

Study on 21st century relevance of learning content

Country report Italy

**Multidisciplinary, Project-based
Digital Learning Content for VET**



VETPROFIT



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Author: Giulia Dakli, Fondazione ITS Jobsacademy (JAC)
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Introduction

This document was prepared in the VETProfit Erasmus+ project for providing information about the state-of-art situation related to the project aims as follows:

- *Decrease the skill-gaps between VET and the labour market*
- *Prepare teachers for 21st century education*
- *Starting collaborative development of learning materials for VET – teachers, students' companies*

The aim is to perform a thorough analysis of learning outcomes, curricula, learning materials and applied methods of the initial/basic training of IT and telecommunications sector in Italy.

The document has 4 parts:

- (1) *Introduction of our company of Fondazione ITS per le Nuove Tecnologie per il Made in Italy - Jobs Academy (JAC)*
- (2) *A short introduction to the VET system in Italy*
- (3) *Results of the interviews in Italy*
- (4) *Description of the selected standard curricula, subject and topics*

Short introduction of the partner organisation

Fondazione ITS per le Nuove Tecnologie per il Made in Italy - Jobs Academy (JAC) is a short-cycle higher Education Institution founded in 2010 and located in San Paolo d'Argon (Bergamo) in the Lombardy Region, set up to train skilled technicians in strategic areas for the Region's economic development and competitiveness. The educational provision of JAC answers to the industry's need for new high-level technical and technological skills to promote innovation processes. It is placed at **Level 5 of the EQF**, and it provides to students a technical level qualification.

JAC counts around 500 students, following 2-year EQF 5 level courses in 5 different fields:

- **Business Area:** *Personnel and business administration course; Food & Hotel management course; HR Management Course; Sustainability and Social Enterprises Course*
- **Green Area:** *Sustainable building course; Energy and innovation course; Polymer transformation technologies course*
- **Marketing Area:** *Export Management Course; Digital Marketing & social media course; Marketing & Sales Course*
- **Software Area:** *Cloud Development Course; IT systems management course; Software development course; Web Development course*
- **Technical Area:** *Logistics and mobility course; Industrial design course; Aircraft mechanics and maintenance course; Mechatronics and Industrial Automation 4.0 course.*



Main features of JAC's courses

At least **30% of the duration of the courses takes place directly in companies** (also abroad) through **internships**, thus making it possible to establish a very strong bond with the production world and the job market. Work experience in the company can be carried out as an internship or apprenticeship, ensuring greater integration between training and work, to reduce the mismatch between demand and supply of professional figures and the skills gaps.

At least **50% of the teaching staff comes from the world of work** and have worked or still work as professionals in private companies and businesses. The courses are usually divided into four

semesters (1800/2000 hours). The final exams are conducted by special **examination committees** consisting of **representatives of the school, university, VET centers and professionals from the job market**.

VET systems in *ITALY*

In Italy, the proportion of students in vocational education and training (VET) is relatively high (55.3% in 2017, compared to the EU average of 47.8%)

In Italy, the Ministry of Education and the Ministry of Labour lay down general principles and rules for the VET system, as established by article 117 of the Italian Constitution, but then the Regions have exclusive legislative power over the VET programmes.

In Italy, compulsory education lasts up to age 16, but at age 14 learners make a choice between general education and VET.

The Italian education and training system is very fragmented:

At the **UPPER SECONDARY LEVEL** (EQF levels 3 and 4), on completion of a three-year vocational qualification, it is possible to attend one additional year leading to a four-year vocational diploma; this allows enrolling in the fifth year of the State education system and sitting the State exam for a general, technical or professional education diploma (EQF 4).

The following VET programmes are offered in the Italian VET education system:

- *five-year programmes (EQF level 4) at technical schools (Istituti Tecnici) leading to technical education diplomas;*
- *five-year programmes (EQF level 4) at vocational schools (Istituti professionali) leading to professional education diplomas.*

- *three-year programmes (EQF level 3) in lower vocational institutes (istruzione e formazione professionale, IeFP) leading to a vocational qualification;*
- *four-year programmes (EQF level 4) leading to a technician professional diploma.*

At **POST-SECONDARY LEVEL** (EQF levels 4 and 5), VET is offered as higher technical education for graduates of five-year upper secondary programmes or four-year IeFP programmes who passed entrance exams. The system offers the following opportunities:

- *higher technical education and training courses (istruzione e formazione tecnica superiore, IFTS): one-year post-secondary non-academic programmes leading to a high technical specialisation certificate (certificato di specializzazione tecnica superiore, EQF level 4).*
- *higher technical institute programmes (istituti tecnici superiori; ITS): two- to three-year post-secondary non-academic programmes which lead to a high-level technical diploma (diploma di tecnico superiore, EQF level 5). These courses are organised by foundations that represent schools, universities, training centres, enterprises and local bodies.*

Finally, in **ADULT EDUCATION**, VET is offered by a range of different public and private providers. It includes:

- *programmes leading to upper secondary VET qualifications to ensure progression opportunities for the low-skilled.*
- *continuing vocational training (CVT) to meet enterprise, sectoral and regional needs.*

DUAL SYSTEM

The reform programme “La buona scuola”, introduced in 2015, focuses on alternance learning and made workplace training compulsory for all students in the last three years of upper secondary, in general education schools and technical and vocational schools. Together with diversification of study pathways and support for the dual system, piloted since 2015/16, this may facilitate transitions from education to work.

Apprenticeship is available at all levels and programmes and is defined as an open-ended employment contract. The promotion of the dual system in three-year EQF 3 programmes (IeFP) aims to relaunch apprenticeship with the allocation of new resources from the Government for the realisation of paths characterised by a high amount of in-company training (minimum of 400 hours per year) or virtual business simulation, and new individualised training plans.

To increase the formative value of work-based learning pathways, school-work alternance (ASL, Alternanza Scuola-Lavoro) has been replaced by transversal competence and guidance pathways (PCTO, Percorsi per le Competenze Trasversali e per l’Orientamento) in 2019. This will support the acquisition of interdisciplinary skills and raise learners’ vocational awareness.

FOCUS: What are Italian Vocational Upper Technical Institutes?

Vocational Upper Technical Institutes, in Italian Istituti Tecnici Superiori, mostly referred to as **ITSs**, offer **short-cycle non-university post-secondary higher education**, which is part of the official Italian education system since 2011/2012. Courses are accessible to holders of an upper secondary education qualification or diploma. In general, courses last 4 semesters (in very few cases 6) for a total of 1800/2000 hours of training and they lead to the qualification of “Higher/Advanced technician” (Diploma di tecnico superiore), corresponding to an **EQF Level 5**.

The offer of ITSs is available nationwide. At present, there are 104 ITSs In Italy.

ITSs are post-diploma technical specialization paths, referring to the areas considered priorities for the economic development and the competitiveness of Italy.

ITSs represent an absolute novelty in the Italian training scenario as they are an expression of a strategy that combines education, training and work policies with the country's industrial policies. **ITSs are the Italian answer to its SMEs, which need human resources with new and advanced technical skills** to promote the processes of innovation and technology transfer in the logic of Smart Specialization.

ITSs are organized according to the organizational model of Foundations, and they work in collaboration with companies, universities and scientific and technological research centers, local authorities, education and training systems. By law, ITSs must involve:

- *a vocational/technical upper secondary school situated in the same territory of the Foundation, which has the role of reference body and that issues the relevant qualification.*
- *a training VET center accredited by an Italian Region for the purpose of higher-level training and situated in the same province of the Foundation.*
- *a SME/industry/private company belonging to the same productive sector of the ITS.*
- *a university department or any other body belonging to the technological/scientific research system.*
- *a local authority (municipality, province, etc.).*

Market sectors connected to ITSs

ITSs offer several courses related to **six Technological Areas** to guarantee that **training is in line with** the aspirations of the students and with the needs of the **national productive system**.

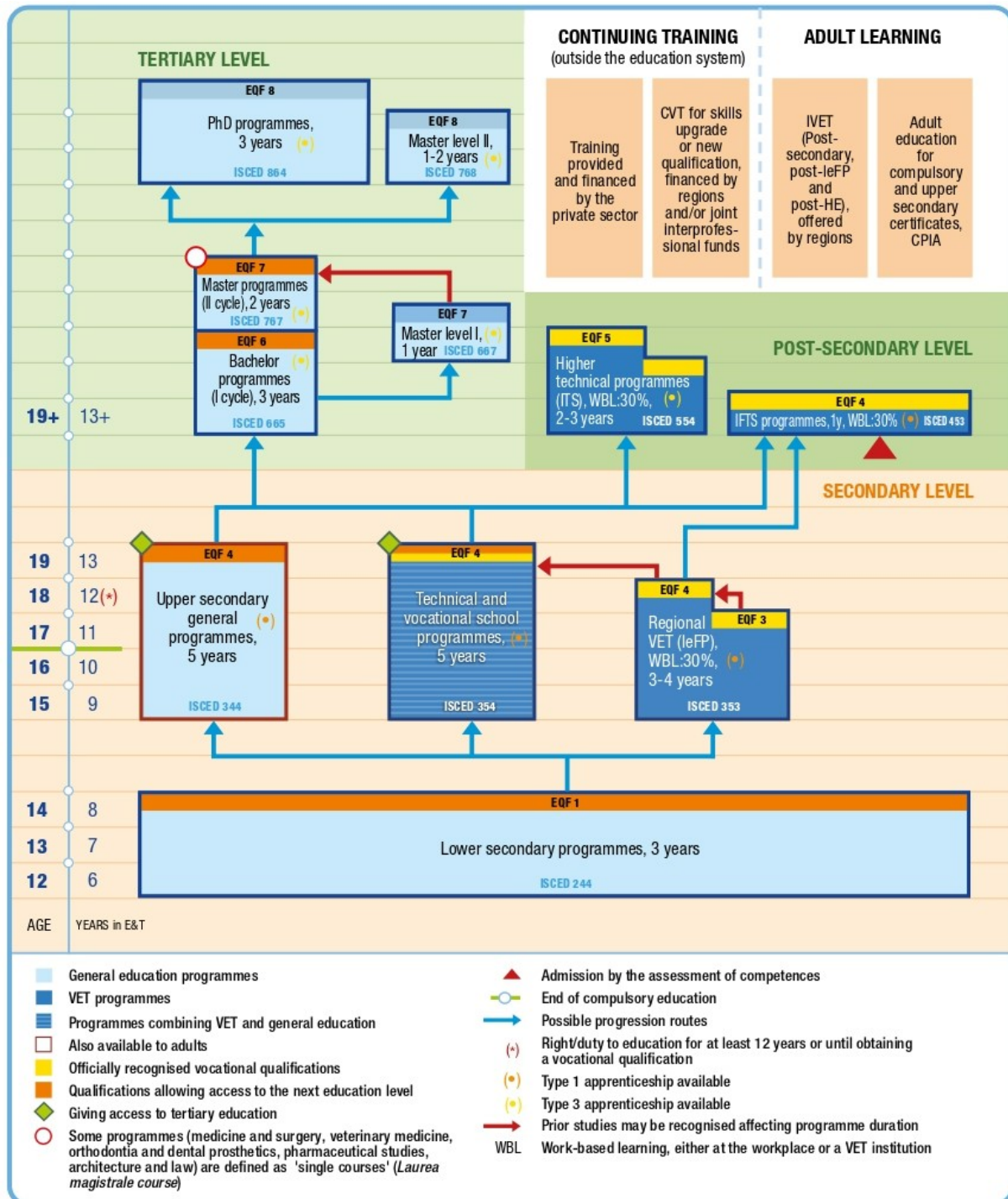
- *Energy efficiency*
- *Sustainable mobility*
- *New biotechnologies*
- *New technologies for the Made in Italy*
- *Innovative technologies for cultural heritage and tourism*
- *Information and Communication Technologies*

For each Technological Area, **specific sub-sectors and professional figures are identified** in order to diversify the training offer so that it is consistent with the production chain active in each specific territory. To date, **29 professional figures** have been identified, pertaining to **17 specific sub-sectors**, corresponding to "technical macro-skills" (what the graduate "knows" and what he "knows how to do") that each ITS student must achieve by the end of the course.

For each professional figure, each ITS defines a specific professional technical profile based on the needs of the territory in which it operates.

The qualification

At the end of the course the "Diploma of Higher/Advanced Technician" is obtained with the certification of the competences corresponding to the **V level of the European Qualifications Framework**. To facilitate circulation at national and European level, the title is accompanied by the **EUROPASS diploma supplement**. The diplomas are issued by the school institution of reference of the ITS based on a national model, following a final verification of the competences acquired by the students who have attended at least 80% of the total duration of the course.



NB: ISCED-P 2011.

Source: Cedefop and ReferNet Italy, 2020.

Results of the interview with teachers, students and companies in Italy

The survey was focused on identifying the needs of teachers and students regarding textbooks and digital learning materials and asking companies (from the selected two sectors) as well about their requirements against young professionals applying for their vacancies.

Our main preliminary assumptions to clarify by the interviews were as follows:

- *if there are textbooks existing, they were not prepared for the new professions, they are not up-to-date, not fit for the learning-outcome oriented approach; methodologically they are not suitable for active learning and the development of soft skills;*
- *content is not always motivating; few examples are practical or real-life;*
- *the learning content has gaps - it does not always correspond to the needs of the labour market (new technologies are not reflected in the curriculum).*

This document includes a short summary about the VET system of our country, it presents the circumstances of the interviews (place, date, duration), the profile of the respondents and the conclusions of the interviews.

Methodology

The consortium developed agreed in a few basic rules to follow the interviews as follows:

- *Contact the persons, send them invitation explain how the process will work and ask for dates/times that are appropriate for the interviews.*
- *Deliver the interviews according to the agenda. Make sure someone – other than the interviewer – takes detailed **notes**.*
- *Welcome and **say thanks** for joining. Do not record the meeting.*
- *Establish a **friendly atmosphere**, assure the participants that you are not there to assess them in any way. It should rather be an informal, “coffee break” type of discussion. **Do not evaluate** what they say.*
- *State at the beginning that **time is limited**, perhaps not all of them will have the chance to speak. Ask them to be “to the point”.*

We developed common interview plan with suggested topics, but we agreed that the leader of the interview can make some modifications when it is needed to adapt to the special character of the respondents.

Suggested topics

Interview with teachers

- *Knowledge content taught (based on learning outcome criteria), skills expected (development of professional and "soft" competences based on learning outcome criteria)*
- *Applied books, professional materials, free-to-use learning materials, curricular elements*
- *Tools used (digital and traditional) teaching*
- *Centrally developed model projects, self-designed projects*

- *Applied teaching and learning methods, own practices (if any)*
- *What are the gaps in terms of textbooks, digital learning materials (in general and for a given subject)?*
- *What (tools, methods) would best support teaching and learning in the school or for a given subject?*
- *Methods (other than grading) and tools used to measure and assess students' knowledge and competences in the institution and/or in the subject.*

Interview with students

- *On what basis (literature, books, teaching materials) do students learn theoretical knowledge?*
- *What tasks, projects, practical demonstrations, etc. help to develop practical competences?*
- *What tools (traditional, digital) support learning?*
- *How is the learning material processed - by what methods?*
- *What is most lacking in order to learn effectively?*
- *What is most lacking for you to obtain adequate practice in this subject?*
- *Do your teachers use other types of assessment methods than grading?*
- *Are you satisfied with the teaching and assessment methods used by your teachers?*
- *What suggestions would you make regarding teaching? (method, teaching material, teaching tools, cooperation, etc...)?*

Interview with companies

- *What do you expect from a new employee who has studied and passed the exam of the qualification of,?*
- *What are the competences the company is missing when employing young people who have just obtained a professional certificate?*
- *Do you see an opportunity to make a real change in the quality of vocational education and training and to make young people take responsibility for their own learning and be motivated to develop?*
- *In what ways can and will you help to ensure that young people are better prepared for their profession?*
- *Would you cooperate with schools in the development of digital curricula?*
- *Would you be open to define a project task for students, what prepares them for acting more effectively in a workplace, and what could help you as well to get a picture about the knowledge, skills and competences of a newly certified young person who just passed the exam?*

Summary of the interviews in Italy

Interview with teachers

Basic figures

The institution conducting the survey: Fondazione ITS Jobsacademy (JAC)

Place: Bergamo (Italy)

Date (period): May-June 2022

The survey was conducted by: Giulia Dakli

Number and profile of teachers (subject, qualifications they teach for):

- *Field of education: 3 teachers (Diego B., Armando E., Cristian L.) are Higher Education VET Teachers (EQF5), while 2 teachers (Giulia L., Alessio V.) offer training for companies (adult education)*
- *Teaching subjects: JAVA programming module 1; Object-oriented programming; JAVA and programming - software development using database; Backend programming with PHP – Basic; Backend programming with PHP – Advanced*
- *Distinctive features: all 5 interviewed teachers have a main job as freelance programmer and consultant for companies. Teaching is their second job.*

1. Knowledge, skills, competences based on learning outcome

Teachers expect their students to have the following skills once they finish their course:

- *autonomy in the ability to design and develop web applications to be able to enter the market as full stack programmer analysts.*
- *ability to create a management application (e.g., data management of a warehouse).*
- *ability to create a web backend application*
- *knowledge on how to create software programs with JAVA language at a basic level.*

2. Applied books, learning materials

Official books and manuals are used only to provide theoretic information on macro-topics and a basis for the theoretical part of the lesson. They are suggested to students, but their use is not compulsory.

Mostly, teachers create and use their own material, such as slides, and projects developed specifically for their class group and updated each year.

All interviewed teachers use books or manuals to some extent, but they are either optional (a corollary to review some aspects of the lessons), or anyway of secondary importance compared to the material developed by the teachers themselves.

3. Tools used (digital and traditional) teaching

Main tools used are the following:

- *during the lesson, students look for materials online on websites provided by the teacher (e.g., W3Schools), as well as through an independent search on Google.*
- *teachers use open-source programmes and often leave the students free to decide what to use as an open-source PHP program and as an open-source text editor (Atom, Visual Studio Code).*

- *examples of code for real or reality-inspired programs are used as a model during the explanation of theoretical subjects and practical exercises.*
- *open tutorials available online.*
- *PPT slides are used to a lesser extent, many teachers avoid them.*

4. Teaching and learning methods

All interviewed teachers organize their lesson as a mix of theory and practice, all much more oriented towards the practice. All teachers claim to use active learning, learning by doing, project-based learning, and collaborative learning as teaching/learning methodologies.

Here follow some examples of how the lessons are organized:

- *The lessons are organized with a first part of frontal introduction on the main topic of the course. This part of the lesson is usually delivered with the use of the whiteboard or slides (the whiteboard is considered better than the slides, as it is more dynamic). Then, the teacher presents a project that is carried out together with the students. Lessons are composed by 25% theory and 75% practical exercise.*
- *The lessons are a mix between a) frontal lesson; b) exercises to be done in pairs or in groups; c) exercises to be carried out independently at home.*
- *As teachers in JAC are freelancers or come from companies, in the IT area the involvement of companies in the courses is automatic because the teachers know what skills the market requires.*

5. Gaps in terms of textbooks, digital learning materials

In JAC, each teacher is free to choose materials and update them every year, so the few manuals and books that are used (but never compulsory) are quite up to date because they are chosen every year by the teacher.

Teachers claim that it is difficult to bring the preparation of young people closer to the needs of the jobs market. The students start the EQF5 course with a lot of theoretical background but without knowing how to use the tools of this profession or without knowing how to use technical and professional terms.

Computer language is constantly evolving so it is not always easy to find updated material that groups topics in a coherent way, so sometimes teachers have to combine a mix of resources.

6. Suggested tools, methods support teaching and learning

Coming from the business world, the interviewed teachers try to always bring practical examples of professional life to their students during their lessons.

External professionals are also invited to speak in the classroom to provide testimonials and to talk about the latest news in their professional field.

According to most interviewed teachers, the method that works best is one in which theory and practice are interconnected. The theory must be explained step by step and the exercise has to be first done together in class, and only later the students can be left alone to work independently. If the teacher explains the theory and shows the exercise without doing it together with the students, or if he/she explains the theory and leaves the students to do the exercises alone, the students will not acquire the required skills and competences and they will go towards educational failure.

7. Methods of assessments

From the interviews, two different approaches emerged:

1. *Each course has an intermediate exercise and a final exercise: practical exercise / simulation (e.g., 4 hours to create an application with certain characteristics, where students can consult the web during the exam and consult their previous exercises);*
2. *No final exam: teachers assigns exercises and projects to be carried out during the course, both individually and in groups. Each exercise is assessed individually and at the end the teacher makes an overall assessment without the need of a final examination.*

8. Conclusions

- *Manuals and books have a smaller role compared to a combination of material created by the teacher and found online.*
- *There is plenty of open-source material available online.*
- *In the ICT field practical and project-based learning is way more effective than the classic frontal theoretical lessons.*
- *Main difficulty encountered by teachers is that the teacher must constantly update his/her lessons to keep up with market trends.*
- *Main suggestion is to involve freelancers and companies to intervene in class and bring real life examples of the application of the ICT contents.*
- *Main method of assessment is to create an application or to carry out a project.*

Interviews with students

Basic figures

The institution conducting the survey: Fondazione ITS Jobsacademy (JAC)

Place: Bergamo (Italy)

Date (period): May-June 2022

The survey was conducted by: Giulia Dakli, Chiara Spizzichino

Number and profiles of students (grade, qualification they learn for, EQF level): 5 students in possession of high school diploma (EQF 4) and enrolled in the 1st or 2nd year of the “Software Development” course (EQF 5) at JAC.

1. Resources students learn theoretical knowledge

All students confirm that they don't use manuals or books, but only slides prepared by the teacher for the course. In some modules of the course, the teacher suggests books to students who want to go in depth in some theoretical topic, while in other modules there is an official manual, but it is not mandatory to use it.

2. Tasks, projects for developing practical competences

Practical competences are delivered in three main ways:

- *Students are usually assigned with small IT projects, or they must complete a part/section of an existing bigger IT project.*

- *Teachers come from the world of business so when they are explaining theoretical or technical concepts, they tell the students how these concepts are applied in the software developer profession in real life.*
- *Exercises are done together in class or in groups or sometimes at home on an individual basis.*

3. Tools the teachers use for support learning

Students confirm that teachers mainly use open-source programming software available online (as an example: Angular JS, Atom, Azure). The only licensed/commercial program used in class is Microsoft 365.

Students are asked to bring their computers in class every day.

4. What do students need to obtain adequate practice?

All students were quite satisfied with the overall teaching method. Main suggestion is to focus more on the technical skills than on the soft skills.

Another request is to work on bigger and more realistic IT projects rather than on smaller fictional projects. The big projects could be done gradually during the whole course, but they are considered important because in real life companies have to deal with this kind of projects.

5. Assessment methods the teachers use

Students claim that there is a final exam at the end of each module and that the exam is a project assignment involving all students.

In some cases, the final exam also included a multiple-choice quiz, while in other cases, the students were assigned with interim exercises and their assessment was based on these in addition to the final exam.

6. Satisfaction of students with the teaching and assessment methods

All students were satisfied with the general assessment methods, except for those who have been assessed through the multiple-choice quiz, as they think it does not reflect the technical competences and soft skills acquired during the course but only the memorization of few theoretical contents.

Conclusion

Students would like to dedicate less hours to the lessons focused on soft skills and would like to rather concentrate on real life IT projects.

There is a general satisfaction on the evaluation methods and on the real-life professional experience brought by teachers in class. The professionalism and availability of teachers is widely considered the best feature of JAC's course

Interviews with companies

The institution conducting the survey: Fondazione ITS Jobsacademy (JAC)

Place: Bergamo (Italy)

Date (period): June 2022

The survey was conducted by: Giulia Dakli

Number and profile of companies (main divisions, geographical place, type (number of employees, SME, micro, etc.):

Company #1

- *Size: Small consultancy agency (SME)*
- *Location: Berlin but operating worldwide*
- *Field: Support to organizations, projects and networks to strengthen collaboration and learning through Knowledge Management*
- *Role of respondent: ICT officer (bachelor's degree in computer science)*

Company #2

- *Size: Small*
- *Location: Rome, Italy but operating Europe-wide*
- *Field: software engineering; provision of modern data solutions for companies & organizations; embedding IT competences in companies and organizations*
- *Role of respondent: Director*

1. Expectation against the employee just graduated

Both respondents focused especially on the soft or transversal skills that they seek for in newly hired employees or interns. These soft skills are:

- *practical sense.*
- *proactivity in decision-making.*
- *ability to question what they are asked to do.*
- *autonomy when performing their tasks.*

Both SMEs were more interested in soft skills, taking the technical skills for granted. They say that graduates usually have the required technical skills.

2. Competences the company is missing

Both companies declared that they are not missing technical competences, but only missing/need more workforce. When asked about missing competences, companies focused on the skills missing in the newly hired employees and in particular:

New employees or interns are often unfamiliar with managing the code that is produced during an IT project and with project management itself. Those who finish their studies are often not autonomous in the choices that must be made during the realization of a project.

This is because the training lacks project management theory and practice.

3. Suggestions for improvement

According to the interviewed companies, software development courses need to be developed with the consultancy of representatives of the job market, through targeted interventions of ICT

professionals and SMEs, especially on certain aspects and technologies that characterize the work practice.

4. Activities to find students with the right skills

None apart from an accurate selection process and interviews that are not focused exclusively on the possession of the technical skills.

5. Cooperation with schools in curriculum development

SME 1 is interested in cooperating with schools, but previous experience has proven VET and Adult courses to be not very organized. Professionals don't have much time to offer so the course must be perfectly organized, and the intervention of the SME must be coherent with the level of the course

SME 2, on the other hand, is not very interested in cooperation with schools as they see it as too time consuming. They are available only for short interventions (e.g., online lessons on very specific issues or as testimonials of professional application of theoretical concepts).

6. Openness for defining project task for students

Both SMEs are open to define a specific task for students as long as they are informed on the subject taught in the course and on the level of the topics.

Conclusions

- *SMEs expect certain attitudes in their newly hired or trainees rather than particular technical skills.*
- *Graduates mainly lack project management skills, and in fact the interviews to students show that rarely they are assigned big projects such as the ones that need to be developed in real life.*
- *SMEs should be involved in ICT education but in a very punctual and tailored way, as they don't have much time.*

Country level summary

Are the teachers aware that the labor market demands workers with strong soft skills?

Some teachers are perfectly aware of the demands of the job market, being themselves freelance consultants or employed in companies, nonetheless, they seem to think that teaching soft skills in dedicated modules, the way that is foreseen in Italian EQF 5 VET system, is far enough to develop these skills in their students, and the students themselves feel that they are dedicating already too much time to the development of these skills.

Are teachers prepared to develop students' soft skills?

Soft skills are almost always included in all technical courses in Italy's higher education VET system (Istituti Tecnici Superiori), nonetheless they are taught in specific modules (e.g., Team Building). This way the students perceive the subject as useless and not connected with the profession they are learning. Teachers are prepared to develop students' soft skills because they are also active professionals in addition to being teachers, so they know exactly in which situation each soft skill is required.

How far are they trained in the teacher-education for developing soft skills, are such methods included into their university program?

In Italy it is not necessary to have a university degree in order to teach in VET, so there is no specific preparation of the teachers on delivering soft skills. Most teachers come from the world of work so they know how these skills are used in real life, but they might lack the methodologies to embed the development of these skills in their classes/modules.

How can students develop soft skills?

Students can develop soft skills during their work internship, but also during the ordinary lessons thanks to the use of methodologies such as:

- *Project-based learning*
- *Simulation*
- *Design thinking*

The key is to include the assessment of soft skills in the ordinary evaluation practice that takes place during and at the end of each course module.

What tools can the school provide to teachers to develop students 'soft skills?

Soft skills should be mainstreamed inside the technical modules, and not taught as separate modules, so that students learn to apply them in the professional context.

Description of the standard curricula, subject and topic

Each partner selected a qualification from the sector and analysed the standard curriculum, requirements of the certificate, the available textbooks and learning materials. They identified a subject in which they intend to develop micro-learning contents in VETprofit project.

Description of the selected qualification and standard curricula

Course: Web Development

Qualification:

- *BACK-END WEB DEVELOPER*
- *FRONT-END WEB DEVELOPER*
- *SOFTWARE DEVELOPER*

Qualification type: The course provides the following certificates, recognized by the Ministry of Education.

- *EQF 5 ITS (Istituti Tecnici Superiori) DIPLOMA (Higher Education Technical VET Degree)*
- *Bachelor's degree ONLY IF THE STUDENT CONTINUES WITH A THIRD YEAR IN A PARTNER UNIVERSITY*
- *WEBSITE AND APP PROGRAMMING LABORATORY*
- *COMPUTER SECURITY LABORATORY*
- *PHP AND SQL PROGRAMMING LABORATORY*
- *WORK SAFETY LABORATORY*
- *ENGLISH B2*
- *DATA MANAGEMENT LABORATORY*

At the end of the first two years, the ITS Diploma recognized by the Ministry of Education is acquired; in the third year, everyone is offered an apprenticeship contract to give them the opportunity to gain experience and continue to deepen their personal project, committing themselves to obtain a three-year degree (Bachelor's degree) at the end of the three-year period in one of the affiliated universities.

Competences: The course allows students to acquire both technological and methodological skills and competences, both in the field of IT and web development and business management. The technologies addressed concern programming, interaction with databases, Cloud Computing tools, Internet of Things and Business Intelligence.

Issuing body: Bodies responsible for Higher Education Technical Vocational Training (Istituti Tecnici Superiori – ITS).

Subjects and topics:

Year I:

- *Object Oriented Programming*
- *Web programming*
- *Analysis and Project Management*
- *PHP backend programming*
- *Front-end web application programming*
- *SQL database programming*

- *360 hours internship*
- *Experiential workshop*
- *Soft skills workshop*

Year II:

- *Framework programming*
- *Software architecture*
- *Internet of Things*
- *Cloud and DevOps methods and tools*
- *Web programming*
- *Agile methodologies*
- *PHP backend programming*
- *IT security*
- *Stage 440 hours*
- *Experiential workshop*
- *Soft skills workshop.*

Dual system: Thanks to the dual system, students enter the world of work from the first year with a 360-hour internship, while in the second year the internship is 440 hours, for a total of 800 hrs. of internship in companies during the whole course.

As all ITS (Higher Education VET) EQF 5 courses in Italy, teachers are professionals capable of bringing real experiences to the classroom. 75% of the teaching staff is made up of professionals and 15% entrepreneurs. All ITS courses guarantee 800 hours of internship. The course includes company workshops to facilitate contact with the largest number of companies. At the end of the course, each student is guaranteed a real and consistent job offer and is coached in his/her entrance in the job market.

Short summary of the subjects, requirements, and available textbooks.

Selected curriculum: Web Development

The Web Development Course was selected for the purposes of the VETProfit project because information technology is increasingly entering our daily activities, both in our private lives and in our professional one. Information technology allows companies to automate all their processes, to improve their efficiency and effectiveness, creating the so-called digital transformation. In this perspective, all companies need technicians and consultants able to understand and analyse business needs and to create software systems that satisfy them. The market associated with digital innovation is constantly expanding and it does so by creating an increasingly pressing demand for new skills. Digital transformation is becoming a priority for Italian companies, which are looking for people with specific technical skills that are difficult to find on the job market.

Information technologies are now pervasive, mobile, and ubiquitous: computers and microprocessors are in fact available in objects and devices that characterize personal and work contexts daily (smartphones, office computers, household appliances, industrial machinery, ...) allowing to support and automate numerous and diversified human activities.

The pervasive diffusion and interconnection of information technologies have generated a large and growing demand for computer technicians, for technicians capable of creating and developing software programs.

There is a large need for developers able to create software systems for the Internet and the World Wide Web, i.e., software systems that are running on computers distributed on the Internet and that interact with the related technologies (browser, HTTP protocol, HTTP server).

Selected subject: Java programming.

Java is a very successful programming language, in great demand in the world of work for software development in various fields. The module on Java provides participants with the first notions of programming, especially useful for those starting from scratch with this language or with programming in general and for anyone who wants to learn programming. The java programming course illustrates the essential fundamentals of the language starting from the basic syntax and fundamental structures up to object-oriented programming.

Main topics:

- *Use of variables and of the 8 primitive types of data: numbers, characters and logical concepts of true or false*
- *Execution flow control, Strings and first data structure (Array)*
- *Introduction to object-oriented programming*
- *Types casing*
- *Dates management*
- *Log messages*
- *Data structures with the Collection Framework*
- *Management of exceptions*
- *Inheritance and package*
- *Abstraction and polymorphism. Management of hierarchies of articulated classes*
- *File management (reading and writing)*
- *Use of generics to allow generalizing an algorithm in this type of data*
- *Standard and custom annotations*
- *Design patterns. Design solutions to recurring problems.*

Competences:

- *Mastery of basic Java programming*
- *Basic programming techniques that can then be translated onto complex techniques*
- *Using lambda expressions*
- *Using OOP programming via Java*

Requirements: there are no requirements to access the Web Development course, except for the possession of a high school degree (EQF 4). There is no entry test.

ANNEX

Agriculture and forestry (HU, DE)

IT and telecommunications (HU, IT)

Partner	Curriculum	Textbook	Subject	Topic	EQF	Company
JAC	Web Development	"Programming PHP, 4th edition", by K. Tatroe and P. MacIntyre, O'Reilly Media Inc., 2020	Web programming	JAVA and Back-end programming with PHP 1	Tertiary VET, EQF 5	???
PREMO	Foundation training for IT students	NONE	Introduction to programming	Python prog.	IVET EQF 3-4	DRDC
DEULA	Web Development	Fachstufe Landwirt (Subject Level Farmer)	Agriculture 4.0	?	CVET, EQF 3-4-5	PROMPT
MAKE-SZISZ	Foundation training for agriculture students	Introduction to agriculture, Introduction to horticulture, Technology in Horticulture (Ornamental horticulture)	Smart Greenhouses, linking weather station to greenhouse automation, drone soil testing	?	IVET, EQF 3-4	DRDC

Project Summary

Multidisciplinary, Project-based Digital Learning Content for VET

Basic data

Title: Multidisciplinary, Project-based Digital Learning Content for VET

Acronym: VETPROFIT

Project ID: 2021-1-HU01-KA220-VET-000025350

Partner countries: Germany, Italy, Hungary

Coordinator: iTStudy Hungary Ltd.

Duration: 01 November 2021 – 31 October 2024.

Background

Vocational education and training (VET) has a key role to play in preparing young professionals for the challenges of a rapidly evolving global and digital economy. However, education often operates in isolation from the business world, with a widening gap between the skills provided by schools and those required by employers.

The labour market needs practical knowledge, and textbooks tend to be dominated by theory. Textbooks are not motivating enough for students born into the digital world and contain very few real-life examples from work situations. While most workplaces expect staff to work in a project-oriented way, the project approach and its associated forms of work are still not integrated into training, and a significant number of trainers are not yet prepared to apply the project approach. The multidisciplinary approach is difficult to integrate with traditional teaching methods, even though young graduates need to apply knowledge and skills from different subjects at the same time to solve workplace problems. While employers expect prospective employees to work in teams and on projects, the project method and related forms of work are not widespread in VET and project-based teaching methods are often missing from the toolbox of VET teachers.

Target groups

- VET- schools' leadership
- VET teachers/trainers
- Companies (Agriculture and IT sectors)

Beneficiaries

- VET students
- Employers

Objectives

The aim of the project is to reflect the needs of the labour market in vocational education and training, to prepare teachers to work with companies to develop project tasks for students and future employees to solve real problems proposed by them. To achieve this objective, the partnership:

- *review the curriculum, learning materials and teaching methods used in the initial training of IT and Agricultural sectors in the partner countries.*
- *train VET teachers of these sectors about the project method, related digital tools, innovative assessment practices and digital content creation.*
- *assign real-life project tasks for VET students, in close collaboration of teachers and labor market representatives.*
- *create a repository of project-based, re-usable, high-quality, motivating digital learning contents with an interdisciplinary approach.*
- *prepare students for successful project implementation by designing and delivering mini courses for them;*
- *create a model to be published as a guide for teachers of other VET institutes.*

Results

R1 – A study on 21st century relevance of textbooks and learning content

R2 - PBL with interdisciplinary approach – blended course for VET teachers

R3 - Labor market-oriented projects for students

R4 - Repository of re-usable digital micro-learning content for VET

R5 - Mini-courses and projects for VET students

R6 - Methodology of developing, publishing and re-using digital micro-learning contents – a guide for VET expert teachers

Partners

iTStudy Hungary IT Education and Research Centre. Hungary

DEULA - Nienburg GmbH, Germany

Fondazione ITS – JobsAcademy, Italy

Association of Hungarian Horticultural Vocational Training Institutions, Hungary

Premontre Vocational High School, Technical School and College, Hungary

Discovery Center Nonprofit Ltd., Hungary