the legal framework for implementing the digital competence module.

1.5.3. Online survey

Qualitative and quantitative data from online survey questionnaires is needed to supplement qualitative analysis and assessment. Online questionnaires were designed specifically for each participant: teachers, learners, alumni and in-company trainers of 11 GIZ's partner colleges. The results of the online survey help point out the current situation of students' digital competence, the requirements of enterprises for digital competences of employees, and the need of learners for digital competences.

1.5.4. Consultation meeting

Consultation meeting was conducted after the consultants had completed the preliminary activity report, updated Informatics subject and an implementation guideline, in order to present key findings of activities to all participants of the in-depth interviews, leaders of TVET and those who are interested in the assignment. Moreover, the consultation meeting helps the consultants collect ideas/comments to finalize the final report, the updated Informatics subject and the guideline.

1.6. Activity summary

The assignment of updating the Informatics subject and developing implementation guidelines officially took place in 1,5 months (20/10/2022 - 05/12/2022).

In order to learn about digital competence frameworks for students, the consultants have studied the digital competence frameworks of Europe, UNESCO, UK, Australia and Vietnam; Vietnamese legal documents stipulating learning outcomes, national vocational skills standards, Informatics subject and other documents related to digital competence.

From the October 26 to November 5, 2022, the consultants conducted in-depth interviews with representatives of the Rector Board, managers of training department, heads of IT department, lecturers of Informatics and in-company trainers of 11 GIZ's partner colleges from 10 cities/provinces, including Ha Noi, Bac Ninh, Ha Tinh, Hue, Nha Trang, Ninh Thuan, Ho Chi Minh City, Dong Nai, An Giang, Long An.

In parallel with the in-depth interviews in 10 cities/provinces, October 26th to November 5th 2022, the consultants sent out online survey questionnaires to 11 GIZ's partner colleges and their partner enterprises. Over 2,000 responses of 164 teachers, 1615 students, 208 alumni and 48 in-company trainers were collected, compiled and analyzed to be used as proof for the statements in this report.

After conducting document reviews, in-depth interviews, and online surveys, the consultants compiled data, conducted review meetings, compiled a report, updated the Informatics subject and developed an implementation guideline. The draft documents were advised by experts on digital transformation and consolidated before being presented in a conference held on the 22th November 2022 to the leaders of DVET, representatives from GIZ, participants and those who are interested in the activities. After the conference, the consultant received comments and finalized the final documents.

The final activity's findings were distributed to TVET institutions, GIZ programs, domestic and foreign organizations for reference.

2. DIGITAL COMPETENCE FRAMEWORK FOR LEARNERS

2.1. International Digital Competence Framework

European Commission has recommended Key Competences for Lifelong Learning¹, including key competences that are essential to citizens for personal fulfillment, a healthy and sustainable lifestyle, employability, active citizenship and social inclusion. Digital competence is part of the Key Competences for Lifelong Learning and interlinked with other competences.

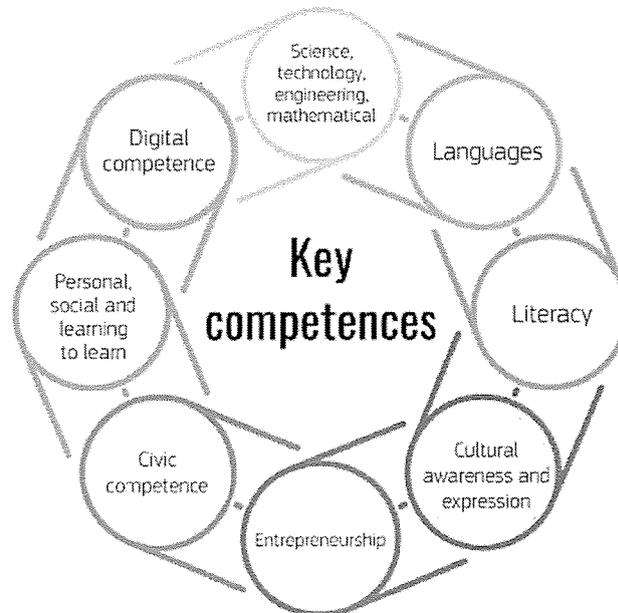


Figure 1: Key Competence Framework for Lifelong Learning

(Source: *The Digital Competence Framework for Citizens by EU 2022 - DigComp 2.2*)

Digital Competence was first defined in 2006, and after an update of the Council Recommendation in 2018, it reads as follows: Digital competence involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking.

¹ European Commission (2022), *DigComp 2.2 - The Digital Competence Framework for Citizens*, Joint Research Center.

According to UNESCO, Digital literacy² is the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies for employment, decent jobs and entrepreneurship. It includes competences that are variously referred to as computer literacy, ICT literacy, information literacy and media literacy.

The importance of digital literacy is reflected in the efforts of many countries and regions to develop and refine digital competence frameworks and strategies to strengthen this capacity for their citizens. In addition to the digital competence framework developed by each country, there are currently popular digital competence frameworks as follows:

- International Computer Drivers Licence
- Certiport Internet and Computing Core
- Microsoft Digital Literacy Standard Curriculum
- EU Digital Competence Framework version 2022 (DigComp 2.2)
- Digital Literacy Global Framework proposed by UNESCO in 2018
- Digital capability Framework by Joint Information Systems Committee (JISC) in 2017

This report will introduce the two most popular frameworks today, the Digital Competence Framework of the European Commission and of UNESCO. These are two Digital Competence Frameworks that are used as a basis for countries/organizations to build and develop their own digital competence frameworks suitable for their own contexts.

2.1.1. The EU's Digital Competence Framework

The Digital Competence Framework by EC was first published in 2013 (DigComp 1.0), updated in 2016 (DigComp 2.0), in 2017 (DigComp 2.1) and the newest publication in 2022 (DigComp 2.2). In the DigComp 2.2, digital competence is a combination of 21 competences grouped in five main areas: 1) Information and data literacy, 2) Communication and collaboration, 3) Digital content creation, 4) Safety and 5) Problem solving (Table 1).

² UNESCO (2018), *A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2*

Table 1: Digital competences in DigComp 2.2

Information and data literacy	→	<ul style="list-style-type: none"> 1.1. Browsing, searching and filtering data, information and digital content 1.2. Evaluating data, information and digital content 1.3. Managing data, information and digital content
Communication and collaboration	→	<ul style="list-style-type: none"> 2.1. Interacting through digital technologies 2.2. Sharing information and content through digital technologies 2.3. Engaging in citizenship through digital technologies 2.4. Collaborating through digital technologies 2.5. Netiquette 2.6. Managing digital identity
Digital content creation	→	<ul style="list-style-type: none"> 3.1. Developing digital content 3.2. Integrating and re-elaborating digital content 3.3. Copyright and licences 3.4. Programming
Safety	→	<ul style="list-style-type: none"> 4.1. Protecting devices 4.2. Protecting personal data and privacy 4.3. Protecting health and well-being 4.4. Protecting the environment
Problem solving	→	<ul style="list-style-type: none"> 5.1. Solving technical problems 5.2. Identifying needs and technological responses 5.3. Creatively using digital technologies 5.4. Identifying digital competence gaps

(Source: The Digital Competence Framework for Citizens by EU 2022 - DigComp 2.2)

The digital competences are a combination of knowledge, skills and attitudes. Therefore, in DigComp 2.2, for each of the 21 competences, there are 10-15 statements of knowledge, skills and attitudes. They are not learning outcomes that are expected from all citizens. They are just examples given to illustrate timely and updated examples that highlight contemporary themes. The examples are not developed on proficiency levels as well as not offered as an assessment instrument or as a tool for self-reflection on one's own competence development.

In terms of proficiency, DigComp 2.2 develops 8 proficiency levels in 4 Dimensions: foundation, intermediate, advanced, high specialized (Table 2). Eight proficiency levels for each competence have been defined through learning outcomes (using action verbs, following Bloom's taxonomy) and inspired by the structure and vocabulary of the European Qualification Framework (EQF). A wide and detailed range of proficiency levels supports the development of learning and training materials

as well as helps in the design of instruments for assessing the development of learners' competence.

Table 2: Proficiency levels of digital competence

Proficiency levels		Complexity of tasks	Autonomy	Cognitive domain
Foundational	1	Simple tasks	With guidance	Remembering
	2	Simple tasks	Autonomy and with guidance where needed	Remembering
Intermediate	3	Well-defined and routine tasks, and straightforward problems	On my own	Understanding
	4	Tasks, and well-defined and non-routine problems	Independent and according to my needs	Understanding
Advanced	5	Different tasks and problems	Guiding others	Applying
	6	Most appropriate tasks	Able to adapt to others in a complex context	Evaluating
Highly specialized	7	Resolve complex problems with limited solutions	Integrate to contribute to the professional practice and to guide others	Creating
	8	Resolve complex problems with many interacting factors	Propose new ideas and processes to the field	Creating

2.1.2. UNESCO's Digital Literacy Global Framework

Based on the European Digital Competence Framework (DigComp 2.0), UNESCO has proposed a Digital Literacy Global Framework. In this Framework, beside 5

competences of the Digicomp framework, two additional competences are added: 0) Devices and software operations and 6) Career-related competences. So, UNESCO's framework has 7 competence areas (Table 3) and UNESCO is particularly interested in career-related competences.

Table 3: UNESCO's Digital Literacy Global Framework

Competence areas and competences	Description
0. Devices and software operations**	To identify and use hardware tools and technologies. To identify data, information and digital content needed to operate software tools and technologies.
0.1 Physical operations of digital devices**	To identify and use the functions and features of the hardware tools and technologies.
0.2 Software operations in digital devices**	To know and understand the data, information and/or digital content that are needed to operate software tools and technologies.
1. Information and data literacy	To articulate information needs, to locate and retrieve digital data, information and content. To judge the relevance of the source and its content. To store, manage and organize digital data, information and content.
1.1 Browsing, searching and filtering data, information and digital content	To articulate information needs, to search for data, information and content in digital environments, to access them and to navigate between them. To create and update personal search strategies.
1.2 Evaluating data, information and digital content	To analyze, compare and critically evaluate the credibility and reliability of sources of data, information and digital content. To analyze, interpret and critically evaluate the data, information and digital content.

1.3 Managing data, information and digital content	To organize, store and retrieve data, information and content in digital environments. To organize and process them in a structured environment.
2. Communication and collaboration	To interact, communicate and collaborate through digital technologies while being aware of cultural and generational diversity. To participate in society through public and private digital services and participatory citizenship. To manage one's digital identity and reputation.
2.1 Interacting through digital technologies	To interact through a variety of digital technologies and to understand appropriate digital communication means for a given context.
2.2 Sharing through digital technologies	To share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices.
2.3 Engaging in citizenship through digital technologies	To participate in society through the use of public and private digital services. To seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies.
2.4 Collaborating through digital technologies	To use digital tools and technologies for collaborative processes and for co-construction and co-creation of resources and knowledge.
2.5 Netiquette	To be aware of behavioral norms and know-how while using digital technologies and interacting in digital environments. To adapt communication strategies to the specific audience and to be aware of cultural and generational diversity in digital environments.
2.6 Managing digital identity	To create and manage one or multiple digital identities, to be able to protect one's own reputation, to deal with the

	data that one produces through several digital tools, environments and services.
3. Digital content creation	To create and edit digital content. To improve and integrate information and content into an existing body of knowledge while understanding how copyright and licenses are to be applied. To know how to give understandable instructions for a computer system.
3.1 Developing digital content	To create and edit digital content in different formats, to express oneself through digital means.
3.2 Integrating and re-elaborating digital content	To modify, refine, improve and integrate information and content into an existing body of knowledge to create new, original and relevant content and knowledge.
3.3 Copyright and licences	To understand how copyright and licences apply to data, information and digital content.
3.4 Programming	To plan and develop a sequence of understandable instructions for a computing system to solve a given problem or perform a specific task.
4. Safety	To protect devices, content, personal data and privacy in digital environments. To protect physical and psychological health, and to be aware of digital technologies for social well-being and social inclusion. To be aware of the environmental impact of digital technologies and their use.
4.1 Protecting devices	To protect devices and digital content, and to understand risks and threats in digital environments. To know about safety and security measures and to have due regard to reliability and privacy.
4.2 Protecting personal data and privacy	To protect personal data and privacy in digital environments. To understand how to use and share personally identifiable information while being able to

	protect oneself and others from damages. To understand that digital services use a “Privacy policy” to inform how personal data is used.
4.3 Protecting health and well-being	To be able to avoid health-risks and threats to physical and psychological well-being while using digital technologies. To be able to protect oneself and others from possible dangers in digital environments (e.g., cyber bullying). To be aware of digital technologies for social well-being and social inclusion.
4.4 Protecting the environment	To be aware of the environmental impact of digital technologies and their use.
5. Problem-solving	To identify needs and problems and to resolve conceptual problems and problem situations in digital environments. To use digital tools to innovate processes and products. To keep up to date with the digital evolution.
5.1 Solving technical problems	To identify technical problems when operating devices and using digital environments, and to solve them (from troubleshooting to solving more complex problems).
5.2 Identifying needs and technological responses	To assess needs and to identify, evaluate, select and use digital tools and possible technological responses to solve them. To adjust and customize digital environments to personal needs (e.g., accessibility).
5.3 Creatively using digital technologies	To use digital tools and technologies to create knowledge and to innovate processes and products. To engage individually and collectively in cognitive processing to understand and resolve conceptual problems and problem situations in digital environments.
5.4 Identifying digital competence gaps	To understand where one’s own digital competence needs to be improved or updated. To be able to support others with their digital competence development. To seek

	opportunities for self-development and to keep up-to-date with the digital evolution.
5.5 Computational thinking**	To process a computable problem into sequential and logical steps as a solution for human and computer systems.
6. Career-related competences**	To operate specialized digital technologies and to understand, analyze and evaluate specialized data, information and digital content for a particular field.
6.1 Operating specialized digital technologies for a particular field**	To identify and use specialized digital tools and technologies for a particular field.
6.2 Interpreting and manipulating data, information and digital content for a particular field**	To understand, analyze and evaluate specialized data, information and digital content for a particular field within a digital environment.

*** Added competence areas and competences which are not in the DigComp 2.2 framework.*

After studying digital competence frameworks of countries and organizations, we found that the European's and UNESCO's digital competence frameworks are used as a basis for organizations and countries to build and develop their own digital competence frameworks.

2.2. Digital competence framework in Vietnam

Vietnam has not developed a national digital competence framework yet. However, there are some digital competence frameworks for learners proposed by some organizations and researchers.

In 2021, a research team from the University of Social Sciences and Humanities, Hanoi National University, has proposed a Digital Competence Framework for Students (DigiLit 1.0)³, consisting of 7 competence areas:

- Devices and software operations;
- Information and data literacy;
- Communicating and collaborating in a digital environment;
- Digital content creation;
- Security and safety in cyberspace;
- Learning and developing digital skills;
- Career-related digital competences

The competences described in each of competence areas are also classified and rearranged in the direction of less emphasis on technical factors in operations, but focusing on attitude, empathy and critical thinking.

In addition, in 2020, the Ministry of Education and Training, in cooperation with UNICEF, also proposed a Digital Competence Framework for high school and primary school students⁴. In particular, the Digital Competence Framework for Vietnamese high school students is developed based on the UNESCO's Digital Competence Global Framework (2018), including 7 competence areas and 26 component competences. At the primary level, the Digital Competence Framework selects only 6 competency areas, excepts career-related competence.

2.3. Compare learning outcomes of Informatics course with digital competence frameworks

Informatics is one of the compulsory subjects at college level, issued under Circular No. 11/2018/TT-BLDTBXH dated September 26, 2018 of the Ministry of Labor, Invalids and Social Affairs stipulating curriculum of Informatics in the block of general subjects in intermediate, college qualification training programs. Informatics subject has 6 chapters with specific objectives as follows:

³ Do Van Hung (2021), *Năng lực số (Digital Literacy) 2021, Khung năng lực số dành cho sinh viên, DigiLit 1.0*, Department of Information and Library, University of Social Sciences and Humanities, Hanoi National University

<https://ussh.vnu.edu.vn/vi/news/khoa-hoc/ra-mat-khung-nang-luc-so-danh-cho-sinh-vien-20961.html>

⁴ Le Anh Vinh, Bui Dieu Quynh, Do Duc Lan, Dao Thai Lai, Ta Ngọc Tri (2021), *Xây dựng khung năng lực số cho học sinh Việt Nam*, Tạp chí Khoa học giáo dục Việt Nam, Số đặc biệt tháng 01/2021.

http://vjies.vnies.edu.vn/sites/default/files/noidung_sdb_01_2021-1-11.pdf

Table 4: Content and Objectives of Informatics subject

Seq.	Content	Objectives
1	Basic IT knowledge	<ul style="list-style-type: none"> - Present basic knowledge about computers, software, information representation in computers, basic networks; regulations relating to the usage of computers and information technology; - Identify major hardware devices, operating systems, and application software; strictly comply with regulations in the use of computers and information technology applications.
2	Basic computer usage	<ul style="list-style-type: none"> - Present basic knowledge about Windows operating system, folder and file management, utility and multimedia software; using Vietnamese in computers; using printers; - Start and turn off computer and printer according to the correct procedure. Manage folders and files; install, remove and use some common utility software.
3	Basic document processing	<ul style="list-style-type: none"> - Present basic knowledge about documents, document processing and editing, usage of Microsoft Words in document processing, rendering and distribution of documents; - Create documents that meet technical requirements for administrative documents; print and distribute documents in accordance with regulations.
4	Basic spreadsheet usage	<ul style="list-style-type: none"> - Demonstrate basic knowledge of spreadsheets and sheets; usage of Microsoft Excel; - Use Microsoft Excel to create spreadsheets and sheets; enter and format data; use mathematical expressions, basic functions to calculate practical problems.
5	Basic presentation usage	<ul style="list-style-type: none"> - Present basic knowledge about usage of computers and Microsoft PowerPoint in designing and presenting information; - Use Microsoft PowerPoint to create content, design and present the necessary content for a simple presentation.

6	Basic Internet usage	<ul style="list-style-type: none"> - Present basic knowledge about Internet, WWW (World Wide Web), manipulation with email; - Use basic processing operations on the Internet, email and search information. - Identify and implement information security measures when using Internet-related devices and pages.
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According to UNESCO's definition, digital literacy is a combination of computer literacy, ICT literacy, information literacy and media literacy. However, the Informatics subject provides for students only with computer literacy.

Besides, the six chapters of Informatics cover only a small part of the first four areas of competences of UNESCO's digital literacy global framework, and do not have any content related to problem solving and career-related competences or digital technologies. In addition, the proficiency levels of these competences are mostly at the basic level (level 1-2) in the 8-level assessment scale of the European Digital Competence Framework.

3. CURRENT SITUATION OF DIGITAL LITERACY TRAINING AT 11 GIZ'S TVET PARTNERS

This section, based on the results of literature review, in-depth interviews and online surveys, presents the current situation of digital competence training for students at 11 GIZ's partner colleges.

3.1. Difficulties in training digital literacy in TVET colleges

3.1.1 Legal framework

In the TVET system, Informatics is a compulsory subject and the only general subject that trains students in IT application skills for every training program. However, the legal regulations related to the content of Informatics subject still have shortcomings as follows:

Regulations on digital literacy training have not caught up with the development of IT and digital technology.

Firstly, it has been 4 years since the content of the Informatics subject was published under Cir. 11/2018/TT-BLDTBXH. The content of this course needs to be updated according to Circular No. 03/2017/TT- BLDTBXH's provision that the training program needs to be updated and adjusted every 3 years.

Secondly, the content of Informatics subject is regulated based on the IT usage competence under Circular No. 03/2014/TT-BTTTT dated March 11, 2014 of the Ministry of Information and Communications stipulating Standard skills for information technology usage. It has been 9 years since the issuance of this Circular. Over the past decade, there have been strong developments and great changes in the IT sector. Due to the development of IT/digital competences based on an outdated legal document, students are not trained to meet the requirements of the labor market for IT and digital competences.

The inconsistency of regulations between legal documents makes it difficult to train digital competences for students.

The content of the Informatics subject is built based on learning outcomes of training programs and digital technology competences specified in the National Occupational Skills Standards. However, these regulations are inconsistent.

Firstly, according to Decision No. 806/QĐ-LĐTBXH dated July 14, 2021 of the Ministry of Labor, Invalids and Social Affairs on Announcement of National Occupational Skills Standards in 2020, the IT competence in the National Occupational Skills Standards has been changed to digital competence. The descriptions of each competence have also been changed from IT application capabilities to digital technology related competencies. However, despite the change to digital competence, some descriptions and evaluation still refer to outdated Cir. 03/2014/TT-BTTTT.

Secondly, the digital technology application standards have been applied to only 19 occupations issued under Decision No. 806/QĐ-LĐTBXH. The National Occupational Skills Standards for other occupations issued before the issuance of Decision No. 806/QĐ-LĐTBXH are still using standards of IT usage or even have no regulations on this competence.

Thirdly, although the National Occupational Skills Standard has updated the ability to use IT into the ability to apply digital technology, the content of Informatics subject has not been updated yet. It still keeps the content issued under Cir. 11/2018/TT-BLĐTBXH and refers to Cir. 03/2014/TT-BTTTT.

Thus, with the above regulations, the content of the Informatics subject still has not been updated to suit the development of science, technology and digital transformation. Meanwhile, Informatics is a compulsory subject issued under a circular, so schools must fully comply with. Being limited by a legal document makes schools not have the autonomy to innovate subject's content to suit the actual situation, to meet the needs of learners and enterprises.

3.1.2 Resources

IT infrastructure

The IT infrastructure of some colleges only meets basic teaching and learning requirements. At some colleges with a large number of students, the IT infrastructure has not yet met the current training needs. Some difficulties in IT infrastructure can be listed as follow:

- Internet connection is not strong enough and unstable; there is no free Wi-Fi for students in classes, labs, libraries...
- Labs are equipped with low performance computers and lack of computers
- Server is not strong enough and needs to be added
- Learning management systems (LMS) need to be upgraded

- Students do not have laptops to practice or group work at home

Human resources

Currently, there are no IT majors at some colleges, so there are no teachers to teach Informatics. Students are trained by teachers of Informatics and Foreign Language centers or have to study Informatics at centers, then submit the certificates of completion (Certificate of IT according to Cir. 03/2014/BTTTT) to colleges. Besides, the digital competence of teachers also needs to be improved to meet the requirements of new teaching and learning methods in the context of digital transformation.

3.2. The situation of digital literacy training needs for students

This section presents the current situation of students' digital competences as well as the need for improving them based on the results of online surveys. Because of the small scale of the survey (11 colleges, 164 teachers, 1615 students, 208 alumni and 48 in-company trainers), the results may not represent the entire vocational education system. However, from these results, it is possible to partially understand the situation of digital competence training for college students.

3.2.1 Students' digital literacy training needs

Regarding the ability to practice, the survey results show that students have the ability to perform the most basic skills in each competency area, such as searching information on the Internet (86.3%), communicating proficiently through digital apps and software (85.9%), using Microsoft Office to create contents (79%), protecting personal accounts (81.1%), solving technical problems (74.3%). Only about 50% or less than 50% of students can practice more advanced digital skills. See details in Figures 2 - 6 below.

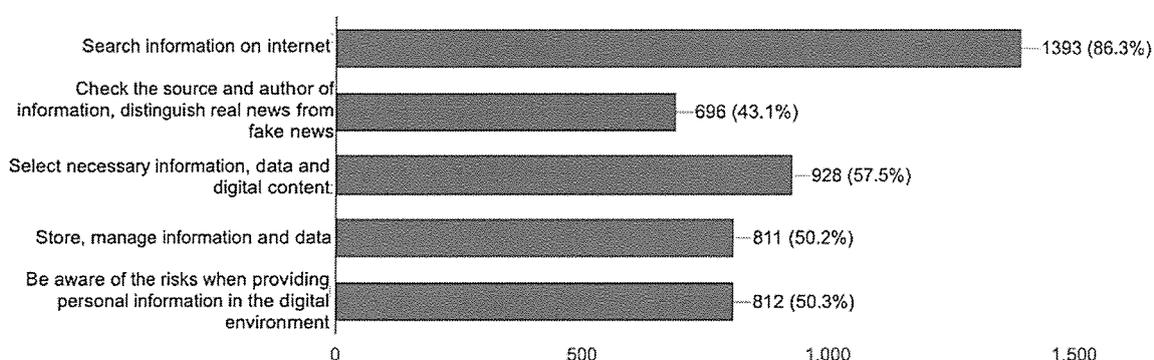


Figure 2: Information and data literacy

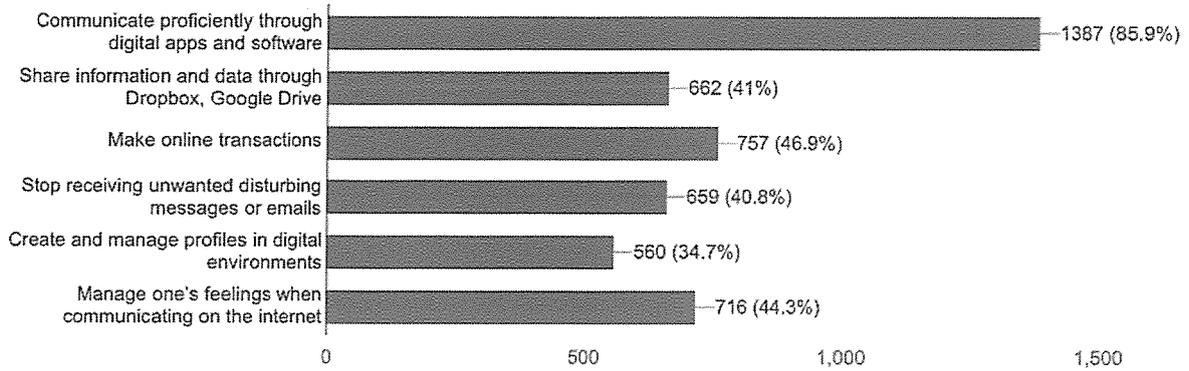


Figure 3: Communication and collaboration

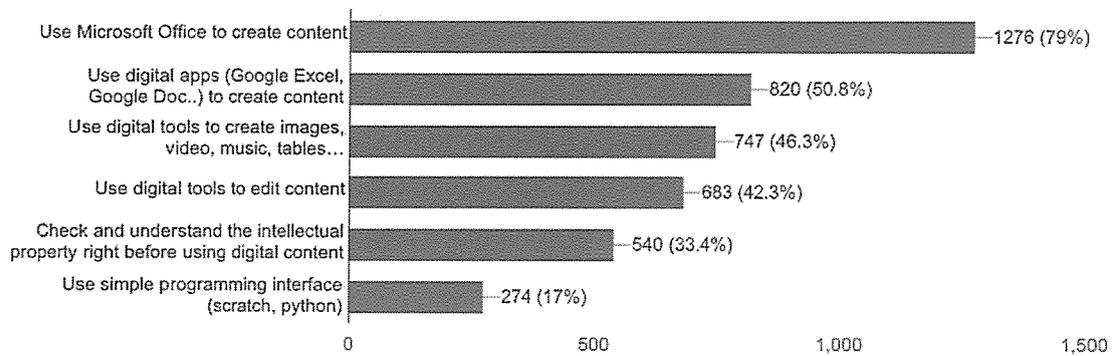


Figure 4: Digital content creation

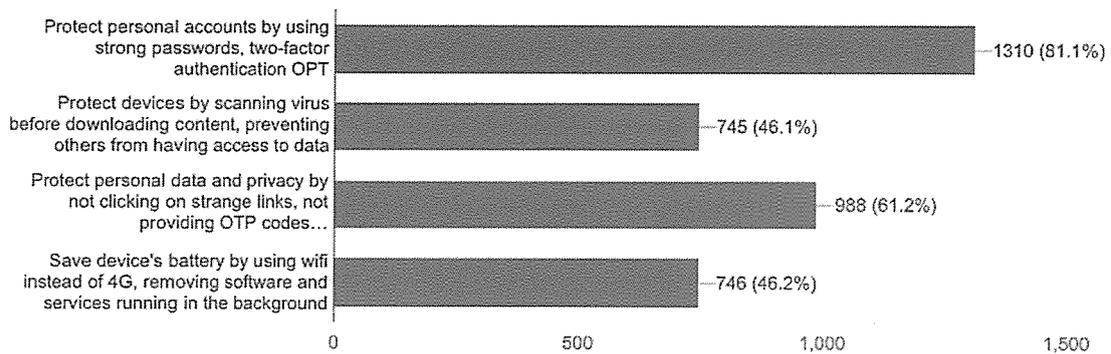


Figure 5: Safety

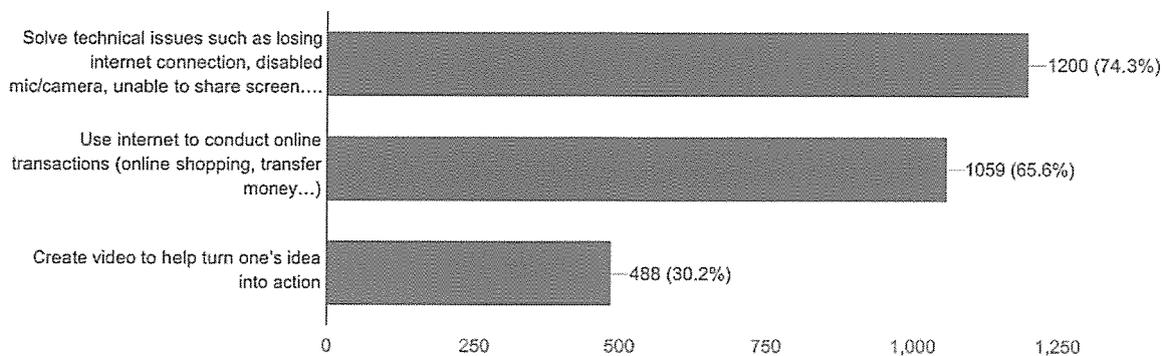


Figure 6: Problem solving

In terms of proficiency levels, students' self-assessment of proficiency in five competence areas (information and data literacy, communication and collaboration, digital content creation, safety, and problem solving) shows that their digital competence proficiency are at **intermediate** (about 40%) and **foundation** (about 25%) levels. However, according to the teachers' assessment, the students' proficiency levels in areas of digital content creation, safety and problem solving, are mainly at **foundation** level (Figure 8).

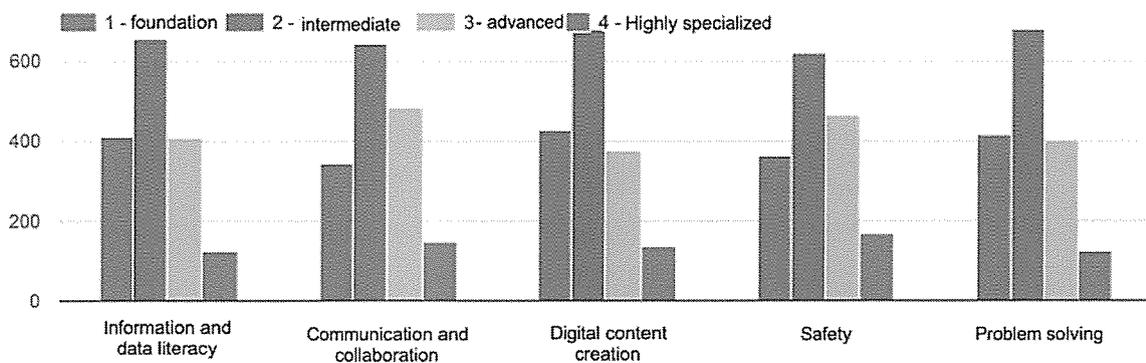


Figure 7: Students' proficiency levels of digital literacy (assessed by themselves)

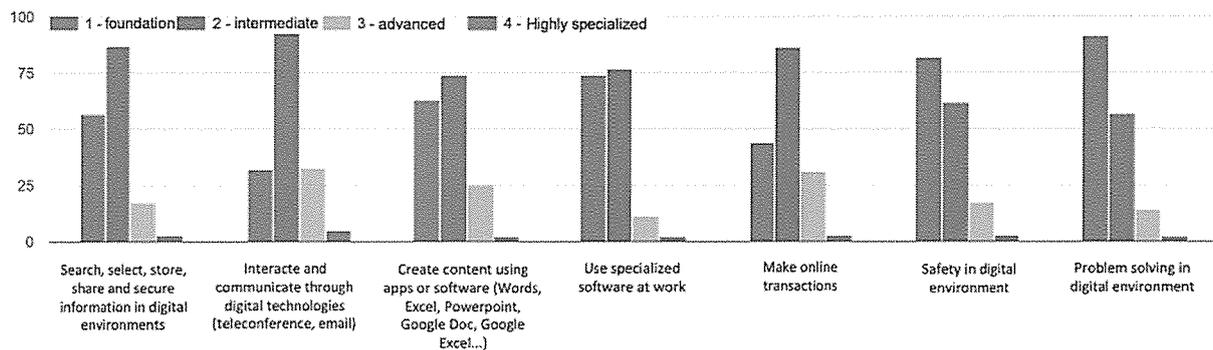


Figure 8: Students' proficiency levels of digital literacy (assessed by teachers)

Regarding the need for digital competence training, about 85% of surveyed students want to improve their capabilities in all five digital competence areas (Figure 9). Both lecturers and students propose to increase the practical duration of Informatics subject and add the following contents and skills, especially the skills that students' proficiency is at foundation level:

- Basic and advanced usage of Words, Excel, PowerPoint

- Cybersecurity, private information security, data security, cyber security laws, behavioral culture in digital environment.
- Software for online learning and communication such as Outlook, Moodle, One Drive, Google Drive, Padlet, Google Jamboard, Zoom, Google Meet, Kahoot, quizizz, email, ePortfolio and other digital applications
- Specialized software at work
- Search and filter information, regulations on copyright
- E-commerce applications
- Solve technical problems, internet-related problems, and unexpected errors
- Wi-Fi system, bandwidth, hardware upgrade, installation of application software
- Basic programming: python, scratch...
- Video design and editing
- Concepts of sharing, digital transformation and the manners to change behavior in a digital environment.

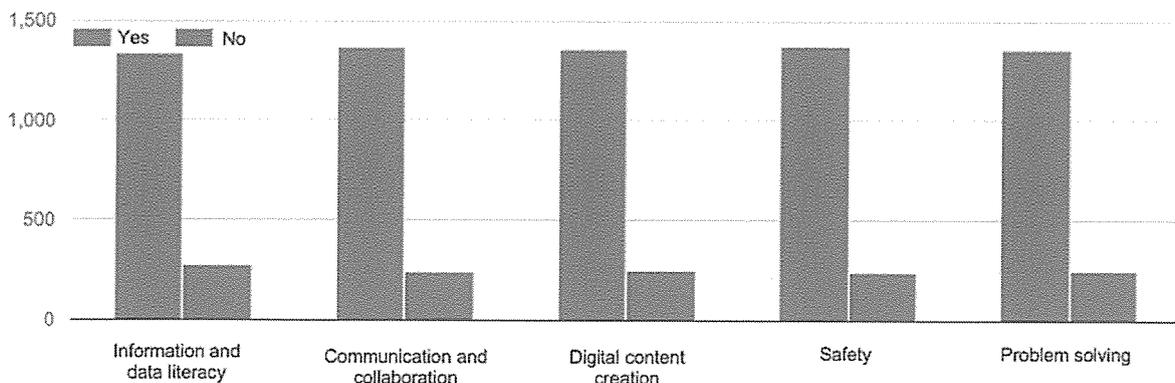


Figure 9: Students' needs for digital literacy training

3.2.2 Requirements of enterprises for digital literacy of employees

Depending on each position, the proficiency requirements for digital competences of employees are mostly at intermediate level. However, employees meet only 25-50% of these requirements.

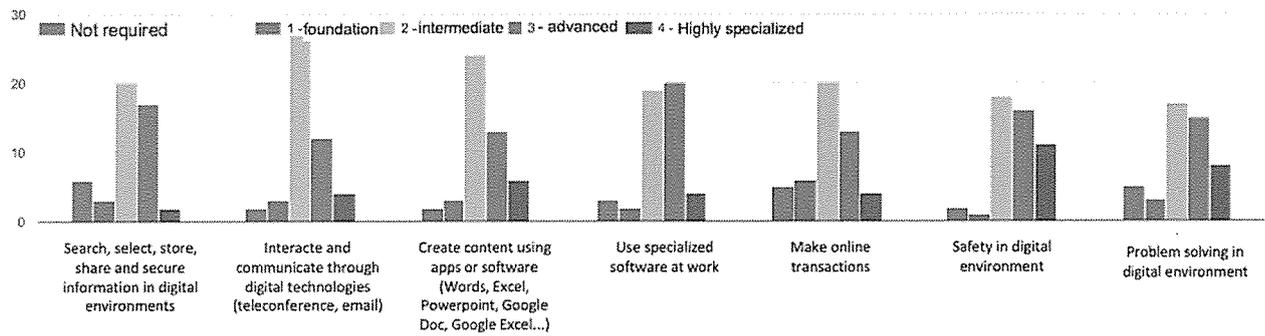


Figure 10: Requirements for proficiency levels of digital literacy for employees

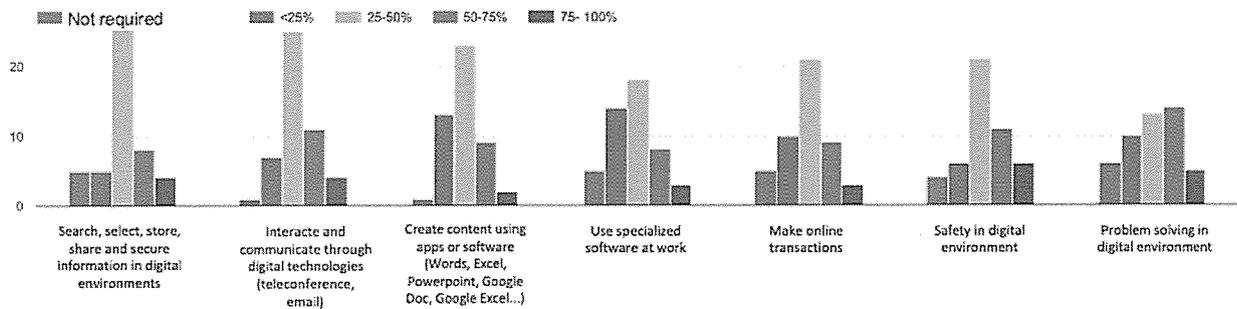


Figure 11: The proficiency levels of digital literacy of new employees (fresh graduates)

New employees often have to be retrained in the following skills:

- Use specialized software at work such as SAP, ESC, MISA, CAD 2D, 3D, Canva, Corel, AI, Photoshop...
- Use software for online communication and meetings such as Google Meet, email, social networks...
- Create contents, documents, forms, reports... through Microsoft Office (Words, Excel, PowerPoint)
- Use and examine information and data
- Share and secure information in cyberspace

In the opinion of alumni, students should be equipped with the following knowledge and skills to improve their digital competences to meet the requirements of labor market:

- Online transactions: declaration of social insurance and tax, electronic invoice...
- Strengthen basic and advanced office computer skills
- Proficiently use computers, software and applications dedicated to work and communication; allow students to exchange and work more with online learning and working software

- Digital communication skills
- Install some basic software
- Ability to search and process information on digital platforms
- Ability to quickly handle arising situations
- Understand laws on network security and digital environments to avoid risks.

3.2.3 Strategies of colleges on digital literacy training for students

All colleges have developed digital transformation plans and implementation roadmaps, including focus on digital literacy training for teachers and students. The activities have been implemented step by step, such as:

- Integrate digital content into relevant career skills
- Build a Moodle system to deploy digital classes
- Promote digitization of training programs and learning materials
- Build an e-Portfolio system for students to develop personal profiles for future study and work
- Use Office 365 for students right after they enter colleges
- Upgrade IT and Internet infrastructure for easy access for students to learn and interact in digital classrooms
- Apply digital software to lectures and training management to improve students' research and learning capacity
- Standardize the program in line with current and future digital technology
- Enhance awareness and behavior in the digital learning environment
- Continue to participate in projects to improve digital competences for lecturers and students such as EMVITET project, GIZ's project with TVET...

4. RECOMMENDATIONS

Based on the current situation of digital literacy training, the consultants propose some recommendations as follows:

4.1. Revise the legal regulations related to digital literacy training

- **It is necessary to develop a Digital Competency Framework for college students.** There are Digital Competency Frameworks for university students, high school students and primary school students in Vietnam. However, there is not a Digital Competency Framework for college students.
- **Integrate digital competency standards into every training program and each module/subject.**
- **Update Informatics subject** (Appendix 1) by eliminating knowledge and skills that students have learned in high school and spending time for new digital knowledge and skills.
- **Develop a digital literacy module to replace Informatics subject.**
 - o The change from Subject to Module is in line with the policy of training program modularization of DVET.
 - o The module is named Digital Literacy to match the context of international integration on the labor market.
 - o The content of the Digital Literacy module should be developed on the basis of the European and UNESCO's Digital Competency Frameworks. Therefore, the digital competences of Vietnamese college graduates will be higher or equal to those of the same level of international labors. Accordingly, the proficiency level of digital competences needs to be at the intermediate level (level 3-4) at the present and to reach the advanced level (level 5-6) of the European Competency Framework after 3 to 5 years.
 - o The Digital Literacy module is the foundation to help students accumulate and improve their digital competencies and skills through other modules/subjects of the training program. Upon graduation, students will have digital competencies that meet the requirements of the labor market and lifelong learning.
 - o

- **There are two solutions to implement the Digital Literacy module:**

- 1) Grant colleges autonomy to develop a digital literacy module, then colleges will proactively decide the contents of digital competences that will be trained for students and timely adjust it.
- 2) In case the digital literacy module remains a compulsory subject, the DVET should issue a new module program and update it periodically or promptly according to the development of digital technology.

4.2. Upgrade resources to implement digital literacy training module

Human resources

The updated Informatics subject and the Digital Literacy module later are developed based on the European Competency Framework, so the biggest difficulty will be human resources. In addition to the fact that some colleges do not have or lack teachers to teach Informatics, teachers' abilities will be a big problem to implement this module.

The solution is to change training methods (Appendix 2). Instead of traditional teaching, it is necessary to apply flipped classrooms and project-based learning. It is easiest to digitize the implementation of the digital literacy module. It can be blended learning or online learning on the digital platform. All theory and instructions will be in online lessons and teachers' role will turn from teaching into coaching.

In order to effectively implement the Digital Literacy module, teachers, who teach this subject, have to carefully study online lessons and all learning and teaching materials in advance. In addition, teachers need to be trained on new contents and methods of implementation of this module.

IT infrastructure

A common learning platform is the best solution to store and share all electronic learning and teaching materials for teachers and students. Colleges need to 1) upgrade the laboratory system, equip with more computers; 2) upgrade the internet connection, especially Wi-Fi because of usage of laptops and smartphones; 3) upgrade server system; 4) upgrade LCMS system; 5) set up a studio to record and edit online lessons.

4.3. Phases of implementation

- Phase 1: Allows pilot implementation of the updated Informatics subject at some of GIZ's partner colleges.
- Phase 2: Evaluate the results of pilot implementation of the updated Informatics subject, then develop a digital literacy module and digitize teaching and learning materials. At the same time, issue or adjust legal regulations related to digital literacy training as well as upgrade IT infrastructure and human resources as mentioned above.
- Phase 3: Transfer all resources of the digital literacy module to the DVET for mass implementation at colleges in the TVET system.

5. CONCLUSION

Implementing digital transformation in TVET is a long process. Integrating digital contents into training curricula, digitalizing materials and changing teaching methods require a lot of stakeholder's efforts. Therefore, updating the content and teaching methods of the Informatics subject is an extremely important first step.

Due to time and resource constraints, the proposed updates for Informatics subject may not be perfect. They will be continuously updated during the pilot implementation.

Hopefully, TVET colleges selected to pilot the updated Informatics subject will actively cooperate and accompany with the consulting team to, on one hand, improve the quality of technology infrastructure and human resources, and on the other hand, help to consolidate the content to develop digital literacy module for mass implementation in TVET system in Vietnam.

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