



IT Administrator  
Competences Development  
and Acknowledgment



# ITACA Project

**Competence-based teaching & learning  
in the Informatics field**



Lifelong  
Learning  
Programme

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## 1. European context

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### 1.1 The Digital Agenda and the Grand coalition for digital jobs

None of the initiatives promoted by the European Union in the 2010s can be properly understood without referring to Europe 2020: it is the EU's growth strategy with a horizon in 2020 pursuing the goal of EU becoming a smart, sustainable and inclusive economy.

Logically the goal cannot be reached without a strategy for the digital economy: The Digital Agenda for Europe (DAE). DAE aims to reboot Europe's economy and help Europe's citizens and businesses to get the most out of digital technologies. It is the first of seven flagship initiatives within Europe 2020, the EU's strategy to deliver smart sustainable and inclusive growth. After the review of the Digital Priorities published on 18th December 2012, the DAE identifies 7 key areas for further efforts in the area, to stimulate the conditions to create growth and jobs in Europe:

1. Create a new and stable broadband regulatory environment.
2. New public digital service infrastructures.
3. Launch Grand Coalition on Digital Skills and Jobs.
4. Propose EU cyber-security strategy and Directive.
5. Update EU's Copyright Framework.
6. Accelerate cloud computing through public sector buying power.
7. Launch new electronics industrial strategy – an "Airbus of Chips".

As an implementation of key area 3, in March 2013 the Commission launched the Grand Coalition for Digital Jobs (GCDJ): a multi-stakeholder partnership that endeavours to facilitate collaboration among business and education providers, public and private actors to take action attracting young people into ICT education, and to retrain unemployed people. The goal is to start to increase the supply of ICT practitioners by 2015, so as to ensure a sufficient number of them in Europe in the near future. Obviously the DAE could not progress on the way to its goals if there are not enough qualified professionals to support activity related to Digital Jobs and activities.

GCDJ works with on-going programmes and best practices that could be scaled-up for concrete actions while focusing on some priorities like the following ones:

- Training and matching for digital jobs: training packages co-designed with the ICT industry so that the skills people get are the ones business needs.
- Certification - to improve recognition of qualifications across countries by stimulating take-up of the European e-Competence Framework.
- Innovative learning and teaching: more aligned degrees and curricula at vocational and university level education to promote the skills for success.

## 1.2 European guidelines for competence-based learning

Relevant guidelines are included in the ***Recommendation of the European Parliament and of the Council 18 December 2006: “Key competences for lifelong learning”*** and in the ***c (EQF)***.

An important reference point is also represented by ***European credit system for vocational education and training (ECVET)***.

### 1.2.1 Recommendation on Key competences for lifelong learning

The Recommendation of the European Parliament and of the Council (16 December 2006) identifies 8 key competences, *«those which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment»*:

1. Communication in the mother tongue.
2. Communication in foreign languages.
3. Mathematical competence and basic competences in science and technology.
4. Digital competence.
5. Learning to learn.
6. Social and civic competences.
7. Sense of initiative and entrepreneurship.
8. Cultural awareness and expression.



KEY COMPETENCES FOR LIFELONG LEARNING  
**European Reference Framework**



The annex to the Recommendation defines the competence as «*a combination of knowledge, skills and attitudes appropriate to the context*», it also provides a definition of the 8 key-competences and for each of them it describes «*Essential knowledge, skills and attitudes related to this competence*».

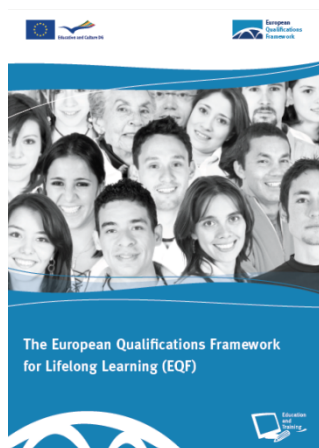
### **1.2.2 European Qualification Framework (EQF)**

The European Qualification Framework for lifelong learning is «*a common European reference framework which links countries' qualifications systems together, acting as a translation device to make qualifications more readable and understandable across different countries and systems in Europe*».

In EQF the definition of competence is as follows: «*competence means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development*».

Instead of "attitudes" they speak of "social and/or methodological abilities," but it is perhaps just another way to detail them.

Instead of just talking of a "combination of knowledge, skills and attitudes" here they focus on an operational dimension: "the ability to use them" in concrete contexts.



EQF identifies 8 levels - *«the levels span the full scale of qualifications, from basic (Level 1, for example school leaving certificates) to advanced (Level 8, for example Doctorates) levels»* - that *«are described in terms of learning outcomes»*.

Each country is required to locate its own titles within that grid.

**Italy** has established that the diplomas of Technical upper secondary school and Vocational schools match level 4. According to this the learning outcomes relevant to the diploma of upper secondary education are those indicated in the table below:

	Knowledge <sup>1</sup>	Skills <sup>2</sup>	Competence <sup>3</sup>
<b>Level 4</b>	Factual and theoretical knowledge in broad contexts within a field of work or study.	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study.	Exercise self-management within the guidelines of work or study contexts that are usually predictable, but



			are subject to change Supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities.
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<sup>1</sup> In the context of EQF, knowledge is described as theoretical and/or factual.

<sup>2</sup> In the context of EQF, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).

<sup>3</sup> In the context of EQF, competence is described in terms of responsibility and autonomy.

**Spain** has established that the diplomas of Medium level FP educational cycles (*Ciclos Formativos de Grado Medio*) match level 4 (see above), while the diplomas of Higher FP educational cycles (*Ciclos Formativos de Grado Superior*) match level 5:

	Knowledge	Skills	Competence
<b>Level 5</b>	Comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge.	A comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems.	Exercise management and supervision in contexts of work or study activities where there is unpredictable change. Review and develop performance of self and others.

In Hungary a comprehensive NQF has been developed, titled Hungarian Qualification Framework. The government decree on the Hungarian qualifications framework was approved in July 2012. Stakeholders from all other ministries, the National Council for Public Education, the National Institute of Vocational and Adult education, the Hungarian Rectors' conference, the Higher Education and Research Council and representatives of social partners are included. It will adopt the eight-level structure and it will include qualifications from all subsystems of education and training and it will open to non-formal and informal learning. Level descriptors are grouped in four categories: knowledge, skills/abilities, attitudes, autonomy/responsibility.

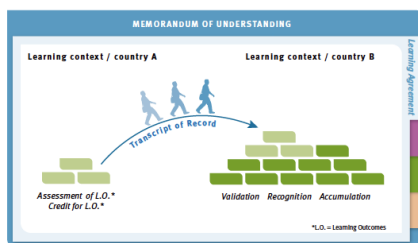
	<i>Knowledge</i>	<i>Skills and abilities</i>	<i>Attitudes</i>	<i>Autonomy and responsibility</i>
<b>Level 4</b>	<p>Knows basic facts and concepts related to a given field of work or study, understands key processes and correlations.</p> <p>Knows the language, the terminology of a given field, eventually in a foreign language as well.</p> <p>Knows and understands the conceptual correlations and structure of his field of interest.</p> <p>Understands the correlations of complicated, multifactor phenomena.</p> <p>Is familiar with the methods and has the literacy necessary for employing the facts, concepts, correlations and proceedings of a given field.</p>	<p>Able to apply knowledge related to a field of work or study in an unconventional context.</p> <p>Able to think systematically, and use certain forms of abstraction.</p> <p>Able to gather new information, and process it independently.</p> <p>Able to plan and implement a problem-solving strategy on his own and make the necessary corrections.</p> <p>Able to identify problem situations in a field of work or study and articulate adequate proposals for solving them.</p>	<p>Open to undertaking new tasks.</p> <p>Able to assess possibilities; consider risks, alternatives and consequences; is capable of making compromises.</p> <p>Follows ethical and legal norms in decision-making situations, understands the correlations between values, behaviour and lifestyle.</p> <p>Committed to the professional, quality work.</p> <p>Demands continuous self-education and applies its proceedings.</p>	<p>Autonomy and self-control are characteristic in work, study and problem solving as well.</p> <p>Takes responsibility for his/her own actions or for the work of a small group or community.</p>

### 1.2.3 ECVET

ECVET is a common methodological framework useful to facilitate the accumulation and transfer of learning credits from a certification system to another. Its aim is to promote transnational mobility and access to life-long learning.

EQF refers to qualifications (certificates, diplomas, degrees,) and their mutual recognition: each state declares which "level" a certain certification corresponds to.

Instead ECVET concerns learning outcomes and transfer of credits from a certification system to another; a person can get the recognition of some learning outcomes in a country (A) and use them to obtain a certification in another one (B).



### 1.3 e-Competence Framework (e-CF)

The e-CF, *e-Competence Framework*, is the European framework of the competences required for those who work in the ICT sector: professionals, workers, public and private companies of supply and demand, training and/or certification organizations. It permits reference systems at international, national and enterprise levels to "talk to" one another.

It was developed within the CEN Workshop on ICT skills with the support and guidance of the European Commission. Version 1.0 of 2008 was followed by a 2.0 version and recently by a 3.0 version.



The CEN - the European Committee for Standardization - has formed a Project Committee, the "PC 428", with the goal of transforming the e-CF in a European standard. This is a step already taken by Italy with the UNI 11506 regulation.

e-CF includes four dimensions:

- **Dimension 1:** five e-Competence areas, derived from ICT business processes;
  - Plan,
  - Build,
  - Run,
  - Enable,
  - Manage.
- **Dimension 2:** A set of reference e-Competences for each area, with a generic description for each competence. 40 competences identified in total provide the European generic reference definitions of the e-CF 3.0.

### European e-Competence Framework 3.0 overview

Dimension 1 5 e-CF areas (A – E)	Dimension 2 40 e-Competences identified	Dimension 3 e-Competence proficiency levels e-1 to e-5, related to EQF levels 3–8				
		e-1	e-2	e-3	e-4	e-5
A. PLAN	A.1. IS and Business Strategy Alignment					
	A.2. Service Level Management					
	A.3. Business Plan Development					
	A.4. Product/Service Planning					
	A.5. Architecture Design					
	A.6. Application Design					
	A.7. Technology Trend Monitoring					
	A.8. Sustainable Development					
	A.9. Innovating					
B. BUILD	B.1. Application Development					
	B.2. Component Integration					
	B.3. Testing					
	B.4. Solution Deployment					
	B.5. Documentation Production					
	B.6. Systems Engineering					
C. RUN	C.1. User Support					
	C.2. Change Support					
	C.3. Service Delivery					
	C.4. Problem Management					
D. ENABLE	D.1. Information Security Strategy Development					
	D.2. ICT Quality Strategy Development					
	D.3. Education and Training Provision					
	D.4. Purchasing					
	D.5. Sales Proposal Development					
	D.6. Channel Management					
	D.7. Sales Management					
	D.8. Contract Management					
	D.9. Personnel Development					
	D.10. Information and Knowledge Management					
	D.11. Needs Identification					
	D.12. Digital Marketing					
E. MANAGE	E.1. Forecast Development					
	E.2. Project and Portfolio Management					
	E.3. Risk Management					
	E.4. Relationship Management					
	E.5. Process Improvement					
	E.6. ICT Quality Management					
	E.7. Business Change Management					
	E.8. Information Security Management					
	E.9. IS Governance					

- **Dimension 3:** Proficiency levels of each e-Competence provide European reference level specifications on e-Competence levels e-1 to e-5, which are related to the EQF levels 3 to 8 as in the following table.

e-CF Level	related to EQF Level
e-5	8
e-4	7
e-3	6
e-2	4 and 5
e-1	3

- **Dimension 4:** Samples of knowledge and skills relate to e-Competences in dimension 2. They are provided to add value and context and are not intended to be exhaustive.

An overview of the first three dimensions is shown in the figure on page 6.

As far as e-CF is concerned, a competence is *«a demonstrated ability to apply knowledge, skills and attitudes for achieving observable results»*.

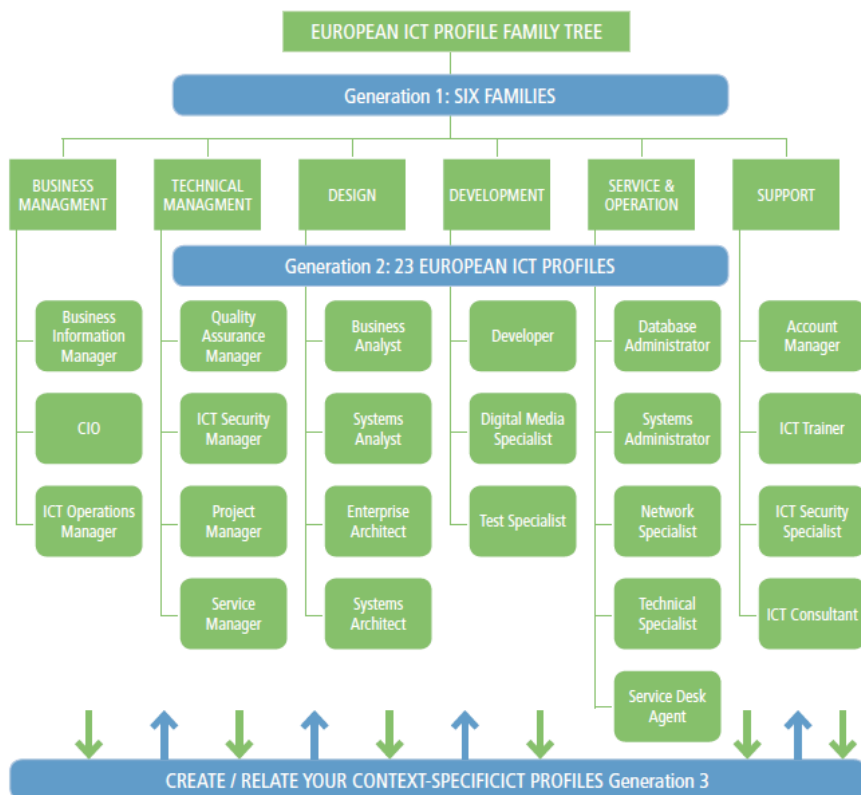
A definition in line with the Recommendation and EQF: in particular it is to be noted the emphasis on the fact that no recognition of competence is possible without observable results.

And here is the definition given in the e-CF of the three components of competence:

- **«Knowledge** represents the “set of know-what” (e.g. programming languages, design tools...) and can be described by operational descriptions as well.
- **Skill** is defined as the “ability to carry out managerial or technical tasks”. Managerial and technical skills are the components of competences and specify some core abilities that form a competence.
- **Attitude** means in this context the “cognitive and relational capacity” (e.g. analysis capacity, synthesis capacity, flexibility, pragmatism...). If skills and knowledge are the components, attitudes are the glue, which keeps them together».

e-CF is a system of competences, not of professional profiles. A profile can be built by integrating multiple competences, even at different levels of e-CF proficiency levels.

Upon completion of e-CF the CEN ICT Skills Workshop has developed a series of typical ICT professional profiles that can be used as a reference and adapted according to specific contexts (creating a "third generation"):

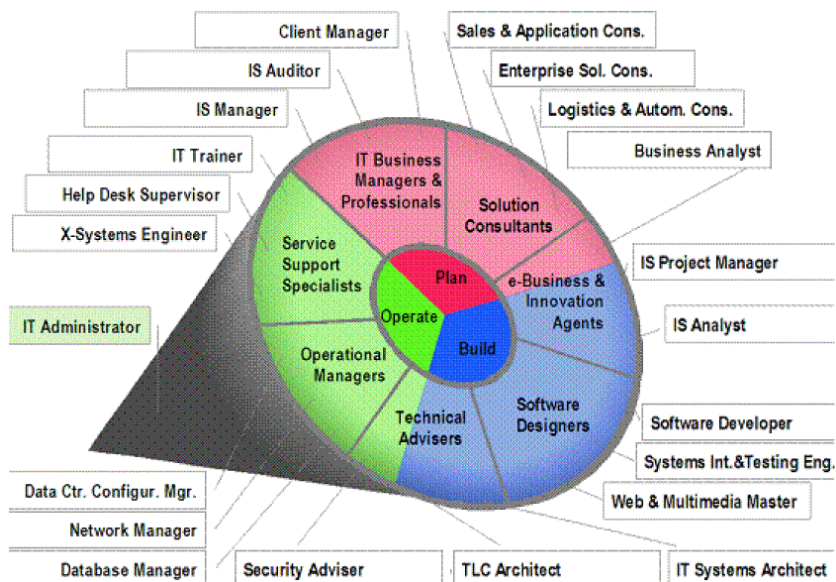


## 1.4 EUCIP IT Administrator & EUCIP Core

### 1.4.1 The EUCIP system

EUCIP - *European Certification of Informatics Professionals* - is a system of competences, job profiles, certifications and services developed by CEPIS

- Council of European Professional Informatics Societies - and managed in Italy by AICA and in Spain by FEE (Fundación EUCIP España).



The EUCIP system is composed of:

- A **syllabus**, divided into three areas - **Plan, Build and Operate** - and in 18 macro-categories of competence, further articulated in 156 categories of competence for each of which knowledge and skills are described (in total about 3.000).
- **21 professional profiles** characterized by a common set of skills, EUCIP core, plus a twenty-second profile: IT Administrator.
- A system of **certifications**:
  - **EUCIP-Core** certification.
  - **IT Administrator Fundamentals** certification.
  - **IT Administrator certification**: 4 modules in the 3.0 version. The passing of the 4 modules provides a full IT Administrator Certification.
  - **21 elective profiles** certifications: they require the EUCIP core certification and the completion of the following tasks:

- the presentation by the candidates of their portfolio: the training school attended, certifications obtained in the ICT sector, both independent and vendor (for example, ITIL, Cisco, Microsoft, ...) and their professional experiences;
  - the presentation of a case-study based on their own experiences;
  - an oral examination in which examiners - usually a responsible of EUCIP, a representative of the world of universities and a representative of the world of work - assess the communication skills of the candidates, verify the content of their portfolio and the mastery of their case-study.
- A **set of services** for individuals and businesses: self-assessment, self-assisted assessment, qualification, design and delivery of training paths,
  - A **network of competence centres** that manage the exams and deliver services.

### 1.4.2 EUCIP and e-CF

The initial development of EUCIP competence system was completed in 2006, thus preceding the e-CF 1.0 version dated 2008.

CEPIS, and the organizations composing it, such as AICA, have actively participated - within CEN ICT Skills Workshop – to the development of e-CF and have supported its dissemination.

Since 3.0 version of EUCIP professional profiles (2011) references have been added to the e-CF competences. CEPIS and AICA are currently working to implement the transition of EUCIP certifications and services towards a complete consistency with the e-CF framework.

As far as EUCIP Core and ITAF are concerned, within the ITACA project, references to the e-CF competences have been identified.

The [CEPIS e-Competence Benchmark](#) is a free, online interactive tool that enables current and future ICT professionals to identify the competences they need for various ICT roles and career paths. It is powered by the European e-Competence Framework and supports the European Commission's Grand Coalition for Digital Jobs.



It helps individuals plan their career development and make informed decision about further education.



The e-Competence Framework is not intended to replace existing competence systems or to define a new system of certification.

As it is said in the “User Guide for the Application of the European e-Competence Framework (3.0)” (page. 14): *«The e-CF is designed to relate to specific skills and job profiles frameworks (e.g. AITTS, CIGREF, EUCIP, SFIA, etc) coming from different cultures and experiences across Europe».*

In particular as far as EUCIP is concerned it is said (page 28): *«EUCIP and the e-Competence Framework have common features and interesting potential synergies. The e-CF, as a common, accepted reference point for ICT professional competences, has the potential to be an important input for the future evolution of EUCIP and its associated certification and service offered.*

*[...] e-CF Dimension 4 (Knowledge and Skills) link to EUCIP Competence Categories and more detailed topics. Referring to granularity of e-CF Dimension 4, EUCIP provides more in depth detail at this level finalized to support activities such as assessment.*

***[...] EUCIP's high level of granularity is useful for training departments to design and develop curricula and learning initiatives. It can provide detailed guidelines to identify knowledge and skill topics. ».***

### 1.4.3 IT Administrator

ITACA stands for IT Administrator Competences Development & Acknowledgment: development and recognition of IT Administrator competences.

Initially, as it will be discussed in the next chapter, the idea was, in fact, only to refer to the IT Administrator syllabus and certification. The

hypothesis was that such a professional profile could be taken as a reference to achieve the learning objectives of Informatics school giving, at the same time, a response to the needs of many small and medium-sized companies.

The IT Administrator is, in fact, the manager of information systems in small businesses or remote offices of larger organizations, where it is required for a single person to have a broad spectrum of operational ICT expertise.

As for Italy it is a professional profile in line with the objectives of the Ministerial guidelines for the two disciplines "Systems and networks" and "Technology and design of computer systems and telecommunications," such a profile is to be developed during the last two forms and the fifth form of the secondary school.

The IT Administrator Syllabus is organized, since 3.0 version, into 4 modules:

1. **PC hardware,**
2. **Operating systems,**
3. **Network,**
4. **IT Security.**

Module 1 requires a theoretical examination with automated correction, while the other modules also require a theoretical examination plus a practical test.

The IT Administrator Fundamentals syllabus is organized like the same 4 modules but at a less detailed level. The exam is unique with automatic correction.

Italian school students wishing to join the ITACA proposal can take advantage of a version of the ITAF exam divided into four modules (certification, however, can be obtained only being successful in the all 4 modules).

#### **1.4.4 EUCIP core**

The Core corresponds to the body of knowledge that, according to the EUCIP model, all 21 professional profiles should have. The core syllabus is organized into three areas:

A. Plan,

- B. Build,
- C. Operate.

To get certified one must pass the 3 automated exams of the three areas. Although it is allowed to translate the exams into national languages, in many countries, as in Italy, exams are available only in English. Non-English speaking people have more time to take the exam if in English (and they can use dictionaries).

While the ITACA project was still on its way, AICA - in agreement with the Italian Ministry of Education (MIUR) - proposed Economical Institutes with specializations in "IT Management for Business" to join a pilot scheme, begun in 2010 in 3 Institutes, which included EUCIP Core syllabus in the curriculum.

The project aims to make the students acquire, in three years, the EUCIP Core certification (Build exam in the fourth form, Plan exam at the beginning of the fifth form and Operate the end of it).

Strengths of the project – joined by 90 institutes in 2012/13 and by a further 70 in 2013/14, out of a total of 444-level Italian – are as follows:

- a reference system of competences and certification outside the school,
- interdisciplinary approach involving primarily teachers of Computer Science, Business Economics and English,
- intensive use of the English language in a CLIL (*Content and Language Integrated Learning*) logic.

The experience has led the Italian partner of ITACA to consider the idea of extending the project also to EUCIP core.

## 2. ITACA Project

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### 2.1 Objectives

In the Application form under "Aims and Objectives" we wrote:  
"ITACA promotes the adoption by the schools of the EUCIP IT ADMINISTRATOR competence and certification system as a tool and opportunity to:

1. overcome self-referring to meet the standards established in the market and get an external certification;
2. provide transparency and recognition of training paths by specifying them in terms of "learning outcomes";
3. adopt teaching methods in which the acquisition of knowledge and skills takes place in project-work activities and work-based learning to develop real expertise.



IT Administrator  
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The objectives of the project are as follows:

- A. To promote a fruitful debate between teachers and the working world on the IT Administrator profile.
- B. To plan, in a pilot course of research/action, a training/learning path that leads to IT Administrator certification, based on project activities and work-based learning experiences, structured in units with well-defined learning outcomes.
- C. To design and deliver, in Italy and in Hungary, courses for informatics teachers on competence-based learning, ECVET model and IT Administrator, to let them acquire the IT Administrator certification.
- D. To experiment - in three Italian regions and in Hungary - a training/learning path for those students wishing to attain the IT Administrator (full or fundamentals) certification.
- E. To promote the full implementation of such a training/learning path at a regional level with recognition of credits/ECVET points and its spread to other regions.
- F. To validate the model at a European level."

## 2.2 Partnership



ITACA partnership includes:

1. Three Italian Technical Institutes with informatics specialization (one in the South, one in the Centre and one in the North) and an association of schools called Hermes. All four organizations have experience in certification and are ECDL Test Centres).  
The three Italian schools are as follows:
  - IT Giordani in Naples (Promoter)
  - IT Meucci in Florence,
  - IT Mattei in San Donato Milanese (Milan).
2. A Hungarian vocational training centre in the informatics field: Szamalk.
3. Three organizations responsible for EUCIP certification:
  - AICA (project coordinator) in Italy;
  - FEE (Fundacion EUCIP Espana) and ATI (Asociación de Técnicos de Informática) in Spain.
4. PROMPT, a Hungarian organization specialized in IT training and certifications (ECDL and CISCO Test Centre).
5. Three associations linked to the world of work:

- Assintel, the Italian association of IT companies,
- CNA Lombardy, Confederation of Crafts and Small Businesses,
- GAK, Hungarian organization founded to offer services to companies in the agro-industrial sector.

While Assintel has a systemic vision of the informatics professional profiles, CNA Lombardy and GAK provide the project with a broad view of the needs of all those small businesses that require people able to manage their computer system, which is precisely the function of an IT Administrator.

6. The Spanish organization Scierter CID that, due to its experience in the management of European projects, can perform the function of internal evaluator.

It is therefore a multi-actor partnership in which each partner plays a specific role, related to its nature and experience.

## 2.3 ITACA Work Phases

The Gantt below illustrates the phases of work. Some concern the whole project period, 24 months, from 1 October 2012 to 30 September 2014:

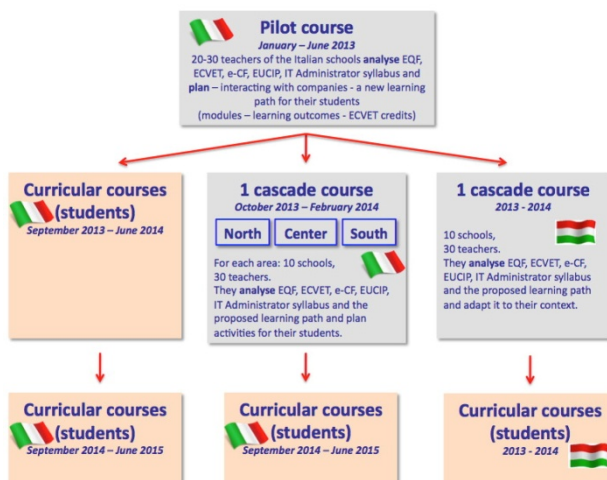
- **WP1, Management Accounting and Finance** (Responsible is the promoter: IT Giordani).
- **WP2, Management of work plan and developmental project** (Responsible is the co-ordinator: AICA).
- **WP12, Evaluation** (Scierter).
- The activities of dissemination and exploitation are two consecutive stages: a first phase of 18 months, WP10, **Dissemination & Exploitation** (responsibility of AICA), followed by another, **WP11, Closing Exploitation**; the responsible organizations for this phase are as follows:
  - ⌞ Hermes for Italy.
  - ⌞ Mattei, Meucci and Giordani for the three final events in the North, Centre and South of Italy.
  - ⌞ PROMPT for Hungary.
  - ⌞ FEE/ATI for Spain.

## The ITACA Project

### Competence based teaching and learning in the Informatics field

	2012			2013									2014											
	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September
WP 1 - Giordani Administrative/Financial Management																								
WP 2 - AICA Work plan & Project Management																								
WP 3 - AICA Kick-off, Planning of the pilot course																								
WP 4 - Hermes Pilot course/Cooperative production Italy																								
WP 5 - Prompt - FEE Validation, Translations & Adaptation																								
WP 6 - Hermes + 3 Italian schools Teachers training in Italy																								
WP 7 - Prompt Teachers training in Hungary																								
WP 8 - 3 Italian schools & Szamalk Piloting with students in Italy & Hungary																								
WP 9 - AICA, FEE Validation & Publication in the Internet																								
WP 10 - AICA Dissemination & Exploitation																								
WP 11 - Hermes, Prompt, FEE Final Exploitation																								
WP 12 - ScienTer Project evaluation																								

The other phases of the project can be considered the core of the project, well shown in the following image:



- The phase entitled **WP3 Kick-off & Designing of the pilot course** concerns the agreement between the partners, the first meeting of the Partnership and the design of the pilot course.
- The **WP4, Pilot course/Cooperative production in Italy** phase refers to the development of the so-called "pilot course", not exactly a course – except for the first part devoted to the study of European documents (Recommendation, EQF, ECVET, e-CF) – but a collaborative activity aiming to the design of students' training/learning path.

The Italian teachers of the partner schools carried out this activity, which took place partly in the Moodle platform, purposely developed, and by means of videoconferences. It was at this stage that the partnership decided to take not only the IT Administration profile, but also EUCIP Core (as described in Chapter 3) as a reference, at least in Italy.
- The **WP5, Validation, Translation and Adaptation** phase has seen the involvement of FEE and ATI in the evaluation of results and Prompt and the other Hungarian partners in the preparation of the course (for teachers) in Hungary.
- The phases **WP6, Teachers training in Italy**, and **WP7, Teachers training in Hungary**, have seen the involvement of lecturers external to partner organizations respectively in Italy and Hungary. The training material related to competence-based teaching and learning in the informatics field, designed for the pilot course or within it, have been proposed to teachers with the aim of helping them change their teaching practices.

**In Italy** 237 teachers - including 114 from the South, 63 from the North and 60 from Central Italy, for a total of 39 provinces involved - have asked to participate in the course and were enrolled in the ITACA Moodle platform.

The course proposed three stages:

  - A phase of study/discussion of the European documentation (Recommendation, EQF, ECVET, e-CF, EUCIP,).



- A phase of confrontation on the proposal for the students emerged from the pilot course (learning path, certifications, ... see chapter 3)
- A phase - attended by only a part of the trainees: 81 – devoted to the design of learning resources and detailed learning paths for students.

In **Hungary** 45 teachers - delegated by vocational high schools with IT specification from three regions: Central Hungary, Southern Great Plain and Central Transdanubia - were enrolled in the pilot, which started on two seminars in Budapest, and continued on the ITACA Moodle platform implemented by Prompt-H Ltd and moderated by experts SZÁMALK and Prompt experts.

The course proposed three stages:

- In the first one the teachers analysed the EUCIP ITAF syllabus (in English and in Hungarian) and a discussion started on a possible learning path which would help to build in the ITAF exam into the regular education of the students of IT curriculums.
  - In the second phase the headmaster of Öveges József Vocational and Grammar School introduced the ECVET system and the teachers were involved into a discussion on EQAVET.
  - In the third phase the participants started a discussion on European and Hungarian Qualification Framework, and agreed, that ITAF could be fit to the level 4 in both systems.
  - The teachers' collaboration continued after closing the online course, they discussed the results of the students' pilot after the practicing ITAF exam and after the official, paper based ITAF test involving more than 100 students too.
- The phase **WP8, Piloting with students**, relates to the beginning of the activities with the students.

In **Italy** the three partner schools and one school of the Hermes network started the activities in 2013/14 with about 100 students and the first EUCIP exams will take place in September 2014. Other Italian schools involved in the cascade phase, will start the activities in September 2014.

**In Hungary** Prompt's trainers implemented the EUCIP ITAF practicing tests on the Hungarian ITACA platform and the teachers started ITAF consultations with 96 students enrolled to the pilot. The Hungarian ITACA partners are satisfied with the final results: 52 Hungarian candidates – 15 teachers and 37 students – were successful and will get the EUCIP ITAF certificate.

- Finally, in **phase WP9, Validation & Publication in the Internet**, the training course for teachers on competence-based learning in the informatics field and on ITACA proposals will be made available as an open course in Italian and Hungarian language.

## 2.4 Site, eLearning environment and availability of project results

The results of the project are available on the ITACA website - [www.itaca-project.eu](http://www.itaca-project.eu) -, which is in four languages: English, Italian, Spanish, and Hungarian.

All the public products of the project are available (or will be as such by the end of the project), as well as data about the project and its management.

The before mentioned products are as follows:

- several leaflets in Italian, English, Hungarian and Spanish,
- An Italian and English version of this booklet,
- documents,
- reports,
- articles,
- ...

On the eLearning project site - <http://elearning.itaca-project.eu> – the following products are available:

- the self-learning on-line course entitled “Competence based training/learning in the Informatics field (in Italian and in other languages).
- open educational resources and training paths to be used with students.

## 3. Experience and perspectives in Italy

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The Itaca project addresses the three last years (year 11, 12 and 13) of *Istituti Tecnici Tecnologici in Informatica* ((Technical Institutes in Informatics or Computer Science). That means that the project addresses just a little part of the Italian Upper Secondary Education: the one in charge to produce Informatics Technicians.

### 3.1 Mapping EUCIP Syllabuses with Italian Ministerial Guidelines

The object of the project was initially defined as a "transfer" of IT Administrator Syllabus & Certification from the companies' context to the technical schools context (schools in the computer science field).

But, right from the start, the partners agreed on taking also the EUCIP core syllabus and certification into consideration.

The Italian teachers have analysed two different kinds of documents:

- The Italian Ministerial Guidelines for the "Informatics" courses in the Technical Education (see attached).
- The EUCIP syllabuses: Core, ITA and ITAF.

They have matched the knowledge and skills, defined in the Ministerial Guidelines for each subject, with the EUCIP syllabuses items.

The results can be found at this address: <http://goo.gl/pExure>.

### 3.2 Results of the mapping

What emerges is a **strong correspondence** between the various EUCIP syllabuses and the Ministerial guidelines. So it is undoubtedly possible to introduce the EUCIP certifications in the "Informatics" Italian course.

The following table shows the matching of the different subjects and the EUCIP areas.

Subjects	Eucip
<i>Informatica</i> (Informatics),	Eucip core: Build
<i>Sistemi e reti</i> (Systems & Networks),	Eucip core: Operate IT Administrator IT Administrator Fundamentals
<i>Tecnologie e Progettazione di sistemi informatici e di telecomunicazione</i> (Technologies and Planning of Information and Telecommunication Systems)	
<i>Gestione progetto e organizzazione di impresa</i> (Project management and business organization).	Eucip core: Plan

The teachers analyzed the compatibility of EUCIP syllabuses with the attending hours of the school subjects involved.

The Core certification was evaluated compatible with the school training plan. As far as ITA & ITAF are concerned, the opinion is that the objectives set out in the guidelines formally correspond to the ITA syllabus, but not all the students are really able to reach them: the ITA certification was evaluated too difficult for most students. Thus it is not feasible to offer all students the ITA (full) certification, while ITAF could be a feasible goal for all students.

Thus it was decided to provide a formal **training/learning path finalised to get ITAF and Core certifications**, and to propose the most talented students additional material and tasks to get prepared for the ITA exams.

## 3.2 The learning path

The teachers planned a training/learning path for Technical Institutes in Informatics, based on project-work activities and work experiences, structured in Units with Learning Outcomes to be assessed in EUCIP exams (Core and ITAF).

Such a training/learning path has been designed with the aim of obtaining a recognition of credits/ECVET points by the competent institutions, having the European Qualifications Framework for lifelong learning (EQF) as a reference.

The training/learning path above mentioned is structured in ECVET units consistent with the Ministerial guidelines and involving the already cited four disciplines of the last three school forms: "Informatics", "Systems and Networks", "Technologies and planning of computer systems and telecommunications", "Project management, business organization".

The ECVET units are designed as follows:

1. **PC Hardware** (ITAF 1).
2. **Operating systems** (ITAF 2).
3. **Computer networks** (ITAF 3).
4. **IT security** (ITAF 4).
5. **The Information Technology and Communication in organizations** (Core Plan).
6. **Development, testing, integration and release of software systems** (Core Build).
7. **Work with communication services of an IT infrastructure** (Core Operate, only the few parts not covered by ITAF).

The first four units define a qualification as **Technical operator for management of a small informatics infrastructure** (EQF level 4).

The other three units define a qualification as **Technical operator for planning, implementation and management of information systems** (EQF level 4).

The following table shows how the 7 ECVET Units can be located inside the curriculum.

For each school form, the table shows the attribution of the ECVET learning units to the various subjects and the proposed EUCIP exams. Some ECVET Units are purposely split to insert some content into different subjects and/or different school forms.

Third form					
Subject	Learning unit	h.	h.	Ref.	ECVET Learning Unit
Systems & Networks	1.1 Introduction to the Personal Computer	5	60	ITAF 1	1.Hardware
	1.2 Motherboards	10			
	1.3 Bios	6			
	1.4 Microprocessors	9			

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	1.5 Bus & System resources	10	<b>35</b>	<b>ITAF 3</b>	3. Computer networks - A
	1.6 Interfaces	8			
	1.7 Mass storage devices, printers and video interfaces	12			
	3.1 Computer networks fundamentals	10			
	3.2 Physical level, data link and network	15			
	3.3 Transport level, session and presentation	10			
Technologies & Planning	2.1 Operating Systems fundamentals	15	<b>116</b>	<b>ITAF 2</b>	2. Operational systems
	2.2 System configuration	35			
	2.3 Management and maintenance of the disc	22			
	2.4 Shares and Permissions	14			
	2.5 Administration and Diagnostic Tools	20			
Informatics	2.6 Database	10	<b>30</b>	<b>Core Build</b>	6. Development, testing, integration and release of software systems – A
	6.1 Systems development	30			

<b>Fourth form</b>					
<b>Subject</b>	<b>Learning unit</b>	<b>h.</b>	<b>h.</b>	<b>Ref.</b>	<b>ECVET Learning Unit</b>
Systems & Networks	3.4 Application level	5	<b>85</b>	<b>ITAF 3</b>	3. Computer networks - B
	3.5 World Wide Web	10			
	3.6 e-mail	10			
	3.7 Group applications and sharing	10			
	3.8 Connection to a network	25			
	3.9 Configuring and	25			

	Using Network Services				
	7.1 Mobile computing	5	<b>10</b>	<b>Core Operate</b>	7. Work with communication services of an IT infrastructure (Core Operate integration)
	7.2 Network Management	5			
Informatics	6.2 Programming	40	<b>100</b>	<b>Core Build</b>	6. Development, testing, integration and release of information systems - B
	6.3 User interfaces & Web design	30			
	6.4 Data management - Database	30			
	7.3 Services distribution and support	10	<b>10</b>	<b>Core Operate</b>	7. Work with communication services of an IT infrastructure (Core Operate integration)

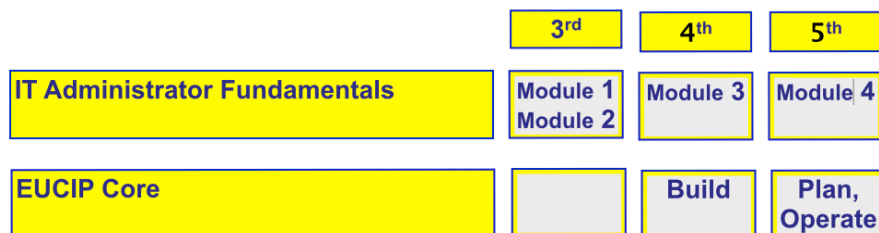
<b>Fifth form</b>					
<b>Subject</b>	<b>Learning unit</b>	<b>h.</b>	<b>h.</b>	<b>Ref.</b>	<b>ECVET Learning Unit</b>
Systems & Networks	4.4 malware	10	<b>42</b>	<b>ITAF 4</b>	4. Computer security - B
	4.5 Security	15			
	4.6 Firewall	12			
	4.7 Social, ethical and legal aspects of security	5			
Technologies & Planning	4.1 Basic Principles on Security	16	<b>28</b>	<b>ITAF 4</b>	4. Computer security - A
	4.2 Authentication, availability, and access control	6			
	4.3 Public Key Infrastructure	6			
	5.5 Project Management	30	<b>30</b>	<b>Core Plan</b>	5. ICT inside organizations - C
Project planning & Business management	5.1 Use of ICT in Organizations	20	<b>70</b>	<b>Core Plan</b>	5. ICT inside organizations - A
	5.2 ICT management	20			
	5.3 Measuring the value of ICT	10			

	5.6 Collaboration and communication	10			
	5.7 Ethical and Legal Issues	10			
English	5.4 The global economy in the net	10	<b>10</b>	<b>Core Plan</b>	5. ICT inside organizations – B

### 3.3 Exams & Certifications

As you can see from the tables above, the learning paths related to ITAF 1 and 2 (and similarly ITA 1 and 2) are to be completed in the third form, the learning paths ITAF 3 and Build in the fourth form, the learning paths ITAF 4 and Plan in the fifth form. The Operate path is contained in ITAF except for the two items "Mobile computing" and "Network Management" that are to be completed in the fourth form.

The pattern of examinations could be therefore as follows:



In order to allow the delivery of the above pattern of exams, ITACA partners asked CEPIS and ECDL Foundation the permit to split the ITAF examination in 4 exams. Permission was granted and AICA has implemented 4 separate exams.

### 3.4 ITACA Methodology

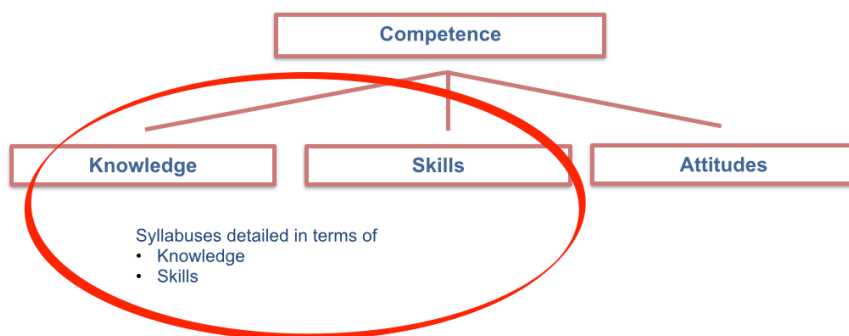
A few hundred of informatics teachers, involved in an online course, were presented the project ideas and the proposal of the training/learning path as above described. With these teachers the ITACA partners have started



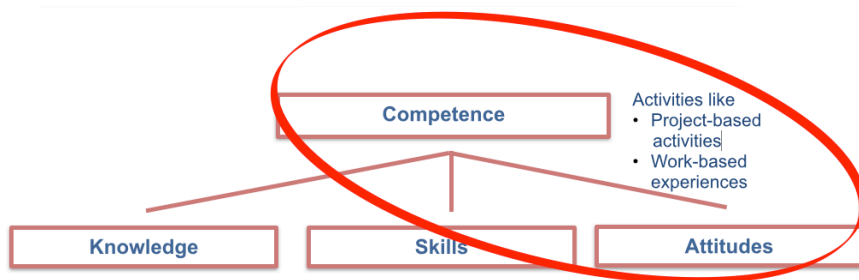
to collect teaching resources and to develop learning paths. The goal was/is to build a community of practice of teachers willing to exchange ideas and experiences.

Here are some interesting clues that are emerging.

1. The ministerial guidelines are very well defined in terms of knowledge and skills. Taking EUCIP Core and IT Administrator syllabuses - consistent with the guidelines - as a reference, provides teachers with a tool useful to assess the results achieved; a tool external to the school and independent from technology providers.



2. But dealing with knowledge and skills does not mean dealing with competences. This requires that students be offered real and concrete contexts in which they could develop their attitudes, where they could work together to produce visible results.



3. Thus, how can one work with classes on both these levels at the same time?

The **Flipped classroom** could be an answer.

The acquisition of knowledge and skills may imply online self-study activities, where students are offered learning objects, video-tutorials, simulations, self-learning tests.

The class time can then be devoted to more interactive group activities centred on the resolution of problems.

## 4. Experience and perspectives in Hungary

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### 4.1 Hungarian computer studies & EUCIP syllabuses

The Hungarian partners of ITACA project are Institutes from the Hungarian CVET and IVET systems. The teachers taking part in the cascade pilot course carried out a survey with their students to learn how far they were interested in obtaining an IT certification recognised at EU level. The result was highly inspiring: most of them answered: “YES”. The idea of the teachers was that the students attending IT oriented curriculums in their school could be prepared for one of the EUCIP exams by attending a learning path enriched with knowledge, skills and competences as defined in the EUCIP syllabuses.

In 2013 teachers worked several months in order to fully understand the EUCIP certification and competence system, they deeply analysed the EUCIP IT Administrator, IT Administrator Fundamentals and EUCIP Core syllabuses and the ITAF practicing test provided by AICA.



ITACA seminar with teachers in the Neumann János Vocational School, Budapest

As far as the ITACA curricular pilot course is concerned the Hungarian partners selected, among the several EUCIP syllabuses, IT Administrator Fundamentals Syllabus and related Certification, considered suitable to be transferred from the business context to the Hungarian vocational school. The teachers mapped EUCIP ITAF syllabus with the Professional and Examination Requirement of “IT System Administrator” certificate defined in the Hungarian National Qualification Registry for the upper secondary vocational education. All the EUCIP ITAF resources provided by AICA were translated into Hungarian and localized according to the Hungarian standards.

96 students were enrolled in the curricular course, most of them attending IT System Administrator curricula, at different grades, with some differences with the previous studies. The graduated VET students had prior knowledge about the following topics: IT fundamentals, Operating systems, Electronics, Computer networks, Programming, Software development and Databases.

After the exam the students felt that taking part in the ITACA course was a very good opportunity and a worth challenge for them. Most of the questions were up-to-date and assessed competences needed by a system administrator in real working situations. All the students appreciated the benefit of the pilot course even if not all of them were able to meet the requirements of the official ITAF exam.

## 4.2 Perspectives

In 2010 the Hungarian government started a comprehensive reform programme to raise the prestige of vocational education and to improve the VET students' flexibility and responsiveness to labour market needs. In the frame of these developments the implementation of European educational tools (EQF, ECVET, EQAVET) were speeded up, and a movement started towards learning oriented, modular and competence based VET curricula. The transferred innovation of EUCIP concept is contributing to the Hungarian reform processes in the IT sector.

During the project period the EUCIP IT Administrator Fundamentals syllabus and exam have been adopted in Hungary; teachers have studied

the EUCIP system as a whole and analysed IT Administrator and EUCIP Core certificates in details. Albeit at present the localized version is completed only for EUCIP ITAF, the Hungarian partners will have the possibility to continue the transfer of EUCIP Core certificate in the frame of I-TShape Leonardo project co-ordinated by Prompt-H Ltd. and involving AICA as a partner (<http://it-shape.hu>).

The Hungarian partners are disseminating the outcomes of ITACA project in a final event in Gödöllő on 25<sup>th</sup> September 2014, and at the same time they will be presenting how the results of ITACA project will be further implemented in the frame of the I-TShape project.

## 5. Perspectives in Spain

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The plan of the ITACA project did not include the implementation of specific teaching actions in Spain but, among other tasks, it implied the analysis of the perspectives of transferring the Italian experience to Spain, with the necessary adaptations to the Spanish national context. Spanish partners (FEE and ATI) have carried out specific tasks with the aim to analyse the formal and official higher vocational training level. However, the whole process has also taken into consideration the long experience with EUCIP in Spain in informal life-long learning programs for workers and unemployed people as well as in-company training.

Following the same approach employed in Italy, experts and researchers have been comparing the following two sets of relevant documents:

- The Spanish Ministerial Guidelines for the curricula of the “Informatics and communications” profiles in the Technical Vocational Education, with specific requirements of regional authorities of each “autonomous community”.
- The EUCIP syllabuses: Core, ITA and ITAF.

Experts contributing to this analysis were both representatives of API (<http://apimadrid.org/>: the association of secondary and vocational education informatics teachers of the region of Madrid) and experts from the Academic Committee of FEE, with years of experience in implementing EUCIP in Spain. They have matched the knowledge and skills, as defined by the Guidelines for each course, with the items of EUCIP syllabuses.

The results of such an analysis, reported in a specific project document, has highlighted the following relevant points:

- Spain has a different structure of levels and organization of vocational training.
- An on-going process of recent changes in regulation, organization and funding by the Spanish Ministry and Regional Authorities needs to be carefully analyzed once finally implemented.
- With the existing programs in Vocational Training, it is possible to introduce a similar learning path within official syllabuses to support students to get EUCIP certifications.

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