WP 2: Educational Model

Leading organization: HELLENIC GRAPHIC-MEDIA RESEARCH LAB GRAPHMEDLAB – UNIVERSITY OF WEST ATTICA (E10031602 - EL)

EKFIPLUS - Development of an educational model

EKFIPLUS – Innovation through cooperation AGREEMENT
NUMBER – 2022-1-NL01-KA220-VET 000085437
Duration: 24 months - 01 September 2022 – 31 August 2024

WP 2: Educational Model

An Educational Model will be developed with the core-question: 'How do we develop in an effective and efficient way learning materials online and cross- borders'?

EKFIPLUS - Development of an educational model

1. Summary

The main subject of this study, compiled by University of West Attika EKFI Plus team in the context of KA220-VET - Cooperation partnerships in vocational education and training - Erasmus+ program, is the development of an Educational Model for the effective creation and authoring quality learning material in an online and cross-border context. Nowadays, teachers, educators and professors use technology as well as various pedagogical tools to encourage their students to think out-of-the-box and innovate in and out of their classrooms. The educational model to be developed will be used in updating the existing electronic platform of EKFI (ekfi.eu) in order to provide the possibility for the creation of learning material within the new EKFIPLUS platform.

In particular, the educational model will be used from international teams of teachers / authors to develop learning material as teams. The Model will be used as the guideline towards two main directions:

- Guidelines and specification for co-authoring – coauthoring learning material by teams of authors
- Technical specifications that will be applied in the platform with various digital tools
- digital tools and applications that will lead to the) and in a second year to the further development of the platform and to the support of the development of educational material.

A very important goal of the project is to facilitate the teachers and specialists from different countries and schools to cooperate with each other in order to create new learning material together.

The report describes the requirements of the educational model to be applied in the EKFIPLUS project and the platform. These are divided in two main sections, namely, the Guidelines and Specification for co-authoring learning material by teams of authors as well as the description of technical specifications that will be applied in the platform with various digital tools.

Educational Model and learning Material development – A framework

Based on research into existing educational models, the study of various theoretical frameworks or the development of educational materials is required.

- Pedagogical - didactic theoretical framework
- General & detailed specifications for the development of learning material
- Technical specifications for submitting educational material

2. Didactic model for developing learning materials

2.1. Pedagogical - didactic theoretical framework

Introduction to General & Detailed specifications for development of educational materials

The digital educational material cannot simply be a scientific report that presents the subject, even if it has the expected perfection. A necessary condition is that it has a series of pedagogical and technical features, which aim to facilitate and animate the learners in their studies (Kokkos, 2005). In certain forms of education, such as distance education, the digital educational material takes on the role of the instructor.

As digital material we consider the artifact which combines digital content (digital content), some means of disposing of the content (media) for a specific - educational - purpose or application (Dimou, Kameas, 2011). This research study presents a set of characteristics and quality requirements of digital educational material suitable for two levels of education (VET and Higher Education) in the modern Branch of Graphic Arts (and New Media) with the e-learning method. For example: when in a digital educational material, the content is the text, the technological medium is a hypertext application, while the teaching application is the context in which the application is used (Dimou, Kameas, 2011).

The chapter covers contemporary Learning Theories that propose specifications for the design and development of digital educational material.

Each section concerns a learning theory and presents the theory's positions with teaching approaches, and its impact on educational software design (e.g. user interface design, modern digital tools, etc.). With the development of educational material, regardless of format, it is necessary to provide the possibility of using a variety of teaching methods, the choice of which belongs exclusively to the responsible teachers - creators.

Each particular theory, as is known, focuses independently of the other theories, formulates and investigates its own assumptions and reaches its conclusions and approaches the phenomenon of learning which is complex in a different way. A learning theory is a descriptive theoretical model, which describes the phenomenon of learning with the appropriate conceptual tools, which experimentally investigates the relationship between the basic parameters of the phenomenon and formulates research-based conclusions that illuminate the -basic at least- aspects of learning.

2.2. Educational Learning theories

The chapter focuses on connecting the main groups of Learning Theories (Behavioural, Cognitive and Knowledge Construction Theories) (as in individual educational theories and models subsequently in the next chapter), with the development of educational software. According to experts, no learning theory is unacceptable in the design of educational software. All can find application, depending on the background of the users and the educational topic being analyzed, as long as the team developing the software knows the strengths and weaknesses of each theory in order to optimize their use with the appropriate educational strategy (Panagiotakopoulos et al., 2003).

Learning theories are conceptual frameworks that describe the processes in which students are affected by the ways in which the education process is carried out, are affected by the environment and by the means used by the teacher. Changes in education arise as a consequence of new needs obviously changing both teaching strategies and the integration of technology into the educational process. The conflict between theory and practice also gave rise to different views on teaching and learning.

• Guiding-behavioural learning, with its main object of study being the recording and study of man's manifest reactions, does not deal with intermediary factors.

• Constructivism whereby the learner learns how to construct knowledge within collaborative and interactive environments and,

• Finally, the humanistic theories according to which man learns using his personal capabilities and the role of the instructor is to facilitate.

Important:

The technological applications based on one or the other theory cannot be used exclusively by the teacher.

Selective use is required depending on the needs that already exist or arise during the educational process in order for it to be complete and effective.

2.2.1. Behaviorism

Behaviorism uses a teaching and learning system in which the pre-defined curriculum is broken down into small, clearly separated steps (stages) and organized constructively in a logical sequence (Palios, 2002), which students can easily learn, the planned teaching. The most important learning mechanism according to behaviorists is the reinforcement of desired behavior. Reinforcement consists either in giving the student the correct answer as soon as he has recorded it, or in giving him the possibility to proceed to the next stage only when he has recorded the correct answer. The environment is considered as the main factor in the formation of behavior, through the assumption that learning is determined by the effects of the environment (with an emphasis mainly on the externally measurable elements of the behavior) and not by the qualities of the individual (Palios, 2002).

The theory of 'Behaviourism' provides important advantages that can be exploited both in computer-based teaching.

• Ability of the student to follow his own pace of learning and legitimize his right to make mistakes in a process of trial and error.

• Sense of success with the use of reinforcers and rewards through careful analysis of the learning process.

• Immediate evaluation of responses, which is very important for guiding and achieving a cognitive goal, since reinforcement is only useful if it is directly related to the correct response. This immediacy is very difficult in traditional classroom instruction, but is possible in carefully designed software.

Behavioral Theories preceded Learning Theories, which were used to theoretically support the application of technology in education (Solomonidou, 2006). The most "classic" applications of the behavioral approach are exercise and practice software and learning software. A "guidance system" is designed according to the principles of the instructional design model and aims to satisfy at least two phases: presenting information and guiding the student to achieve learning outcomes (Alessi & Trollip, 2001 cited in Komis, 2004).

Despite the strong criticism leveled against behaviorist theories, due to the limited targeting they attribute to the specificity of learners and the communicative relationship between the instructor and the learner, many educational practices to date adopt behaviorist methods (Palios, 2002).

Guidance and Teaching Systems
Theory of Behaviorism
Practice Software
Tutoring or Teaching Software
Educational games
Multimedia software
Information processing theory
Experienced Learning Systems
Neural networks

2.2.2. Cognitivism

The theory of Gnosticism placed considerable emphasis on the active role of the individual in the acquisition of knowledge, emphasizing that active learning is much more rewarding than passive learning. According to Piaget's theory where the child constructs his knowledge in an individual and active way, the basic methodology for designing computer-based learning environments should consider the following:

• To inform learners of what they need to achieve

• To support the construction of knowledge (representing students' ideas, understanding and performances).

• To enable explorations (access to information for comparison with other perspectives).

• To support learning through practice (simulation of real situations).

• To support the expression and connection of knowledge (mental partners).

"Logo" is a whole theory of learning based on the knowledge and epistemological view of Piaget's work and artificial intelligence in the sense of cognitive science. It is one of the most suitable programming languages for proper computer literacy. Seymour Papert developed it not only as a technocratic software engineer, but also as a mathematician and educator, influenced by his work with Piaget. A key characteristic of Logo is its Graphical User Interface (GUI) with the user, which is implemented with the turtle and its graphics.

Gagné's conceptual model

Gagné's conceptual model is an information processing model in which the mechanism of learning is cumulative, that is, the learning of new knowledge builds on previous knowledge. The teacher follows a series of steps to develop lesson plans. These steps may be different for each teacher or proponent of this theory, but they always include the following:

● Course design.

● Development of teaching materials.

● Application.

● Evaluation.

Gagne's "teaching facts" for lesson planning can be used in conjunction with all kinds of educational software, i.e. simulation, guided learning, drill and practice software

Instructional Design Model

The model of instructional design (instructional design) represents a systematic and structured approach to the design of instructional systems with or without a computer, while at the same time it represents a consistent strategy in the design of learning environments. This model is based on the approaches of B. F. Skinner and R. Gagne (Komis, 2004).

The three main stages of model development (Boyle, 1997):

• Needs analysis (needs analysis): Identifies each activity of the student and each part of knowledge that must be acquired by him.

• Selection of teaching methods and material

• Evaluation of the student

2.2.3. Constructivism

Constructivism is a theory based on the views of great educational psychologists, such as Piaget, Bruner and Papert. He argues that the goal of learning is to modify pre-existing knowledge, while the goal of teaching is to create an appropriate and rich environment with which the student interacts. The main difference of the constructivist model from other teaching approaches lies in the fact that it considers the students' pre-existing ideas and proceeds to their teaching use. Ausubel (1968) points out that: "the most important factor affecting learning is what the student already knows. Find out and teach him accordingly".
Knowledge is constructed, not transmitted, and all that is transmitted is information. Its main pillars are the following:

- Learning is an individual process of building knowledge.
- Meaning is acquired through experiences.
- Learning is not memorizing concepts or facts.

Discovery learning, which is one of the two constructivist learning models, is a teaching strategy that encourages the student to explore and experiment with the aim of discovering relationships between concepts and events.

Vygotsky: Sociocultural theories

The study of Vygotsky's developmental course and psychological processes contributed to the development of modern psychology. According to his theory, the child develops through his social environment and social interactions. The main theme of Vygotsky's theoretical structure is that social interaction determines with a fundamental role the development of knowledge (Koullaidis, 2007).
The basic position of Vygotsky's theory is the "Zone of Proximal Development" (ZPD), i.e. the ability of the subject to exceed cognitive development at a given moment. The ZPD represents the distance between the actual level of development (the child's ability to solve a problem on his own) and the level of the ability to solve a problem with the help of someone else. Vygotsky believed that teachers would provide better instruction if they identified each child's developmental point and built on their experiences. He called this building process "**scaffolding**". Under this prism we can see that what the child does together today will be able to do it alone in the future.

Information, Expression, Search & Communication Systems
Sociocultural Theories
Internet applications (chat, forums, video conference)
Internet Tools for Collaboration and Communication (systems cooperative learning)
Online Online Games (MOOs, MUDs)
Theories of constructivism and social constructivism
Digital Encyclopedias & Dictionaries
Digital libraries
Internet search engines (search engines)
General Purpose Software (office applications, etc.)
Multimedia & Web Application Development Systems

Jerome Bruner: Discovery Learning

Learning by doing is one of the most immersive education strategies, especially if your teacher offers encouragement and immediate feedback. Is it still possible to use this system in an eLearning course that lacks an on-site instructor? When designing an eLearning course, we need to think about where our online learners will use the knowledge, and then design the course accordingly. Discovery-based learning engages us more and enhances memory recall. We probably don't remember the teacher's lectures, but we still remember every experiment we once did. Computer simulations give an opportunity for students to learn in a discovery environment. One of the techniques to help us incorporate discovery learning into our eLearning course design is ''Create Context''. When designing an eLearning course, we need to think about where our online learners will use the knowledge and then design the cosurse accordingly.

Discovery Learning Systems & Environments - Investigation - Construction
Constructivism and Social Learning Theories
Hypermedia Applications
Virtual Reality Applications
Visualization Systems
Concept Mapping Systems
Simulation Applications
Modeling Applications
Computer Based Labs
Environment Connection Devices (sensors)
Robotic Systems (Lego type)
Microcosms in specific subject matters
Programming Environments (Logo type)
Educational games or electronic games
General Purpose Software

2.2.4. Humanistic theories

These theories approach learning through the perspective of personality development. The founders of humanistic theories of learning, equally reject the interpretations of Freudian psychologists and behaviorists and consider learning as the result of the conscious and responsible utilization of the possibilities of the individuals offered opportunities and experience. One of the founders of humanistic theories is the American psychologist Carl Rogers (Theory of Personality Development), according to which the completion of the individual takes place when he is facilitated to gain a full picture of his potential. The teacher is not a transmitter of knowledge, but a catalyst (facilitator), coordinator of the learning process and creator of situations that facilitate deep learning (Palios, 2002). Its role is not to transmit an academic knowledge "pre-made", but to propose possibilities for investigating a cognitive field, therefore to organize learning processes that are always renewed. C. Rogers also considers that learning takes place, as long as the individual is actively involved in it, with all his intellectual and emotional powers. "We cannot teach a person directly. We can only facilitate his path to learning (...)

Carl R. Rogers acknowledged that a human's behaviour is a factor stimulated by the tendencies of self-actualisation to work and accomplish the highest level of their potential (creativity, a growing openness to experience, reliability and constructiveness, freedom of choice, etc). People create a self-concept (structure) of themselves, which if negative (negative self-concept) makes them unhappy with who they are, while if positive (positive self-concept) makes them feel safe and certain. The central hypothesis of this approach is that the individual has within him or herself vast resources for self-understanding, for altering her or his self-concept, attitudes, and self-directed behaviour (Kutash, 1986)

An educator based on the theories of humanistic scientists generally follows the strategy of:
- tries to help learners recognize the need for learning,
- is very interested in their personal goals,
- stimulates the activation of their interest and their potential.

3.Forms of innovative Blended & Integrated Learning

The chapter focuses on the connection of individual educational theories and models, with the development of educational software.

3.1. Derivatives of the Major Learning Theories

The important modern theories of learning, developed based on the scientific method - i.e. with the possibility of refutation/verification through experimentation - are not simply individual theoretical models, but constitute large currents of scientific thought (scientific paradigms) (Dimitriadis, 2015). A number of individual theories (smaller and interconnected) and models have roots in one or more of the above frameworks, analyze in a complementary way the same or different aspects of the learning phenomenon.

3.1.1. Blended Learning

Blended Learning is an approach to education that goes beyond traditional means of teaching and combines them with technological media such as e-learning. The term refers to an educational activity that combines the traditional classroom (live instruction) with online instruction and activities. Traditional classroom and digital content should overlap to some extent as well as complement each other so that learning is blended. A well-designed Blended Learning activity can combine the advantages of the traditional classroom (discussion and interaction) with the advantages of the online classroom (mobility and flexibility)
Blended learning is an approach to training that goes beyond the traditional means of teaching and blends them with technological means, such as eLearning and mobile learning. Blended and **Integrated learning** are modern educational practices, which are related to the inclusion of technological means and the adoption of an interdisciplinary approach to learning and training.

	Electronic Material	Hardware that is presented in the class	Type of Education	Description
1.	0%	100%	Traditional	A traditional class
2.	1-29%	71-99%	**Teaching with the help of electronic media**	Use of Websites or Online tools for some activities
3.	30-79%	21-70%	**Blended Learning**	This is considered Blended Learning
4.	80-100%	0-20%	Online teaching	Mostly online teaching with some live encounters

According to Allen, Seaman, & Garrett (2007)

With color marking, the proposed types of education are recorded: a) Blended Learning (Type 3) and b) Teaching with the help of electronic media (Type 2).

When should educators use Blended Learning?

- If there is a group of students who are geographically distant and it would be more convenient for them to meet periodically rather than systematically.
- If they wish to create material to introduce a new section or repeat material.
- If there is a specific subject that would need multimedia for its teaching.
- If less live teaching would be helpful for him or for the students.
- If the students have many obligations and it would help them to learn at their own pace

Benefits for students

Adopting an integrated learning approach to education and training can have significant benefits for students, such as:

- Active participation in relevant real-life experiences
- Better understanding of content
- Linkage between the various disciplines of the curriculum
- Development of higher order thinking skills

3.1.2. Project-based learning

Project Based Learning (Theory of Social Constructivism, Dewey) is a student-centered methodology that encourages students to learn and apply knowledge and skills through engaging experience and active investigation of real-world problems (Dewey, 1997). Project-based learning contrasts with traditional teaching in that it does not depict a linear path of knowledge but instead poses questions and problems, thus allowing learning-by-doing.

Project-based learning

- it is often multidisciplinary and broader in scope
- often involves authentic work that solves real problems, i.e. has real-world impact;

while

Problem-based learning

- uses scenarios and situations that may be less relevant to real life (Larmer, 2014)
- deals mostly with a single topic

3.2. Learning Theories for Online Education

For e-learning several theories have been developed, most of which derive from the main learning theories that preceded it. In this section, some will be examined for their suitability for application in an online environment.

3.2.1. Technological theories

Technological theories are based on the postulate that we must specifically improve the technology of pedagogical communication processes if we want to achieve better learning. They argue that technology is the only way to solve practical problems and the best way to improve education.

Two ways of applying technological theories in education:

- The **systemic education** that originates from the researches concerning the general theory of systems, which allow us to improve the organization of the teaching and lead to the educational design (purposes, procedures, evaluation, feedback).
- **Hypermedia**, a trend originating from research in cybernetics, artificial intelligence, informatics, cognitive sciences, communication theories. They combine cognitive and informatics theories, but are characterized by pragmatism.

Multimedia learning refers to the use of visual and auditory teaching materials that may include video, computer and other information technology. (Mayer, 2009).

3.2.2. The Connectivist theory of online learning

Connectivism, by G. Siemens & S. Downes (2005), is a learning theory for the digital age that at its core holds that knowledge is distributed in a network of links and learning is based on the possibility of constructing and traversing these networks. Is a relatively new learning theory that suggests that students combine thoughts, theories, and general information in a useful way. Connectivism promotes learning that occurs outside of an individual, such as through social media, online networks, blogs, or information databases. The student learns by navigating through a multitude of websites, choosing the content, the way, the time and the tools to use, thus building a network of personal learning.

Connectivism accepts that technology is an important part of the learning process and also promotes group collaboration and discussion, allowing for different opinions and

perspectives in decision-making, problem-solving and understanding information. Knowledge is not a proposal from the teacher, who now plays a secondary role, if not completely absent. Decisions are based on rapidly changing bases as new information is constantly acquired. The ability to discriminate between important and unimportant information is key, as is the ability to recognize when new information changes the landscape based on decisions made the previous day.

The main principles of Connectivism

- Learning is a process of connecting.
- Learning and knowledge rests in the diversity of opinions.
- Learning may reside in non-human appliances.
- Learning is more critical than knowing.
- Nurturing and maintaining connections are needed for continual learning.
- The ability to see connections between fields, ideas, and concepts is a core skill.
- Decision-making is a learning process It's clear that technology is changing how students learn in and out of the classroom.

Before these principles came on the scene, many theories positioned students solely as receivers of information. However, connectivism supports the theory that knowledge is distributed across networks where connections and connectedness inform learning. Understanding this theory can give to a teacher additional tools and strategies to create a learning environment that sets your students up for success.

E-learning 3 generations model		
Generation 1	*Generation 2*	*Generation 3*
Appearance of online learning platforms, the creation of virtual classrooms and campuses.	Anthropocentric The interaction between peers and the communication between teachers and students are essential elements for a quality e-learning (that aims to go beyond a simple content publication process).	Is characterized by the fact that e-learning is no longer associated exclusively with online learning platforms.
	The platforms allow: socialization, motility, data interoperability **Important factors** Development of web 2.0, Mobile technologies, Open resources	

The Connectivist theory of online learning views learning as a network process. The massive open online course, or MOOC, which is an instantiation of that process (Downes, 2012). A series of 'generations' of technologies and approaches have characterized the development of online learning over the years. These generations

that span more than a 20-year period will help us understand something of the direction it will take in the future.

6 Generations of Web and Learning technology Model (Downes 2012)		
Generation 0		The existence of a zero-generation characterized by the design and publication of online multimedia resources. At this first moment, the most important thing is to use computers to transmit instructional content and carry out activities based on tests and evaluative questionnaires.
		Generation 0 brings us the idea of documents and other learning content, created and managed using application programs.
Generation 1	Focus on documents	Starts from the Internet and the use of email that facilitates virtual communication Commercial software development The personal computer became a tool that anyone could use to create and store their own content.
Generation 2 (early nineties)		Application of computer games for online learning.
Generation 3		Development of learning managers (LMS) connects the contents of the zero generation with the platforms
Generation 4 Based on the use of web 2.0.	Focus on data	Interaction between students, changing the nature of the underlying network where the nodes are now people instead of computers. Social orientation is boosted thanks to the use of mobile devices.
Generation 5		Cloud computing and open content
Generation 6 and beyond		Massive open online courses (MOOCs)

Data (CMS, Web 2.0, MOOCs) do not stand alone, as documents do. the representation of any object is linked to the representation of any number of other objects, through common characteristics or properties or by association by some action (Downes, 2012)**.** The next three generations of **web and learning technology** will be based on the idea of flow (Komis, 2004).

Both the student and the educator can benefit from Connectivism in the classroom.

The benefits of Connectivism:

“Knowledge has many authors, knowledge has many facets, it looks different to each person, and it changes moment to moment. A piece of knowledge isn’t a description of something, it is a way of relating to something.” (Stephen Downes). The theory of "connectivity" has been linked to "**computational neural networks**" while the most important application of the theory of information processing in the design of computational educational environments is "expert teaching systems".

Cognitive Theories and Computational Learning Environments (Komis, 2004).	
Cognitive Theories	**Computational learning environments**
Structural Constructivism (Piaget)	Logo, microcosms
Construction (Papert)	Logo, Logo – Lego
Discovery Learning (Bruner)	Simulations, microcosms
Information Processing (cognitive psychologists)	Experienced Learning Systems Neural networks
Connection (Varela, Maturana)	

3.2.3. Educational techniques - Mixed techniques of discovery and application: Working groups.

The working group technique consists in dividing the participants into small groups, which respond to specific separation criteria and are tasked with producing, in a specific period of time, a result resulting either from an investigative activity or from an application activity (Courau, 2000).

4. Elements of the process of developing learning materials

Effectiveness in learning starts with creating a good curriculum, where expected learning outcomes, teaching practices, learning environment, assessment and feedback are aligned. The appropriate didactic model for developing learning materials -with the latest didactic insights- contains various elements.

4.1. Learning environment

The term ‘’Learning environment’’ indicates (UNESCO-IBE, 1995-2023):

- the learner’s immediate physical surroundings (classroom, school),
- the resources made available to support the learning process, and
- the social interaction or types of social relationship functioning within this context and having an influence on learning

The term is used in various ways. Thus, it indicates the student's immediate physical environment (classroom/school), the resources available to support the learning process, and the social interaction or types of social relationships that operate in this context and influence learning. It is the culture created by teachers and students. Thus, in addition to individual characteristics and personal dispositions, important for students are: students' social environment (e.g. family context), peers, peer networks and school/classroom climate (Roos et al, 2021)

Learning environments include:
• the physical spaces where lessons take place - classrooms, studios, auditoriums, indoor and outdoor facilities and how other learning spaces are created and used: such as local cultural spaces (theatres, art galleries, museums);
• the spaces of distance learning, where the teacher and the students do not coexist in a physical space: the home and online collaboration spaces,
• how to integrate different learning approaches and assessment, as well as classroom management processes
• the co-creation of supportive environments (professionals outside the school, parents)
• co-creation with students (issues of sense of security, creativity, well-being)

Social and Cultural Learning Environments as a term defines the role of the "openness" of the school in the cooperation between students and teachers but also between them and the local community.

Strong learning environments in vocational education

A learning environment is considered strong if learning takes place in an authentic context. A research-based learner-centered model for the robust learning environment in vocational education (PoLEVE), has the following linked features that support learning and teaching:

• positive and safe learning community
• possibilities for the development of students' basic competences
• challenging and authentic learning assignments
• adaptive support for learning

Authenticity in education varies, with an emphasis on practical learning for the acquisition of professional knowledge, skills and abilities on the one hand, but also more general abilities, such as planning and organization in terms of learning tasks, students prefer intellectually demanding, which are linked to real situations (Roos et al, 2021).

Learning environments and ICT

Virtual and Technological Learning Environments represent the potential of new technologies in redefining not only school infrastructures, but also the learning process itself (Moraitopoulou 2018).

Some of the **basic characteristics of the learning environments**, the development of which aims to introduce ICTs. in the teaching process combined with the application of modern learning theories, are the following (Paraskeva & Papagianni, 2008):

- Knowledge is created and not reproduced (The learner actively participates and is responsible for his own theory of learning).
- The multiple representations of reality. (The active use of a variety of tools to support learning provides alternative views of the subject matter and favors critical thinking).
- The complexity of the real world. (With the multiple representations of reality and the conceptual associations between the structural elements involved in a process or phenomenon, the learner realizes that reality is not as simple as a model, but also that it cannot easily generalize situations).
- Encouragement to undertake tasks in a real/authentic environment (Authentic-real tasks are linked to case studies and problem-solving methods).

Learning environments and ICT applications	
Creating knowledge	Entity management of ICT applications, use of online tools, creating algorithms etc.
Multiple representations of reality	Exploring websites, search engines, web pages with multimedia content, searching simulation of real-world phenomena, different graphs of correlation of quantities.
Real world complexity	Non-serial sequencing of relationships between concepts and relationships from hypertexts, simulation parameterization, etc.
Original works	Solve real-world problems, application case studies. Ability to propose solutions by the learner and create entities within the technical characteristics of the application.
Reflective thinking	Finding relationships between variables, implementing the application with different initial conditions, personal recording of the learning process (web log, blog, etc.), evaluation of the process, etc.
Cooperative learning	Virtual learning environments, online collaboration tools, action event log files, discussion groups (fora), etc.

(Source: Paraskeva & Papagianni, 2008)

Learning Environment in Higher Education

Higher education is typically dominated by an open learning environment where students and teachers are co-creators of knowledge. In a more collaborative

approach, students are active members of the learning process and their views are valued and encouraged by their teachers. Collaboration of this type creates opportunities to promote new ideas and innovations. The student is at the center of the learning process.

21st Century Learning

A 21st century learning environment is a program where everything is student-centered and supported by= or includes the use of modern digital technologies. Many programs incorporate key elements of active learning. Blended learning. as mentioned in a previous chapter, is a learning program in which a student learns at least in part through the delivery of content and instruction through digital and online media with greater student control over time, place, path, or pace than with traditional learning. Personalized learning is an educational strategy that offers pedagogies, curricula, and learning environments to meet students' individual needs, learning preferences, and specific interests.

4.2. Role of the teacher

In general, the role of teachers is to help students learn by imparting knowledge and creating a situation in which students can and will learn effectively. But learning today is not limited to the classroom environment. It takes place in the digital and physical worlds, in the home and in the community. The old model of learning, where teachers dispensed information and maintained discipline no longer exists. Now teachers are expected to provide rich and customized learning experiences for their students. Teachers now take on a complex set of roles, which vary from one society to another and from one educational level to another (Havighurst, 2023). Professional teachers can profoundly influence the lives and career choices of their students as they grow.

Roles in the school or university (Havighurst, 2023).

- Mediator of learning
- Judge of achievement
- Organizer of curriculum
- Expert in some area of knowledge or skills
- Scholar and research specialist
- Confidant to students, Parent substitute, Disciplinarian or controller of student behavior
- Agent of social change, Surrogate of middle-class morality, Roles in the community
- Public servant, Bureaucrat
- Member of teachers' organization

Role in curricular design. In the field of professional responsibility there is a large distinction between university and secondary education systems (Havighurst, 2023). At the higher education level, teachers have the autonomy and responsibility to determine the curriculum—its content and teaching methods ("academic freedom"). On the contrary, in some countries there is little or no participation of the individual

teacher in matters such as the evaluation for the selection of textbooks and educational materials and the definition of curriculum subjects

Professional development of teachers through communities of practice. The professionalization of teachers and trainers is a key objective of European co-operation in the area of education and training (Nielsen- ETF, 2009). The roles of teacher -academic or vocational- and student are changing as a result of new approaches to learning. **Vocational teacher** is a person whose function is to impart knowledge or know-how to students or trainees in a vocational school or training center. (UNESCO, 2009). With the increasing shift to active learning and self-directed learning, responsibilities are now shifting from the teacher to the learner, and the teacher is changing from a transmitter of specialized knowledge to a facilitator of learning processes. In many countries vocational teachers have a low professional status (Nielsen-ETF, 2009). The methods of training and recruitment of teachers create conditions for the fragmentation of the profession. Good practice is the continuing professional development of vocational teachers through communities of practice. Through a learning network participant share data, practice joint learning activities, exchange experiences and are able and willing to collaborate in devising models, tools and new processes, etc., as well as share their results from mutual work.
Another challenge is the need for learning processes to adapt to the changing needs of their students and the priorities of the local labor market. Reform processes require continuous interaction between national and local partners.

Researching new learning strategies. Today there is a glut of information from many sources. Training can help teachers understand how to leverage technology and devices to support learning. Teachers must take the time to research and stay informed about changes affecting education. The world is changing at a rapid pace and no one should feel inadequate even in the subjects of their specialty. Although some schools still operate with the conventional classroom layout, an understanding of technology and psychology has become essential in the teaching profession.

4.3. Learning goals

They are general statements written from the perspective of an instructor or institution that give the general content and direction of a learning experience, and describe in general terms what a trainer or program aims to do. That is, "The curriculum will introduce students to the major research methods of the field." (Depaul.edu-Teaching Commons, 2023)

4.4. Learning objectives

Learning objectives are statements of what you intend to teach or cover in a learning experience (Depaul.edu-Teaching Commons, 2023). They tend to be:

- More specific than learning goals
- Not necessarily observable nor measurable
- Instructor-centered rather than student-centered
- Useful in helping you formulate more specific learning outcomes

Modern instructional goals should be to help students analyze information, think critically, solve problems, search for information sources, and make educated decisions. Learning objectives are specifications of learning to be achieved upon completion of an educational program or an activity. (Adapted from: UIS 2012). Learning objectives can also be specified for a lesson, a theme, a year, or an entire course.

The Cognitive objectives in Bloom's taxonomy

Bloom's taxonomy is a set of three hierarchical models used for classification of educational learning objectives into levels of complexity and specificity. The three lists cover the learning objectives in **cognitive, affective and psychomotor** domains**.** The cognitive domain list has been the primary focus of most traditional education and is frequently used to structure curriculum learning objectives, assessments and activities.

The goal of Bloom's taxonomy is to motivate educators to focus on all three areas, creating a more holistic form of education. It is considered a fundamental and necessary element of the educational community.

The **cognitive goals** (cognitive) concern knowledge about concepts, understanding and critical thinking about a subject of a cognitive area.

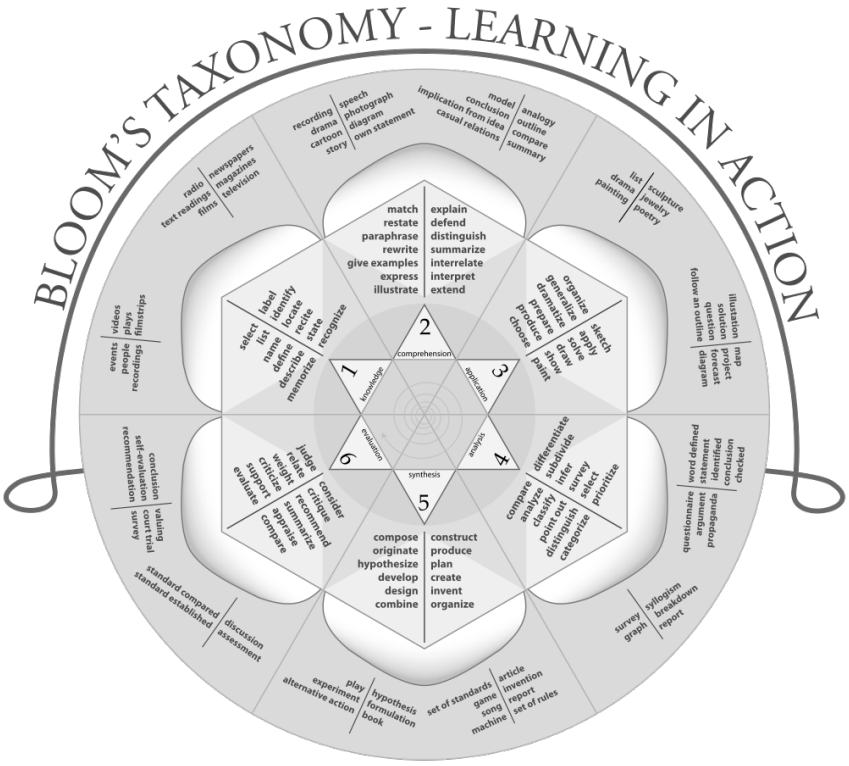
Affective goals refer to the development of attitudes, assessments, feelings, internal motivations regarding learning. They are expressions based on logical inferences rather than activities.

Psychomotor refers to the development of skills related to manipulation, design, construction, assembly, etc. These goals are related to technology lessons, conducting an experiment in the science lab, but also using a computer, fluency during public speaking, etc.

The classification of goals is useful because they present the range of possible goals that we can choose or describe if we choose to use them. If the teacher can describe precisely and correctly what the students can do, then he has also defined what they should be able to do at the end of the lesson.

The classification of educational objectives	
Level	**Commonly used verbs**
Knowledge The learner recalls basic knowledge and information learned, remembers facts, terminology, basic concepts.	state, state, determine, show, select, list, describe, match, etc.
Comprehention The learner understands facts and concepts, identifies common points in concepts, organizing, comparing, interpreting, describing and relating the main concepts, while also connecting	compare, relate, prove, interpret, explain, illustrate, describe, categorize, reformulate, clarify, etc.

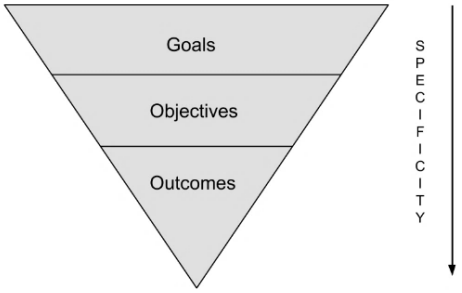
concepts to each other.	
Application The learner solves problems by applying the acquired knowledge with scientific methodology, designs and manufactures.	implement, calculate, develop carry out a process, organize, construct, develop, use, select, design, model, discover, etc.
Analysis The learner examines and analyzes information into smaller segments based on criteria or simpler structures. Infers and finds evidence to reach generalizations.	analyze, categorize, compare, find differences, discover, break down into simpler sections, distinguish, register, etc.
Evaluation The learner presents and defends opinions/judgments, judging information and facts for what they are available, checks the validity of concepts or the quality of a work based on a series criteria. It can still evaluate a build.	conclude, classify, argue, evaluate, document, compare, rate, support, prove, disprove, revise, etc.
Composition-Creation The learner gathers information to formulate a solution or design and build a structure.	compose, combine, improve, create, make, develop, shape, invent, predict, generalize, etc.



Bloom's taxonomy organized radially (Multi-license with GFDL and Creative Commons CC-BY 2.5- 5 May 2008

4.5. Learning outcomes

Learning outcomes: The totality of information, knowledge, understanding, attitudes, values, skills, competencies or behaviours a learner has mastered upon the successful completion of an education programme. (UIS, 2012 in UNESCO-IBE, 1995-2023)
The modern pedagogical model uses the 21st century skills framework, emphasizing high-level functional knowledge, thinking skills, and personality elements. Such skills include: scientific and technological literacy, the ability to access information, problem solving, critical thinking, metacognition, the ability to collaborate, creative thinking, the ability to effectively communicate and synthesize information.



The learning outcomes specify the learning goals and objectives.

Why write learning outcomes?
Learning outcomes help **educators** to:

- describe to students what is expected of them
- design appropriate teaching strategies, materials and assessments
- learn from and make changes to the curriculum to improve student learning
- assess how the outcomes of a single course align with larger outcomes for an entire program

Learning outcomes help **students** to:

- predict what they will gain from an educational experience
- track their progress and know where they are
- they know in advance how they will be evaluated

Elements of Effective Learning Outcomes

Clearly written course-level and module-level outcomes are the foundation upon which effective courses are designed. Outcomes inform both the way students are evaluated in a course and the way a course will be organized. Outcomes are student-centered, measurable, meaningful, achievable and outcome-based, and inform both how students are assessed in a course and how a course will be organized.

- **Student-Centered**
- **Measurable** (they use a concrete action verb)
- **Meaningful**
- **Concise** (are written in short, succinct sentences).
- **Achievable**

Formula for Writing Learning Outcomes
As a result of participating in (educational unit), students will be able to (measurable verb) + (learning statement).

Learning goals and objectives generally describe what a program or institution aims to do, whereas, a learning outcome describes what a student is able to do after completing a learning experience (e.g. learning unit, or course) in observable and measurable terms.

Eight key competences for Lifelong Learning in the European Schools
Competences are defined by the European Commission (2018b, p.1) as a combination of knowledge, skills and attitudes appropriate to the context. **Key competences** are developed in a lifelong learning perspective, from early childhood throughout adult life, and through formal, non-formal and informal learning. The eight key competences as defined in the European framework (European Commission, 2018) are:

1) Literacy competence;
2) Multilingual competence;
3) Mathematical competence and competence in science, technology and engineering;
4) Digital competence;
5) Personal, social and learning to learn competence;
6) Civic competence;
7) Entrepreneurship competence;
8) Cultural awareness and expression competence.

Digital competence involves the confident, critical and responsive use of, and engagement with, digital technologies for learning, at work, and for participation in society.
Competence in science refers to the ability and willingness to use the body of knowledge and methodology employed to explain the natural world, in order to identify questions and to draw evidence-based conclusions.
Competences in technology & engineering are applications of that knowledge and methodology in response to perceived human wants or needs.

4.6. Learning contents

Learning content: According to UNESCO-International Bureau of Education Learning contents are the topics, themes, beliefs, behaviours, concepts and facts, **often grouped within each subject or learning area** under knowledge, skills, values and attitudes, that are expected to be learned and form the basis of teaching and learning (UNESCO-IBE, 1995-2023). There are some characteristics that can help the instructor to orient in specific directions for organizing the learning and teaching contents. Some of them are:

- Learning and teaching time.
- Program philosophy - Shared knowledge and educational values.
- Definition of the subject (what is being learned)
- Amount and structure of information provided (how much is needed and how it is organized).
- Cognitive information acquisition strategies.
- Identification of learning moments (steps according to Rogers, which constitute the learning episode).
- Interests and needs of the trainees.
- The role of the trainer.

Learning and teaching time

It is not the same concept. Teaching time is very different from learning time and does not necessarily coincide with it. Teaching time is usually limited. It has a specific duration and is determined by the program organizer. The learning period, on the other hand, does not have a clear duration and much more is not characterized by stability in the sense that it is adjusted and readjusted according to the priorities of the participants and not necessarily within the context of the teaching.

Defining the object of learning and/or teaching

We usually mean in the content that new knowledge or information is offered to the participants with the aim of satisfying their learning needs (contents become old quickly, b. the combination of purposes and contents leads to the questioning or revision of those contents that do not convince of their value)

Amount and structure of information provided (how much is needed and how it is organized).

Complex and demanding process, based on research (exploration) of the learning object and the selection of the amount of information provided.

Cognitive information acquisition strategies.

Identify learning moments (steps)

Rogers defines 4 areas of action for the instructor, which constitute the learning episode:

1. defining the general approach of the learning contents

2. selection of the learning object
3. how much of the learning content can be covered in the time available
4. the way participants will respond

For Rogers, the instructor's sensitivity to the needs of the participants is what will ultimately determine the approach to the learning content (depending on whether it is absolutist, potentially leading to unlearning).

Interests and needs of learners.

Learners participate actively and based on their experience, which should be recognized by the instructor in the selection and organization of the contents.

Digital Educational Content and e-Learning Services

The strategy to strengthen e-learning services in Higher education is supported by two pillars of actions:

- The former focuses on the development of digital content, while
- the second in the modernization of horizontal platforms and services for the promotion and utilization of content.

Digital content refers to digital courses and educational resources, both open access and controlled access, aimed at target groups.

Content development is about:

- the development of specifications for the structure, content and metadata of the digital courses of the curricula,

- supporting synergies for the joint development and use of core course content and digital courses;

- the development of special purpose Massive Open Online Courses (MOOCs) focusing on thematic areas of international interest,
- the development of special purpose courses and content, e.g. digital skills, career guidance, health, etc.

4.7. Learning Content Areas for the EKFIPLUS project and platform

The Educational model which has as its main axis the development of digital multimedia and multimodal content for sharing through the electronic platform EKFIPLUS on the Internet. This fact gives it a flexible character and allows the participation of teachers and experts, who wish and aim to acquire additional knowledge and skills, in the development and management of a variety of digital material. The learning content is created by choosing from a variety of learning objects - divided into 6 main subject areas - within the EKFIPLUS community. The basic idea is that these individual learning objects can be easily combined with each other. Community rules allow members to download learning objects and modify or translate them.

The content is divided into the following content areas.

1. Printing and Packaging
2. Entrepreneurship – Management
3. Sustainability – Circular economy
4. Digital media
5. Sign and Display
6. Digitalization – Digital Transformation – Industry 4.0

Content area 1

Printing and Packaging

Premedia-Prepress
Printing
Finishing
Print management
Quality control
Holistic packaging design
Packaging printing
Color management, workflow and measurement
Typography & Layout
Graphic design
Other proposed

Content area 2

Entrepreneurship – Management

Workflow & Production management
Legal and Regulatory Compliance
Marketing and Branding - Market Research & Trends
Financial Management
Business Planning and Strategy
Networking and Industry Associations
E-commerce and Online Sales
Entrepreneurship for art items and artifacts
Quality & Standardization
Health & Safety
Leadership & Communication skills
Risk Management & Crisis Response
Other proposed

Content area 3

Sustainability – Circular Economy

Environment, Sustainability, Circular Economy - definitions and relation
Energy Transition & Efficiency
Modular Technologies, recycling, short chain economy
Sustainable Value Chain
Climate Change
Carbon Footprint
Product Lifecycle
United Nations Sustainable World Objectives
Circular economy: definition, importance & benefits
Product-raw material life cycles
Business models in Circular Economy in relation with CCI
Other proposed

Content area 4

Digital Media

App Development
Web design
Content management
User Interface Design (Usabilty)
Database Management
Game Development
Animation/Video/Film making
Aspects of Sound
Audio-visual techniques
UX/UI - Programming for digital media (PHP, XML, etc.)
Other proposed

Content area 5

Sign and Display

Sign & Display design and production
Screen printing
Wide format digital printing
Materials and Substrates
Finishing and Assembly
Other proposed

Content area 6

Digitalization – Digital Transformation – Industry 4.0

History, terms, definitions
Cyber-Physical Systems
Blockchains
Robots
Virtual & Augmented Reality
Internet of things (IOT, IIOT)
Big data
The Smart Factory
Other proposed

4.8. Learning activities

Learning activities, as the name suggests, are activities designed or deployed by the teacher to bring about, or create the conditions for learning. Engaging learning activities can turn complex or even meaningless cognitive learning units into interesting learning experiences.

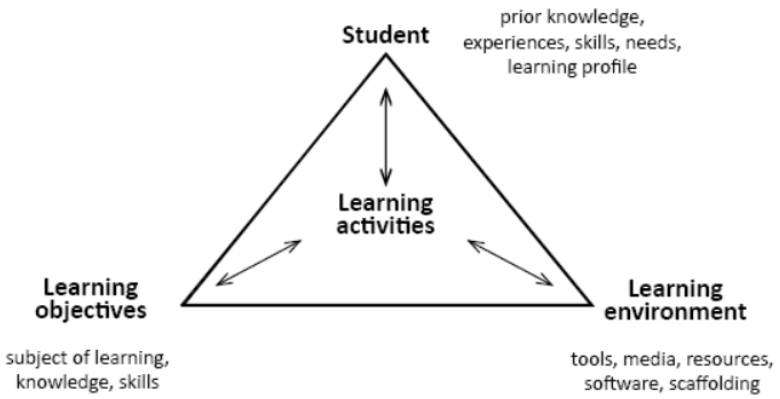
In order to use learning activities effectively they should:

- engage students in active learning
- align to outcomes and assessment
- consider the level of experience of the students
- have an appropriate period of time for achieving the goals
- facilitate the practice of core skills prior to assessment
- provide feedback on student progress towards outcomes
- be accessible for all students.

Other factors are:

- Identifying and using media and technology (such as big data) is an important factor extremely useful when creating learning activities.
- Data helps you design more personalized learning materials, identify gaps in previous learning activities, assess what type of activity is appropriate for a particular unit, and find alternative activities.
- The use of virtual learning, augmented reality of storytelling, gamification, etc. to create learning activities can promote better learning.

A prerequisite for the successful planning of learning activities is the right context.



The framework for designing ICT-based learning activities

The framework for planning learning activities using ICT tools	
Student	Cognitive needs, prior knowledge, experiences and skills, learning profile, learning interests.
Learning	Learning object, knowledge and skills identified

objectives	from the Study Program.
Learning environment	Programming tools, teaching materials, media, resources, educational software and learning support (scaffolding).

Types of learning activities

There are a very large number of ways in which learning activities are integrated into the eLearning program. Diana Laurillard's Conversational Framework (2012) identified six types of learning activities. There are different techniques to embed learning depending on what we're teaching or learner preferences.

Types of learning activities		
Type Description	Examples	Learners will:
Acquisition (1) Learning through acquisition is when teachers engage students with theories, concepts, and ideas. This is the least active type of learning – sharing information	**Learners read the text** -reading books, journal articles, blog posts, or papers -attending synchronous lectures/tutorials **Learners acquire knowledge**: watching videos, demonstrations, animations, -listening to podcasts or lecture recordings.	Read Observe Name Tell Recall Define Repeat Describe Arrange Memorise Recognise State
Inquiry (2) Students are supported and guided by teachers to explore and compare theories, concepts, and ideas being taught or included in the training resources, **to develop their own conceptual understanding**.	Research concepts, theories, or events Explore and analyse data Finding and evaluating information and ideas Compare different ideas to critique practice Formulate solutions to problems Browsing, seeking, and collecting information Problem-solving or answering big questions Inquiry driven investigation of authentic situations Case-based study of individual cases Evaluating and using online guidance Comparison and analysis of the range of digital sources	Locate Match Explain Experiment Record Solve Collect List Arrange Define Describe Categorise Recognise Identify
Practice (3) Learners perform a practical task to put theory into practice and practice the skill or knowledge. Use the feedback to improve their next action.	Test solutions to problems Simulations Work-integrated learning and placements Game-based learning engaging learners with the game environments and practicing exercises Virtual labs and Role-play activities Simulation to interact with the simulated world or branching scenarios Cross-context learning across physical, social settings	List Arrange Define Describe Categorize Recognize Identify Locate Match Explain Experiment Record Solve Collect
Production (4) Learners apply their knowledge in practice. They create actual artefacts or articulate their current understanding and how they use it in practice.	Constructing, designing and making objects drawings, models, representations of designs. Creating digital artifacts and designs: e-portfolios, infographics, digital posters, concept maps, blogs, website, videos, animations, photos, slides, video and audio presentations, journals, and wikis Reflecting on activities (discussion, writing, production) Presenting to an audience	Create Show Explain Describe Develop Review Record Evaluate

Discussion (5) Students engage with their peers and teacher (through discussion) to articulate and share their ideas and questions, and generate more questions and ideas.	think-pair-share jigsaw in-class or online synchronous discussions online asynchronous discussions polling	
Collaboration (6) Students build knowledge to tackle a problem by working together on a project or assignment. Collaboration is based on research and acquisition and occurs during online or offline discussion, practice and production. The teacher designer considers: • the size of the groups whether it is synchronous or asynchronous work	jigsaw group activities project-based work team problem solving collaborative problem solving peer feedback Small group projects Discussing projects and giving feedback	Create Share Discuss Investigate Review Role-play Practice Demonstrate Employ Support

Diana Laurillard's Conversational Framework (2012)

Laurillard argues that different forms of media have different capabilities, i.e. they provide different levels of support for different types of learning experiences.

LEARNING EXPERIENCE	METHOD/TECHNOLOGIES	MEDIA FORMS
attending, apprehending	print, TV, video, DVD	narrative
investigating, exploring	library, CD, DVD, Web resources	interactive
discussing, debating	seminar, online conference	communicative
experimenting, practising	laboratory, field trip, simulation	adaptive
articulating, expressing	essay, product, animation, model	productive

Table on learning experiences, methods and media forms (by Peter Clinch, 2005, based on Laurillard, 2002)

4.9. Learning resources/materials

Any resource – including print and non-print materials and online/open-access resources – which supports and enhances, directly or indirectly, learning and teaching. Typically, the use of a learning resource in the classroom is subject to a process of evaluation and approval at the school, local or national level. Evaluation criteria may include relevance to the curriculum and expectations for learning, social considerations, and age or developmental appropriateness.) (UNESCO-IBE, 1995-2023). Usually the use of a learning resource in the classroom is subject to an assessment and approval process at school, local or national level. The evaluation criteria of a learning resource may include the:

- relevance to the curriculum
- expectations for learning
- social concerns
- age or developmental appropriateness

Here are a number of useful outside study resources in case you need help or inspiration to design or develop a project. Make sure you review all the tutorials available. You just might discover new features or abilities.

Open Educational Resources (OER) **and Learning Practice** are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others. (UNESCO 2019).

Online/open-access resources – which supports and enhances, directly or indirectly, learning and teaching
https://www.unesco.org/en/open-educational-resources
Open Solutions: alongside Free and Open Source software (FOSS), Open Access (OA), Open Data (OD), and crowdsourcing platforms,
https://www.unesco.org/en/open-solutions

Graphic arts/Graphic design Open-source Resources

- Open-source solutions & affordable software packages- Apps (indicatively):
- Inkscape/vector graphics tool, Scribus / Desktop publishing software, GIMP/Photo-retouching, Blender/3D animation or a video games creator, Libre Office, MyHomework/mobile app.
- Graphic arts official suppliers: white-papers, audio-visual material, etc (ESCO, Heidelberg, Adobe, Adobe Help, etc)
- Non-profit literary journals
- EduBlogs
- Multimedia resource banks
- **Tutorials** (GIMP Tutorials, Photoshop and Lightroom tutorials (https://phlearn.com/tutorials-free-page/), Scribus Tutorials, Indesign Tutorials (https://www.indesignskills.com/tutorials/ Web Design Library, etc)
- Artes gráficas, http://educalab.es/recursos/historico/formacion-profesional/familias-profesionales/artes-grafica

4.10. Learners

Students are young peoples who have stable or slowly changing characteristics such as identity, interests - personal preferences (e.g. for specific types of information or approaches to participation in learning), background (previous learning experience, social and interpersonal skills, ability to use ICT), needs, access requirements, internal motivation, lifelong motivation, learning motivation and expectations from the specific course, future prospects, work/professional expectations, etc. Learners also have characteristics that develop in the learning process and that depend on the context in which they find themselves (Niittylahti et al, 2021).
The mentioned characteristics are of crucial importance for understanding why their initial participation in VET programs and the prospect of continuing or discontinuing studies.
Examining the way in which the participation of vocational education students develops during VET, we can identify three different profiles of student engagement: immediate, nascent, and indeterminate (Niittylahti et al, 2021).

In the first group, the factors that supported immediate engagement are a strong connection with other students, interest and/or enthusiasm for the curriculum, and an appropriate learning style.
In the second group some choose with very loose criteria (reduced interest of all options in the field) and wait for the first year of study to be completed to activate their interest in the field. Others, according to a survey of apprentices, make a random career choice but develop a strong attachment to their professional identity along the way (Chan, 2019).
In the third group (indeterminate engagement profile), interest and enthusiasm for the curriculum was low throughout the training period. Factors that can activate or increase interest in the field are: the appropriate pace of learning, the variety in teaching methods and learning activities, the development of learning skills and the "opening" of the field and of course the development of friendships at school.
It should also be emphasized that learners become more knowledgeable and competent in their profession if the formation of their professional identity is supported by trainers who give them confidence and responsibility.
The field is developed in detail in Chapter 6 (How do students- digital learners learn in the Digital Era?).

5. The Co-Design Process of Educational Material

5.1. Co-designing with balance and distance collaboration

In the current chapter, the structure and the elements of a model for the efficient cooperation of teachers for developing learning material will be developed in detail.
In a co-design approach, the central role opens up to ideas from many, which directly influences how a topic is developed and ultimately delivered to students. Remote collaboration, developing relationships of trust and balancing the needs of the parties involved can simplify the processes of carrying out a complex collaborative project. Attitude change is not easy for activities where a single teacher has the key role and controls the entire process to produce innovation.
Co-design brings together many experts. Collaborative material design (co-design) is a team-based process in which a group of teachers, researchers and developers engage in iterative cycles (planning, researching, design, implementation, testing, re-design) to develop educational materials. Building and sustaining relationships takes intention and commitment. Co-design uses a series of contacts and activities where dialogue and engagement create new, shared meanings based on specialist knowledge and lived experience. The resulting themes can be used as a basis for codified solutions.
The co-design process enables and supports professional learning (Westbroek, et all, 2019), with teachers playing an active role in the design process. Co-design positively affects both the professional development of teachers and the optimization of curricula.

The EKFIPLUS platform invites groups of teachers from different schools and faculties, from different countries, who submit an application-form and upon selection participate in collaboratively producing modern educational material:

- based on their relevance and experience in scientific content,
- the proposed methodology for developing educational material
- the know-how of using design and development tools and media
- way in which the variety of needs and resources
- and their availability and willingness to carry out the work.

Project selection criteria

- Authoring group qualifications
- Quality of collaborative culture
- Topic, Structure, Completeness, Originality
- Didactic utilization
- Material maturity and writing schedule
- Technological (interactivity, use of multimedia, complementarity to existing materials, etc.).

5.2. Definition guidelines for joint authoring of learning material

The design process of co-designing an exemplary educational material is cyclical: planning, research, draft proposals, approvals, implementation, testing, evaluation-redesign, submission. The co-design process should start with the formation of the team and proceed gradually, but at the same time knowing that the process may not be as linear as it seems based on the framework. Before you start co-design make sure that there are the right conditions to support co-design.

Getting started: building the co-design team

Each step of the process involves the basic co-design team and the wider community of stakeholders. The initial stage involves creating a team, appointing a project coordinator to develop a step-by-step project plan. The design team for the project can include a wide range of expertise with different characteristics.

- design Team: number of practitioners, members from different schools, different countries
- teachers (teacher as educational designer, teacher as digital designer, e.tc)
- external members/partners for common development (learning technologists, researchers, educational developers, to digital media producers, industry practitioners, students (etc.)
- details of teachers - external members (specialties)
- target group (you note the class of the students to whom the educational material is addressed)
- participation group (note, if exists, the number of students who can participate in the application of the instructional material)

Capability framework for successful partnerships

- Works as an effective and active member of a team
- Recognizes the unique and valuable contributions of each team member
- Willing to listen, share and learn
- Works collaboratively to build consensus 2. Demonstrates strong conflict resolution and negotiation skills
- Self-aware and have interpersonal flexibility
- Interested in being part of a team, sharing their thoughts and learning
- Committed to curiosity (external perspective)
- Open to ideas and don't come with a solution in mind
- Are critical and creative thinkers
- Confident to actively engage in constructive dialogue in a group setting
- Flexibly works in unfamiliar and evolving situations
- Implements appropriate QI processes across planning, design, delivery and evaluation

Co-design Elements & Principles

- The different elements that are involved in co-designing are: Engage, plan, explore, develop, decide, change.

Co-design Principles:

• Commit to working together collaboratively as a team
• Make sure all participants understand the common goal
• Make sure the process includes mutual exchange
• Co-design is inclusive. Uses feedback, advice and decisions from people with lived or professional experience.
• Monitor project progress to ensure interim and final project deliverables are achieved.
• Be participative. Participate and facilitate others to participate in co-design activities. All participants are responsible for the effectiveness of the process.
• Contribute to open and respectful discussion. Be empathetic, and supportive
• Be flexible. Be prepared to compromise
• Iterability is a building block of co-design. Ideas and solutions are constantly tested and evaluated, and changes/adaptations are a natural part of the process
• Respectful. All participants are considered experts and their contributions are equally valued.
• Be professional. Pursue solutions that are functional and sustainable

Defining Terms of Reference (TOR)

TOR show how the object in question will be defined, developed and verified and provide a documented basis for developing a common understanding of the scope

among the participants. Participants in the co-design team have roles and responsibilities as a team and as individuals in the team.

- scope, outcomes, individual and group deliverables (i.e. what has to be achieved)
- stakeholders, roles (coordinator, etc.)- responsibilities (i.e. who will take part in it)
- resource, financial and quality plans (i.e. how it will be achieved)
- structures, project planning (i.e. when it will be achieved)
- constraints, risks

Main definitions

• Determination, by the group as a whole, of the topic to be co-designed (title & of instructional material, tags, structure, relation to the curricula
• Identification of educational models and alignment with standards (if applicable) and degree of interaction with students
• What methods, tools and patterns will we use for design?
• Outline how the team will proceed in the co-design process

Identification of the training material

• Ideation stage: submission of a set of ideas for a solution to the problem (brainstorming) by the whole group. Creative thinking and method are required.
• Deciding which idea to prioritize for development
• Plan of structure and development stages of the educational material (work-flow plan)
• Determination of the estimated duration of implementation (in teaching hours)
• Determination of the required material-technical infrastructure (materials, tools, digital tools and media) for the implementation of the educational material as a whole
• Cost estimation & analysis in human and material resources.
• Assignments based on roles and new data
• Choice of ways to remotely communicate, collaborate and exchange material
• Findings are shared with the design team for consideration and decision making.
• Writing a detailed description of the educational material (according to the instructions of the proposal submission form)

Co-implementation Cycle I - Material development

- The learning material is directed for application in practice.
- The team works together incrementally to create a prototype of the product
- Participants work individually or in combination according to roles and assignments for the development of their assigned department. They collect and process resources such as datasets, laboratory materials, simulations and create elements that can be integrated into educational materials (interactive - audio-visual materials, etc.)
- Connecting individual projects and components to the single product (grouped)
- Testing the use of the material and providing feedback on how it could be improved.
- Search for solutions to overcome possible obstacles in the new environment
- Investigate skills and networks each team member has that can assist any improvement or change in practice

- Consider expanding the team if there are new skills or knowledge required for the implementation
- Getting guidance from colleagues and/or application experts is important

Co-implementation Cycle II – Tests / Revisions

- Ideas and the implemented prototype are continuously tested and evaluated with the participants and the target audience.
- Changes and adjustments are a natural part of the process, testing new features.
- Pilot tests: The material is prepared for pilot tests a. by a group of students and b. by a small group of teachers not involved in the design. Usage feedback is provided.
- Field testing: The final educational material is tested by a larger group of teacher-students.

Evaluation, Presentation, Submission, Approval & Share

This stage involves gathering data and communicating the results to others to document the value of the project.

- **Evaluation** of the application of the learning material to the real-world learning process
- **Presentation. Presentation type depends on the content area and the media types of the learning material.** It is also developed based on the specifications for the evaluation of educational materials.
- **Submission of the instructional material submission form (IMPORTANT).** For each educational material submitted, a separate description form is submitted.
- **EKFIPLUS team Approval (based on ''Development of an educational model'' units)**
- Uploading of the co-design approved material on the EKFIPLUS platform
- Acknowledged the contribution of everyone who has been involved in the process.

6. How do students- digital learners learn in the Digital Era?

6.1. Learning strategies - self-regulation: Teaching students how to learn and setting the stage for lifelong learning

The UNESCO International Bureau of Education has published in summary form the psychological principles - described below - which according to St. Vosniadou (2001) summarize some of the important findings of current research (from different areas of psychology) on learning and have provided us with new insights into the learning process. Syllabus and teaching methods are gradually changing in schools today, in a more student-centered direction. They try to "connect school to real life situations and focus on understanding and thinking rather than memorization and simple practice" (Vosniadou, 2001). The principles, which can be grouped into three groups based on focus, have been behind a number of innovative programs in schools around the world for years.

Environmentally focused principles

1. Active participation
Learning requires the active and constructive participation of the student.

2. Social interaction
Students should cooperate with other students

3. Activities that have meaning
People learn best when they engage in activities that they find useful for real life and relevant to their culture.

Principles with a focus on cognitive factors

4. Connecting new information with pre-existing knowledge
New knowledge is built on the basis of what we already understand and believe)

5. Use of strategies
People learn by utilizing efficient and flexible strategies that help them understand, reason, memorize, and solve problems)

6. Development of self-regulation and internal thinking
Students need to know how to plan and monitor their learning, how to set their own learning goals and how to correct their mistakes.

7. Reconstruction of pre-existing knowledge
Students must learn how to resolve internal contradictions and reconstruct existing concepts whenever necessary. Sometimes prior knowledge can get in the way of learning something new.

8. The goal is understanding, not memorization
Learning is best when material is organized around general principles and explanations rather than relying on memorizing isolated elements and procedures.

9. Helping students learn to apply their knowledge
Application of knowledge is very important. Why should one go to school if what one learns **there is not applicable in other situations and cannot be used outside of school?**

10. Making time for practice
Learning is a complex cognitive activity that cannot be rushed. It takes considerable time and practice to begin to build proficiency in an area.

Principles of Negotiating Developmental/Individual Differences & Influence of Motivation on Learning

11. Developmental and individual differences

There are key developmental differences in learning. As children develop, they form new ways of representing the world and also change the processes and strategies they use to manage these representations.

12. Cultivation of motivation

Learning is decisively influenced by the existence of motivation for the student. Teachers can help students become more motivated to learn by their behavior and words.

Application suggestions for teachers. A revised digital edition for the negotiation of each principle summarizes the research findings, accompanied by a description of their significance for teaching with suggestions for implementation for teachers, (Vosniadou, S., Lawson, M., Stephenson, H., Bodner, E. (2021): Teaching students how to learn: setting the stage for lifelong learning, UNESCO International Bureau of Education, - International Academy of Education, Switzerland, IBE/2021/ST/EP33, https://unesdoc.unesco.org/ark:/48223/pf0000378839)

6.2. Development methodology of polymorphic b-learning or e-learning

Effective teaching requires understanding and appreciating students' needs, backgrounds, interests and learning styles (Roberts et all, 2012). In vocational education today, as in most academic settings, there is a significant potential for intergenerational tension between teachers and students due to the age gap The generation gap in teaching techniques and learning styles is exaggerated today due to the rapid development and integration of new technologies in everyday educational practice.

Gen Z (Centennials, 1995 – 2010) were born into a world where connected technologies were no longer new but normal, in contrast to Millennials (1977 - 1995) who came of age at the same time as the Internet, social media and smartphones. Members of this generation are generally considered to be technologically savvy and attracted to teamwork and community building. They often prefer structured learning environments to directly meet their needs. To understand how Generation Z learns we can look at education trends over the past decade. by innovative teachers who take advantage of new digital technologies, teaching methodologies. Blended learning approaches that leverage digital media to allow more time for active learning during class. Compared to previous generations, in general, learning for Gen Z has been structured to be more active, incorporate more on-demand online learning tools, and be more collaborative. Traditional ways of education do not reflect the expectations of students today. Students have the ability to discover and process large amounts of information quickly and prefer a learning style that meets their auditory, visual and kinesthetic needs, with educational material brief and attractive.

Teaching Strategies for Gen Z

- **Self-educate about the concept of generational differences**

Acknowledge that this generation sees themselves as smart, creative, and hardworking. Review the way you communicate

- **Think Digital in all tasks and activities. Utilize current eLearning technologies.**

This generation is tech-savvy and does not see a sharp distinction between the offline and the online world. Students want to utilize tech tools and eLearning activities to expand their comprehension of the subject matter. You should explore all available eLearning technology to select the appropriate tools. Good teaching is not replaced by technology, but rather enhanced by it.

- **Gen Z prefers active learning environments**

Gen Z students are not passive learners. Whether working together or independently, they prefer learning by doing in active learning environments and learn by doing (Panopto Team (2020). Students are successful in hands-on learning that involves direct application. They direct their own personalized learning experiences and integrate information from a variety of resources and materials.

- **Encourage research-based learning methods**

Their learning styles are more personal based rather than institutional based. Gen Z has strong opinions and preferences for how they learn.

- **Break the content into short segments**.

Prefer short media to quickly pique interest, keep their attention and get to the point of interest. We are more likely to retain information if it is segmented into short segments. This generation has no patience and is looking for quick options. To adapt to these assumptions in online learning Use microlearning assets (eg podcasts, quick quizzes, etc., which can easily be developed, updated, managed and distributed).

- **Visualize information with aesthetically appealing educational presentations**

Make information graphical. Accustomed to interactive and engaging materials and games, they have higher standards and expectations for how the material is presented (Roberts et all, 2012). Current content creation and distribution technology allows materials to look attractive and aesthetically pleasing, designed even by non-designer authors. Modern Authoring Tools do not include PowerPoint.

- **Integrate new learning technologies and techniques (On-Demand Learning Tools, Mobile Learning, Gamification, Video Based Training)**

Education should incorporate learning strategies that students prefer to use, such as mobile devices, games and videos.

- **Encourage Collaborative - Social Learning**

Encourage them to work with their virtual peers to complete an online task in social collaboration settings. The team-based learning style works for the students as it involves collaborative research. Blended educational models that combine online discussions and in-class collaboration have proven to be effective models for engaging the students in learning.

- **Define expectations in advance**

Create a fair and honest learning environment. Students generally prefer to get a quick overview of the path that's ahead of them. Learning objectives should be clearly

defined, feedback should be offered in an appropriate manner and assessment/grading criteria should be transparent and available.

- **You are fed with immediate information**

Students prefer immediate information (e.g. Google service through their devices to get answers to urgent problems

- **Provide additional help and support**

Include instructions and a list of available resources for further information that students can easily access.

- **Give control to student-users with personalized - adaptive learning**

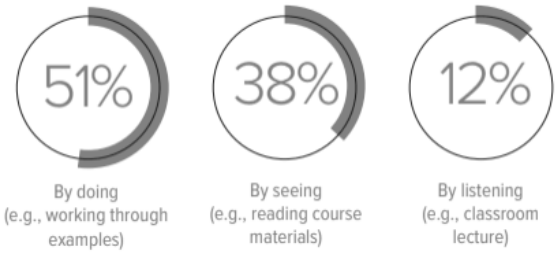
Gen Z learners resist information overload and look for the right information personalized to them. It is important to make the student feel in control of their learning. Personalization can be in the form of: The option of "choosing own learning path", possibility to ignore specific content or receive additional information, choice of courses based on identified skill gaps, use of avatars, etc.

- **Provide educational material relevant to their daily life**

Students prefer a learning style that makes the learning material relevant to their daily lives.

- **Identify the limits of multi-tasking**

Technology is ubiquitous and distractions challenge today's students.



Student studying preferences (Source: Barnes & Noble College)

Positive response levels to ed tech tools in the classroom (Source: bncollege.com)

7. EKFIPLUS - Quality control and evaluation of the learning material

7.1. EKFIPLUS - Basic specifications for submitting learning material

For the correct submission of educational material, it should meet the following basic specifications:

a) Accompanied by a submission form under the title: Description of instructional materials (Appendix IV), with all relevant fields filled in.

b) Be original, have not been used again for a commercial purpose and are free of any promotional or advertising elements.

c) Submitted in digital format. Acceptable formats supported by the electronic repository are listed in Appendix ……. In the case of materials in an unregistered format, a request should be sent to: ###@####.

d) Interoperability: Applications need to have versions for (as many as possible) different widely used operating systems (Windows, Linux, MacOS X).

e) Compatibility: The applications should also run in subsequent versions of the operating systems.

f) Accessibility: Incorporating access for people with special needs.

g) Resources: The design should consider the requirements of the applications in hardware and software dependencies, for reasons of saving resources.

h) License: In order for there to be continuity in the development and expansion of an application/material, it should be subject to the terms of the license that secures it.

i) Rights: Who owns the material? (TO BE COMPLETED).

- Participation in the submission process implies that the submitted educational material is granted to ..... for use and exploitation (non-commercial purpose).
- No future commercial sale of the electronic material may be made with reference to its specific approval.

Educational materials that do not meet the above conditions are automatically excluded from the evaluation process**.**

7.2. EKFIPLUS - General Specifications for the evaluation of educational materials

The educational material to be submitted will comply with the requirements of the following general specifications:

Pedagogical expediency

The educational material to be submitted will comply with the requirements of the following general specifications:

Requirements

• Gives added value to the learning process, addressing problems that cannot be solved by traditional teaching methods.

• Meets existing needs of specific classes or thematic units

• Contributes to the achievement, enrichment and updating of the means to achieve teaching goals and learning outcomes of the Curriculum of the classes of the level addressed

Pedagogical – didactic suitability

Requirements

- It is pedagogically suitable for students of the classes of the level of study addressed. When creating the thematic content of the material, consider the parameters of the topic, context & objectives, structure and curriculum of the level addressed.
- They are implemented inside and outside the school context, in a pedagogically appropriate and reasonable time.
- Makes use of the trainees' previous experience.
- The materials supports self-directed learning
- The material should create motivation and promote experiential and collaborative learning.
- The activities included in the material are necessary to have collaborative characteristics, that is to prefer (where possible) working with small group activities.
- The activities included in the material are necessary to provide opportunities for ingenuity, creativity and strengthening of critical thinking possibly through solving "problem" situations.
- Content has to be written in simple and understandable language, avoiding lengthy descriptions.
- Content uses conversational style (e.g., active voice, present tense, and second person) as more friendly and easier to learn, instead of a formal style
- Language and terminology to be compatible with the age and cognitive level of the pupils/students.
- The material must be free from any kind of stereotypes and prejudices (racist, sexist, etc.) and the adoption of anti-social behaviors.

Content's Scientific validity

Requirements

- Content consists of therefore interrelated sections/modules, through which the educational objectives are progressively approached and achieved.
- Content is distinguished by logical sequence, linguistic and semantic coherence

- Content is relevant, succinct and accurate
- Content includes appendices, as long as there is a need to quote additional instructions, tables of sizes, etc.
- Content contains internal links (where necessary) that will allow concepts to be interconnected with corresponding concepts present in the different modules of the course.
- Content contains information whose the way of structuring and organizing information be obvious and be as much as the student can assimilate.
- Content provides accurate and factual information and (with possibly conflicting scientific opinions) up-to-date content based on contemporary literature.
- The material presents the subject it touches on in full, in the context of the educational level to which it is addressed.
- Content is compatible with the principles of education for Sustainable Development and Sustainability.
- The material utilizes new technologies.
- The material should be characterized by originality, innovation.
- The material should be characterized by originality, innovation.
- Content respects the integrity and ownership of primary sources.
- Content provides the possibility of processing - completing activities that it lists, in a pedagogically appropriate and reasonable time.

Attractiveness

Requirements

- The material has the appropriate structure and organization of information and presents it in an attractive way.
- The material includes manipulations that are easily understood and achievable by users.
- The material encourages interactivity, stimulates curiosity and promotes reflection
- The material is worded in correct language and has no misprints (typos) and linguistic errors.

Flexibility

Requirements

- The material is connected to real situations and experiences from the students' everyday life.
- The material is deemed necessary to provide the flexibility to adapt to the social, cultural and educational characteristics of the students for whom it is intended.
- The material provides the student with the possibility to personalize its use, to utilize it as a tool for autonomous learning, etc.
- The material provides flexibility to the teacher to expand and modify its content, or the way it is used, to meet the particular needs of his/her students

7.2.1. Issues of Retention and Utilization of submitted material

The preservation and utilization of the submitted digital material requires its functional digitization according to appropriate specifications and commonly accepted standards so as to ensure the following:

- ease of access and management of the material. The digital organization of information in databases ensures its convenient management.
- facilitation of optimization processes and utilization/disposal of the material
- damage limitation
- rescue/storage in commonly accepted formats which ensures timeless historical rescue
- accessibility
- interoperability for easy association and mutual completion of files
- security-protection

7.2.2. Copyright Issues

The submitted digital material:

- Does not infringe the privacy, copyright, trademark or intellectual property rights of any person or entity.
- In the event that any material or elements subject to third party rights have been used to create the script (e.g. film clips, images, sound, music, etc.), permission has been secured prior to submission scenario.
- Parental or guardian consent required if material contains images of minors.
- Available for free use, reproduction, redistribution, presentation and exploitation, provided that no commercial exploitation is intended (?)

7.2.3. Submission of Educational Material

Submission Form / Description

- Title, Target group, Type, Sector/Specialty,
- Detailed description (goal, expected learning outcomes, estimated duration of implementation, connection with thematic units of the Study Program)
- Required material-technical infrastructure
- Component list, Implementation
- Sources / Bibliography

The Submission Form in full development is presented in the Appendix, in the field: "Educational Material Submission Form".

7.3. EKFIPLUS - Detailed Specifications for the development of learning material

Nowadays, many kinds of educational software have already been developed, which combine features from various categories. The characteristics of digital media encourage

the interested party to better approach the offered educational materials, since they provide additional incentives for research and knowledge in an attractive way. The quality of a creation or a complex project (collaborative in nature), such as a multimedia production for example, is difficult to determine precisely as the term quality is itself a multiparametric concept. The proliferation of illustrations in e-learning leads to the revelation of hidden meanings but with a method that obeys quality criteria.

Initially, the basic specific specifications for the **Aesthetic Perfection**, **Functional Suitability** and **Content Communication** of the proposed educational material are developed. Next, for each academic subject - and depending on its particularities, the requirements of special specifications are determined separately.
For the formulation of special specifications for the design and development of digital educational material, is necessary to comply with the set of official international standards used by individuals, organizations and governments worldwide, as well as the specialized pedagogical, scientific and technical specifications of educational materials prepared by official educators, scientific bodies and organizations (Open Universities, Official educational institutions, etc.).

The chapter specifies the relevant technical specifications for the development of the learning material within the EKFIPLUS Platform. It specifically refers to the accepted standards and corresponding formats for digital material.

Aesthetic perfection

Requirements

- The educational material should be characterized in terms of its aesthetic perfection with simple designed pages and attractive and easy-to-read graphics.
- The typographic perfection of the material is based on the principles of typographic design.
- The choice of font (font family) should include only one or two sharp fonts (fonts), preferably sans serif, since electronic texts are slower and more difficult to read than printed texts.
- To observe the basic rules of visual composition (balance, harmony, contrast, rhythm, variety, expression, proportion, etc.) which give attractiveness, easy memorization, etc. and activate the receiver's aesthetic preference.
- The selection and management of colors should be done with design consistency and sparingly throughout the project, with appropriate color charts (based on color theory) with possibilities to create, modify and search for color themes (palettes).
- Choose images that are highly relevant to the related texts and avoid their decorative use.
- The material should be characterized by technical perfection both in sound and image.

Functional Suitability

Requirements

• The digital material (application) must specify the prerequisite knowledge and technical conditions for its use.

• Is characterized by simplicity and addresses the problems of disorientation (disorientation) and cognitive overload (cognitive overload) attributed to the complexity of the system and the increased volume of information

• The architecture of the application conforms to widely accepted design standards (accessibility, navigability, quality of provided links, etc.).

• Users must have control over all executable files. Students should be able to control its flow and not be controlled by time commands.

• If its use is interactive, it should be generally user-friendly and provide feedback, help messages and instructions for use.

• Requirements to memorize information should be kept to a minimum.

• The layout of the application must provide guaranteed readability, using short texts and paragraphs.

• There must be complementarity, coherence and synchronization between the various means of presenting information

• Electronic format e-book design should be done according to publication design typology and typographic design principles (section headings, pre-organizers, visuals, etc.)

Content Communication/User Interaction

• The structure and organization of the material and information facilitate the understanding of its content

• The educational material must be organized in modules, through which the educational goals can be gradually approached and achieved.

• The messages for the transition from section to section must be clear and understandable.

• Visual, audio-visual material enhances the content

• The information must be the most necessary and relevant to the current activity. The student should not be "bombarded" with complex visual-textual material

• To choose multimedia as a contribution of multiple dynamic media (hypertext, sound, animation, video, 3D graphics, etc.) and a coordinated way of managing technology with the ability to appeal to different senses.

• To seek the development of a critical attitude towards the messages, since through their semiotic decipherment the receivers/users acquire the ability to select, evaluate and process the messages

• Display the time required to view multimedia

• Educational scenarios must be completed in a pedagogically appropriate and reasonable amount of time.

• There should be an instant help system, a navigation map system, as well as a glossary of terms and names

• It should be possible to save the results of the exercises, so that the student himself can check his progress, and the instructor can evaluate and certify the level of knowledge.

• It must be possible to print screens, graphics, texts and exercises.

• The material should be expandable by the teacher with the possibility of enriching and adding content
• High quality audio is also used when necessary (no sound attenuation, no noise, correct speed).
• The material should contain activities to help convey concepts and check for understanding.

7.3.1. Interface and Navigation

• System requirements are accurately stated at the beginning.
• To include a menu of contents.
• Interface and navigation elements follow standard practices and facilitate learning
• The Home, Exit and Back buttons at the top of the screen should be available everywhere.
• Course information tabs to be available everywhere

7.3.2. Learner Assessment

• Use closed-ended self-assessment questions or realistic scenarios that match the learning objectives and overall goal of the course.
• Questions should be well designed, using reasonable distracters based on the lesson content and passages that are similar to the correct answers.
• Developing questions to provide meaningful feedback that enhances learning.

7.4. EKFIPLUS - Detailed specifications based on material type requirements

Audio-visual material - Video or audio clip (if required)

Video as a technology of creating, programming, recording, processing, storing, transmitting and playing back a series of still images in order to display shots and scenes in motion, requires quite demanding workflows and coordination of various factors. The scientific content - regardless of the duration or complexity of the production - must have been developed according to the standard principles and techniques that concern all the stages and processes of an integrated production (pre-production, shooting, post-production) such as a script (creation), direction, lighting, speekage, editing, credits, etc.
Requirements
• The script, in addition to the basic narrative and the division into sections, must indicate all necessary instructions (movements of the camera and shots, timing of an integration, of environmental shots, etc.)
• The instructor/creator must have basic professional camera skills (focusing, lighting, sounds, etc.)
• The environments (backgrounds) should not be complex
• The captured image must be stationary, of high quality and with high definition resolution.

• The use of effects should be limited and not consecutive or sophisticated, in order to avoid distracting the students from the subject of education.
• Speakers should not speak too close or too far from the microphone or too fast.
• The recording should be done in an area that is as isolated from external sounds as possible, without echo effects.
• The teacher/creator must be proficient in video editing and screen casting tools.
• To provide transition instructions to specific points (indices) of the video
• The sound must be of high quality, homogeneity and clarity (no broken phrases, fluctuations in sound or noise, etc.).
• In the case of embedding audio-visual material (video, music excerpt, etc.) there should be a distinct reference to the source and its contributors (or licenses should be secured).
• Provide subtitling (in case)

Video - screen recording (Screencast)

• The accompanying narrative should provide more information than what the user can see.

• The pointer from the mouse should show where on the screen what the speaker is saying.

Educational game

The educational game/learning game is an interactive software, which tries to help in learning units through a fun way for students.
Requirements
• Adopts and integrates the properties and functions of interactive software.
• It can include different AP and MA (essay, audio-visual media, hypertext, etc.) which it presents through a common interface.
• Can incorporate various stereotypes (types) of learners, assess the learner and provide feedback.
• It can have different levels of difficulty (modules-tracks) for the learner.
• If another type of digital content is used for the learning game, then it should meet the corresponding specifications of the type of digital content to which it belongs.
• Satisfy a fundamental need to learn by providing enjoyment, involvement, motivation, ego gratification, adrenaline, creativity and social interaction in the game itself while the learning takes place.

Experiment/simulation

Media specifications for an experiment/simulation depend on its format.

Requirements
• The experiment (Experiment) aims at the practical test or application of theory.

• The simulation (Simulation) enables the representation of real situations.
• To integrate the properties and functions - as the case may be - of the video lecture or interactive software.
• Digital learning material in the case of text in hypertext format in terms of digital content must follow the rules of functionality: (with indications of functionality, have help and index, with easy navigation) and the principles of typographic design

Visual material: Diagrams, tables, photographs, images, graphics, illustration, info-graphics (if required)

Requirements
• Visual material should work in conjunction with the text, and be an explanatory element that helps to assimilate (understand) and convey the message on a page or screen.
• Visuals should be placed next to their related reference texts and preferably on the same page.
• Visual elements and images engage the learner and do not distract from the message.
• Visual elements (tables, figures, etc.) must necessarily be accompanied by a summary title, by numbering and a caption or text-caption (in case of need for a long explanation).
• References to tables, figures and other visual elements within the text should refer to the number of the figure or table, etc. (e.g. in Figure 1).
• The reference to primary sources for drawing tables and other visual material (if applicable) should be mentioned at the end of each element.
• Figures or sketches to add friendliness and simplify the degree of complexity of a standard representation or realistic photo
• Visual cueing elements must be effectively visualized with various key elements such as circles, arrows, strong outlines and/or color contrasts.
• To facilitate the guidance of accessing information of a content to use advance organizers (advance organizers)
• Illustration and Infographics to effectively convey abstract or "subtle" concepts that are difficult to capture in other media.
• The timelines should represent the important information
• Sources of tables, graphs (bar graphs, tree diagrams, figures, etc.) of visual elements must be listed at the end of the document or application
• Use of visuals must follow applicable copyright laws.
• Visual material should work in conjunction with the text, and be an explanatory element that helps to assimilate (understand) and convey the message on a page or screen.
• Visuals should be placed next to their related reference texts and preferably on the same page.

Online and Offline Presentations

Requirements
• The content should be characterized by brevity and clarity and present the subject excluding any unnecessary information.

• The full explanation of the individual topics (carried out with an oral presentation alongside the projection) to be the material of the narrative.
• The presentation of the slides should be organized in an understandable way and should follow the following structure: I. Initial slides (Slide of title elements, Description of thematic section (briefly), Objectives and Subsection Titles). II. Development of subsection topics. It is considered appropriate to include visual/audio-visual material as well. III. Conclusions.
• Slide layout must be simple and balanced and applied consistently to all slides of the presentation.
• Each slide should include up to six (6) lines of text, six (6) words in each and when required, use bulleting lists and avoid the numbering list.
• Words should be emphasized in bold (the use of capitals, italics, underlining, or other special effects should be avoided).
• To create a strong contrast of the letters with the background of the transparency to ensure legibility
• Avoid very bright colors of letters or background and the number of colors per presentation should not exceed three.
• The visual and audio-visual elements (sound, graphics, video, etc.) must be coherent and with sufficient space around them.

7.5. EKFIPLUS - Technical Guidelines for upload educational material

7.5.1 Application of international standards

The accessibility guidelines in the current regulatory framework are the WCAG 2.0 (Web Content Accessibility Guidelines) framework, also known as ISO standard ISO/IEC 40500:2012, accessibility guidelines for people with disabilities in web content. These guidelines are published by the World Wide Web Consortium (W3C) and the Web Accessibility Initiative (WAI), a specialized initiative for web accessibility. Accessibility encompasses various disabilities, including visual, motor, auditory, speech, cognitive, language, learning, and neurological impairments. The WCAG accessibility guidelines were developed through the W3C following a process of close and continuous collaboration with individuals and organizations worldwide, with the ultimate goal of providing a common accessibility standard for the World Wide Web to fully meet the needs of individuals, organizations and governments internationally. When uploading materials to a web platform, it is essential to adhere to the Web Content Accessibility Guidelines (WCAG) 2.0 to ensure accessibility for all users, including those with disabilities. Here are guidelines regarding the specifications for WCAG 2.0 compliance when uploading materials to a web platform:

1. Perceivable Content: Ensure that all users can perceive the material, regardless of their abilities. Provide alternative text descriptions for images, captions, transcripts for audio and video content, and clear headings and structure for easy navigation.
2. Operable Functionality: Ensure that the material is operable by all users, including those with mobility impairments. Allow users to navigate the content using a

keyboard, provide visible focus indicators, and ensure that interactive elements are accessible via assistive technologies.
3. Understandable Information: Make the material understandable for all users. Use clear and simple language, provide instructions and error messages that are easily comprehended, and ensure that the content is presented consistently and predictably.
4. Robust Compatibility: Ensure the material is compatible with various user agents and assistive technologies. Use standard HTML markup, provide text alternatives for non-text content, and ensure compatibility with web browsers and screen readers.
5. Alternative Formats: Offer alternative formats for the material to accommodate different user needs. Provide downloadable PDF versions, text transcripts, or audio descriptions for users with difficulty accessing the material in its original format.
6. Color Contrast: Ensure sufficient color contrast between text and background to make the content readable for visually impaired users. Use a color contrast checker to verify that the contrast ratio meets WCAG 2.0 guidelines.

7. Multimedia Accessibility: Ensure that multimedia content, such as videos or audio files, are accessible to all users. Provide closed captions, transcripts, and audio descriptions to make the content understandable for users with hearing or visual impairments.
8. Keyboard Accessibility: Ensure that all interactive elements and functionalities can be accessed and operated using a keyboard alone. Test the material using only the keyboard to verify that all features are accessible.
9. Testing and Validation: Regularly test and validate the material for accessibility compliance. Use automated tools, manual testing, and assistive technologies to identify and address accessibility issues.
10. Accessibility Statement: Include an accessibility statement on the web platform, clearly stating the commitment to accessibility and providing contact information for users to report any accessibility concerns or request accommodations.

7.5.2 Specifications and Guidelines

Specifications and Guidelines about text files/ page layout/ extensions

When uploading text files/ page layouts/ extensions to a web platform, it's essential to consider various specifications to ensure compatibility and optimal performance. Here are some guidelines regarding the specifications:

1. File Format: The most common file format for text files is plain text, typically with a .txt extension. Ensure that the files you upload are saved in this format, as web platforms universally support it, and users can easily view and access it.
2. Encoding: Text files should be encoded using a standard character encoding scheme, such as UTF-8. This encoding supports various characters and ensures compatibility across different platforms and languages. Avoid using proprietary or less common encoding schemes that may cause display issues or incorrect character rendering.

3. File Size: Consider the size of the text files you intend to upload. Large files can take longer to process and transmit, potentially affecting user experience. Therefore, keeping text files as small as possible while conveying the necessary information is generally a good practice. Compressing the files into archives like ZIP or GZIP can reduce their size for faster uploading and downloading.
4. Line Endings: Different operating systems use different conventions for line endings in text files. Windows typically uses carriage return followed by a line feed (CRLF), while Unix-based systems (like Linux and macOS) use only a line feed (LF). Ensure that your text files use the appropriate line endings to ensure proper display on the web platform.
5. File Naming: Choose descriptive and meaningful names for your text files while adhering to the restrictions imposed by the web platform. Avoid using special characters, spaces, or non-standard symbols in file names, as they can cause compatibility issues or make it harder for users to access and share the files.
6. File Validation: Implement validation checks on the text files before uploading them to the web platform. This can include verifying the file format, size, and content to ensure that only valid text files are accepted. Validation helps prevent potential security risks, such as uploading malicious files or files with incorrect formats that could cause errors.
7. Metadata: Consider including relevant metadata for the text files, such as title, description, author, and creation date. Metadata provides additional context and helps users discover and organize files more effectively within the web platform.
8. Security Considerations: Ensure that appropriate security measures are in place to protect the uploaded text files. This can include implementing user authentication and authorization mechanisms to control access, encrypting the files during transmission and storage, and regularly updating the web platform's security protocols to address potential vulnerabilities.
9. Indexing and Searching: If your web platform requires indexing and searching of text files, consider implementing appropriate search functionality. This may involve using technologies like full-text search engines or indexing algorithms to efficiently search and retrieve relevant content from the uploaded text files.
10. Error Handling: Develop a robust error handling mechanism for various scenarios, such as file upload failures, file format errors, or exceeded file size limits. Provide informative error messages to users, guiding them on resolving the issues and successfully uploading their text files.

Specifications and Guidelines about data files/gis

When uploading data files, particularly GIS (Geographic Information System) files, to a web platform, there are several essential specifications and guidelines to consider. These specifications ensure compatibility, optimal performance, and effective utilization of the data. Here are some procedures for handling data files, including GIS files, on a web platform:

1. File Formats: There are various file formats commonly used in GIS, such as shapefiles (SHP), GeoJSON, Keyhole Markup Language (KML), and GeoTIFF. Ensure that the web platform supports the file format you intend to upload. Additionally,

consider the specific needs of your project or application when choosing the appropriate file format.
2. Coordinate Reference System (CRS): GIS files typically include geographic data with specific coordinate systems. Specifying the correct Coordinate Reference System (CRS) for your data is crucial, as it ensures accurate positioning and alignment of spatial features on the web platform. Verify that the web platform supports the CRS used in your GIS files.
3. File Size: Large GIS files can be resource-intensive, affecting the performance of the web platform. Optimize file size by reducing unnecessary details or simplifying geometries whenever possible. In addition, consider compressing the data using appropriate techniques like file compression or simplification algorithms. This helps ensure faster uploading, downloading, and rendering of the data on the web platform.
4. Attribute Data: GIS files often contain attribute data associated with spatial features. When uploading data files, ensure the attributes are compatible with the web platform's data model or database structure. Perform data transformations or conversions to match the required format, data types, and field lengths.
5. Data Validation: Before uploading GIS files to the web platform, perform data validation checks to ensure data integrity and reliability. Validate the geometric and attribute data to identify and correct any errors or inconsistencies. This helps prevent issues like invalid geometries, missing details, or data corruption.
6. Metadata: Include relevant metadata for your GIS files to provide additional information about the data. Metadata may include data source, creation date, data accuracy, and dataset description. Properly documented metadata enhances data discoverability and interpretation and ensures users have the necessary context for using the data effectively.
7. Security: When dealing with sensitive or confidential GIS data, prioritize security measures to protect the uploaded files. Implement appropriate access controls, encryption techniques, and authentication mechanisms to safeguard the data from unauthorized access or tampering.
8. Visualization and Interactivity: Consider how you want the GIS data to be visualized and interacted with on the web platform. Determine whether you require static or dynamic maps and support for zooming, panning, or spatial queries. Choose a web mapping library or framework that aligns with your requirements and supports the desired level of interactivity.
9. Performance Optimization: GIS files can be computationally intensive, especially with large datasets. Optimize data processing and rendering using techniques like data tiling, spatial indexing, or generalization. These techniques help improve the performance of the web platform and ensure a smooth user experience, mainly when working with complex or high-resolution GIS files.
10. Error Handling: Develop a robust error-handling mechanism to handle potential issues during the data upload process. Provide informative error messages that guide users in resolving upload failures, format errors, or exceeding file size limits. Additionally, implement data validation checks to detect and report any errors in the uploaded GIS files.

When uploading audio files as learning material to a web platform, it's crucial to consider various specifications to ensure compatibility, accessibility, and optimal

learning experience. Here are some guidelines regarding the specifications for audio files to be uploaded to a web platform:

1. File Format: Choose a widely supported audio file format, such as MP3, AAC, or WAV. These formats offer a good balance between audio quality and file size. For example, MP3 is the most common format supported by almost all web browsers and devices. Ensure that the web platform supports the chosen file format.
2. Audio Quality: Balance the audio quality with the file size to provide a good listening experience. Use a bitrate appropriate for the content and ensure the audio is clear and intelligible. A lower bitrate can reduce file size but may compromise audio quality, so find the right balance based on the requirements of the learning material.
3. File Size: Consider the file size of the audio files to minimize the impact on page loading times and user experience. Compress the audio files using appropriate compression techniques, such as variable bit rate (VBR) encoding or audio codecs that offer good compression without significant loss of quality. Aim to strike a balance between file size and audio quality.
4. Metadata: Include relevant metadata with the audio files to provide additional information and improve discoverability. Metadata can include title, artist, album, duration, and description. Adding metadata helps users find and organize audio files effectively within the web platform.
5. Accessibility: Ensure that the web platform meets accessibility standards for audio files. Provide alternative text descriptions (alt text) for audio files, enabling users with visual impairments to understand the content through screen readers. Consider adding closed captions or transcripts for audio files, enhancing accessibility for users with hearing impairments or those who prefer reading the content.
6. Streaming Support: Consider implementing audio streaming functionality for longer audio files to allow users to listen to the content without waiting for the entire file to download. Streaming reduces buffering time and enables users to navigate the audio file easily.
7. Cross-Browser Compatibility: Test the audio files across web browsers and platforms to ensure compatibility. Different browsers may support other audio formats or have variations in their audio playback capabilities. Regularly check for updates to audio codecs and ensure compatibility with the latest browser versions.
8. Mobile Compatibility: Optimize audio files for mobile devices, as they make up a significant portion of web traffic. Consider lower bitrates or file sizes for mobile users to accommodate limited bandwidth or storage capacity. Test the audio files on various mobile devices and ensure they play smoothly and are accessible on smaller screens.
9. Error Handling: Implement error handling mechanisms for audio files to address potential issues during playback. Provide clear error messages and instructions to users in case of playback failures or compatibility issues. Troubleshoot common problems and provide resources for users to resolve any playback-related concerns.
10. Copyright Compliance: Ensure the uploaded audio files comply with copyright laws and licensing requirements. Obtain appropriate permissions or licenses for any copyrighted content to avoid legal issues. Communicate the terms of use and restrictions associated with the audio files on the web platform.

Specifications and Guidelines about Video files

When uploading video files as learning material to a web platform, it's essential to consider various specifications to ensure compatibility, accessibility, and an optimal learning experience. Here are some guidelines regarding the specifications for video files to be uploaded to a web platform:

1. File Format: Choose a widely supported video file format, such as MP4 (H.264) or WebM. These formats offer good video quality and are compatible with most web browsers and devices. MP4 is the most widely supported format, while WebM offers open-source and royalty-free video encoding. Ensure that the web platform supports the chosen file format.
2. Video Resolution and Aspect Ratio: Consider your learning material's appropriate video resolution and aspect ratio. The solution should be suitable for the content and the target audience. Common resolutions include 480p (SD), 720p (HD), and 1080p (Full HD). Choose an aspect ratio (e.g., 16:9) that works well with different devices and screen sizes.
3. Video Compression: Compress the video files to reduce their size without significantly losing quality. Use modern video codecs, such as H.264 or H.265 (HEVC), to achieve efficient compression. Adjust the compression settings, such as bitrate, to balance file size and video quality. This helps ensure smooth video playback and faster streaming on the web platform.
4. File Size: Consider the file size of the video files to minimize the impact on page loading times and user experience. Compress the videos using appropriate compression techniques and codecs. Use video optimization tools to reduce the file size without sacrificing visual quality. This is particularly important for users with limited bandwidth or slower internet connections.
5. Metadata: Include relevant metadata with the video files to provide additional information and improve discoverability. Metadata can include details like title, description, duration, tags, and credits. Adding metadata helps users find and organize video files effectively within the web platform.
6. Captioning and Subtitles: Include closed captions or subtitles in the video files to enhance accessibility. This allows users with hearing impairments or those who prefer reading the content to understand the video. Ensure that the web platform supports captioning functionality and follows accessibility guidelines for providing captioning options.
7. Streaming Support: Implement video streaming functionality to enable users to watch videos without waiting for the entire file to download. Implement adaptive streaming techniques, such as HTTP Live Streaming (HLS) or Dynamic Adaptive Streaming over HTTP (DASH), to adjust the video quality based on the user's internet connection speed. As a result, streaming improves playback performance and user experience.
8. Cross-Browser and Cross-Device Compatibility: Test the video files across web browsers, operating systems, and devices to ensure compatibility. Different browsers and devices may support other video formats or have variations in their video playback capabilities. Ensure that the videos play smoothly and are accessible on various platforms.

9. Mobile Compatibility: Optimize video files for mobile devices, as they account for a significant portion of web traffic. Consider lower resolutions or adaptive streaming to accommodate limited bandwidth or smaller screens. Test the videos on different mobile devices and ensure they play smoothly and provide a good user experience.
10. Copyright Compliance: Ensure the uploaded video files comply with copyright laws and licensing requirements. Obtain appropriate permissions or licenses for any copyrighted content to avoid legal issues. Communicate the terms of use and restrictions associated with the video files on the web platform.

Specifications and Guidelines about image files – 3d/ raster/ vector/ cad/ disk image

When uploading image files, including raster, vector, CAD, and disk image files, as learning material to a web platform, it's essential to consider various specifications to ensure compatibility, accessibility, and an optimal learning experience. Here are some guidelines regarding the specifications for image files to be uploaded to a web platform:
1. File Format: Choose the appropriate format based on the image file type. Standard file formats for raster images include JPEG, PNG, and GIF, while vector images are often saved in formats like SVG or PDF. CAD files are typically saved in formats such as DWG or DXF, and disk image files can be in ISO or IMG format. Ensure that the web platform supports the chosen file format.
2. Image Quality: Balance image quality with the file size to provide a visually appealing learning experience. Optimize raster images to find the right balance between file size and image clarity. Use compression techniques such as JPEG compression while considering acceptable compression artifacts. Ensure vector images are created or exported with appropriate resolution and maintain scalability.
3. File Size: Consider the file size of the image files to minimize the impact on page loading times and user experience. Compress raster images using appropriate compression techniques while aiming to reduce file size without significantly losing quality. For vector images, optimize the file size by simplifying paths and removing unnecessary details. Compress CAD and disk image files using standard compression algorithms.
4. Image Dimensions: Determine the optimal dimensions for displaying the images on the web platform. Consider the space available on the webpage, the aspect ratio, and the intended viewing devices. Resize or crop the pictures to ensure they fit well within the layout and maintain their visual integrity.
5. Accessibility: Ensure that the web platform meets accessibility standards for images. Provide alternative text descriptions (alt text) for images, enabling users with visual impairments to understand the content through screen readers. Use descriptive alt text that accurately represents the image's content and context. Consider providing high-contrast versions or alternative formats for users with specific visual needs.
6. Metadata: Include relevant metadata for the image files to provide additional information and improve discoverability. Metadata can include titles, descriptions, copyright information, and keywords. Adding metadata enhances the web platform's searchability and organization of the image files.

7. Copyright Compliance: Ensure the uploaded image files comply with copyright laws and licensing requirements. Obtain appropriate permissions or licenses for any copyrighted content to avoid legal issues. Communicate the terms of use and restrictions associated with the image files on the web platform.
8. Cross-Browser Compatibility: Test the image files across web browsers to ensure compatibility. Browsers may handle image formats, compression techniques, or color profiles differently. Regularly check for updates to image formats and ensure compatibility with the latest browser versions.
9. Mobile Compatibility: Optimize image files for mobile devices, as they make up a significant portion of web traffic. Consider lower resolutions or responsive images to accommodate smaller screens and limited bandwidth. Test the pictures on various mobile devices and ensure they display correctly and provide a good user experience.
10. Error Handling: Implement error handling mechanisms for image files to address potential issues during the upload process. Provide informative error messages and instructions to users in case of upload failures or format compatibility issues. Troubleshoot common problems and provide resources for users to resolve any image-related concerns.

Specifications and Guidelines about database files

When uploading database files as learning material to a web platform, it's essential to consider various specifications to ensure compatibility, security, and optimal access to the data. Here are some guidelines regarding the specifications for database files to be uploaded to a web platform:

1. Database Format: Choose a database format that is widely supported and appropriate for the type of data you're working with. Standard database formats include MySQL, PostgreSQL, SQLite, or MongoDB. Ensure that the web platform supports the chosen database format.
2. Database Structure: Define and design the database structure to match the requirements of the learning material. Determine the tables, relationships, and fields necessary to store and organize the data effectively. Then, normalize the database structure to minimize redundancy and ensure efficient data retrieval.
3. Data Types: Select appropriate data types for each field in the database to accurately represent the learning material. Consider data size, precision, and compatibility with the web platform's database system. Use data types that best match the nature of the data, such as integers, strings, dates, or blobs.
4. Security: Prioritize security measures to protect the uploaded database files and the sensitive data they may contain. Implement proper authentication and authorization mechanisms to control access to the database. Apply encryption techniques to secure data at rest and in transit. Regularly update the database software and apply security patches to mitigate vulnerabilities.
5. Data Validation: Perform data validation checks to ensure the integrity and reliability of the uploaded database files. Validate data types, field lengths, and relationships to prevent data corruption or inconsistencies. Implement input validation techniques to mitigate the risk of malicious input or injection attacks.

6. Database Backup and Recovery: Establish a robust backup and recovery strategy for the uploaded database files. Regularly back up the database to prevent data loss in case of hardware failure, accidental deletion, or other unforeseen circumstances. Test the backup and recovery process to ensure its effectiveness.
7. Data Privacy: Adhere to privacy regulations and guidelines when handling personal or sensitive information in the uploaded database files. Ensure compliance with relevant data protection laws, such as the General Data Protection Regulation (GDPR) or the California Consumer Privacy Act (CCPA). Anonymize or pseudonymize personal data where necessary.
8. Database Performance: Optimize database performance to ensure efficient retrieval and manipulation of data—design indexes on frequently queried fields to improve query speed. To enhance performance, consider database tuning techniques, such as query optimization and database caching. Regularly monitor and optimize the database to maintain optimal performance levels.
9. Scalability: Plan for future database scalability to accommodate data and user base growth. Design the database with scalability, considering factors such as data sharding, replication, or clustering. Implement techniques that allow for easy expansion of storage and processing capabilities.
10. Documentation: Create comprehensive documentation for the database structure, data models, and relationships. Document the purpose and structure of each table, field definitions, and any business rules associated with the data. In addition, provide documentation on accessing and interacting with the database, including API documentation if applicable.

Specifications and Guidelines about executable files

Uploading executable files as learning material to a web platform requires careful consideration of various specifications to ensure compatibility, security, and user safety. Here are some guidelines regarding the specifications for executable files to be uploaded to a web platform:

1. File Format: Choose the appropriate file format for the executable files. Standard executable file formats include EXE (Windows), DMG (Mac), or APK (Android). Ensure that the web platform supports the chosen file format and provides the necessary mechanisms for users to download and execute the files.
2. Security Considerations: Executable files can pose security risks, so taking appropriate measures to protect users is essential. Scan the executable files for malware or viruses using reliable antivirus software. Implement strict security measures on the web platform to prevent unauthorized execution or access to the files.
3. User Consent: Communicate to users the nature of the executable files and the potential risks associated with executing them. Obtain explicit consent from users before allowing them to download or run the executable files. Provide disclaimers and warnings about the possible consequences and encourage users to exercise caution.
4. Source Verification: Ensure the executable files come from trusted sources. If possible, provide information about the source or author of the files and establish a reputation for reliability and safety. Encourage users to verify the basis of the executable files and exercise discretion when downloading or executing them.

5. Compatibility: Consider the compatibility of the executable files with various operating systems and devices. Specify the system requirements, including minimum hardware specifications, operating system versions, and software dependencies. Inform users about any limitations or configurations required to run the executable files successfully.
6. Documentation: Provide comprehensive documentation accompanying the executable files. Include instructions on how to install, run, and use the files effectively. In addition, document any prerequisites, setup procedures, and troubleshooting steps. Clear documentation helps users navigate the installation and execution process smoothly.
7. Version Control: Implement version control mechanisms for the executable files to ensure users can access the latest updates and bug fixes. Maintain a revision history and communicate any changes or improvements to users. Provide mechanisms for users to update their installed versions of the executable files easily.
8. User Support: Offer support channels for users who encounter issues while downloading, installing, or running the executable files. Provide contact information, FAQs, or forums where users can seek assistance or report problems. Timely and effective user support enhances the learning experience and builds trust with the users.
9. Legal Compliance: Ensure the executable files comply with relevant laws and regulations. Obtain necessary licenses or permissions for any copyrighted software or components in the executable files. Communicate the terms of use and any restrictions associated with the files on the web platform.
10. Regular Maintenance: Continuously monitor and update the executable files to address security vulnerabilities, bugs, or compatibility issues. Regularly check for software updates, patches, or new versions of the executable files. Stay informed about emerging technologies and security practices to maintain the integrity and safety of the files.

Specifications and Guidelines about game files

Uploading game files as learning material to a web platform requires careful consideration of various specifications to ensure compatibility, accessibility, and an optimal user experience. Here are some guidelines regarding the specifications for game files to be uploaded to a web platform:

1. File Format: Choose the appropriate format for the game files. Standard game file formats include executable files (e.g., EXE), mobile application files (e.g., APK for Android, IPA for iOS), or web-based formats (e.g., HTML5). Select a file format widely supported by the target audience and compatible with the web platform.
2. Compatibility: Consider the compatibility of the game files with different operating systems, devices, and web browsers. Ensure that the game files can be played on popular platforms like Windows, macOS, iOS, and Android or web browsers like Chrome, Firefox, or Safari. Test the game files on different devices and platforms to ensure smooth gameplay.
3. File Size: Optimize the game files to minimize their size without compromising gameplay quality. Compress assets, such as images, audio, and video, using appropriate compression techniques to reduce the overall file size. Consider the target

audience's bandwidth limitations and storage capacities when determining the acceptable file size.
4. Accessibility: Ensure that the game files are accessible to users with disabilities. Provide accessibility features like adjustable text size, color contrast options, and keyboard navigation support. Consider implementing assistive technologies like screen readers for users with visual impairments. Test the game files with accessibility tools to ensure compliance with accessibility standards.
5. Security: Implement appropriate security measures to protect the game files and user data. Consider using encryption techniques to secure data transmission and storage. Protect the game files from unauthorized access or tampering. Regularly update the game files to address security vulnerabilities and apply patches or updates as needed.
6. Documentation: Provide clear and comprehensive documentation accompanying the game files. Include instructions on how to install, run, and play the game. Document the game controls, objectives, rules, and any specific requirements. Provide troubleshooting tips and FAQs to address common issues that users may encounter.
7. Licensing and Copyright: Ensure the game files comply with relevant licensing and copyright laws. Obtain necessary licenses or permissions for any copyrighted assets, such as music, images, or code libraries used in the game. Communicate the terms of use and any restrictions associated with the game files on the web platform.
8. User Support: Offer support channels for gamers who encounter issues while downloading, installing, or playing the game. Provide contact information, forums, or FAQs where users can seek assistance or report problems. Timely and effective user support enhances the learning experience and encourages engagement with the game files.
9. Update and Maintenance: Regularly update and maintain the game files to address bugs, compatibility issues, or user feedback. Listen to user feedback and incorporate improvements to enhance gameplay and user experience. In addition, keep the game files up to date with the latest technologies and trends in gaming.
10. User Feedback and Analytics: Implement mechanisms to gather user feedback and analytics to understand how users interact with the game files. Collect information such as gameplay duration, completion rates, or user ratings. Analyze this data to improve the learning experience and make informed decisions regarding updates and enhancements.

Specifications and Guidelines about web files

When uploading web files as learning material to a web platform, it's essential to consider various specifications to ensure compatibility, accessibility, and an optimal user experience. Here are some guidelines regarding the specifications for web files to be uploaded to a web platform:
1. File Format: Choose appropriate file formats for the web files based on their content and purpose. Standard web file formats include HTML, CSS, JavaScript, PDF, Word documents (DOCX), PowerPoint presentations (PPTX), or Excel spreadsheets (XLSX). Ensure that the web platform supports the chosen file formats.
2. Compatibility: Consider the compatibility of the web files with different web browsers, operating systems, and devices. Test the files on popular browsers like Chrome, Firefox, Safari, and Edge, ensuring they display and function correctly. Use

web standards and practices supported across different platforms to ensure broad compatibility.
3. File Size: Optimize the file size of web files to minimize load times and bandwidth usage. Compress images, videos, and other media files without significant loss of quality using appropriate compression techniques. Minify CSS and JavaScript files to reduce their size. Consider the bandwidth limitations of the target audience when determining the acceptable file size.
4. Accessibility: Ensure that the web files are accessible to users with disabilities. Adhere to accessibility standards, such as the Web Content Accessibility Guidelines (WCAG), and provide alternative text for images, proper headings, and semantic markup. Ensure compatibility with screen readers and assistive technologies. Test the accessibility of the web files using accessibility evaluation tools.
5. Security: Implement appropriate security measures to protect the web files and user data. Use secure protocols (HTTPS) for data transmission. Protect sensitive information using the best authentication, authorization, and data encryption practices. Regularly update the web files and associated software to address security vulnerabilities.
6. Navigation and Structure: Design the web files with a clear and intuitive navigation structure. Use consistent layouts, menus, and navigation elements across pages to help users find and access content quickly. In addition, consider usability principles, such as logical information hierarchy and intuitive user interfaces, to enhance the learning experience.
7. Multimedia Integration: Incorporate multimedia elements into the web files to enhance the learning material. Embed videos, audio files, or interactive features to engage learners. Ensure compatibility across different browsers and devices. Provide alternative formats or captions for multimedia content to accommodate users with additional needs.
8. Documentation: Provide clear and comprehensive documentation accompanying the web files. Include instructions on how to navigate and interact with the files. Document any prerequisites or software requirements. Provide troubleshooting tips and FAQs to address common issues that users may encounter.
9. Version Control: Implement version control mechanisms for the web files to manage updates and revisions. Maintain a revision history and communicate any changes or improvements to users. Provide tools for users to easily access and download the latest versions of the web files.
10. User Support: Offer user support channels for learners who encounter issues accessing or using the web files. Provide contact information, forums, or FAQs where users can seek assistance or report problems. Timely and effective user support enhances the learning experience and encourages engagement with the web files.

Specifications and Guidelines about system files

When uploading system files for a learning system to a web platform, it's crucial to consider various specifications to ensure compatibility, functionality, and an optimal user experience. Here are some guidelines regarding the specifications for system files to be uploaded to a web platform:

1. File Format: Select appropriate file formats for the system files based on their purpose and compatibility with the learning system. Standard system file formats include executable files (e.g., EXE), installation packages (e.g., MSI), compressed archives (e.g., ZIP), or system configuration files (e.g., XML, JSON). Ensure that the web platform supports the chosen file formats.
2. Compatibility: Consider the compatibility of the system files with different operating systems, devices, and web browsers. Determine the supported platforms (e.g., Windows, macOS, Linux) and versions of the learning system. Then, test the system files on various platforms and browsers to ensure proper functionality and compatibility.
3. Installation and Configuration: Provide clear instructions on installing and configuring the learning system using the uploaded files. Include step-by-step installation guides, system requirements, and any dependencies that must be installed beforehand. Document the configuration options and settings to help users set up the system correctly.
4. File Size: Optimize the file size of the system files to ensure faster download and installation times. Compress large files or resources without compromising functionality or quality. Consider the bandwidth limitations of the target audience when determining the acceptable file size.
5. Security: Implement appropriate security measures to protect the system files and user data. Use secure protocols (e.g., HTTPS) for data transmission during installation or configuration processes. Ensure that the system files are free from malware or vulnerabilities. Regularly update the system files to address security patches or bug fixes.
6. Documentation: Provide comprehensive documentation accompanying the system files. Include user manuals, installation guides, and troubleshooting documentation. In addition, document the system's features, functionalities, and usage instructions to help users navigate and utilize the learning system effectively.
7. Version Control: Implement version control mechanisms for the system files to manage updates and revisions. Maintain a revision history and communicate any changes or improvements to users. Provide tools for users to easily access and download the latest versions of the system files.
8. User Support: Offer user support channels for learners who encounter issues during the installation or configuration. Provide contact information, forums, or FAQs where users can seek assistance or report problems. Timely and effective user support enhances the learning experience and encourages engagement with the learning system.
9. System Updates: Regularly update the system files to introduce new features, fix bugs, or address user feedback. Provide mechanisms for users to update their installed versions of the learning system easily. Notify users about available updates and improvements to enhance their learning experience.
10. System Integration: Ensure the system files seamlessly integrate with other components or platforms. Consider compatibility with external databases, APIs, or third-party tools commonly used in the learning ecosystem. Test the integration points to verify the interoperability of the learning system with other software or systems.

Specifications and Guidelines about compressed files

When uploading compressed files for a learning system to a web platform, it's essential to consider various guidelines and specifications to ensure compatibility, efficiency, and ease of use. Here are some policies regarding the specifications for compressed files to be uploaded to a web platform for a learning system:

1. File Format: Select a widely supported compressed file format such as ZIP, RAR, or 7z. Ensure that the web platform supports the chosen file format and provides the necessary tools or libraries for users to extract the compressed files.
2. Compression Method: Optimize the compression method to balance file size reduction and extraction time. Use an appropriate compression algorithm that provides good compression ratios without significantly compromising the extraction speed. Test the compressed files on different platforms and devices to ensure compatibility.
3. File Size: Compress the files to reduce their overall size, allowing faster downloads and minimizing bandwidth usage. Consider the file size limitations of the web platform and the target audience's internet connection speeds. Balancing file size reduction with maintaining the integrity of the learning materials is essential.
4. File Structure: Organize the compressed files logically and intuitively. Group related files together and provide clear folder hierarchies. Use descriptive file and folder names to make it easier for users to navigate and find the specific learning materials they need.
5. Compression Software: Recommend or provide instructions for users to use appropriate compression software to extract the compressed files. Mention popular compression software such as WinRAR, 7-Zip, or built-in extraction tools available on different operating systems. Ensure that the instructions are clear and easy to follow.
6. Documentation: Include clear documentation accompanying the compressed files. Provide instructions on extracting the files and navigating the compact folder structure. Include a README file or a user manual that provides an overview of the learning materials and how to access and use them effectively.
7. File Integrity: Verify the integrity of the compressed files to ensure they are not corrupted during the compression process or download. Provide checksums or hashes for users to verify the integrity of the compressed files. This helps maintain the integrity of the learning materials and ensures that users are working with reliable content.
8. Security Considerations: Compressed files may contain sensitive or copyrighted content. Ensure that the compressed files comply with relevant licensing and copyright laws. Obtain necessary permissions for any copyrighted materials included in the compressed files. Communicate the terms of use and any restrictions associated with the learning materials.
9. User Support: Offer support channels for users with issues extracting or accessing the learning materials from the compressed files. Provide contact information, forums, or FAQs where users can seek assistance or report problems. Timely and effective user support enhances the learning experience and helps users overcome challenges.
10. Accessibility: Consider accessibility guidelines when creating or compressing learning materials. Ensure that users with disabilities can access and utilize the

learning materials effectively. Provide alternative formats or accommodations for users with specific accessibility needs.

Specifications and Guidelines about developer files

When uploading developer files for a learning system to a web platform, it's essential to consider various guidelines and specifications to ensure compatibility, usability, and a practical learning experience. Here are some policies regarding the specifications for developer files to be uploaded to a web platform for a learning system:

1. File Format: Select appropriate file formats for the developer files based on their purpose and compatibility with the learning system. Standard developer file formats include source code files (e.g., HTML, CSS, JavaScript, Python), project files (e.g., .NET solution files, Maven/Gradle build files), configuration files (e.g., JSON, XML), or documentation files (e.g., Markdown, plain text). Ensure that the web platform supports the chosen file formats.
2. Compatibility: Consider the compatibility of the developer files with different operating systems, devices, and web browsers. Determine the supported platforms and versions of the learning system and the tools required to work with the developer files. Ensure that the necessary development tools or software are available or accessible to learners.
3. File Structure: Organize the developer files well-structured and intuitively. Group related files together and follow best practices for file organization. Provide clear and descriptive file and folder names to make it easier for learners to navigate and understand the structure of the developer files.
4. Documentation: Include clear and comprehensive documentation accompanying the developer files. Provide instructions on how to set up the development environment, install the required software, and run the projects. Document the purpose and functionality of the developer files, including explanations of code structures, design patterns, or concepts used. Include code comments or inline descriptions to aid learners' understanding.
5. Version Control: Implement version control mechanisms for the developer files to manage updates and revisions. Use popular version control systems like Git or Subversion to track changes and enable collaborative development. Include clear instructions for learners to access and clone the repository to work with the developer files.
6. Dependencies: Specify any dependencies or external libraries required to run the developer files. Provide instructions on installing and configuring these dependencies to ensure learners can run the code without issues. Include version information and any specific configuration steps necessary for successful execution.
7. User Support: Offer support channels for learners encountering issues while working with the developer files. Provide contact information, forums, or FAQs where learners can seek assistance or report problems. Encourage collaboration among learners through community forums or chat platforms to facilitate knowledge sharing and problem-solving.
8. Code Quality: Ensure the developer files adhere to coding standards and best practices. Encourage learners to write clean, readable, and well-documented code. Provide feedback mechanisms or code review processes to help learners improve their

coding skills. Encourage learners to follow industry-standard conventions and guidelines.
9. Security: Implement appropriate security measures to protect the developer files and user data. Ensure the development environment and tools are updated with the latest security patches. Educate learners about secure coding practices, such as input validation, protection against common vulnerabilities, and secure communication protocols.
10. Learning Resources: Supplement the developer files with additional learning resources, such as tutorials, walkthroughs, or sample projects. Please provide links to relevant documentation, online resources, or communities where learners can further enhance their skills. Encourage learners to experiment, modify, and extend the provided code to deepen their understanding.

References

Bibliography

Boyle, T. (1997). Design for multimedia learning, London: Prentice Hall.

Courau Sophie (2000). The basic "tools" of the adult trainer, Metaichmio, Athens, ISBN 960-375-173-1, P. 66.

Dimitriadis, S. (2015). Learning theories and educational software [Undergraduate textbook]. Kallipos, Open Academic Publications. https://hdl.handle.net/11419/3397

Dimou, & Kameas (2011). Characteristics and Knowledge of Digital Educational Material for Distance Education - International Conference on Open & Distance Education, 6, http://epublishing.ekt.gr | e-Publisher: EKT | Downloaded at 29/06/2016 17:16:45

Downes Stephen (2012). *E-Learning Generations*, https://www.downes.ca/post/57741

Kalou A., Solomou G., Kameas A., 2011. Introducing Learning Outcomes in Knowledge Management Systems for e-Learning, Educational Materials and Educational Methodology Laboratory, Hellenic Open University, DOI:10.12681/icodl.748

Kokkos, A. (2005). Adult Education Methodology, Volume I: Theoretical Framework and Learning Conditions, Patra E.A.P., 2005

Komis, I. V., (2004). Introduction to the educational applications of Information and Communication Technologies. Athens: New Technologies Publications

Kutash and A. Wolf (eds.) (1986). *Psychotherapist's Casebook: Theory and Technique in Practice.* San Francisco: Jossey-Bass, ISBN-10: 0875896855

Mayer, Richard E. (2009-01-12). *Multimedia Learning*. Cambridge University Press. ISBN 9781139475495.

Palios Zacharias (2002). *Trainer Training Program - Training material for theoretical training trainers*, volume 1, p. 61-66, Published by EKEPIS (National Accreditation Center for Continuing Vocational Training) - Ministry of Employment and Social Protection, Athens.

Panagiotakopoulos, C. Pierrakeas, C. & Pindelas. P, (2003). *Educational software and its evaluation*. Athens: Metaichmio Publications

Paraskeva F., Papagianni Aik. (2008). Scientific and Pedagogical skills for Education staff, Pedagogical Institute - Ministry of Education.

Picciano, A. G. (2017). *Theories and frameworks for online education: Seeking an integrated model*. Online Learning, 21(3), 166-190. doi: 10.24059/olj.v21i3.1225

Solomonidou, X., (2006). *New trends in educational technology. Constructivism and modern learning environments*, Athens: Metaichmio Publications

Online sources

Barnes & Noble College (2023). *Getting to Know GEN Z - Exploring middle and high schoolers' expectations for higher education*, retrieved from https://www.bncollege.com/wp-content/uploads/2018/09/Gen-Z-Report.pdf

Cedefop (2010). *Learning outcomes approaches in VET curricula A comparative analysis of nine European countries.* Luxembourg: Publications Office. Available from Internet: https://www.cedefop.europa.eu/files/5506_en.pdf

Center for Teaching and Learning, DePaul University (2023). Teaching Commons, Chicago, https://resources.depaul.edu/teaching-commons/teaching-guides/course-design/

Centers for Disease Control and Prevention (.gov) Jun 19, 2018. Quality E-learning Checklist, U.S. Department of Health & Human Services, https://www.cdc.gov/training/development/design/online/checklist.html

Chan, S. 2019. "From Job to Calling: Vocational Identity and the Role of Apprenticeship." *Vocations and Learning* 12 (3): 387–403. doi:10.1007/s12186-019-09220-5.

Clinch, Peter (2005), Supporting law teaching: training and teaching, Presentation at UKCLE seminar on teaching and learning for legal skills trainers, 16 February 2005, HTML

Cook V. S. (2017), *Teaching the Generation Z Student*, University of Illinois Springfield, https://sites.google.com/a/uis.edu/colrs_cook/home/teaching-the-generation-z-student

Connectivism Learning Theory (2021), https://www.wgu.edu/blog/connectivism-learning-theory2105.html#close

Cook, Albert M. and Gray, David B. "assistive technology". Encyclopedia Britannica, 12 May. 2017, https://www.britannica.com/science/assistive-technology. Accessed 22 April 2023.

Downes Stephen (2012). E-Learning Generations, https://www.downes.ca/post/57741

Educational Material and Educational Methodology Laboratory (2012). Scientific and Technical Specifications, - Hellenic Open University - EAP, https://eeyem.eap.gr/specifications-gr/. Accessed 22 April 2023.

Havighurst Robert J. (2023). *Functions and roles of teachers*, https://www.britannica.com/topic/teaching/Functions-and-roles-of-teachers

Karagiannidis C., Politis P. & Karasavvidis H. (ed.) (2012). Proceedings of the 8th Panhellenic Conference with International Participation "Information &

Communication Technologies in Education", University of Thessaly, Volos, September 28-30, 2012
Laurillard, Diana. (2012). Teaching as a design science. In *Routledge, Taylor & Francis Group*. Routledge.
Laurillard, D, 2002. Rethinking University Teaching: A Conversational Framework for the Effective Use of Learning Technologies, 2nd edition. London: Routledg
Laurillard conversational framework, https://www.futurelearn.com/info/courses/blended-and-online-learning-design/0/steps/191671
McKercher, K. A. (2020). *Beyond Sticky Notes, Co-design for real: mindsets, methods and movements*, Inscope Books, Australia, ISBN: 9780648787501
Moraitopoulou Elina (February 21, 2018). *Useful Guides: Designing Modern and Stimulus-Rich Learning Environments*, https://oer.ellak.gr
Niittylahti S., Annala J., Mäkinen M. (January 2021). Student engagement profiles in vocational education and training: a longitudinal study, Journal of Vocational Education and Training 75(12):1-19, DOI:10.1080/13636820.2021.1879902, LicenseCC BY-NC-ND 4.0
NCOSS, Fair Deal Forum (2017), Principles of Co-design, https://www.ncoss.org.au/wp-content/uploads/2017/06/Codesign-principles.pdf
Nielsen Søren, ETF (editor). The professionalization of teachers and trainers is a key objective of European co-operation in the area of education and training, INFORM, Issue 04 November 2009, https://www.etf.europa.eu › sites › default › files
Panopto Team (2020). They're Coming: Rethinking Training and Development for Generation Z, https://www.panopto.com/blog/rethinking-training-and-development-for-generation-z/
Pappas C. (2019). Incorporate Discovery Learning into Your eLearning Course Design, https://elearningindustry.com/incorporate-discovery-learning-elearning-course-design
Roberts, David & Newman, Lori & Schwartzstein, Richard. (2012). Twelve tips for facilitating Millennials' learning. Medical teacher. 34. 274-8. 10.3109/0142159X.2011.613498.
Roos, L., Trasberg, K., Kõiv, K. et al. Characteristics of powerful learning environments in VET transition program for at-risk students: qualitative insights from teachers and support specialists implementing the program. Empirical Res Voc Ed Train 13, 19 (2021). https://doi.org/10.1186/s40461-021-00123-1
Schola Europaea / Office of the Secretary-General - Bureau du Secrétaire général des Ecoles européennes (2018). Key Competences for Lifelong Learning in the European Schools, Approved by the Joint Teaching Committee by Written Procedure 2018/47. Available from Internet: https://www.eursc.eu/BasicTexts/2018-09-D-69-en-2.pdf
Una revisión actualizada del concepto de eLearning. Décimo Aniversario. EKS [en línea]. 2015 [citado 11/04/2019]; 16(1):119-144. DOI: http://dx.doi.org/10.14201/eks2015161119144
UNESCO - International Bureau of Education (2023). UNESCO IBE Glossary of curriculum, https://www.ibe.unesco.org/en/glossary-curriculum-terminology

UNESCO Institute for Statistics/UIS (2012). International Standard Classification of Education – ISCED 2011. Montreal: UIS, http://www.uis.unesco.org/Education/Documents/isced-2011-en.pdf
UNESCO-UNEVOC/NCVER, TVET glossary: some key terms, 2009
UNESCO Institute for Statistics/UIS (2012). International Standard Classification of Education – ISCED 2011. Montreal: UIS, http://www.uis.unesco.org/Education/Documents/isced-2011-en.pdf
Vosniadou Stella (2001). How students learn, UNESCO International Bureau of Education, - International Academy of Education, http://www.ibe.unesco.org/fileadmin/user_upload/archive/Publications/educationalpracticesseriespdf/prac07gr.pdf
Westbroek, H., de Vries, B., Walraven, A., Handelzalts, A., McKenney, S. (2019). Teachers as Co-designers: Scientific and Colloquial Evidence on Teacher Professional Development and Curriculum Innovation. In: Pieters, J., Voogt, J., Pareja Roblin, N. (eds) Collaborative Curriculum Design for Sustainable Innovation and Teacher Learning. Springer, Cham. https://doi.org/10.1007/978-3-030-20062-6_3
Weller M., Bea de los Arcos, Farrow B., Pitt B., McAndrew P. (2015). The Impact of OER on Teaching and Learning Practice, International Council for Open and Distance Education (ICDE), November 2015Open Praxis 7(4):351-361
DOI:10.5944/openpraxis.7.4.227, LicenseCC BY 4.0
Zarifis G. (2014). "Vocational Education and Training: Issues of Organization and Planning of Educational Programs with the Aim of Developing and Improving the Skills of Human Resources. Section 11. Learning Contents and Teaching Methodology''. Version: 1.0. Thessaloniki 2014, http://eclass.auth.gr/courses/OCRS176/
https://digitalstrategy.gov.gr/project/psifiako_ekpaideytiko_periechomeno_kai_ypiresies_e-mathisis

Annex

The last section includes the 'Learning Material Submission Form' with thedescription of the Learning material.

LEARNING MATERIAL SUBMISSION FORM

DESCRIPTION OF LEARNING MATERIAL

(For each educational material submitted, a separate description form is submitted)

PARTNERS FOR CO-DEVELOPMENT
Enter the name and region of the cooperating educational units or educational organizations.

DETAILS OF EDUCATORS/TEACHERS	SPECIALTY
Enter the name and specialty of the teachers implementing the educational material.	

TARGET GROUP – PARTICIPATION GROUP
You note the class of the students to whom the educational material is addressed. *Note, if exists, the number of students who can participate* in the application of the instructional material. *Define the exact level(s) of the European Qualifications Framework/EQF (EQF level 4, EQF level 45, EQF level 6).*

TITLE OF LEARNING MATERIAL
Enter the title of the training material, up to 10 words

TYPE OF LEARNING MATERIAL (*Drop down menu*)
Mark the type of learning material (media type: video, image, text, etc.) by selecting from the corresponding group
KEY WORDS/TAGS
Enter up to 8 keywords

DATE OF SUBMISSION	
RELATED LEARNING CONTENT AREA/KNOWLEDGE OBJECT (*Drop down menu*)	
Note the related object areas of the classes and/or subject areas that may be addressed	
DETAILED DESCRIPTION OF THE LEARNING MATERIAL	

Please note in detail (up to 1000 words):

- *the goals,*
- *the expected learning outcomes*
- *the estimated duration of implementation (in teaching hours)*
- *the required material-technical infrastructure*
- *the connection with units of the Curriculum*

BIBLIOGRAPHY - SOURCES OF DOCUMENTATION

Compiling reference lists using APA Style (the last revised edition)

ADDITIONAL INFORMATION

Fill in any special information that refers to special features of the proposed material (if any).