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Athena Digital Pedagogical Model

Project Athena - University Goes Digital for a
Global Sustainable Education
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Background and Purpose

The purpose of the Project University Goes Digital is to improve digital skills of University teachers, to reinforce their capacity to respond to the challenges Universities are facing during the COVID-19 pandemic or will face in future similar challenges. With active involvement of the lecturers and students from the beginning of the project, ATHENA will create, test and implement innovative digital practices, putting technologies in use to create new pedagogical approaches and achieve better learning and teaching experiences. The project seeks to foster cooperative learning environments, making them transformative and inclusive through the effective adoption of new technologies, such as e-learning, gaming platforms, virtual and augmented reality, systematically modelled to activate key competencies in digital learning. The project will create templates that lecturers can adopt and adapt to their classes, using different pedagogical approaches. It will be a toolkit that includes ebooks, videos, games, quizzes, AR and AI.

RESULTS:

O1 - a multi-regional Platform Digital Learning Live HUB for Lecturers (eLEARN-HUB) to support lecturers to implement online/e-Learning courses. The eLEARN-HUB will have: 1) a Pedagogic Model of Digital Learning, with course learning design (learning outcomes, syllabus, schedule, teaching methodology, assessment, academic resources, technological tools); and 2) a Prototype of Digital Learning Solution.

O2 – a Universal Toolkit for Digital Learning, to be used and tailor made by lecturers form all the scientific areas.

O3 – O6 – four online courses: Technology in Architecture, Organization and Leadership, Logistics and Research Methodology. The 4 Courses will be tested with pilot groups of professors and students, with active online participation of teachers from non-European Countries (Cape Vert, Brazil, Tunisia). The final version of the courses will be implemented in training events with lecturers from the 4 partners. In the testing phase, using pilot courses and staff training events, Lecturers of the 4 Universities of the project will be given the skills to develop digital tailor-made courses for their students, using: GBL VR/AR, video classes, and AI systems.

For Intellectual Output 1 three main themes made explicit in the Athena Digital Learning Pedagogical Model; Athena Design Thinking methodology; Athena Pedagogical Model have been defined as worth investigating in the research phase and to be implemented along the project.

Those themes are all related to digital learning and inspired by the Digital Education Readiness program of the European Commission.

Theme 1: Digital Learning State of Art

Digital learning literature review and Experiences from the field

Theme 2: Athena Design Thinking for Digital Learning Field Diagnosis

Towards students-centred systems

Towards an effective Digital Education Technological Solution

Theme 3: Athena Digital Pedagogical Model

Towards a relevant digital educational provision

This report is regarding Theme 2 and the goal is to present the pedagogical and learning model created with the insights of the students and the teachers, to implement digital education courses in Higher Education Institutions.

Theoretical Framework for Pedagogical Models

1.1 Introduction

The current transformations and challenges faced by the Knowledge Society are related to Information and Communication Technology (ICT). This has changed the way people be, be, stay and learn. These transformations, caused by the use of ICT, contribute to generating another form of culture, cyberculture or culture of ICT use. With regard to learning, there is the teacher who had to reinvent himself through the changes of society mediated and connected by the various technologies. Thus, in the training centers and, especially in universities, there was a profound impact on the professional profile of teachers and also on the professional training of skills and abilities. In this context of change, the main competence to be developed by teachers: is digital (GRÜNWALD, et al., 2016; FALLOON, 2020).

These changes require rethinking education, designing a new model of education for sustainable development that challenges educational ideas and organizations, and even content, and at the same time deals with issues such as collaborative and creative skills, reflective and critical thinking (Siemieniecka, -Manea-Țoniș et al., 2020). From this model, one can improve education and the process of teaching students to learn how to make sensible decisions. In this context, there is sustainable digital education (Bucea-Manea-Țoniș et al., 2020), which seeks to educate people about social commitment and transformation and facilitate the construction of an increasingly responsible society towards future generations.

This education is increasingly influencing classroom/campus teaching, which leads to the construction of new models of teaching and learning designs (Sousa et al., 2019). What makes learning digital, that is, use information and communication technologies, being an interactive learning, in which learning content is available online (Sousa & Sousa, 2019).

In this scenario, we note the importance of social learning and collaborative learning within the digital pedagogical model, this being the basic strategy that can help us achieve a sustainable education based on a cognition pedagogy (Siemieniecka & Siemieniecki, 2016) that advances to the future of education, as it stresses that learning is a cognitive process of connecting us with sources of information from different areas of knowledge, in an interdisciplinary way.

It is then important to propose a conception of a pedagogical model that can represent the relationship between teaching – learning supported by learning theories that are based on different epistemological fields and is composed of some dimensions: Design, study plan,

identification of content structure, pedagogy, learning activities, technologies and evaluation process imbued with a feedback system that feeds back the entire model based on ethics and security processes ensured by the innovative applications of blockchain technology (Machado, Sousa and Rocha, 2020). The dimensions (and their relationships) that make up the proposed model aim to promote a systemic view of the teaching-learning process and feedback the maintenance of the functionality of the pedagogical system.

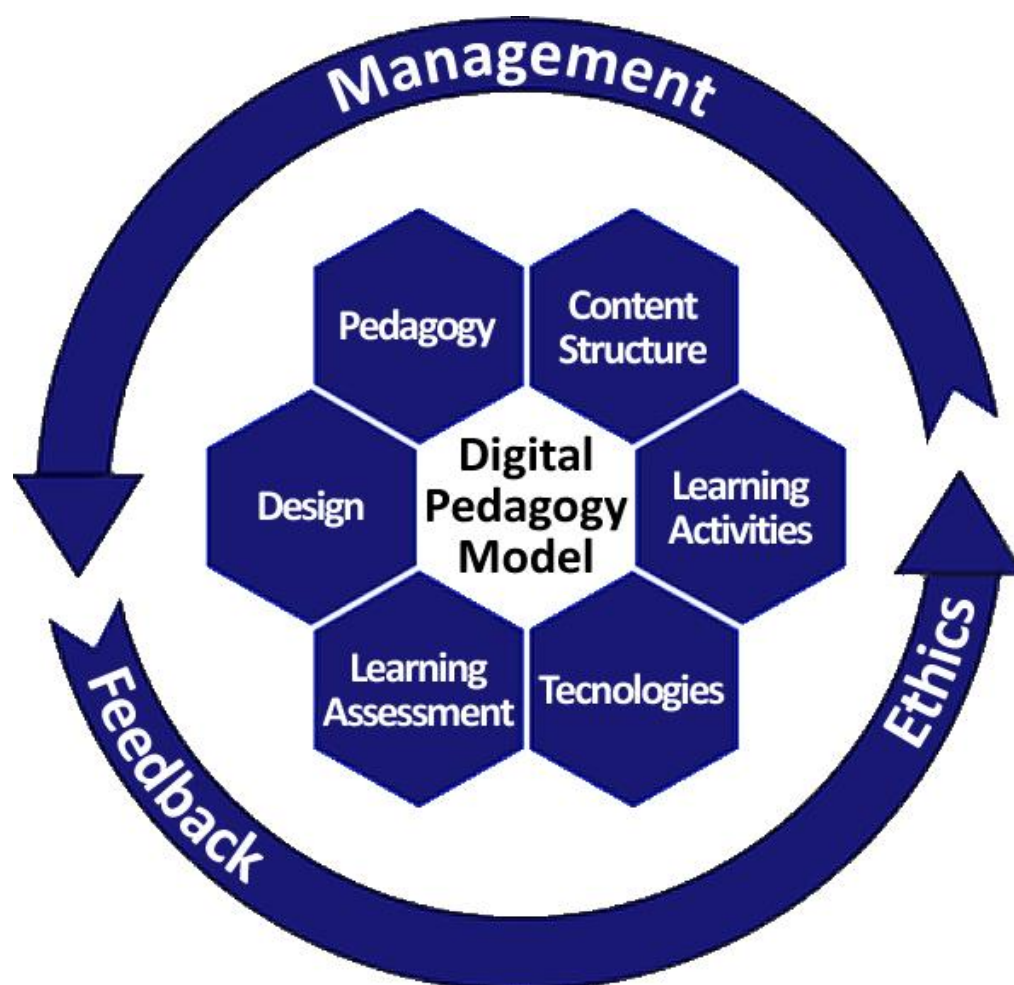
1.2 Theoretical framework

The improvement and evolution of pedagogical models are linked to issues arising from the needs of the educational institutions in improving pedagogical practices in order to improve the quality of student education. In 2006, there was the creation of the Technological Pedagogical Content Knowledge (TPACK) model that proposes a teacher knowledge structure for technology integration. The structure of knowledge of technological pedagogical content (TPACK) tries to describe how the three main components of teachers' knowledge relate to each other, that is: knowledge of content, pedagogical knowledge, and technological knowledge (Mishra & Koehler, 2006).

In 2017, we sought a student-centered model that would create a framework for the digital competence of educators (DigCompEdu) to define the specific digital skills that educators need to explore the potential of digital technologies, they are: digital resources, teaching and learning, evaluation and training of students (Redecker & Punie, 2017).

In this scenario of constant changes in pedagogical models, or thinking for the teacher, at other times for students, the teaching process full of digital technologies that shape everyday life is imbued. Digital technologies have created, among other things, new opportunities to seek and share information more easily. Education systems around the world have had to adapt to the changes that digital technologies have caused in society and prepare to meet the new learning expectations of 21st century students, and now with the rules of social isolation caused by the pandemic of COVID-19 (Nehring et al. 2019). This constant reinventing led to some questions proposed in this research and elucidated through a systematic search in the literature (Torraco, 2016). The search questions resulted in search terms for search in two databases (Scopus and Web of Science). From the qualitative analysis of the contents of the articles, the conception of a pedagogical model was outlined, as shown in Figure 1.

Figure 1 - Theoretical Digital Pedagogical Model



This model is based on the constitution of the course design, the structure of the content, the learning activities, technology, pedagogy and the evaluation that provides for the formative process, that is, that presupposes the monitoring of the students' activities to feedback and significantly direct the pedagogical action. (Väättäjä & Ruokamo, 2021).

1.3 Educational Pedagogy

Education for years has been related to enabling human knowledge and practical learning experiences in order to become active and competitive members of society and through it can ensure greater sustainability of these societies. Questions of how best to acquire, transfer, collect and structure knowledge, skills and attitudes have been part of society much earlier

than issues related to educational pedagogies (Dreiman, 2019). Currently, learning is thought of as an engaging way to provide learning experiences that allow students to develop skills and competencies of different cognitive, emotional and psychomotor functions.

This rethinking of the learning process was proposed by cognitive theories that include areas of knowledge that are related to cognition, thinking, information processing and problem solving. This pedagogy called cognitivist advances to the future of education, to the extent that it stresses that learning is a cognitive process. Starting from constructivist pedagogical orientation that takes into account the role of the teacher. In this context, the teacher is seen as a facilitator whose objective is to increase students' understanding of the theme, giving them opportunities to express their conceptions and perceptions. In this pedagogy there are five basic areas: Neuro-didactics, Neuroeducation, Memetics, Pedagogical Anthropology and Media Pedagogy (Siemieniecka & Siemieniecki, 2016).

Neurodidactics includes questions related to Research and practice in the area of education, which aims to optimize teaching activities to achieve its objectives. Neuroeducation, on the other hand, is an area of cognitive pedagogy that deals with the regularities, mechanisms and potential of human involvement, all explained through neuroscience. Knowledge about information processing in the brain is then used to induce intentional and conscious changes of human personality.

Memetic is an area of cognition pedagogy that is based on the theory of cultural evolution that presupposes the existence of cultural information units labelled as memes (used to describe a concept of image, videos, GIFs and/or related to humor).

Pedagogical anthropology, a branch of cognitive pedagogy that addresses human beings seen as creatures that are capable of being educated and need education.

Media pedagogy deals with the human being and media-assisted communication, with its multidimensional analysis of learning and education mechanisms, instigated by the impact of the media on humans. Therefore, it can be assumed that media pedagogy deals with human communication with and through the media. As such, it covers five areas of general education, dealing with: media in the media, media education, information technology, computational diagnosis and pedagogical therapy and the media in the human world, dealing with different cultural bio-socio-circumstances and civilizational aspects of media use in the learning process (Siemieniecka & Siemieniecki, 2016).

1.4 Applied Technologies

The development of mobile learning, smart phones and computers has facilitated changes in teaching models in all disciplines. With the application of technology, teaching is no longer limited by time, space, psychological state or geopolitical boundaries. In this way, one can learn anywhere and form the habit of learning for life (Xu, 2019).

Many national and foreign universities have built their own online education platforms in recent years, using internet and digitization resources to provide students with an interactive and personalized learning channel that is not limited to time and learning space (Cornali &

Cavaletto, 2020; et. al, 2020). Such learning can be supported by mobile technologies, applications for tablets and smartphones (Sousa & Rocha, 2020)

Technologies applied in the digital world such as gamification (Асташова, et. Al, 2020), Moocs (Lehmann, 2019),SPOCs (Fu, 2019), among others demonstrate that students learn new knowledge through instructional videos that include auditory and visual content (Lehmann, 2019). Thus, limited time in the classroom can be used primarily for teaching activities that employ two-way interaction or communication, such as practices, problem solving and discussions, to increase the effects of learning and realize the idea of student-centered education (Shen, Wu and Lee, 2017). In addition, with digital materials, students can learn repeatedly anytime, anywhere. It is a good opportunity for them to adjust the pace of learning (Lai, Hwang and Tu, 2018), which is one of the characteristics of teaching proposed in this digital pedagogical model.

1.5 Assessment Process

For the evaluation process based on the digital pedagogical model of this study, formative evaluation and mediating evaluation were proposed. The first segundo Barana et al. (2019) allows classroom practice to be formative to the extent that evidence on student performance is obtained by teachers in order to use them to make decisions about their pedagogical action. The second implies the search for the meaning of teaching/learning in a mediating perspective of approximation and dialogue between those who teach and learn (Hoffmann, 2019). This plan, based on dialogue and mediation, allows feedback in the evaluation process involving three actors: the teacher, the student and the colleagues, who are activated during formative practices.

1.6 Final considerations

The conception of the digital pedagogical model presented in this study can provide tools for teachers to rethink their pedagogical orientation, pedagogical practices and competencies by integrating digital technologies into their teaching. It was found that with the increase of globalization and the emergence of digital learning there was a change of pedagogical paradigm from conventional higher education from campus to digital and online higher education. Allowing the main digital educational pedagogies and strategies applied in higher education institutions to be based on active activities carried out through research projects that provide open and direct feedback.

The main technologies used in this scenario are: moocs, scanning, gamification, interaction designer and Blockchain, a tool that allows the management of the educational process through feedback.

Digital education skills are those that people have to use digital media to search for information and that allow them to analyze the data they receive from cyberspace while gaining the ability to communicate with others using a variety of digital tools and applications: such as mobile phones or social networks. Thus, digital competence is a multidimensional skill

that can include knowledge of information and communication technology, ethical awareness and cognitive abilities.

In this context of the model proposed here, the interaction between teachers and students becomes important in the effective use of technology for teaching and learning, in order to promote students' knowledge and skills. For future research, it is proposed to analyze the conception of the digital pedagogical model proposed here as the objective of evaluating it in the scenario of higher education institutions.

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2.1 Learning theories and models

Learning is increasingly of pressing importance in today's society, where knowledge is a driving factor for development. It is possible to analyze the different theories: behaviorists, humanists and cognitivists and we find that in informal learning it is also possible to identify and apply the same principles in informal learning contexts.

a) Behavioral Theories

Behavioral theories assume certain factors such as nuclear, such as learning objectives, matter and results presented in a split way and reinforcement based on positive actions, promoting learning.

The final learning objectives should be defined as accurately as possible. These are deeply intertwined with the activities to be carried out, which must be well defined and analysed in order to help determine more accurately the learning path.

The subject to be seized should be presented in short sequences in order to allow better learning through positive learning experiences. It is important to present stimuli capable of eliciting adequate reactions to learning.

Learning outcomes should be disseminated in instalments to positively reinforce reactions, rewarding the behaviors that lead to the desired learning.

Finally, combine theoretical learning with applied practice to exercise learned behaviors. The exercise of identifying behavioral learning techniques presents the following design:

Learning techniques

- Applied exercises
- Individualized and personalized teaching
- Theoretical and practical demonstrations
- Collaborative work

b) Cognitive Theories

Cognitive theories give relevance to factors associated with the motivation of the trainees/learners, the valorization of the acquired knowledge as a basis for the acquisition of knowledge, the strategies for retention of new knowledge, experimentation and practical application.

It is important to define strategies to motivate the trainee/learner for learning, to relate individual objectives and needs with the objectives of the learning itself.

To value the previous experience, because the cognitive structure of the trainee/learner depends on their previous experiences and based on these define teaching strategies adapted to their level of development.

Relate the new with the acquired, help individuals relate new knowledge with previously acquired knowledge, valuing understanding to the detriment of memorization.

Provide information, indicate facts, provide clues that facilitate the understanding, organization and retention of knowledge and value practice, the experimentation of new knowledge for new situations.

Finally, resort to systematization, starting each learning unit with small learning units. The exercise of identification of cognitive learning techniques, presents the following design:

Learning techniques:

- Learning by research and discovery;
- Presentation of objectives
- Brief introductions to the matter
- Presentation of summaries per learning unit
- Quematic presentation of the subject
- Thematic debates and discussions
- Comprehension-oriented questionnaires
- Case study

c) Humanist Theories

Humanist theories have as their central concern not teaching but learning from a perspective of development of the individual.

Learning should focus on the individual and his needs. You must be given responsibility for self-learning and instill in it the spirit of self-assessment. Focus learning on meaningful activities and experiences for the student.

It is important to teach to learn and feel beyond learning to think, developing interpersonal relationships based on empathy in groups of trainees/learners.

Thus, a positive emotional atmosphere should be created in the groups, which helps the learner to integrate new experiences and new ideas, promoting an active learning, oriented to autonomous discovery processes.

The exercise of identifying humanistic learning techniques presents the following drawing:

Learning techniques:

- Individualized teaching
- Discussions
- Debates

- Panels
- Simulations
- Games
- Troubleshooting

These principles are guiding the analysis necessary to define the learning strategies to be implemented, taking into account the objectives and contexts where the learning process develops, themes to be explored in the following chapters.

2.2 Learning processes

Learning theories explain that different types of learning imply distinctive cognitive processes, presuppose different capacities and require different levels of response. These elements can be facilitators or inhibitors of learning.

As far as the Teacher is concerned, this is a facilitator of learning by enhancing the knowledge that the trainee/learner already has and helping to develop new knowledge.

Knowing and mastering cognitive processes that can facilitate the resolution of learning activities is a key element for the learning process. The trainee finds more easily the strategies and solutions appropriate to the proposed activities and the Teacher can identify and select the types of learning best suited to the desired objectives and to create learning conditions that facilitate the realization of the activities.

Learning situations are influenced by several factors. namely:

- the Teacher/facilitator of learning - this assumes several roles simultaneously: moderator, participant, and observer.
- the individual and the group of trainees – the interactions became with the Teacher and also with the other elements of the learning group.
- space and time – the space for learning is global and does not go around a training room and time can be customizable, depending on the learning needs of each;
- the context - learning should be directed to the objectives of the trainees and be associated with their professional reality.

a) Factors influencing learning

There are certain factors that positively influence learning and the Teacher is the main responsible for its careful preparation and implementation:

- learning objectives.
- learning strategies;

→ target audience.

Training planning includes the definition of these factors, both internal and external, which can facilitate or inhibit the learning process.

As far as the Teacher is concerned, the Teacher needs to take into account elements such as the difficulty of the activities to be carried out and to ensure that they are carried out by trainees/learners.

Corrections to the smooth running of activities should be made in the form of a suggestion or incentive to debate and learning and information on the results obtained should be positively enhanced.

Also, the factors internal to the trainee himself can condition learning, such as their motivation, capacity for self-discipline, ability to concentrate.

There are also factors external to the individual himself, which can facilitate the learning process and that are the responsibility of the Teacher. We refer to the definition of learning objectives and to make them known to trainees/learners, to the explicitness of strategies, to keep the group active and to participate in activities, such as group and individual work.

The Teacher should also use the technical and practical means available to implement the learning strategies best suited to the defined objectives. The implementation of the strategies can make practical exercises, synthesize plots and conclusions on the learning units and, finally, carry out the evaluation of learning, discussing the results obtained.

b) Learning success factors

The learning process needs to develop in a climate of trust in order to promote the sharing of experiences and knowledge.

The planning of the whole process, from the phase of defining learning objectives to the evaluation phase of the acquired learning, through the organization and implementation of the activities that allow the achievement of the objectives is central, even if the training/learning process is more informal in nature.

In addition to more formal aspects of the learning process, other aspects are key to its success. The involvement of trainees/learners in the process requires a knowledge of their experiences and experiences, in order to create a frame of reference that helps motivate them and direct the learning path in relation to their real needs and objectives.

Training motivation strategies:

Learning objectives should take into account the structure of the activity, the type of learning required and the characteristics of trainees/learners, in particular basic knowledge or skills.

2.3 Learning Models

a) Digital learning models

Online learning models are part of constructivist models. One of the most important models to refer to is the model designed by Gilly Salmon (2000) and presented below:

Table 1 - Digital learning model

Phase	Learner's activities	Tutor activities
Level 1 Access and motivation	System configuration and access and incentive	welcome Guidance on where to find technical support
Level 2 Online socialization	Send and receive messages	Introductions Ice-breakers Basic rules netiquette
Level 3 Exchange of information	Carrying out activities Reports and discussion of results	Facilitate structured activities Assign roles and responsibilities Support the use of learning materials Promote discussions Summarising conclusions and/or results
Level 4 Knowledge building	Conferencing Thematic discussions Critical thinking Make connections between models and learning	Facilitate open activities Facilitate the process Ask questions Encourage reflection Very active tutorial activity at this stage.
Level 5 development	Strategic use of video conferencing Integration of learning forms Reflection on learning processes Students take a critical role	Support Reply only when needed Stimulate reflection Tutors are less active and students become more active.

Source: Gilly Salmon (2000)

Model operationalization:

Level 1 - Access and Motivation

The course should provide a welcome message to trainees/learners

Learners should know how to access the *online system*

Level 2 - Online socialization

- Making presentations
- Online icebreaker *activity*
- Welcoming new members
- Provide a structure of group rules - Label
- Create discussions where all members participate
- Encourage the less participatory (known as 'lurkers' or 'browsers') to participate
- Provide discussion summaries

Level 3 - Exchange of information

- Propose structured activities
- Encouraging participation
- Ask questions
- Encourage members to share short messages
- Provide summaries of specific discussion segments
- End topics that have been discussed
- Encourage the *online group* to develop their own language, metaphors or rituals.

Level 4 - Knowledge Building

- Propose more open activities
- Facilitating the learning process
- Ask questions for the group to consider
- Encourage group members to question theory and practice
- Encourage the *online group* to develop their own language, metaphors or rituals.

Level 5 - Development

- Encourage group members to lead discussions
- Encourage group members to transfer their skills to other areas of work
- Encourage reflection on different learning processes (individual and group)

In this model, the first level implies supporting and facilitating access to the system. The second level requires the trainee to create his/her identity online and interact with other trainees. At the third level, trainees must exchange information with each other on their own initiative. In the fourth level the thematic discussions focused on the contents of the learning unit begin, and the whole collaborative process of construction and knowledge sharing begins. At the fifth level, trainees seek to achieve their personal goals by integrating various forms of learning and reflecting on the whole process.

For Salmon (2000), the Teacher needs to promote interaction so that most trainees exceed level 2 (socialization), promoting trust, and encouraging the exploration of knowledge.

b) Online learning tools

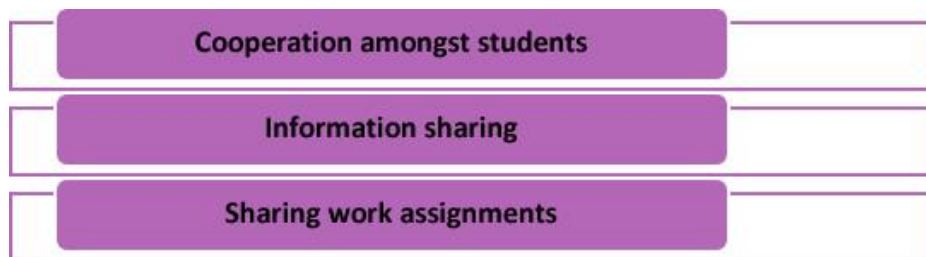
There are two types of online tools that can be used in the learning process, those that promote synchronous communication and those that promote asynchronous communication.

Synchronous Communication

This type of communication takes place in real time, synchronous tools promote 'virtual' proximity between participants, for example, using video conferences (e.g. via Zoom) or chat (e.g. Whatsapp).

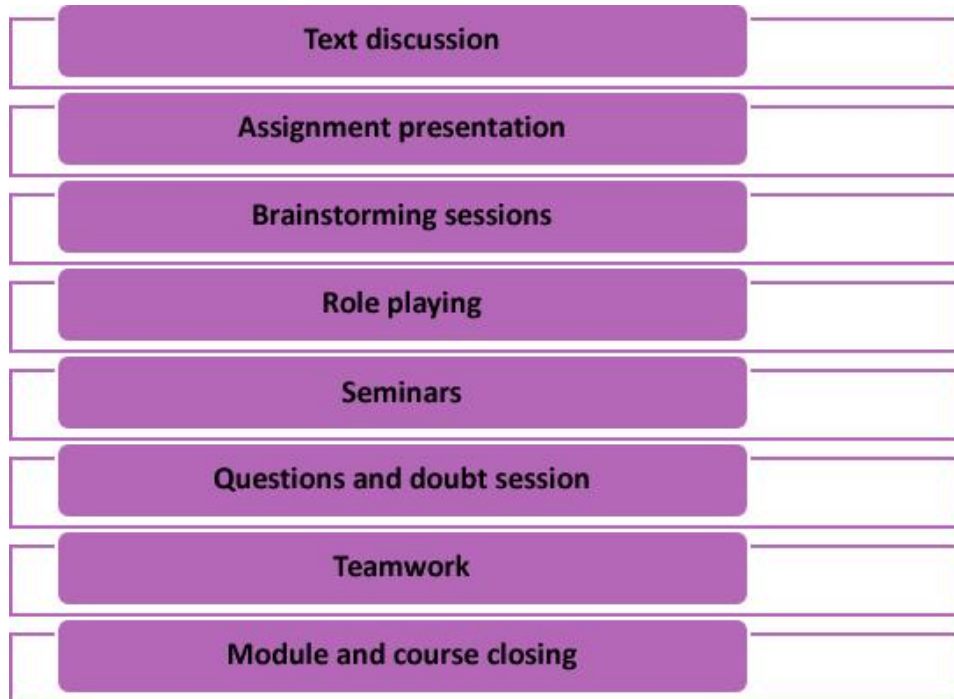
Chat ("Conversational Hypertext Access Technology") is a space that allows "a real-time textual discussion" (in writing) between multiple participants.

Activities that can be performed in the chat:



Video Conferencing - allows you to put in contact, through a video and audio system, two or more people geographically separated.

Activities that can be performed in the Video Conference:



Asynchronous Communication

The forms of asynchronous communication take place intermittently and with a temporal difference between the participants.

These allow greater reflection in the answers, because they are not immediate, and allow integration with other sources of information, which facilitates learning and the construction of knowledge.

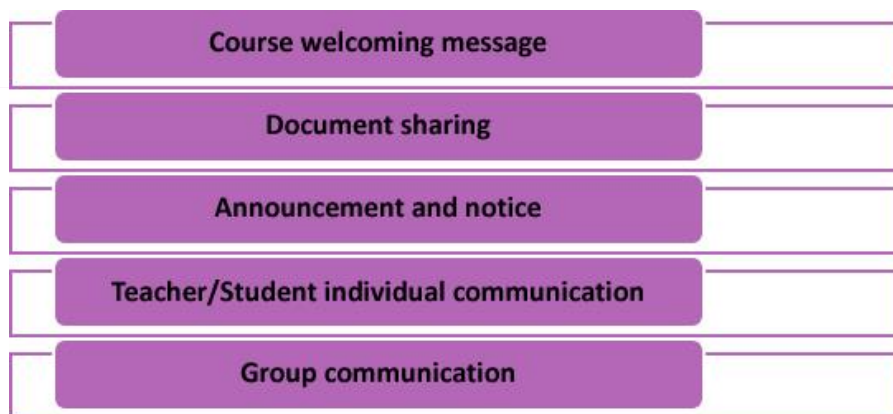
Contrary to synchronous communication, in asynchronous communication participants have the opportunity to study, reflect, seek information, write weighted, and correct as many times as necessary, their interventions in interactions that take place during an e-learning course.

Communication tools and asynchronous interaction:

Email and distribution lists - e-mail is used for communication between participants in training actions.

Distribution lists - are collective email addresses, which serve to distribute a message across a set of users.

Activities that can be done via email:

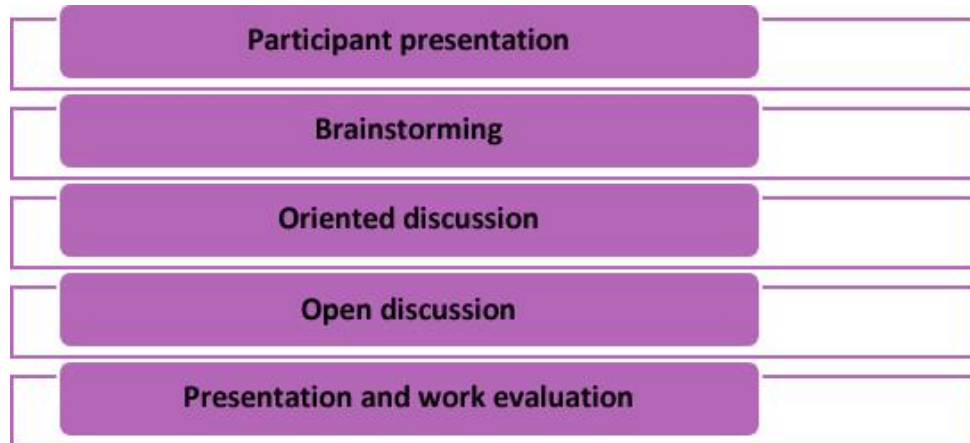


Discussion forum - discussion forums are also often of particular relevance, as all messages exchanged on the topics discussed are gathered and organized. One of the advantages identified in the use of this asynchronous communication service is the possibility that the various actors can subsequently consult all messages sent to the forum and be able to participate by giving their personal contribution. In the areas of learning, the care to be taken in the use of this service involves, above all, the definition of the topics to be discussed and the guarantee that the objectives outlined are being met, which implies a permanent and active monitoring by the Teacher.

It is essential to plan the use of the forum in the context of the course and define its structure. This structure is configured through threads. A thread is the set of messages about a particular subject, topic, or activity, which are placed in response to an original message that institutes it.

Thus, it is necessary to decide which lines of discussion should be created, establish appropriate titles (descriptive and meaningful) and plan the beginning and end of each. In addition to the predefined ones, in many cases it will be appropriate for trainees to be able to create new lines of discussion themselves.

Activities that can be performed in the forum:



Recommendations to be considered when using discussion forums:

Carefully plan the use of the discussion forum – define the activities that should take place in the forum, establish their timetable, choose their designation and prepare the initial messages, which will lead to the respective discussion lines.

Define and disseminate the rules of operation and use of the forum - trainees should know the rules and rules of operation.

Follow the forum regularly - access the forum frequently, especially at the beginning of the course, or its modules.

Maintain the functioning of the forum - ensuring its use in accordance with the defined rules and standards, archiving the closed discussions in another area of the forum.

Moderate the discussions and activities of the forum - keeping the lines of discussion within the defined objectives and returning them to your topic, when they move away from it, placing regular comments of synthesis and analysis (recognizing individual contributions and relating them in order to underline).

Tests, questionnaires and practical work - assess learning, interaction and knowledge construction among participants of e-learning courses. According to Gilly Salmon and other authors, they are called e-tivities.

Practical work – practical activities, the performance of which or results can be documented in writing, such as essays, reports, analysis of texts, writing of original texts or by audio or video.

Tests and questionnaires - always has an evaluation function. In some cases, it may be used for trainees and the Teacher to assess initial knowledge (usually called diagnostic evaluation).

Tests and questionnaires can be used to certify learning, classify trainees, and meet the requirements needed to qualify.

2.4 The actors of the Learning Process

There are several actors who play key roles in the learning process: learners or trainees, Teachers or facilitators of learning.

They are the main actors in the learning process and their action allows implementing the strategies of change appropriate to the context in which they are included.

a) Role of the Teacher

The teacher currently assumes a role as a facilitator and promoter of personal development. The variety and complexity of training situations require the Teacher a great capacity for adaptation and the responsibility to provide the acquisition of knowledge, systematically questioning their own knowledge.

The Teacher is a learning facilitator, so its main task is to get the trainees to learn. This means that you should be able to create situations that favor learning. Learning is the ability we daily need to respond adequately to the different requests and challenges that arise in our interaction with the environment.

In eLearning the designations: Teacher, Teacher, Tutor, Moderator, are associated with the prefix E- or virtual or online words. For example: E-Teacher; E-Moderator; Virtual Teacher.

Although there are specificities that distinguish them, the core of their characteristics is similar.

The e-Teacher must promote, stimulate, guide and support the interactions that occur in the training process and that, according to Mason (1998), has three dimensions:

- interaction between forming and training.
- interaction between forming and content;
- interaction between trainees.

In the context some authors add a fourth type of interaction:

- interaction between the trainee and the interface or platform.

Is there a single type of learning, i.e. you always learn in the same way, regardless of the learning objective? For example, during a training course when trainees are asked to:

- to reproduce a particular theoretical concept;
- that from the theoretical concepts transmitted solve a problem;
- make a practical demonstration.

Is the same type of learning present in the three situations presented and will the same cognitive (mental) processes be at stake?

In order to perform the different tasks we found that there are probably several types of learning and different cognitive processes:

- learning concepts and characteristics;
- theories, modes/models/learning mechanisms;
- processes, stages and psychological factors of learning;
- sources and methods of motivation.

Collison et al. (2000) divide the role of the e-Teacher (designating by e-moderator) into three categories:

- "Guide on the Side" (Guide on the Side): a seminar-like approach, with the e-Teacher directing and conducting multiple discussions between students, but containing too many direct interactions.

- Instructor or project leader: as facilitators of online courses, Teachers play an instructive role, must provide feedback, guide and define the rules of interactions.

- Group process leader: the e-Teacher should promote the participation of all in the discussions, guiding them and focusing them on constructive lines.

For his part Berge (1995), classifies the intervention of moderators in four areas:

- Pedagogical (intellectual) - as an educational facilitator, the moderator uses various methods to focus the discussion on the essential concepts, principles and competencies;

- Social – it is essential to create a friendly environment that promotes learning, by encouraging human relations, developing the work and cohesion of the group.

- Management (organizational, administrative) - this area involves the establishment of the agenda, objectives, calendars, rules of participation and procedures, etc.

- Technique – The moderator must make participants feel comfortable using the *software being* used. The ultimate goal of the Teacher is to make the technology transparent to the trainee.

In order to perform the variety of the above functions, e-Teachers must have a set of personal characteristics, and pedagogical, technological and communication skills and competences.

Hywel Thomas of the Training Foundation, referred to in Shepherd (2003), tried to synthesize, in a 4 P's mnemonic, the qualities that e-Teachers must possess:

Positive – Establish connections, generate enthusiasm, maintain interest, and help in difficulties;

Proactive – Make it happen, be a catalyst (when necessary), identify when action is needed and do it;

Patient – Understand the needs of each of the trainees and the group and have the flexibility to adjust the course, as far as possible, to these needs;

Persistent – Keep the focus on the essential, preventing trainees from moving away, and solving problems, technical or other nature.

Teacher Tasks According to Duggleby (2002):

Table 2 - Teacher tasks

Welcoming students	Define jobs and tasks
Encourage and motivate	Ensure that course objectives are met.
Track progress made	Evaluate participants
Ensure that students are working at the right pace	Evaluate the course
Provide information, develop, clarify, explain	Make sure students are up to the required standards.
Provide feedback on student work	Ensure the success of conferences
Facilitate discussions	Become a facilitator of a learning community.
Monitor progress	Provide advice and technical support
Control the pace	Complete the course
Give information and add knowledge	

Source: Duggleby (2002)

The reception of the trainees and the beginning of the course are a fundamental moment for the success (or failure) of a course. This is all the more true, as a still considerable number of trainees will be attending an elearning course for the first time.

Following are the main skills of the Teacher.

Teacher's Skills

- A) Ability to understand and integrate the various contexts in which it operates
- B) Ability to adapt to various organizational contexts and groups of trainees.
- C) Ability to plan and prepare training sessions.
- (D) the ability to conduct/guide the training/learning process in the training group, in particular:
- E) Ability to manage the learning process and evaluation of training.

b) Role of the student

The student is a central element of the learning process and plays a decisive role in the use of learning methods and in their self-learning. He learns from problem solving, formulates hypotheses, deduces and finds a solution.

The main competencies of the student fall into the communicational, collaborative and transversal category.

i. Communication skills

- Know how to listen
- Know how to ask questions
- Be assertive
- Know how to transmit
- Give feedback/criticism
- Receive feedback/criticism
- Understanding non-verbal communication

ii. Collaborative skills

- Show collaboration availability
- Know how to exchange experiences and impressions
- Give feedback
- Receive feedback
- Know how to convey your own opinion
- Knowing how to manage a conflicting situation
- Collaborate on an egalitarian basis
- Knowing how to intervene on an equal footing with others

iii. Transversal Skills

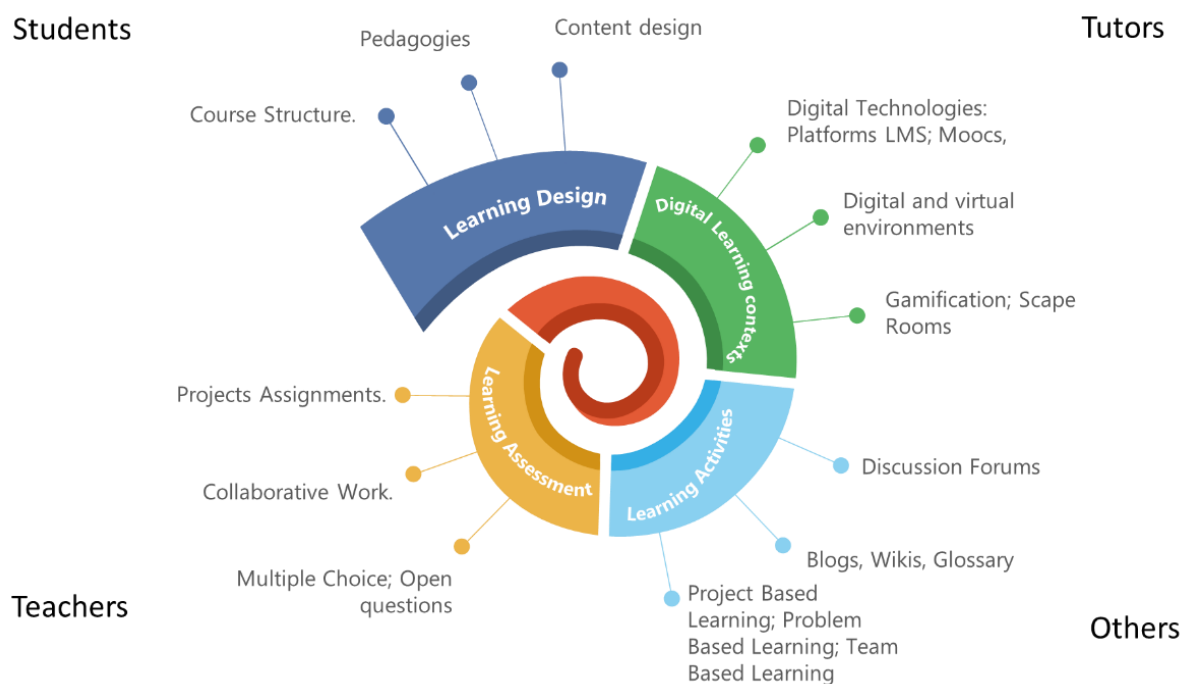
- Know how to observe
- Take initiative
- Know how to analyze problems and put them in context

3. Athena Digital Learning Model

3.1 Spiral Pedagogical Model

The spiral pedagogical model represents an interactive digital learning process, in which learning content is *available online*, ensuring automatic *feedback* of the student's learning activities. It begins with the **learning design** process including the course structure, the definition of pedagogies adapted to the specific type of course, and the content design; includes the **digital learning contexts**, with the digital technologies as Learning Platforms and Moocs, the digital and virtual environments, and the gamification tools to facilitate the students learning; continue to the **learning activities** as discussion forums, blogs, wikis, and glossaries, and other dynamic activities as project based learning, problem based learning, and team based learning; and in the end of the spiral the **learning assessment** with the multiple choice questions, open questions, collaborative assignments, and project assignments, as shown in figure 2:

Figure 2 - Athena Spiral Pedagogical Model



The model combines diverse dimensions which need to be designed in an integrated way:

- **Contexts and learning methodologies** for courses oriented to self-learning and collaborative learning.
- **Participants** engaged with the learning contexts .
- **The contents** prepared for self-learning.
- **The technology is oriented** to various types of contexts.
- **The appropriate interaction** with the different types of participants and taking into account the contexts.
- **Communication** ,language appropriate to participants and the objectives of learning.
- **The evaluation/assessment** system is rigorous and transparent in order to evaluate the various elements of the learning process.

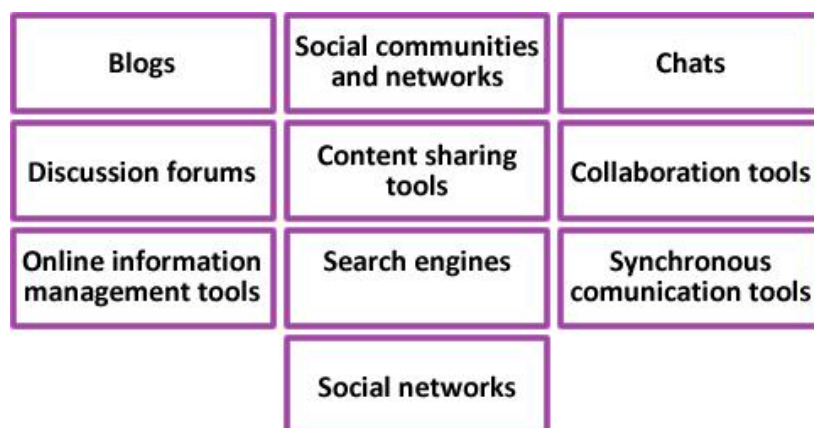
3.1.1 Learning design

Learning Design is the activity of creation and organizing the teaching and learning activities to develop a set of learning experiences for the students to move towards their learning goals (i.e. based on the Bloom's (1956) taxonomy of educational objectives).

3.1.2 Learning digital contexts

Technologies are not a condition for learning, but are tools that facilitate informal learning, due to the diversity of sources, ease of organisation and temporal and local flexibility, cooperation and mutual help, among other aspects.

Online *tools* that promote learning:



3.1.3 Learning activities

Processes used in *online learning*:

Interaction and collaboration	Use of Information management tool
Information search	Online communication
Information selection	Forums participation

Online learning *activities*:

Organization and categorization of information	Information and resources sharing
Clarify doubts	Social networks participation
Post questions	Gather opinions

The best implementation of the model is based on a blended learning model that can be considered as a pedagogical strategy that combines situations of pure eLearning moments with face-to-face teaching. In more classic terms, Blended learning is a process that mixes two learning strategies into a single project (online learning and face-to-face learning), using the mixed mode.

3.1.4 Learning Assessment

Assessment is the process of evaluating the students' knowledge based on their educational experience, and the results show the areas that need improvement.

There are two basic types of assessment:

Formative assessments occur within an online lesson and are used to provide critical feedback to the student.

Summative assessments can be the final exam and measure what the student has learned after completing a course.

Assessments can also help the students by challenging them to reflect, interact, and apply their knowledge to answer questions, solve problems, and communicate.

To Evaluate Students Online it is possible to use several approaches:

Online quizzes	Essay questions	Drag-and-drop activities
Online interviews	Dialogue simulations	Online polls
Game-type activities	Peer evaluation and review	Forum posts

The type of assessment will vary, based on the learning objectives.

The **online quiz** will be appropriate to measure knowledge gains quickly.

Open-ended or essay-type questions are a qualitative assessment method. They encourage critical thinking and require a longer time for students to think, organize, and compose their answers.

Drag-and-drops are a type of assessment that show a learner's ability to link information and apply knowledge to solve a practical problem.

Online interviews allow students to demonstrate their proficiency in communication and on where other specific skills are an important requirement.

If the goal is to test the students' interviewing skills, the **dialogue simulation** is the best assessment mode.

Polls allow you to capture feedback directly from your audience about their learning experience.

Game-type activities turn a series of test questions into a game, awarding points based on the number of correct answers. It promotes the development of non-cognitive skills, such as discipline, risk-taking, collaboration, and problem solving.

Peer evaluation allows the students to review and edit each other's work, in a way that they need to reflect on their knowledge and then communicate their feedback in a consistent and structured way.

The **forum posts** is a tool organized around a topic to support students' learning, as they need to interact, communicate, and collaborate as part of the learning process

The main goal of the Spiral Pedagogical Model is to lead to a change in the nature of learning, based on online environments.

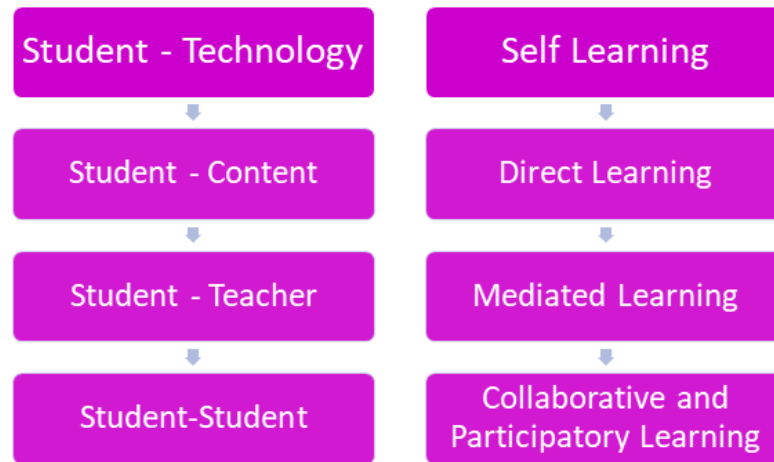
3.2 Spiral Digital Learning Model

The spiral digital learning model combines the use of diverse digital technologies with other means for the creation of learning environments, leading to the following learning strategies:

1. Self-learning: in which the learner relates directly to the content through materials and exercises that are provided automatically and whose answers are also evaluated automatically;
2. Direct-learning: in which the learner takes the initiative to seek solutions to specific problems;
3. Mediated learning: in which the transmission of information is mediated by presenters;
4. Collaborative learning: in which, based on reference documents, the concepts are developed by working in groups, with the support of tutors;
5. Participatory learning: in which individual learning happens not only through the relationship with the content but also by interaction with peers (participatory learning) and tutors (who propose individual activities, moderate the discussions of the forums and adjust, when necessary, the work plans).



The model allows several types of interaction during the learning process:



It is also important to examine the advantages and disadvantages of the digital learning strategies:

Advantages, which facilitates the education and learning process:

- The materials are available twenty-four hours, and can be easily accessed at any time and everywhere.
- Students learn at their own rhythm.
- The student becomes autonomous, being responsible for their learning.
- Reuse of content and experiences.
- Course content may be reused in other courses partially or totally.
- The learning materials are easy to update.

Potential **disadvantages**, of which the following refer to:

- The interaction of the student/teacher becomes reduced, since communication is made online, resulting in a physical distancing.
- It implies a strong motivation and a rhythm of the student.
- It requires more time in the preparation of content and teaching.
- Internet broadband and costs of Internet access.

