

The cover features a large, diagonal red band that runs from the bottom-left towards the top-right. This band is overlaid by several semi-transparent maroon shapes: a triangle on the left side, a trapezoidal shape below the band, and a triangle in the bottom-right corner. The text is centered in the white space.

# Pedagogical Model for Distance Learning

Paulo Duarte Branco  
Pedro Ramos Brandao

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SCIENTIFIC SUPERVISION  
(Peer Review)

# **Pedagogical Model for Distance Learning**

**Paulo Duarte Branco; Pedro Ramos Brandão**

## **Scientific supervision report**

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**The type of article and work:** Digital Book

### **Emphasize or describe de importance of the research work:**

The distance learning systems are gradually occupying space in all levels of education. The pace at which this progression happens is not identical: varies from system to system, from country to country. However, it can be considered that with COVID 19 pandemic this change has become more urgent. Higher education is placed with new challenges: on the one hand, the construction of e-Learning courses allows greater dissemination and internationalization, on the other hand, the use of digital tools is not the common practice of academies. To meet the challenges of the academy, documents such as pedagogical models enable political decision-makers to make decisions for the development of education and society. According to the World Economic Forum, "Research suggests that online learning has been shown to increase retention of information, and take less time meaning the changes coronavirus have caused might be here to stay". (World Economic Forum, 2020)

This pedagogical model for Distance Learning for ISTEAC is presented as something urgent for higher education institutions and society in general.

**Justification of the evaluation and detailed comments, importance in publishing:**

Research in the area of digital education is the result of the convergence of different areas of knowledge and knowing. Several methods can be adopted to obtain various forms of response to initial problems. To develop research in this area, it is necessary to have a holistic view of the problem. This document reveals itself as an accurate guide for the implementation of study cycles in higher education: from theory to practice; it addresses the different canons of distance learning. It is a model that reflects national and international policies and finds real and sustainable ways for its implementation. With pertinent bibliography and state of the art very well presented and reflected, we see in the document a concern for current issues within the scope of digital systems implementation for diversity, inclusion and active participation.

The authors take a thorough and necessary approach with a holistic understanding of the problem to be a reference document that must be published and read by their peers as well as by civil society.

**The proposal to accept the article for printing (put an X):**

Total interest in publishing: X

Interest in Publishing: \_\_\_\_\_

Publish: \_\_\_\_\_

Do not publish: \_\_\_\_\_

Lisbon, 30 September 2020

The reviewer's signature

*Andr a T lles Vieira*

# **Pedagogical Model for Distance Learning**

**Paulo Duarte Branco; Pedro Ramos Brandão**

## **Scientific supervision report**

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**The type of article and work:** Digital Book

### **Emphasize or describe the importance of the research work:**

The theme has a double interest for academics and educational institutions. First, by addressing current theoretical and methodological concepts clearly and supported by current and reference bibliography and in line with the policies adopted at national and international level. Second, for presenting concrete solutions and practices for executing the model in its own context, which is distance learning.

This book thus presents us with a justification for the creation of distance study cycles, with a concern for inclusive, participatory and Portuguese-speaking education, while addressing the issues of ethics, cybersecurity and data protection, which are increasingly discussed in the academy and in the high instances both national and international.

### **Justification of the evaluation and detailed comments, importance in publishing:**

Although aimed at academics and higher education institutions, this model also serves the

interests of organizations and companies, particularly in the field of information and communication technologies, who wish to develop systems for the active training of their staff, taking advantage of the solutions and opportunities that teaching distance allows.

This pedagogical model for Distance Learning, being an internal document of an institution, does not close in itself, opening space to be used and adapted by others who seek to develop formal education systems, using current technologies and practices.

**The proposal to accept the digital book for printing (put an X):**

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Date, place: Santarém, September 28, 2020. The reviewer's signature:

A handwritten signature in blue ink, appearing to read "Uaué", is written below the signature line.

# **Pedagogical Model for Distance Learning**

**Paulo Duarte Branco; Pedro Ramos Brandão**

## **Scientific supervision report**

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**The type of article and work:** Digital Book

### **Emphasize or describe the importance of the research work:**

Nowadays human society is living in uncertainty times. This situation manifests the importance of technology in human life, in particular for Education. In this sense, this work could be very important for teachers and educational institutions. This digital book presents a pedagogical model for the distance education that is very useful for recognizing the fundamental elements for the education in this modality. Looking for an inclusive and significative education, the reader will recognize the fundamentals for a digital platform to solve the actual problems of time and space. This work describes important elements for distant education as: cyber security, design and organization for courses and technological tools that could be used.

### **Justification of the evaluation and detailed comments, importance in publishing:**

The abruptly, and necessary, change for an online education has demonstrate the unable and inequity access to technological and methodical infrastructure that ensures a quality education. A work like this takes a great importance for professors and educational institutions that out of nowhere where forced to change their traditional teaching methods. In this moment, and to the future, this work could be of great importance to sustain, from the base of the comprehension, the mechanisms that fundament the education at distance.

**The proposal to accept the digital book for printing (put an X):**

Total interest in publishing: X

Interest in Publishing: \_\_\_\_\_

Publish: \_\_\_\_\_

Do not publish: \_\_\_\_\_

**Date, place: Monterrey, NL, Mexico; October 11, 2020. The reviewer's signature:**

A handwritten signature in black ink, appearing to read "Gilson", is written on a light-colored rectangular background. The signature is stylized with a large initial "G" and a horizontal line extending from the end of the name.

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## PREFACE

This document is a pedagogical model for the distance learning of a Higher Education Institution with more than three decades of existence, as many as its experience in the development of technology-mediated teaching/ training projects in hybrid or distance systems.

The thematic has a double interest for academics and educational institutions. At first, by clearly addressing current theoretical and methodological concepts supported by reference bibliography and in line with policies adopted at national and international levels. Second, by presenting actual and practical solutions for implementing the model in its context, which is distance learning.

ISTEC's pedagogical model for distance learning, as an institution's internal document, does not close in on itself, opening space to be used and adapted, by others who seek to develop formal education systems, using current technologies and practices.

This book thus presents us with a justification for the creation of distance learning cycles, with a concern for inclusive, participatory and Portuguese-speaking education, not neglecting the issues of ethics, cyber-security and data protection, which are increasingly discussed in the academy and at high national and international levels.

Although targeted at academics and higher education institutions, this model also serves the interests of organizations and companies, particularly in the field of information and communication technologies, who want to develop active training systems for their staff by making use of the solutions and opportunities that distance learning allows.

(Maria Potes Barbas)

Principal Coordinating Professor at the School of Education of the Polytechnic Institute of Santarém.

With Aggregation in Distance Education and E-learning by Open Universit

## PROLOG

ISTEC has been genetically linked to distance learning since its creation until today. It arises precisely to meet a need for this type of teaching in Portugal.

Its founding entity, ITA - Institute of Advanced Technologies for Training, was born from an international partnership between the multinational Control Data Corporation and two major Portuguese companies linked to communications: CTT and TLP.

Control Data Corporation was a company specialized in the design and production of supercomputers and in the development of innovative technologies in the area of learning, through dedicated computer systems.

This partnership's primary purpose was the implementation in Portugal of a technology developed by Control Data Corporation in collaboration with the University of Illinois: the use of the PLATO (**P**rogrammed **L**ogic for **A**utomatic **T**eaching **O**perations) system for the development of learning programs that were then called CBT- Computer Based Training.

It was a system that at the time many considered visionary, and used technologies that only many years later would become of everyday use. Just as an example: today, we all feel the use of touch screens in our mobile devices as well as in notebooks to be normal. Already at that time, 1986/1987, (more than 30 years ago) Control Data Corporation's "*workstations*", with the PLATO system, had touch screens, facilitating the interaction between students and learning contents.

ISTEC has diversified its educational objectives and offers for decades; however, at no time has it ceased to be related to E-Learning and Distance Learning.

## PART I

### 1 - Overview

In line with the strategic mission and the educational project of the Institute of Advanced Technologies (ISTEC), in a perspective of diversifying the formative offer through the promotion of new courses and formative initiatives, namely through distance learning, the need arose to define a pedagogical model that would respond to the demands of this teaching regime, and that would support this formative offer.

In this regard, this document will seek to establish a set of theoretical and methodological references to guide teaching and learning practices in ISTEC distance learning courses. It is not intended to define a rigid and closed model, but rather to create an open and flexible paper that can have a set of guidelines that support the various educational agents involved (e.g. teachers, students, administrators, technicians) that can be adapted to the context of each level of education, course or curriculum unit.

The advent of technologies and their massification, as well as the greater capacity and scope of computer networks, facilitate, on the one hand, the existence of a formative offer at a distance, as, on the other hand, they stimulate and foster it. Society and the economy, increasingly mobile and digital, give rise to the need for an educational offer that meets them. And the academy, itself more digital and connected, seeks to respond to this need, investigating and proposing teaching-learning models adjusted to the new times.

It is, therefore, ISTEC's responsibility, and as described in its educational project, to promote "distance learning, using the pedagogical technologies of interactive multimedia and online communication and interaction systems", featuring a pedagogical tool that supports this strategy.

This paper is divided into two major sections. The first one will begin with a brief description of the history of the Institute and its institutional entity, as far as distance learning (EaD) and e-learning projects are concerned. It will then present a brief theoretical contextualization (from face-to-face teaching to distance learning)

and the reasons that motivate this distance learning strategy by ISTECS, not disregarding the issues related to cyber-security, ending with the framework of distance learning today. The second part, of an operational nature, will address the existing Virtual Campus at ISTECS, the organization of courses and teaching work, will briefly describe the technological tools for mediation and learning support of this model. In the following, we present the lines of interaction and communication as well as the theoretical and methodological principles, concluding with the evaluation of learning.

## **2 - ISTECS's consolidated experience in Distance Learning and E-Learning projects**

ISTECS's experience in Distance Learning (EaD), which has accompanied it since its formation, and the E-Learning projects it has developed or participated in over the decades, obviously have to be impacting in this document and in the way it is conceived and the options it features.

For many years, ISTECS has developed interactive learning systems for thousands of individual users, which have also been used by many large companies, including the main Portuguese banks, for their employees' professional training in the financial and information technology areas.

The knowledge acquired by the entire institution over the decades has to be considered as a foundation for the modelling of the Pedagogical Project for Courses in the Distance Learning Modality.

For this reason, it's relevant to briefly describe some of the great courses and projects in this area that ISTECS has developed, or in which it has participated/collaborated with other partners.

### **CBT Courses**

Finance Course for Non-Financial. Course with a high degree of interactivity and feedback between the user and the system, designed to obtain the active

involvement of users, optimizing the time needed to acquire knowledge and skills defined in their pedagogical objectives. It was one of the most successful projects, having been acquired by the main Portuguese banks (e.g. **Totta Bank, BESCL, BCP, CGD**) and by some large companies (e.g. **TAP, Portugal Telecom**). It was also made available as a complementary pedagogical resource for financial curricular units in the first ISTECS courses.

Analytical Accounting and Cost Analysis. This course was developed following the success attained with the Finance for Non-Financials Course and was fundamentally aimed at the same corporate clients. It was also used as a complementary pedagogical resource at ISTECS.

Courses for Word, Advanced Word and Excel users. These courses were designed to use the same CBT technology and were aimed at training human resources to come to exercise a professional activity. In its online version, in the years 2000 and 2001 they were also used by **Foundation for the Dissemination of Information Technologies (FDTI)**.

Course on checks. This course was developed for a banking client (**BCP**). The Bank's central services felt the need to systematize a set of procedures that should be followed by branch staff throughout the country regarding issues related to the use of checks. A team of legal advisors from the Bank and technicians from ITA and ISTECS, designed and developed an online application made available to all branches through the Bank's servers.

## **Projects**

### Hard&Software

In 1994/95, ITA and ISTECS, in an initiative aimed at disseminating computer technologies to the general public, launched a system of publications in the form of fascicles (HARD&SOFTWARE) that were weekly made available to the public, along

with a diskette containing interactive learning content. It was a highly successful project. Many of the users have initiated, through this project, professional activity in the information technologies area. Some of them came later to attend ISTECS higher education courses.

### The year 2000 Project

Later on, in the years of 1999, 2000 and 2001, when the great boom in information technologies and the Internet took place, and this time in collaboration with ACADEMIA DE SOFTWARE (SOFTWARE ACADEMY), ISTECS launched a pioneering distance learning project that aimed to train professionals in various areas of expertise in the field of information technologies. To this project, which became internally known as the YEAR 2000 PROJECT, were added dozens of partner entities from all over the country and also from abroad.

These specialization courses had a length of 11 months and corresponded to 11 levels of training. Each level of training was, in turn, made up of 4 weekly modules. These courses comprised virtually all the technological content of longer-term higher education courses.

Briefly, the functioning of the system can be described as follows: daily, ISTECS, and ACADEMIA DE SOFTWARE provided the learning materials online. On Saturdays, face-to-face sessions were held, which allowed executing practical projects of application of the knowledge acquired through distance learning, performed during the week (in a methodology that was similar to the *flipped classroom*). At the final face-to-face session of each level, each student was given an assessment test.

The design, development and availability of distance learning contents were the responsibility of ISTECS and ACADEMIA DE SOFTWARE. The face-to-face sessions, outside the Lisbon area, were the responsibility of the partners who provided facilities and teachers, receiving for this purpose the necessary support from ISTECS.

Through this initiative, thousands of people have started a professional career in the information technologies area.

## **The response to the pandemic outbreak**

The pandemic outbreak, with the consequent impossibility of developing their teaching activities in the classroom, placed the institutions of higher education facing the need to implement, in a very short-term period, systems of distance education that would allow the continuity of academic activities.

The need to quickly implement a distance learning system represented a relatively "familiar" challenge for ISTEAC. On the one hand, virtually all the elements of its teaching staff are proficient in the use of computer technologies. On the other hand, many of these elements have participated in some of the distance learning projects, as mentioned above. Finally, the technical support staff has the experience of implementing e-learning platforms employed in these projects.

ISTEAC thus found itself "on familiar ground", and this is what justifies the tremendous success of the system promptly implemented and which translates into the high degree of satisfaction expressed by students.

## **3 - General questions**

### **3.1 Theories and learning models (from face-to-face to distance learning)**

Without intending to be exhaustive, we must contextualize, in a synthesized way, the evolution of teaching-learning theories and practices over the years that have led us to the distance learning system that we intend to develop.

For several millennia, one of his oldest and most essential contributors have been Socrates with his (Socratic) method based on argumentative question-answer dialogue, for whom the assumption of ignorance was a learning path, many will follow him as his apprentice Plato and in turn Aristotle (Plato's apprentice). Naturally, over the last 2400 years, many others have studied learning, and several learning theories and teaching-learning models have been designed.

In terms of learning theories, some have been studied in greater depth since the previous century and have influenced many teachers and researchers. One of the most studied and oldest models is behaviorism, which has its origin in the word "behavior". This somewhat generalized concept encompasses the most paradoxical theories on behavior within Psychology. These lines of thought only have in common the interest in this subject, and the certainty that it is possible to create a science that studies it, for their conceptions are the most divergent, even concerning the meaning of the word 'behavior'.

Although Behaviorist Theory was characterized in the form of a manifesto created by John B. Watson in 1913 - "Psychology as a Behaviorist sees it", several currents followed it with different visions of what human behavior was. Internalism postulates that the causes of behavior are based inside man, either in his organism or in his mind - either in memories or in emotions. Skinner, by proposing radical behaviorism, objects to this vision, making the environment responsible for human conduct. However, from teaching and learning, which is the aspect that we are interested in reflecting on in this document and seeing what implications result in the distance learning process. For a behaviourist, we still have the teacher as the master and the "source of knowledge and wisdom", the student is a passive agent and mere "recipient of that knowledge", not far from the practice advocated by Socrates over 2000 years ago.

For a behaviorist, Psychology should not study internal processes of the mind, but rather behavior because it was visible and observable by a positivist science, in which human behavior is based on the binomial stimulus/response, wherefrom concrete and observable stimuli a set of tangible and palpable answers are obtained.

Watson would even argue that if given a group of healthy children, from which he could choose one at random, he would train them, in an environment he controlled, to be whatever he wanted them to be (e.g. doctor, artist, lawyer), regardless of their biological or social background. This current that would come to be called Methodological Behaviorism advocated "being possible to predict and control all human conduct, based on the study of the environment in which the individual lived, meeting the theories of Ivan Pavlov, later supported by Skinner on operant conditioning.

It is, therefore, a model that, in pedagogical terms, disregards the complexity of the teaching-learning process, much based on the binomial stimulus-response.

Another critical theory to discuss is constructivism, which appears as one of the essential learning theories and has, as prominent authors, Piaget and Vygotsky. Unlike behaviourism, constructivism holds that the individual actively builds his knowledge, thus playing a central role in his learning process. Therefore, the learner is no longer the passive receiver described in behaviorism, being seen as someone who develops his ideas and who critically acquires information that assimilates and transforms it according to his perceptions. Moreover, the other's existence and the importance of society in the construction of knowledge acquires a preponderance that was not evident until now, namely with Vygotsky and socio-constructivism, in which the development of the individual and his learning are corollaries of social interaction if there is a potentiation of hereditary knowledge (present in permanent memory) in its relation with the environment.

Since constructivism is not a teaching method, it points out elements about the way we learn and about the importance of using active methodologies (such as those described in this model) to place the learner at the center of the educational process and to provide an active construction of knowledge.

While constructivism is the theory of knowledge developed by Piaget and other theorists, in the theory of constructionist learning, developed by Papert and his colleagues at MIT, students learn by doing, within a network of knowledge, through real communities of education and practice. The fundamental concept of the whole teaching-learning process is interactivity. The student is the one who builds the sense of things; learning is considered an interpretative act, in close interaction with the physical and social world.

The same evolution of neuroscience has contributed a lot to our better perception of how we learn, knowing today that emotion and emotional memory are near related to learning. Something that Vygotsky already described in the last century, for whom thinking has its origin in motivation, that is, in desires, needs, interests and emotions, also in line with the meaningful learning that is one of the principles of this model (cf. Theoretical principles and learning methodologies).

It is also this theory that, in Piaget and Vygotsky's writings, comes to recognize the importance of games in learning, as they stimulate action, but even creativity and self-confidence, being necessary for the development of concentration and thought, but also language. Indeed, these thoughts contribute to new active methodologies and concepts such as game-based learning and gamification, commonly used in teaching and a work context with recognized success in terms of knowledge and levels of motivation. It is known, though, that in contemporary society, computers and video games fill, in a way, human needs that real space cannot satisfy, that is, they offer rewards and teach other ways. It is in the teaching of other paths that we consider essential the role of learning through the acquisition of new (and different) skills. Education has changed over the years, both in the way it is understood by others and in the student's role in the learning process.

The evolution from Behaviorist theory to Constructivist theory is essential as it has practical implications for the teaching and learning process, both face-to-face and non-presential, both in terms of the pedagogical philosophy, the teaching institution, the contents, and the role of the teacher, as well as the student and the evaluation process.

More recent studies, initiated by George Siemens and Stephen Downes, propose a new theory of learning, still widely discussed by academics, in which knowledge is distributed and present in the network (outside the individual), emphasizing the role of informal education obtained through society or online social networks. Although the need for further study regarding this possible learning theory (or model) is recognized, its eight principles, described by Siemens, are essential for us to consider them:

- Learning and knowledge are based on the diversity of opinions;
- Learning is a process of connecting specialized nodes or sources of information;
- Learning can exist in non-human mechanisms;
- The ability to know more is more critical than what we know today;
- Fostering and sustaining connections is fundamental to assist continuous learning;

- The ability to visualize connections between areas of knowledge, ideas and concepts is a core competence;
- Updated and accurate knowledge is the goal of all connectivism learning activities;
- Making decisions is in itself a learning process. Choosing what to learn and the meaning of the information that comes to us is seen in the light of a constantly evolving reality. What is now right tomorrow may be wrong due to changes in information impacting the decision.

The MOOC (Massive Open Online Courses) typology itself, resulting from the studies and initiatives of George Siemens and Stephen Downes, has acquired its room within the distance education offer. The global economic context and the increased mobility of people and services, as well as the advent of mobile technologies as well as higher Internet speeds, has boosted this phenomenon. Several platforms (commercial or non-profit) emerged at the beginning of this century dedicated to this type of training (e.g. Coursera, Edx, Udacity), including academic degree and specialization courses.

The COVID-19 pandemic accentuated the demand for distance learning in periods of confinement and when formal classroom teaching, at times, failed to adapt rapidly and expeditiously as intended.

The current online training offer includes, for instance, many programs with integration of various emerging technologies and media in student and teacher learning, social networks, open educational resources, along with online communication, subject-specific websites or digital repositories and virtual classrooms have been widely used. The advent of online tools combining modes requires teacher/trainer training courses to show them how to combine these various modalities of distance learning.

In the United States and Europe, teachers, mainly in higher education, already make systematic use of these training and EaD models, also receiving training and knowledge updating through interaction with a combination of models, for instance, online peer-based professional development, self-study through interaction with web

resources, participation in online seminars, webcasts display and interaction in study and research groups.

Due to the nature of World Wide Web technologies, the boundaries between categories of Web-based distance education models are very fluid. They offer a range of pervasive, broad and often complete professional development opportunities. A professor in Lisbon can participate in an online course through the Boston University program on ODL and then can enroll in another class on Assisted Technology at UT Austin. Next, he can enroll in an online conference at the University of Alice Spring in Australia to communicate what he learned in the course at the University of Texas at Austin. Though his web training may not end there: he can participate in a set of monthly online seminars offered by a teacher training program in Germany; participate in a particular education teacher network on Facebook; improve his knowledge of content through interaction with applets and Java mathematical simulations; participate in self-paced online tutorials at the Adaptive Technology Resource Center at the University of Toronto; code develop a math activity with a teacher from Panama through a wiki; download videos of technology education classrooms through the free Miro video viewer. With reliable and robust Internet access, teachers can interact with various global resources and colleagues through multiple formats, these models are not possible with any other technology or any other form of distance learning, apply par excellence to the Internet and specifically to the WEB.

By this we mean that the implementation of distance learning systems, properly planned and coordinated, may have a significant contribution to improve the quality of education, this is implemented in its methodological aspect and not only in its technological part. However, the practice carried out in the field was, in many situations, a maintenance of methods and techniques of classroom teaching, ignoring, to a large extent, the methodological evolution achieved and focusing only on the use and evolution of technological equipment.

### **3.2 Inclusive online education**

People with disabilities have travelled a path of exclusion, discrimination, stigmatization and prejudice throughout history, in all human societies, even the most developed ones. The families with whom they live also feel the effects of this condition, with repercussions on their quality of life, both because of their involvement and because of the sense of insecurity about their future.

Thanks to greater social awareness and democratization of societies and states, this paradigm has been evolving, and in this perspective, along with the concepts of integration and inclusion, an allusion to the principles of equality and participation is recurring today as a corollary to a new generation of social policies and citizenship rights, supported by criteria of equity, solidarity and cohesion.

An example of this evolution is the adoption of the United Nations Convention on the Rights of Persons with Disabilities at the beginning of this century, which also resulted from a consensus of the international community on the need to effectively guarantee respect for the integrity, dignity and individual freedom of persons with disabilities and to reinforce the prohibition of any type of discrimination against these citizens that would impede their participation in society.

In this context, the Convention's signatory states, namely Portugal, undertake to create the conditions for people with disabilities to have access to higher education, vocational training, adult education and lifelong learning without discrimination and on equal terms with other citizens.

The broad bases of the legal regime of prevention, empowerment, rehabilitation and participation of the person with a disability in Portugal, recognize the principle of the importance of public responsibility, according to which it is up to the State to create the conditions for the implementation of a policy of prevention, empowerment, rehabilitation and participation of the person with a disability, also defining as the State's competence in this field the adoption of specific measures necessary to ensure access of the person with a disability to education and inclusive education, namely through the allocation of resources and instruments suitable for learning and communication.

In this line of rights recognition, in 2010 the EU approves the European Strategy on Disability 2010-2020, electing as a fundamental priority objective the empowerment of people with disabilities, defining among the eligible areas of action

the education and training in a line of promoting inclusive teaching and lifelong learning for students with disabilities, considering that equal access to quality education and lifelong learning will enable people with disabilities to participate fully in society and improve their quality of life.

In addition to the support instruments listed in the framework of people with disability rights recognized nationally and internationally, the Portuguese government has been following a policy of promoting the valorization of citizens based on the training of the Portuguese, enhancing the use of tools and technological means that allow curriculum enrichment and boost employability, particularly in the areas of digital technologies, and of stimulating distance learning in higher education institutions with the definition of goals to be achieved in this field, examples of which are the recent change in the new legal regime for distance learning, the guidelines for a technological and business innovation strategy for Portugal for the period 2018-2030 and the National Initiative Digital Skills and 2030, Portugal INCoDe.2030, which, from its combination, it seems to us that a higher level formative initiative aimed at facilitating access to education and training for people with disabilities, is a national goal within the framework of public policies to promote equality and non-discrimination with respect to citizenship rights and the realization of the strategic challenges of the government that are envisaged for the coming years.

Therefore, it results from this:

a) in the interest of people with disabilities:

- Greater choice;
- Improved time management;
- Reduction of road accident risks;
- Reduction of constraints (accessibilities);
- Greater flexibility in the management of family activities,
- Further people' empowerment;
- Less dependence on the family;
- Reduction of travel costs;

- Greater quality of life;
- More individual and professional accomplishment.

b) in the public interest:

- Increase in people's training;
- Valuing people;
- Fulfillment of goals and commitments;
- Greater effectiveness of public policies;
- Context cost savings;
- Increased level of accomplishment of citizenship rights; and
- Expansion of teaching in Portuguese.

### **3.3 Why distance learning?**

It must be clarified why distance learning is chosen, which is explained in some way in the previous points, but which will be contextualized and summarized here.

The literature presents us with advantages and possibilities that this teaching model offers us both in terms of learning and of logistics and finance, particularly by using virtual learning environments such as those in this model.

One of these possibilities is interaction, the same that is lost due to lack of physical contact between peers or between students and teachers, is gained in a new context at a distance through the forums and virtual learning environments propitious to individuals who, in face-to-face contexts, could have greater difficulty in interaction and participation, a result of their greater introversion.

Interaction and the already mentioned virtual learning environments are also promoters of an enterprise and collaborative construction among students. Tools such as wikis, blogs, discussion forums and online collaborative development software, combined with group work and discussions, are essential tools for

building a collective intelligence advocated by Pierre Lévy and widely discussed since the advent of the so-called Web 2.0. It is in this collaborative construction that the student develops not only his specific skills but also transversal skills.

The student's responsible autonomy is one of the most requested elements by this model, which, despite being a challenge, is also an opportunity and an advantage compared to other models. Distance learning methodologies that place the student at the center of his learning, with greater control of his time, pace and method of work, learning becomes more autonomous and freer, preparing the student for the demands of the market and the society in which we live.

School learning is a dynamic process by which the learner, through exchanges with his/her peers and teachers, establishes an interaction between his knowledge and know-how to build new pieces of knowledge, adapting them to the situations with which he is confronted, to use them in non-teaching cases.

Current market requirements give rise to the need for continuous training allowing access to it on a planetary level: a student from a geographically disadvantaged background has the same type of opportunities to access quality training in higher education. In the case of ISTECS, given the offer of courses in Portuguese language, students from the Portuguese Diaspora, in particular, Portuguese-speaking countries (PALOP), will be able to enjoy the educational offer in distance learning. On the other hand, Brazilian students also feel more comfortable with the same official language for teaching classes. Since 2008/2009, Brazil is the foreign country with the highest number of students enrolled in Portuguese higher education, currently representing 32% of all students in international mobility.

The option for distance learning becomes more and more relevant as it allows students to have access to a more significant educational offer, lower costs related to travel, accommodation as well as greater accessibility. Despite the model's limitations, it is a fact that distance learning allows democratic access to the different teaching tools, also allowing a student with mobility, disability or illness limitations to access training without leaving home.

Naturally, it is also essential to recognize some of the limitations of distance learning, so that we can mitigate and/ or circumvent them, namely the higher rate of abandonment, often due to the difficulty of adaptation of students to this model, the inefficiency and/ or insufficiency of technology adapted to this specific context, as well as problems in the strategy and design of the training or lack of preparation of the team (teachers, tutors, technicians).

Recognizing these limitations, this model seeks to mitigate them in various ways, as follows:

- Through the mandatory and recurrent training of the teaching staff and technical-pedagogical support in the specific techniques of synchronous and asynchronous pedagogical communication. Besides the required initial training, ISTECS will implement a system of permanent training for its teachers and promote the exchange of experiences with other national and foreign institutions (as a result of protocols currently established or to be established).
- It is making use of online communication platforms that facilitate and stimulate interaction, in a multitude of ways, between teachers, students and other agents of the educational process to allow the creation of real learning environments. ISTECS will use the most advanced distance learning platforms (explained in the Virtual Campus in due course in this document) and will create the complementary systems that may prove necessary taking into account the specificity of some curricular units.
- With constant interaction and contact (to be established using different means of communication with students: LMS, e-mails, doubt forums and other contact networks) with the students (the teacher should contact the class at intervals of maximum three working days, being responsible for informing the students when they are absent for more than three days), to keep them motivated, increasing the feeling of belonging and reducing the sense of uncertainty, disorientation and isolation.
- With a careful design of study plans and each curricular unit. Developing and using interactive multimedia resources to be made available to students, being a complementary factor of enrichment of this new pedagogical experience. In addition to having a team of professionals with expertise and specific skills in the development of these learning applications, ISTECS will

also promote the necessary training of its teachers so that they can guide these teams in the development of those pedagogical resources.

### **3.4 Why distance learning?**

Distance learning has, of course, the same purpose as face-to-face teaching, the training, in this case, advanced, of students in ISTECS's core technological areas. This training is not extinguished merely in the technical component, but is oriented towards an integral formation of the individual, from the already mentioned specific technical skills of the courses and transversal skills very much required in the market today, but also the student's personal, social, academic and civic growth. Therefore, in the same way that it eases the access to individuals with disadvantaged backgrounds and/ or displaced persons from the educational institution (e.g. students from the Portuguese Diaspora, geographical disadvantages, economic difficulties, low mobility, PALOP, among others), it also privileges the coexistence of these different student profiles, promoting their awareness of the problems that involve us all as a society and contributing to an enlightened, egalitarian and better-qualified Lusophony.

Besides, of course, addressing Portuguese citizens, the distance offer at ISTECS will seek to promote Lusophone culture and academia, bringing advanced training of excellence to Portuguese-speaking African countries, Brazil and other places where Portuguese or Portuguese-speaking people can reside. This will promote, on the one hand, the internationalization of ISTECS and, on the other, that of students living outside Portugal.

All will be able, in this model, to do their training with the temporal and spatial flexibility adapted to their needs (according to the pedagogical-didactic program previously established), without the constraints of the classroom teaching.

Distance education is the promoter of the four pillars of knowledge described in the report to UNESCO by the International Commission on Education for the 21st Century:

- Learning to know (more than an acquisition of a set of codified knowledge, distance learning recognizes the student as the main protagonist of his education, developing an understanding of the world around him, promoting his autonomy and flexibility, as well as critical thinking and self-awareness of the learning process - learning to learn).
- Learning to do (indissociable from the previous one, learning to do is putting into practice the knowledge acquired, in a symbiosis between theory and practice. As described in this model as well as in the programs of the different curricular units, with a practical and debate approach to the programmatic contents, using the discussion forums and the support materials inherent to the addressed themes, it is expected that there will be a strong motivation and participation on the part of the students in the activities to be developed, embodied in the digital portfolios. Thus, extending the learning to do, going from a "notion of qualification" to a "notion of competence", promoting creativity, initiative and the ability to make decisions that allow us to move towards innovation).
- Learning to live together (and to learn to live with others, to the extent described above in the personal, social and civic formation of the individual. Collaborative practices that promote debate among peers and between teachers and students based on common goals, as well as the discovery and awareness of the other as an individual, will allow conflicts and differences to be overcome eliminating prejudices and treatment inequalities)
- Learning to be (it is only with self-knowledge, from the capacity of self-observation and self-evaluation to self-worth, the student can develop as a conscious and prepared individual. A highly competitive, changing, mediatized society and a constant target of misinformation and untruths requires an individual who is aware of himself and others, who understands the world around him, knowing how to position himself in a balanced and responsible way).

#### **4- Characteristics of EaD in the current context (2020)**

There are currently several terminologies and different definitions to designate concepts that are often thought to be similar yet have different meanings.

One of these examples is the concept of e-learning which, for some authors, designates learning mediated by technology (even if it is in person). At the same time, for others, it means distance learning (usually also mediated by technology) or even a hybrid system (in-person + distance). In this document, if the concept of e-learning (or online) is used, it should be understood as distance learning mediated by technology.

#### **4.1 Qualities and qualifications of a teacher in distance education**

Today, we have multiple options for WEB resources, which are directly usable in online teaching, which bring with them disruptive changes in the way of developing teaching activities. The fast-technological evolution also implies a certain willingness to keep up with the new times, continually updating itself to make the best use of these tools that are often also used as a means of entertainment. This adaptation also requires the existence of different skills on the part of the teacher, who must be able to integrate the technologies into his teaching method, with specific purposes useful for improving the teaching/learning process.

Of fundamental importance is the commitment of teachers in their work to educate students better, they often forget that they have significant responsibilities to all generations of students they meet in their path, so the commitment to the planning of teaching activities must be accurate and punctual.

Nowadays, an essential prerequisite for teaching is to have travelled a long journey of studies from university to specific training for a particular teaching model, such as EaD. Teachers' preparation is crucial to ensure students a better level of schooling/learning, allowing them to be more effective. In other words, teacher training after initial training is vital, especially in the EaD model. In this context, ISTEAC has sponsored all teachers involved in EaD an intense and multifaceted training in online education.

Good organization and planning of educational activities at an advanced level are critical elements for academic success. We cannot consider improvising a lesson! The teacher needs to organize it before "entering" the class so that it is clear what it intends to do and fill all the time he has to offer. Students immediately notice an improvised class, which usually causes discontent, incompleteness, confusion and the need to return to the same subject. In this way, the precise definition of objectives and competencies becomes mandatory when teaching and presenting the program to students.

In an increasingly diverse and multicultural society, the teacher needs to be able to deal with his eventual prejudices, treating his students in the same way. This element is critical in the teaching path of a teacher, who must be open to debate and not imposing his thinking.

Asking students questions is an excellent methodology to keep the class alive and also to understand the students' different points of view. Teachers should be open to answering students' questions in the first place. Modern teachers should be inclined to listen to their students, and not just limit themselves to confusing and superficial responses. Indeed, it is more honest to admit that you don't have an answer and propose to give one, after having adequately documented yourself.

The "digital" teacher must be willing to innovate and use new teaching strategies; technological tools integrated into teaching that fit into a thought out and not a grossly improvised path.

The "digital" teacher must not only be innovative, but also put himself enthusiastically before what is modern, and which can enrich teaching, improving the learning process. It is not necessarily the last generation technological instrument; he should be able to determine the useful mechanisms to be adapted in the context in which he operates, that is, the most recent technological tool is not necessary to teach a good class correctly.

Asking questions in virtual communities can be a useful way to understand different points of view, breaking in some cases, the obstacle of students' shyness. It is recommended the use of virtual learning environments developed specifically for teaching as Google Classroom and Moodle.

Today's teachers must always be curious to discover new things, to learn with students as well, who are often better suited to technology than teachers. Involving students is the best way to make them feel part of the system, always encouraging them to find the best alternative solutions, to solve problems and even improving the whole class's performance.

## 4.2 Digital Expertise

It has gained importance in the last twenty years in responding to the decisive advance of new networked technologies. It is one of the critical competencies envisaged for the lifelong learning endeavour in Europe. It is a matter of knowing how to use information and communication technologies wisely: this means not only having computer control to find, evaluate and exchange information but also being aware of the context in which modern technologies fit (e.g., cybersecurity and intellectual property issues on the web).

Teachers need to be trained and informed on educational innovation brought by new technologies (IT): a teacher, motivated to improve his digital skills, a reference model is TPACK (*Technological Pedagogical Content Knowledge*). Another document to be considered is the UNESCO document: ICT competence standards for teachers: a policy framework.

([https://unesdoc.unesco.org/ark:/48223/pf0000156210\\_por](https://unesdoc.unesco.org/ark:/48223/pf0000156210_por))

## 4.3 Some benefits of technology-mediated distance learning classes

The online classroom offers numerous opportunities for students and teachers, such as web-based learning environments.

Accessibility: online classes can be accessed using the Internet browser (e.g. Google Chrome) from any computer or mobile device (e.g. tablet, smartphone), without worrying about the type of platform. All records shared by teachers and

students will be stored in a Classroom envelope on Google Drive or in Moodle files. The student can access the platforms anywhere. Students don't have to worry about machine or computer malfunctions.

Exhibition: the online classroom offers access to a web-based learning program for students. The online classroom presentation can help students move on to other executive learning structures used in advanced education.

No paper: teachers and students won't need to reorganize large amounts of paper as the online classroom has no paper. The moment teachers transfer assignments and evaluations to the classroom. Students can finish their assignments and assessments directly in class and even keep the work to analyze later. Students won't lose their work due to technical deficiencies or human failure.

Time-saving: as it is an online classroom, it's available either on the cell phone or on the computer or other devices, teachers and students can participate at any time and by any means in asynchronous classes or synchronous classes, without having to leave the place where they are, unlike the classic model that would have to spend time to travel to the classroom in person.

Communication: teachers and students can send messages, publish on the web, send private comments about tasks and make a contribution to the work. Teachers are responsible for students' observations and publications. Students can also interact with teachers using individual messages or through online classroom email reports that incorporate input.

Collaborative work: the online classroom offers students several approaches to cooperate. Teachers will foster online conversations within the classroom among students and will create group work. Furthermore, students can gather in Google Docs, or Moodle, and analyze together the materials provided by the teacher. ISTE also provides its students with a technological tool specifically designed for collaborative work; this is Microsoft Teams; this tool will be available to all students of the courses available in the EaD model.

Differentiation: teachers can undoubtedly recognize the most appropriate type of orientation for the whole class, however individual students or groups may need a

different orientation, with digital platforms it is effortless to give specialized support in these situations.

## **5 - Issues of Cyber-security to consider in online teaching.**

Nowadays, all kinds of works, plans, projects, implementations involving computer or system networks, must have cybersecurity considerations.

As this is a Pedagogical Model for Distance Learning, based mainly on WEB technologies and with online communication channels, it presupposes, in one way or another, the access, preservation and/ or handling of data and information directly protected by Article 35 of the Constitution of the Portuguese Republic and deeply regulated by the General Data Protection Regulations.

Therefore, a set of principles should be considered to preserve the confidentiality, authenticity and availability of data and information. As far as the later one is concerned, we are not going to dwell on it, as most of the technologies available through the Virtual Campus are technologically supported by Microsoft's Azure, where the SLA requires 99.999% availability.

### **5.1 Digital trust**

There is an educational management platform, on which all academic data will be stored. This platform is segmented according to management areas, and there are distinct authentication and authorization policies for the various areas and the multiple types of users. A PaaS-type cloud computing infrastructure will also support this platform, and the external perimeter security is contracted with the company that provides the PaaS service. ISTECS is in charge of managing software security.

There will be modular identity policies that consequently create layers of protection and are impacting on the authorization of access to resources. This aspect becomes even more critical because the students can make the payment of

fees through the platform. However, the guaranteed access to PayPal allows passing the technological element of the security of financial data in transit to this hired company, including a critical aspect, the bank details of students are on the side of PayPal and never on the infrastructure side of ISTEAC. On the ISTEAC side, all basic architectural structures of the academic Management Platform are secured via SSL, DNSS and IPSec. These enable the digital trust to users/ students.

Nowadays, students also make intensive use of mobile devices to access EaD structures. This situation requires special attention when compared to access through a personal computer located in a house or in a company that uses a secure network. This is because it usually happens that mobile devices can access teaching platforms through unsafe networks. Another aspect to be borne in mind, and which cannot be separated from the one described above, is the fact that the technicians and teachers who develop the contents for EaD courses are not focused on security issues, but on pedagogy and science issues, and can produce excellent contents, but which may eventually create security flaws.

For this, and other security reasons, the central EaD platform will be the latest version of Moodle, but with two key features that should be noted: it is stored and installed in a cloud computing infrastructure, through the IaaS model, in a Double Tier system, therefore redundant internally. Furthermore, the core security of the Moodle platform will be provided by the Azure Security Center, combined with Azure policies surgically applied to each of the Resource Groups, Moodle, User Groups and users.

## **5.2 Cryptographic security**

For a teaching model type AED through WEB Online is advised the use of models such as Public Key Infrastructure (PKI), allowing to provide security services such as confidentiality, integrity, authentication, authorization, access control, non-repudiation, time stamping, and control of authentication failures. This model makes use of a public key cryptographic system. The main reason for this feature is that these are online environments concentrated on the same platforms and if private keys were used it would increase the possibility of theft of one of them, which could

compromise the whole platform. Thus, the encryption will be of the public key type. However, it is a technology made available by the cloud computing platform.

### **5.3 Main risks that may occur in typical online learning platforms**

There are the usual risks to consider: viruses, worms, macros, denial of service, espionage, intellectual property, privacy, etc.

These traditional risks have an impact on five pillars of security, some of which have an impact on legal frameworks. Authentication issues: if there is a breach at this level all communication is compromised; the matter of availability, which in the case of the present scenario the responsibility is contractually assumed by Microsoft via Azure SLA; confidentiality, in cases where the data is not adequately encrypted, or in cases where the references in the storage are not correct and the integrity is lost, which can cause leaks of information; the problem of integrity, with the problems of buffer overflow, cross-site scripting, injection of packages, malicious execution of files.

### **5.4 About Privacy**

Both teachers and students should be aware of security issues beforehand and especially of issues relating to the privacy of the course content and of the participants themselves. There will always be a session in each class on security and data protection issues. We must not forget, and we do not fail at this level, that in cybersecurity the weakest link is the human being! The institution will implement technology to provide mechanisms to preserve privacy, but the human element has a unique role in this area.

A small manual of adequate cyber-security procedures will be created for all online learning infrastructures. This handbook will be given to all students and will be explained as Key Notes in synchronous sessions.

All technical staff related to content production and teaching will have a process similar to that of students, referred to in the previous paragraph.

### **5.5 Secure information management - main issues**

- Software attacks: viruses, worms, macros, DoS;
- Software failures: programming errors, no updating, incompatibilities;
- Human failures: sharing passwords, not blocking terminals when absent, not correctly managing security policies;
- Attacks by on-premise cybercriminals.

### **5.6 Main ISTEK EAD platform security scheme (in the abstract for obvious security issues) (Debra Shinder, 2019, Microsoft)**

Azure's policy regarding trust and reliability is based on the following basic principles: security, privacy, compliance, resilience and intellectual property (IP) protection.

Azure has been developed based on leading security technologies to help organizations and institutions manage and control identities and access, which are central elements in protecting their cloud environment.

Microsoft imposes carefully defined requirements for government and law enforcement impositions on customer data.

If service is interrupted, Microsoft will follow strict standards for the removal of your user data.

Azure offers a wide range of global and industry-specific standards and support materials for key regulations including, for instance, ISO/IEC 27001 and ISO/IEC 27018, FedRAMP and SOC Reports 1, 2 and 3. Azure complies with regional and national standards that include the EU, EU-US model clauses. Privacy Shield, Singapore MTCS and CS Mark in Japan.

Azure is prepared to prevent disasters and quickly recover if a disaster hits the data center where our data is allocated. Azure provides resiliency to your cloud-based applications and data, providing continuity of service in the following ways:

- High availability,
- Disaster recovery,
- Backup copying.

Microsoft takes an in-depth defense approach to security at Azure. Integrated security controls and partner solutions are articulated to faster protect across the full range of technology, network and data, and also provides tools to assist security management and threat protection (see figure 1).

Identity and Access	Apps and Data Security	Network Security	Threats Protection	Security Management
Based on access features	Cryptography	DDOS Protection	Antimalware	Log Management
Multifactor authentication	Private Computing	Firewall NG	Based on AI Detection and Reply	Security Posture Assessment
Central identity management	Keys management	Web App Firewall	Cloud Workload Protection	Policies and Governance
ID Protection	Certificate Management	Private Links	SQL threats protection	Compliance Regulation
Administration of identity privileges	Protection of information	Network Segmenting	IoT Security	SIEM

Table 1: In-depth defense at Azure

Source: Microsoft

The platforms that comprise the Virtual Campus of ISTECS comply with all these policies of defense in depth, expressed in table 1, and provided in the implementation model IaaS and PaaS of Azure, a structure of cloud computing where most of the modular applications that make up the Virtual Portal ISTECS will be allocated.

## **5.7 Data Protection**

Azure allows encrypting data and managing keys. It protects client and application data, platform, system and storage using four specific methods: segregation, encryption, redundancy and destruction (Debra Shinder, 2019, Microsoft).

### **Data segregation**

As a multi-tenant service, Azure employs logical isolation to separate the storage and processing of each customer to help ensure that the customer's data is not combined with that of another entity.

### **Data Encryption**

We can encrypt data in storage and in transit, thus aligning with best practices to protect data confidentiality and integrity. We provide support for several encryption models, including client-side and server-side encryption.

### **Data redundancy**

We have adopted in-country storage for compliance or latency purposes or out-of-country storage for security or disaster recovery purposes. Data can be replicated within a selected geographical area for redundancy.

### **Data destruction**

When we delete data or exit the Azure service, Microsoft follows industry-standard processes to replace storage resources before reusing them, including the National Standards and Technology Institute (NIST) 800-88 Special Publication guidelines for media sanitization.

## **5.8 International regulations implemented in the platforms that make up the Virtual Campus of ISTECH:**

ISO/IEC 27018.

EU Model Clauses.

EU-U.S. Privacy Shield.

FERPA.

HIPAA.

HITRUST.

LOPD (Spain).

PIPEDA, PIPA, e BC FIPPA (Canada).

EU (GDPR).

## **5.9 - Integrated Security Center**

Taking into account that the pedagogical platform to be used par excellence will be the last version of MOODLE, and the fact that this platform is installed in a cloud computing infrastructure, in this case, Microsoft Azure, data security incorporated in Moodle is covered by the protection provided by Azure, specifically through the Azure Security Center.

Azure datacenters are built according to the leading industry standards and comply with all relevant certification authorities such as ISO/IEC 27001: 2013 and NIST SP 800-53, to name a few. These standards ensure that Microsoft Azure is built to provide security and reliability. Moodle's pedagogical platform inherits this security from Azure in a direct way.

## PART II

### Application of the Pedagogical Model for Distance Learning

#### 6. Virtual Campus

ISTEC's Virtual Campus is par excellence, a Portal that will give access to several technological components, all-digital, and that work modularly.

Virtual Campus modules are equivalent to the buildings and services on a physical campus so that each one will have its specific characteristics.

At the Virtual Campus students will have access to:

- The platform for academic management (Praxis);
- Moodle Platform (Curriculum Development);
- Springer Network (with authentication and VPN);
- Public module with all the educational offer (information);
- Documentation services;
- Access to ISTEC Web-Mail (via web-mail);
- Direct access to ISTEC institutional website;
- Direct access to Azure Platform (with authentication);

- Academic Information Module (with authentication).

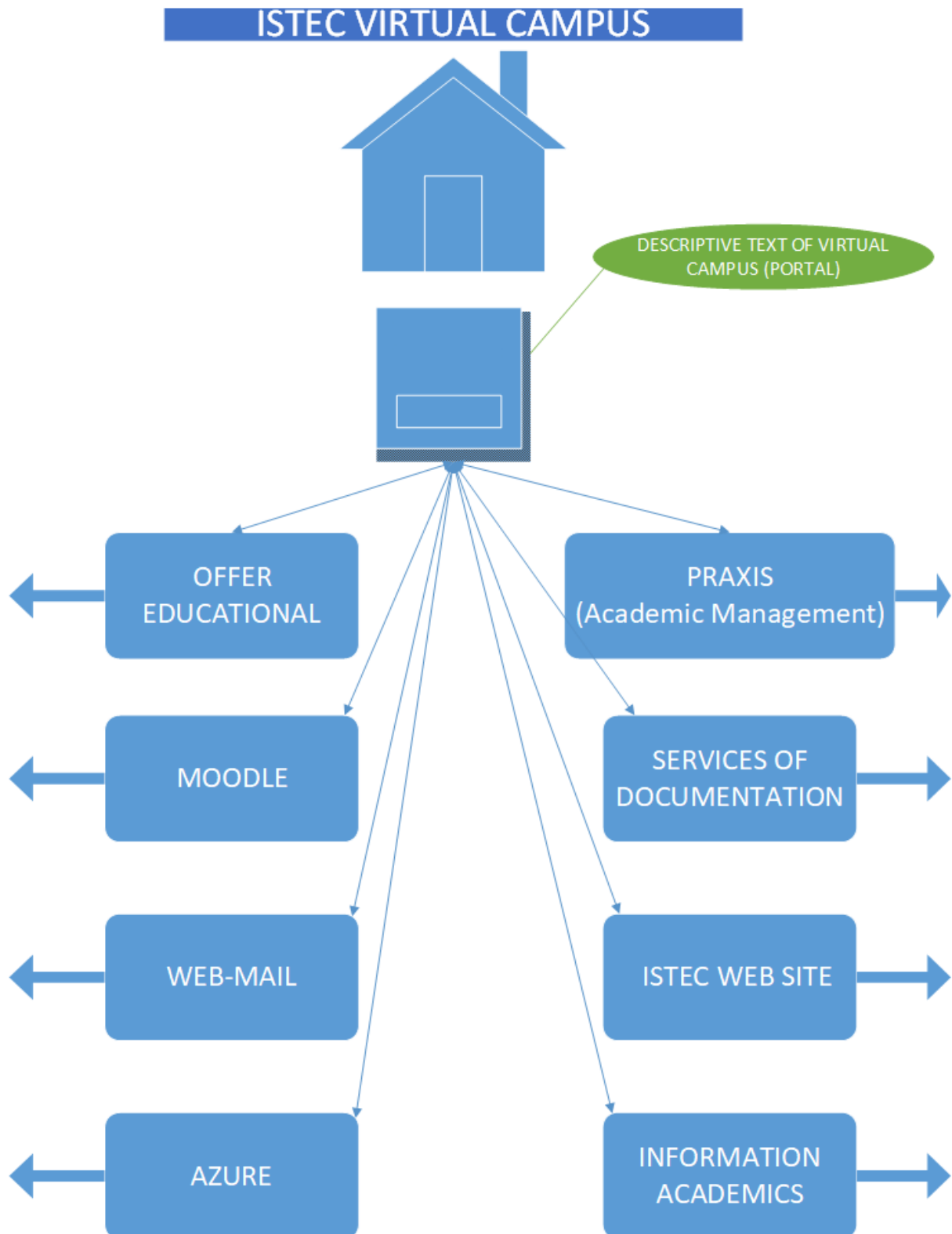


Figure 1: Virtual Campus Graphic Description

Because this is a technologically complex Portal, it will always be evolving and updating.

## 7. Course design and organization

Considering that the courses given at ISTECS give, as a rule, origin to academic degrees (e.g. Degree, Master's degree) or certifications/specializations (e.g. Post-graduation, Professional Technical Superior Courses), these will have to follow the legislation in force, as well as, the internal regulations so that they are recognized.

Notwithstanding the characteristics of the appropriate legislation, this pedagogical model can apply to any course taught at ISTECS in Distance Learning, being nevertheless developed with greater relevance to the degree courses and postgraduate courses.

Courses at ISTECS are organized according to a set of instruments, both to disseminate and present the educational offer, and as elements that guide the student in his decision making. This element, therefore, has an added importance for the student accompanying him/her at the moment of his choice, but also throughout his journey at ISTECS.

Therefore, for each course taught at ISTECS, there is a course guide (GC) that includes a set of elements, namely:

- General information on ISTECS.
- General organization of the course (including length and teaching regime).
- Course objectives.
- Addressees.
- Training profile and professional outings.
- Degree and/ or level of training assigned according to the European Qualifications Framework and the National Qualifications Framework.

- Conditions for admission (if applicable).
- Technological requirements (i.e. computer characteristics in terms of hardware and software required).
- Plan of studies.
- Methodological proposal.
- Information regarding applications and registrations.
- Information on structuring regulations (internal).
- Framework in the institution's strategic plan.
- Quality Management System.
- Fees.
- Protocols.
- Assessment and Classification.
- Course coordination, teaching team and technical support.
- Online environment.
- Information on accreditation and/ or permanent evaluation of the course.

Like the courses, each curricular unit is planned and designed according to a set of elements that, based on the "Curriculum Unit Form" developed by the Agency for Evaluation and Accreditation of Higher Education, structure and design the body of the curricular unit is the responsibility of the responsible teacher. The elements contained in this curriculum unit guide (GUC) are:

- Name of the course unit.
- Length (includes working hours and contact hours).
- ECTS.
- Teacher in charge.
- Other teachers (if applicable) and/ or tutors.
- Learning Objectives.
- Programmatic contents.
- Methodology.
- Technological means to be used.
- Assessment.

- Bibliography.
- Scheduling.

GUC complements the course guide described above and is an additional element of the student's work in each curricular unit. Therefore, it can know, on time, what is expected from you and what you can expect from the curricular unit in specific.

Although ISTEK students are generally familiar with technologies, even due to the nature of the study cycles taught at the institution, all courses will be preceded by an introductory module to the technological platforms and the distance learning regime.

This module, of voluntary attendance and without summative evaluation (not having, therefore, a reflex of the assessment of the course) will have a duration of 2 weeks. Being designed and planned by the course coordinator, it may be taught by tutors and/ or monitors (e.g. master students or masters who have attended ISTEK courses and have experience in the platforms to be used) under their guidance and supervision.

The importance of the introduction to the technology platforms contained in the Virtual Campus is evident in that, although most students have average levels of digital literacy, no previous experience is required, nor is some platforms specific for educational use not widely known. Additionally, more than technological habituation, this module intends to be an initiation to distance learning, helping the student in his relationship with methodologies, teachers, the institution and his peers, also serving the social purpose of integrating the student in academic life, using an informal learning context.

Despite the informality of this module, it will have specific learning objectives and a realistic character, counting on activities specially developed to introduce the student to the rhythm of the course work. Thus, at the end of this module, the student is expected to be able to:

- Make autonomous use of the Virtual Campus and the leading pedagogical technologies to be used in the course (cf. Technological tools);

- To demonstrate the ability to organize work and meet deadlines;
- To communicate with peers, teachers and institution using synchronous and asynchronous communication tools;
- To search and filter information within the virtual and online environments to be used during the course (e.g. virtual learning environment, email, search engines, scientific repositories);
- To identify different online learning and assessment methodologies (e.g. collaborative learning, peer review, independent learning).

### **Class organization**

Because of its characteristics, in logistic and spatial (physical) terms, a virtual class doesn't have the same limitations as a physical class, being able to have a larger number of students. Nevertheless, to have adequate coordination and a constant and personalized follow up of the students' work, the classes should not have more than **50 students** (this number may be lower according to the specificities of a given course unit that justifies it).

In case the number of students of a given course or course unit exceeds this value, more classes will be formed. The teacher responsible for the course unit (cf. section **Organization of teaching work**) is responsible for the teaching of at least one class (assistant teachers may teach the remaining classes).

In the case of 2nd cycle courses, the number of students per class will be lower, given the need for a more in-depth and individualized scientific orientation proper to the 2nd cycle courses (the number of students per class should not exceed 30, it is suggested that it be between 20 and 25).

## **8. Teaching work organization**

It is notorious that today, and particularly in distance learning courses, teachers are under enormous pressure to be proficient in multiple environments and settings that challenge even their notions of a teaching-learning model.

The distance learning project at ISTECS was thus conceived in multiple stages (some already described in this document), one of them being the previous and constant training of its human resources, from teachers to pedagogical technicians who will assist the teachers (or students) during training

Therefore, all teachers of distance learning courses at ISTECS must have proven training in distance learning, which is guaranteed by the institution either by funding training in external institutions or by internal training promoted by ISTECS teachers with more experience with this modality.

The course team for each study cycle consists of the Course Director (appointed by the ISTECS Director according to the statutes), teachers responsible for each course unit, two pedagogical technicians (an instructional designer and a senior multimedia technician) and an ISTECS member with administrative functions who will assist the Course Director in administrative matters, also assuming the role of secretary.

The team will meet upon convocation by the course director, whenever he/she deems it necessary, to (1) plan the activities for the course, (2) develop educational resources for the different curricular units, (3) follow up and monitor the course, (4) resolve conflicts related to the operationalization of the course, or (5) analyze and evaluate the course performance.

### Course Director's Responsibilities

It is up to the course director:

- To convene and coordinate the course team meetings;
- Scientific, technical and pedagogical monitoring of the teachers responsible for each course unit (including the validation of mentoring plans);
- To represent the course at the institutional level, both internal and external;

- To plan and coordinate the course preparation work as well as its monitoring and evaluation;
- To follow and meet (virtually) with students in subjects related to the course;
- To plan and coordinate the introductory module for the technological platforms and the distance learning system;
- To coordinate and ensure the adequacy and updating of the course file;
- To collaborate in the development of training actions for teachers and tutors whenever necessary (including participation as a trainer in them);
- To coordinate the systematic evaluation process (internal and external) of the course in articulation with the various bodies and instances of ISTECS (e.g. Office of Quality Management; Teachers, Scientific-Technical Council, Pedagogical Council).

### Teachers' responsibilities

It is the responsibility of the teachers responsible for the curricular units:

- To plan and develop their curriculum unit(s) and corresponding mentoring plan (if applicable);
- To develop the curricular unit guide;
- To design the course structure within the virtual learning environment;
- To develop the educational resources to be used in the curricular unit (with the support of pedagogical technicians)
- To define the evaluation elements and their criteria according to the Pedagogical Model for Distance Learning of ISTECS as well as the instruments to be used for this purpose (formative evaluation and summative evaluation);
- Teaching one of the classes (assisted by tutors in situations with more than one class);
- To evaluate students' learning according to the instruments and criteria, they have established;
- To facilitate interaction with and among students;
- Supervising the work of tutors (when they exist).
- To propose suggestions for continuous course improvement.

### Responsibilities of the pedagogical technicians

It is up to the pedagogical technicians:

- To develop the image and audiovisual structure of the course and curriculum units;
- To support teachers in the technical and multimedia development of educational resources;
- To support students in solving problems related to the technological platforms and/ or educational resources developed.

### Responsibilities of the administrative element

It is up to the administrative element:

- To secretary the course (e.g. writing minutes of meetings, organizing documents) according to the indications of the course director;
- To be the link between students and other institutional bodies, facilitating conflict resolution, to receive suggestions and organizing them in the course file);
- To link the course director with other ISTECS bodies and structures to speed up the administrative procedures related to the course.

Along with the permanent course team (described above), there may be tutors, in variable number and according to the number of students enrolled. The tutors will be teachers with teaching experience and scientific, pedagogical and professional skills in the disciplinary areas to which they will be attached, preferably with experience in distance learning training (e.g. graduates of ISTECS distance learning courses). Nevertheless, all tutors will be trained in distance learning and in the technological platforms used in the Virtual Campus, which will be fully offered and taught by ISTECS.

The tutor is seen as an essential element in the teaching-learning process of distance learning courses at ISTECS, supporting the work of the teachers responsible for the curricular units and serving as facilitators of students' learning.

Distance learning, due to its characteristics (already described in this model), requires an extremely active tutoring work that guides the student in the most diverse situations during his academic career. This work is not only limited to technical and/or educational issues, but also social, pedagogical and constant student follow-up. The students, for the most diverse reasons, may think about abandoning the course (starting by not performing the tasks or not delivering them in time), also here the role of the tutor is crucial as it should promote a constant contact with all students and, in particular, with those who may have more difficulty or a lower level of commitment.

Therefore, the tutor, under the guidance and supervision of the teacher in charge of the UC, is responsible for ensuring the tutorial guidance and monitoring of the virtual classes to which he is assigned, helping the evaluation of learning according to the criteria and instruments defined by the teacher.

### Tutor's profile

- Graduated in the scientific areas to which he will be attached;
- Graduated in the scientific areas to which he will be assigned;
- Organizational skills and teaching/training experience;
- Consolidated knowledge in the technologies (and platforms) to be used in the course and curricular unit(s) assigned to him.
- Communicative and social skills that allow him to be a guarantor of motivation and interaction with and among students;
- Professional competence and high technical and scientific knowledge, in the themes of the curricular unit(s) assigned to him, that allows him to provide answers to the doubts and questions raised by the students.

### Tutor Responsibilities

It is up to the tutor:

- To collaborate with the responsible teacher of the curricular unit following his guidelines:
  - To assist in the design of the tasks to be performed by the students;
  - To assist in content development;
  - To collaborate in the development of the curricular unit structure within the virtual learning environment;
  - To plan the activities to be carried out during the semester (e.g. forums, chats, digital portfolio)
- To moderate the curricular unit forums:
  - Motivar os estudantes para a participação nos fóruns e para que estes respondam a questões dos seus pares, desenvolvendo estratégias de construção colaborativa de conhecimento sob orientação do professor/tutor;
  - To correct wrong or insufficiently answered interventions by students so that there are no doubts on the concepts or ideas discussed;
  - To synthesize the ideas and interventions of the participants to respond to everyone (without having to respond individually to each one);
  - To answer the questions directly addressed to him, trying to bring the other students to the discussion;
  - To read all student interventions, ensuring that no questions remain unanswered or that no intervention remains unanswered.
- To encourage student participation in the course activities (paying particular attention to the less involved students);
- To clarify that its function is to guide, moderate and facilitate learning, not being responsible for the curricular unit;
- To establish contact with students at intervals of a maximum of three working days (informing students if absent for more extended periods);
- To provide constant feedback to students, both in their interventions in the various communicative spaces and the works developed;
- To answer academic and/ or technical questions (being able to make the connection between the students and the pedagogical technicians when necessary);

- To propose suggestions for continuous course improvement.

Note: A tutor should not exist in 2nd cycle courses (whose classes will also be smaller), except in exceptional situations (e.g. module of introduction to technological platforms and the regime of distance learning or development of specific laboratories).

## **9. Communication, Interaction and Participation**

Communication within the ISTECE distance learning courses will be essentially mediated by technology, as already described in the previous point.

As far as the organization of courses and curricular units is concerned, the pedagogical model will be based, in no small extent, on asynchronous teaching-learning moments. The educational resources, previously designed by the teacher in charge of the curricular unit, in articulation with the course director and with the support of ISTECE pedagogical technicians (cf. Organization of the Teaching Work), will be the academic support of the curricular units and are available asynchronously. Therefore, the student's temporal flexibility and autonomy will be given priority, being able to manage his study time, articulating it with his personal and family life, also facilitating the access to materials from students of different time zones.

Nevertheless, the model foresees the inclusion of duly planned synchronous moments, either for learning evaluation or for debates, clarification of personalized doubts or others of broader scope and external to the curriculum units or course that may be appropriate (e.g. lectures, webinars).

Given the technological context of the courses taught at ISTECE, there will also be laboratories using cloud computing technologies, for the hands-on development of the subjects and concepts covered in these courses (cf. Evaluation).

In short, by including asynchronous (majority) and synchronous mechanisms, we seek to address different forms of student interaction and participation. Students with a greater need for reflection and a higher level of introversion whose difficulty in

communicating in large groups may feel more comfortable in asynchronous interaction environments, in turn, students (or curricular units) whose reflective characteristics are not so necessary may benefit from synchronous interactions.

Regardless of communication temporality, students will always be motivated and encouraged to interact in the different forums and to actively participate in the construction of their learning both in individual work and in collaborative work with their peers. This interaction can also be of different types, namely: student-content, student-teacher, student-student, student-institution.

## 10. Theoretical principles and learning methodologies

In terms of the application of ISTECS's pedagogical model of distance learning, it is based on a set of theoretical principles and intentions regarding the student's conception of knowledge. These include **Meaningful Learning, Motivation, Orientation, Interaction,** and **inclusion** embodied in **Student-centered Learning.**

### 10.1 Meaningful Learning

Meaningful learning occurs when in addition to the ability to "retain" knowledge, one acquires the ability to "transfer" it. In the same way, this learning goes far beyond factual recall or recognition, for there to be meaningful learning there must be a concern with the student's context, and the programmatic contents and methodologies must be related to real and concrete contexts with which the student may identify. Therefore, ISTECS's Pedagogical Model of Distance Learning (verifiable in its study plans and curricular programs) seeks to motivate students to learn, through pedagogical methods of exemplification and practical work related to the students' personal, social and professional contexts.

This principle of meaningful learning is closely related to active and authentic learning methodologies, in which the student learns through problems and needs of

the immediate context or his daily life, instead of distant learning focused on topics and theoretical concepts that are unknown and disconnected from the learners.

In short, this model aims to promote more significant acquisition (retention) of learning by the student and his ability to solve problems with the knowledge acquired (transfer), based on six cognitive processes (1) memory, (2) understanding, (3) application, (4) analysis, (5) evaluation and (6) creation.

## **10.2 Motivation**

Motivation is crucial to learning, whether in a classroom or distance learning model, gaining even more importance in the latter one given its characteristics already highlighted in previous points of this model. Knowing that the student's desire to learn is more significant when they are motivated, we will seek to foster this motivation, either through methodologies which promote meaningful learning or through a steady presence of the teacher/tutor (in discussion forums and constant feedback to the student's work progress).

Strategies, such as the use of educational games and gamification techniques, to get students engaged and motivated to achieve their goals, have been widely accepted both in the teaching context and in a business context. It is intended herein to implement its use in multiple contexts, from the most basic (for instance, the use of badges) to more complex creations, providing scenarios and actual problems. Some curricular units, namely related to programming and graphic animation may include the development and usage of serious games and educational games, highlighting these technologies' potential to engage and motivate participants, far beyond leisure activities.

## **10.3 Guidance**

Pedagogical mediation is closely related to the motivation mentioned above, in that regard, the entire teaching and technical-pedagogical team, which will assist teachers and students, have prior training in distance learning. In a first moment, this training has been carried out in external (international) institutions and, in the future, the human resources (teachers/guardians/technicians) to be included may have internal or external training through the context and previous training of each individual.

The already established protocols with other higher education institutions (whether with or without distance learning) will contribute not only to this training but also to the development of the educational materials. The team also has instructional designers who will assist in the creation of the teaching materials, ensuring that these are effective, efficient and enjoyable for learners (by using a design and visual aspect consistent with the Institute image).

Additionally, the activities to be developed along with the course units and that will give rise to the digital portfolio must be of high quality to meet the learning objectives defined for each Curricular Unit, as well as guidance and feedback which must be constant, both as elements of learning control as well as a motivational stimulus for students.

#### **10.4 Interaction**

Interaction during learning occurs at various levels, in which the interaction between the student and the object of study stands out in the first instance, and later in the student's interaction with his peers as well as with his teacher/tutor. As described above, one of the potentialities and opportunities that distance learning offers is precisely the collaborative work, either through discussion forums or through the use of collaborative writing and editing technologies. Therefore, particular importance will be given to the development of group works and debates in which this interaction may occur and be fostered. Knowing the other we get to know ourselves, working with the other we develop our skills, those of the other person and we contribute to the growth of collective intelligence. Human beings are social

beings and, we know today, social relations are of great importance for the student's cognitive and formative development as individuals.

Thus, the Virtual Campus is intended to be an environment of dynamic interaction among peers and between students and teachers/ tutors. In this reflection, discussion and development activities are undertaken jointly, allowing knowledge to be problematized, concepts to be discussed, and learning to be in accordance.

## **10.5 Inclusiveness**

ISTEC's pedagogical model of distance learning, embodied in its formative offer, seeks to be an inclusive model at various levels.

On the one hand, and as already widely discussed on what motivated a distance learning strategy, it is intended to include people with disabilities (e.g. mobility, visual acuity) and who would otherwise have difficulties in accessing higher education, seeking to develop educational materials suited to their needs and developing strategies for the inclusion of these individuals. Within the teaching staff, there are also specifically trained teachers in the development of inclusive e-learning contents.

On the other hand, it is intended to promote ISTEC students' digital inclusion, up to the genesis of the institution and existing courses, all of them related to Information and Communication Technologies. Thus, it is intended not only the high-level qualification of its students, as well as the production and dissemination of knowledge, along with its students' cultural, artistic, technological and scientific training, in an international reference framework. In a networked society, increasingly dependent on ICT, and a digital economy in all sectors of activity, it is essential that all its actors have knowledge, particularly the adult population in which the levels of info exclusion are yet significant.

Accordingly, ISTECS will seek with its training offer and its pedagogical model to promote this digital inclusion. Students with less digital literacy will be able to easily access the proposed study cycles as there will be, for each course, a technological initiation module so that students can get to know the tools with which they will work throughout the course. ISTECS will also have a team of pedagogical technicians in charge of computer support, which will act as a link between the students and technological tools.

## **10.6 Student-centered learning**

In general, the five principles already described are part of a broader principle in which the student is at the core of learning. Weimer had outlined five changes that should operate in instructional design for student-centered learning:

- The balance of power (focused on the learning social aspect and on the autonomy that must exist as opposed to the oppressive institutional control of motivation and learning);
- The content role (of course the concern with the content has to be considerable, as it has already been presented here, it must be significant and related to the student's life);
- The teacher's role (often referred to as a tutor or facilitator, who shall assist the student in understanding and filtering contents, returning constant feedback);
- The responsibility to learn (in which the student should play an active role, it should be the student who looks for what is relevant in reading or research, without needing for the teacher to tell him);
- The purpose and process of evaluation (more than assessing competencies, evaluation activities can and should be used to promote learning and the student) and also here the student can play an active role, for instance in the formative evaluation and peer evaluation.

These changes are intricate and sometimes difficult to implement, either by institutional resistance or by the teachers themselves, as well as by the inability and unpredictability of these same actors (institution/teaching staff). The pedagogical model thus seeks to catalyze change which allows for meaningful, student-centered learning taking into account the specificities of distance learning.

In the last decade of the 20th century, António Damásio and Alcino Silva (two Portuguese researchers working in American universities), characterized the different areas of the brain, within the process of understanding and receiving information.

This has allowed us to methodically understand how a human learns today, along with how we shall teach. How should we present the contents directed to the short-term memory, or working memory, and lead the apprentice through individual and group work, to reflect and integrate the information received for his permanent memory. Thus, building his knowledge by integrating or replacing previously acquired knowledge and consolidating within a constructivist approach.

We are aware of the methods and techniques that should be used to teach, and we also know the methods and techniques that the learner should follow for effective learning.

But that's not all. Today different learning styles of our students are identified, as such, the teaching techniques should be differentiated, case by case, or instead develop content presentation techniques that incorporate various aspects related to different learning styles.

We must also be aware of the fact that humans are multi-modal in the learning process and as such, contents presentation techniques must be made following these lines to meet minimum quality requirements. We also know that today teaching is oriented to teach skills (technical and transversal) for jobs that do not yet exist.

The big question is, should they be the same in a face-to-face environment and at a distance?

In this case, distance learning techniques make it much easier to optimize the process, taking precedence over face-to-face teaching.

## **10.7 Active methodologies (project-based learning e problem-based learning)**

The principle of student-centered learning, rather than a theoretical principle, serves as an engine of the learning methodologies described in this model, as they provide a more active role of the student in his learning, namely project-based learning and problem-based learning.

These active methodologies are opposed to teacher-centered learning, focusing on student needs rather than teacher objectives or program contents. By focusing the student on the process, these methodologies do not neglect the teacher's relevant position or programmatic content (and educational resources), but rather reposition them, establishing the intended learning outcomes for the course relating them to the student's exit profile, in which the teacher assumes the role of tutor and knowledge facilitator. Likewise, the response to these derives from the student's will and motivation supported by the nature of the contents and teaching-learning activities.

Project-based learning and problem-based learning are in line with the methodologies described in the curricular programs, related to real and concrete contexts of clear identification for the student promoting meaningful education.

Concisely, some of the main characteristics of these methodologies are described below.

### **10.7.1 Project-based learning**

In line with what is described in this pedagogical model, project-based learning puts the focus on actual situations, ensuring greater motivation and ongoing learning by students. On this methodology, the teacher guides his students in the process of project development, in which there is an identification of a problem, a planning to address it, the execution of that planning (in actual or simulated contexts) and a continuous reflection throughout the process. It is, therefore, an active methodology

in which the student is continuously involved in his learning, either through solving complex problems or through trial and error until the desired result is achieved.

The Buck Institute for Education identifies, in a systematized way, the seven characteristics of this methodology:

- a) **Challenging question or issue:** When defining the project we must take as a basis a problem that will defy the student to learn, this problem (adapted to the age group and level of education) will drive a question that must be **motivating** for the student, **open** and with the possibility of multiple answers and must also be aligned with the learning objectives.
- b) **Supported questioning:** As this is an active methodology, it is up to the teacher to guide, yet not to condition or decide the path the student will follow. Therefore, the student shall be encouraged to raise questions and investigate solutions that will allow him to organize, mentally, the problem-solving process. These questions can be centered on "what do I need to know to answer my problem? Based on this assumption, multiple questions may be asked.
- c) **Authenticity:** This aspect is in line with the significant learning previously mentioned; as such, the project should emerge from the real world, having a strong connection to the students' lives and their environment (e.g. geographical environment, professional environment). As an example, and in the context of ISTE courses, it may be the software development that meets a real community need (a product to be used by real people).
- d) **Voice and student's choice:** The student should be given autonomy to make his choices and make some of the decisions on how he will develop the project. Projects shall be undertaken with the students and not (only) for the students. As it is a Higher Education with a strong practical focus, and adult students (many of them already integrated into the labor market) it is expected that there will be high levels of autonomy and knowledge so that the student can take their decisions. Students are aware of what motivates them, and which needs they want to address, within the limits of the defined learning objectives and the teacher's autonomy, the student must be encouraged to decide and choose the path he intends to follow.

- e) **Reflection:** Reflection is something that covers the whole project, we must reflect on the problems that have motivated the project, the developed activities, the difficulties that we are encountering and the strategies we find to overcome them. This is a process undertaken by the student as well as the teacher. Therefore, time and space must be allowed for reflection, as we reflect on the process we identify the concepts we intend to address, the failures committed, the successes achieved and the changes we have managed to bring about. It is, therefore, a critical element for learning.
- f) **Critics and review:** In several moments, we have described the importance of feedback for learning, in project-based learning, this is also of paramount importance. Accordingly, the teacher shall, within the student's orientation process, provide constant feedback, reviewing the student's work and criticizing him for guiding him towards a better result.
- g) **Public product:** At the end of the process, the developed product should be presented in a general way (preferably to a broader audience than the class in which the students are in). Depending on the context, this product may be presented to peers (school), as well as to the external community (e.g. family members, companies, stakeholders). Thus, not only is the totality of the assumed "real context" reached, but other transversal skills which will be useful in the future of the students are developed. This moment (that may occur throughout the process and not only by the end), also allows receiving feedback from other players who may have greater knowledge on the developed product or who may become the end users of it.

### 10.7.2 Problem-based learning

Problem-based learning follows some of the assumptions of project-based learning, namely the need to solve a problem. This model, initially applied to the healthcare area (medicine), quickly spread to other fields and knowledge areas. In short, problem-based learning is a methodology that promotes learning by solving authentic problems (as described in the previous model). So, the student develops skills related to problem-solving, while seeking the solution to the issue, at the same time learning the intended concepts and achieving the learning objectives.

It is, therefore, a constructivist approach centered on a set of assumptions, that is:

- a) Knowledge is individually built-up and socially co-constructed in interaction with the environment (knowledge cannot be transmitted);
- b) There are multiple viewpoints related to each phenomenon or problem;
- c) Knowledge is anchored and indexed by contexts which are relevant to the individual;
- d) The meaning and the thinking are directly linked to the context in which we are integrated (culture, community).

These same authors present five constant characteristics of this learning model:

- a) **It is problem-focused:** This way, the contents to be learned are not organized by concepts, but rather by problems. Thus, students learn by addressing authentic issues which are related to the expected knowledge.
- b) **It is student-centered:** in line with the constructivist perspective, as knowledge is built individually, it cannot be imposed by the school, it must, in turn, be centered on your expectations and learning needs.
- c) **It is self-directed:** the student has the autonomy to, individually or collaboratively, take his choices and assume the responsibility for them. Concerning learning assessment, self-evaluation and peer evaluation gain emphasis.
- d) **It is self-reflexive:** it is up to the student to reflect on his problem-solving process, so the student must monitor his learning and develop strategies that allow him to respond to the problems he meets.
- e) **The teacher (tutor) is a facilitator:** Although the process is highly focused on student autonomy (being an active and advantageous methodology in the context of distance learning) the teacher, who in this methodology is described as a tutor and assumes the role of a facilitator, must not be excluded from the equation. However, the tutor is not the "owner of the knowledge", rather an agent who helps the student and guides him in his quest for knowledge.

Both of these methodologies can and should be framed in a collaborative and networked learning spirit. Likewise, the existing digital portfolio in all curriculum units can be developed as a product of these methodologies.

## **11. Students' evaluation in ISTECE EaD courses**

The system for evaluating students' learning in ISTECE's distance learning courses is endowed with a set of tools and instruments that can be used, in whole or in part, in the various curricular units. In this section, the primary evaluation tools and instruments to be used are presented in a concise but clear way. It is up to the responsible teacher of the course unit, in articulation with the course director, to define, according to the specificities of his Curricular Unit, which mechanisms shall be used, respecting the evaluation methodology described when designing the course (e.g. application for accreditation of a new study cycle) or updating it.

Taking into account the nature of the distance study cycles as well as the learning methodologies already described, the evaluation will be based on a formative assessment component (continuous) and a summative assessment component (final exam). Taking into account the nature of the distance study cycles as well as the learning methodologies already described, the assessment will be based on a formative evaluation component (continuous) and a summative evaluation component (final exam). 60% - continuous evaluation, 40% - summative evaluation).

### **11.1 - Digital portfolio**

Given the specificity of both distance education, technology-mediated, which is intended to develop at ISTECE, and the educational offer itself, predominantly technological. The Digital Portfolio will be constant in all the curricular units of all ISTECE distance learning courses.

This (digital) instrument has the particularity of being able to aggregate different media (e.g. text, images, audio, video) and other formats and/ or technologies (e.g. executable files, hypertext and web pages, spreadsheets) according to the specificity of the corresponding course unit. It may also be available in cloud computing services or by using resources of the so-called Web 2.0.

The digital portfolio may also include hands-on developments, reflective documents, logbooks and a broad set of collected resources, selected and developed by the student, serving as the demonstrative element of the student's learning along the way in a given course unit and therefore being the central element of the student's continuous assessment.

## **11.2 - Using Quiz**

Although this is an old method of student assessment, it is still a reliable and essential means of assessing students. It helps to involve them in the learning process and is quite useful when combined with technology. The answers to the questionnaire questions can be of various types (e.g. summary, multiple choices, true/ false). An advantage of the questionnaire is usually that it is short, and it eases the evaluation. Furthermore, it becomes easier to evaluate students randomly with similar questions, which makes each student's quiz unique.

## **11.3 - "Cloze" test to fill gaps**

This method requires the teacher to ask questions on the topics covered during the class. In his questions, the teacher will write statements and put blanks in place of some of the discussed terminology in each case. Students can choose from a wide variety of options, or they may either provide the right answer themselves. This questionnaire usually assumes the form of questions, and the teacher may evaluate his students' responses in several ways. This approach is very dynamic and can be used in synchronous classes to consolidate knowledge or clarify doubts; at the same time, they are also being evaluated.

## **11.4 - Related questions**

This method is similar to the multiple-choice method. Students must be given access to a set of words or phrases so that they can choose the right answer. The teacher undertakes this form of assessment by providing text or images. At the same time, students will select an option in column A and identify an option in column B that corresponds to the choice in A. It is a handy tool for evaluating mental flexibility and mental performance. It works outstandingly well for formative evaluations.

### **11.5 - Publications and interventions held in Forums**

The use of forums is one of the most critical elements in student-centered learning, namely in distance learning. Computer-mediated discussion, in this particular case discussion forums, is crucial for student motivation and participation, allowing, unlike (physical) classroom discussion, a greater reflection and, in many cases, a higher degree of ease for more introverted students to participate in discussions. This tool will be used in all the courses' curricular units, either coordinated by the teachers or by the students themselves, where they will have greater autonomy. The forums can be used as tools to clarify doubts asynchronously, which can be answered by teachers or peers (preferably by those with the teacher's guidance and supervision), as well as for the development of reflection, writing and discussion activities.

### **11.6 - Peer review and evaluation**

Peer evaluation (and/ or review) has been used at various levels of peer evaluation (and/ or review) has been used at different levels of education and in successful face-to-face, distance, or combined regimes of education and in successful face-to-face, combined, or distance regimes. This evaluation has had very positive effects on student learning, particularly in collaborative e-learning models such as the one intended with this model as well as with ISTE distance learning courses. As mentioned in other sections of this document, feedback plays a significant role for the student; mainly when he is not in a physical space with peers

and teachers, peer evaluation also allows input (in this case from peers) on the work developed, contributing to a sense of inclusion, but above all, as a formative element (of learning). This tool will be used whenever it is appropriate.

### **11.7 - Research results and investigation**

It consists of reports or articles written by students on themes or subjects developed during the course. They may also be multimedia presentations, related to study and research made by students or groups of students. These presentations can be made synchronously to the class or either to working groups, including the teacher.

### **11.8 - Real-time survey results**

This feature is available on all online platforms, such as Google Classroom or Moodle. Teachers can organize a set of questions for their students, which will make them provide real answers without disclosing their identity. As a teacher, I can pair the set with forum publications or a questionnaire. We can make students decide on a forum publication and ask them why they answered the way they did when the questions were asked. This method is highly recommended to use clickers. (<https://cft.vanderbilt.edu/guides-sub-pages/clickers/>), we can create a "pool" for the whole class. Clickers help to generate and show results so that students know the weight of their answers in comparison to other members of their class; it can generate a creative environment of competitiveness.

### **11.9 - Laboratory execution assessment in Azure**

Teachers follow the realization of the laboratories that substantiate the students' curricular development and carry out a permanent evaluation of the students' performance, and at the end of the date established for the end of the

laboratory work they evaluate according to the objectives reached and the commitment and achievement that students demonstrated in their work on this platform.

### **11.10 - Evaluation of application or solution development in Azure DEVOPS**

The evaluation applied to the works carried out at DevOps is quite identical to that carried out for Azure's infrastructure laboratories. With the difference that by the end of the project, the teacher checks the reliability and functionality of the applications developed by the students.

### **11.11 - Technical Reports**

Students will elaborate technical reports on several key areas of the curriculum throughout the course. This evaluation tool has particular relevance in the projects developed in Azure or DevOps, as these projects involve the presentation of a descriptive memory of what has been elaborated by the student, this descriptive memory is in itself a report. These documents are added to the student's e-Portfolio for final evaluation purposes. On the other hand, they foster the development of general and specific writing skills in the scientific area in which they are studying.

### **11.12 - Oral Presentation of Projects with support in any type of presentation support technology, which will later be part of the Digital Portfolio**

In each school year, the students have to select a Curriculum Unit in which they present a Technological Project. By the end of the school year, they must deliver this project synchronously, which can be shared in Stream for the entire class or group to which they belong. This presentation also implies the addition of a descriptive memory. This work will also be added to the e-Portfolio for final evaluation purposes.

### **11.13 - Final in presence summative exam.**

All course units require the student to take a summative face-to-face final exam. These tests will take place at the end of each academic year and will involve the student's presence at the ISTECS facilities. However, in duly justified situations, this exam may be carried out (in presence) at Portuguese embassies / consulates by means of protocols to be established.

### **11.14 - Persistent mechanisms of validation against plagiarism**

All the works and asynchronous evaluation developed by the student will be automatically checked against plagiarism. For this purpose, the Urkund technology will be employed, nowadays it can be integrated into the latest version of the Moodle platform.

Analysis reports are systematically issued as a result of each document sent; it is intuitive and easy for the teacher to get an overview. It presents in-depth the relevant details and analyzes which fonts were recovered for possible text matches.

## **12. Technological tools**

Technology plays an essential role in ISTECS's distance learning strategy, first because of the very technological nature of the institution and its educational offer, and second because of the characteristics of the online teaching model which requires the continued use of technological tools. Despite the importance of these instruments, technology emerges in this model as a support for educational decisions and not as the element that commands and guides them. Distance education (just like face-to-face education) is people-centered and, in that sense, technology must support helping people.

Therefore, the choice of tools is based on a set of assumptions:

- a) **Availability** (technologies must be made available with no spatial or time restrictions, and may be used anywhere and at any time, using the Internet).
- b) **Suitable to the curriculum** (technologies must support the teaching and learning of specific course contents, serving both teachers and students. Features must meet usage needs).
- c) **Suitable to the pedagogical model** (technologies must be facilitators of the theoretical principles enunciated in this model and the learning methodologies; thus they must facilitate the interaction with contents, promote communication, discussion and reflection, be multi-modal and interactive, and allow a learning evaluation).
- d) **Interoperable** (technologies should work in multi-devices - e.g. computers, mobile devices, in different operating systems - e.g. Windows, MacOS and/ or other Internet browsers - e.g. Chrome, Firefox)
- e) **Ease of use** (technologies must be easy to use, by teachers and students, responding to principles of usability and accessibility. If it is necessary to update it, it must be automatic or easy to resolve).
- f) **Ease to upgrade and update** (if applicable, technologies must be able to hire new or better services - e.g. increase the volume of data according to users increases or new features added as well as be easy to update for teachers and students who use them).
- g) **Security** (technologies should take into account the various issues surrounding cybersecurity - cf. Cyber-security problems to consider in online teaching).

## 12.1 Azure

Microsoft Azure, formerly known as Windows Azure, is Microsoft's public cloud computing platform. It provides a variety of cloud services including computing, analysis, storage and networking. Users can choose from these services to develop and scale new applications or to run existing applications in the public cloud.

The Azure platform aims to help companies and organizations manage innovative challenges and fulfil their organizational goals. It provides tools that support all industries - including e-commerce, finance, educational solutions and is

compatible with open source technologies. This gives users the flexibility to use their preferred tools and technologies. Besides, Azure offers 4 different forms of cloud computing: infrastructure as a service (IaaS), platform as a service (PaaS), software as a service (SaaS) as well as with no server.

It also allows creating network infrastructures and virtual computer networks, being an ideal scenario for laboratories.

It also supports other platforms, such as the Moodle platform.

Azure's primary services and those that will be used in ISTECS's EaD courses (a more exhaustive listing of them is provided to explain that each one of these resources has the possibility of being used by the great majority of the curricular units that comprise the course plans, and not only in one or another curricular unit) are as follows:

**COMPUTING:** these services allow a user to implement and manage virtual machines and, containers and batch tasks, in addition to supporting remote access to applications. Computing resources created in the Azure cloud can be configured with either public IP addresses or private IP addresses depending on whether the resource needs to be accessible to the outside world. (for instance, it can be used in Units such as Operating Systems, Network Administration, Computer Architecture, etc.).

**MOBILE:** These products enable developers to build cloud applications for mobile devices by providing notification services, support for back-end tasks, tools for building application program interfaces (APIs), as well as the ability to engage geospatial context with data. (for instance, it can be used in Units such as software development for mobile applications, etc.).

**NETWORK:** these services support the development and deployment of WEB applications. They also offer features for searching, content delivery, API management, notification and reporting. (for instance, it can be used in Units such as Networks Laboratory, Communications, Computer Networks, etc.).

**STORAGE:** This service category provides scalable cloud storage for structured and unstructured data. It also supports big data projects, persistent storage and archive storage. (for instance) can be used in Units such as all the units related to Databases or Database Management, etc.).

**ANALYTICS:** these services provide distributed analysis and storage as well as resources for real-time analysis, big data analysis, data lakes, machine learning (ML), business intelligence (BI), Internet of Things (IoT) data streams and data storage. (for instance, it can be used in Units such as IoT, Artificial Intelligence, Cyber-security, etc.).

**NETWORKING:** this group includes virtual networks, dedicated connections and gateways, as well as services for traffic management and diagnosis, load balancing, DNS hosting and network protection against distributed denial of service (DDoS) attacks. (for instance, it can be used in Units such as Computer Networks, Computer Networks Project, Computer Security, etc.).

**CDN:** media and content distribution network (CDN). These CDN services include on-demand streaming, digital rights protection, encoding and media playback and indexing. (for instance, it can be used in Units such as Graphic Animation, Multimedia Content Management, etc.).

**INTEGRATION:** these are server backup services, site recovery and private and public cloud connectivity. It ensures the safe and lasting work of everyone, teachers and students.

**IDENTITY:** ensures that only authorized users can access Azure services and helps protect encryption keys and other sensitive information in the cloud. Services include support for Azure Active Directory and multi-factor authentication (MFA). ( it allows) to guarantee data protection through ensuring correct Authentication and Authorization techniques)

**IoT:** these services help users to capture, monitor and analyze IoT data from sensors and other devices. Services include notification, analysis, monitoring and support for coding and execution. (for instance, it can be used in Units such as IoT, Artificial Intelligence, Cyber-security, etc.).

**SECURITY:** They provide resources to identify and respond to threats to cloud security, as well as to manage encryption keys and other sensitive assets. (for instance, it can be used in Units such as Cybersecurity, Computer Systems Security, etc.).

**DATABASE:** this category includes providing Databases as a Service (DBaaS) for SQL and NoSQL, as well as other instances of databases - such as Azure Cosmos DB and Azure Database for PostgreSQL. It also includes support for Azure SQL Data Warehouse, caching and hybrid database integration and migration capabilities. Azure SQL is the platform's leading database service. It is a relational database that provides SQL functionalities without the need to deploy a SQL server. (for instance, it can be used in Units such as: by excellence programming for unstructured and non-relational databases, etc.).

## **12.2 Azure-DevOps**

This group of services provides design and collaboration tools such as Azure DevOps - formerly Visual Studio Team Services - which facilitates DevOps software development processes. It also offers resources for application diagnostics, DevOps tool integration and test laboratories for both test and build testing.

These services help application developers to share code, test applications and track possible issues. Azure supports a variety of application programming languages including JavaScript, Python, .NET and Node.js. Tools in this category also include support for Azure DevOps, software development kits (SDKs) and blockchain.

## **12.3 Moodle**

Moodle is a teaching/learning platform designed to provide educators, administrators and students with a single robust, secure and integrated system for creating personalized virtual teaching-learning environments. This software is free and can be downloaded from a Moodle.org web server.

The Moodle Project is led and coordinated by Moodle HQ, which is financially supported by a network of over 80 Moodle Partner service companies around the world.

Nowadays, Azure has a full integration service of a Moodle platform.

## **12.4 Cisco Webex Meetings**

It is a very powerful videoconferencing software allowing encrypted and secure PTP communications. It is an ideal tool for synchronous classes.

Cisco Webex videoconferencing platform already has a specific version for distance learning: Webex Classrooms. It is specifically designed to meet both the needs of teachers and students, whether during the class or before and after it. Furthermore, it is equipped with traditional learning management systems.

With this platform, teachers can schedule online classes, schedule hours of virtual tutorials or lectures for teachers and parents. It also automates the assistance and notes. It is compatible with predefined teaching templates, and it has security configuration options to generate different virtual classroom experiences. Students can also use Webex Classrooms for viewing schedules, class recordings, notes and homework assignments.

As stated by Cisco, Webex Classrooms is less rigid than other learning management systems and is better focused on facilitating communication among teachers and students. It provides teachers with videoconferencing features designed to keep the class focused and engaged. One of these is the ability to block meetings automatically so that only students and people authorized to participate can attend.

The system automatically orders students who wish to ask questions. On the other hand, the platform also offers co-presentation functions by the teacher, which allows him to have someone else giving the class or addressing students other than him.

Cisco Webex classrooms also offer so-called escape rooms in which students can work in small groups. Moreover, teachers can control or join these rooms.

Students can benefit from the features provided by the meeting platform, live transcripts, meeting summaries and class recordings.

## **12.5 Praxis**

Academic management platform. Fully WEB and consisting of different portals, allowing use by other entities - Management, Teachers, Students, Staff, Academic Services, Quality Department, Financial Department and Human Resources. It will enable us to enrol, organize human resources, optimize infrastructures, disclose information, promote events, and remote communication. It also allows to write down summaries, consult schedules, check attendance (when applicable), student request submission, as well as student and teacher's evaluation queries. It also allows sending messages to the entire academic community, it creates and allows participation in forums, and it also enables managing internships (when applicable).

## **12.6 Microsoft Teams**

Microsoft Teams is a communication and collaboration platform that combines on-site chat, video conferencing, file storage and application integration. The service integrates with the Office 365 productivity suite and features extensions which may be integrated with non-Microsoft products.

### **MODULES:**

#### **TEAMS**

They allow communities, groups or teams to participate through a specific URL or invitation sent by an administrator or team owner. Teams for Education will enable managers and teachers to create specific teams for classes, professional learning communities (PLCs), and various working groups.

#### **CHANNELS**

Members can create channels within a team. Channels are conversation topics that allow team members to communicate without the use of email or group SMS

(text messages). Users can reply to publications with text, as well as images, personalized GIFs and memes or videos.

## MESSAGES

Direct messages allow users to send private messages to a specific user rather than a group of people.

## CONNECTORS

These are third-party services that can send information to the channel. Connectors include MailChimp, Facebook pages, Twitter, PowerBI and Bing News.

## OTHER SERVICES:

- Calls,
- Instant Messaging,
- Voice over IP (VoIP),
- Videoconference within client software,
- Teams supports Public Switched Telephone Network (PSTN) conferencing, allowing users to call landline numbers.

## MEETINGS

Meetings can be scheduled or created ad-hoc, and those users who visit the channel can check if a meeting is taking place. Teams also have a plugin for Microsoft Outlook to invite other people to a Teams meeting. This supports thousands of online users in a meeting or conference.

## TEAM EVENTS

Teams Live Events replaces Skype Meeting Broadcast with the ability for users to broadcast to 10,000 Teams, Yammer or Microsoft Stream participants.

## EDUCATION

Microsoft Teams allows teachers to distribute, provide feedback, and grade student assignments delivered through Teams using the Tasks tab, available in

Office 365 for Education. Surveys can also be assigned to students through Office Forms integration.

## PROTOCOLS

Microsoft Teams is based on a series of Microsoft-specific protocols. Videoconferences are held over the MNP24 protocol, known as Skype's consumer version. SIP and H.323 based video conferencing and VoIP clients use special gateways to connect to Microsoft Teams servers. Using Interactive Connectivity Establishment (ICE), clients who run network address translation routers and restrictive firewalls can also connect if point-to-point connections are not possible.

### **12.7 Techsmith Snagit**

Snagit is a screen capture program that captures video display and audio output. Initially, for Microsoft Windows operating systems, recent versions are also available for macOS, although with fewer features. It was created and distributed by TechSmith and was first released in 1990. Snagit is available in English, German, Japanese and Korean versions.

Snagit replaces native screen function with additional features. The latest versions allow batch capture of embedded items such as links, images and multimedia. Users can set parameters and keyboard shortcuts to capture specific types of data, which are stored in a folder called "Catalog" by default. The software can also follow links on web pages, capturing the specified data from the linked pages.

### **12.8 Techsmith Camtasia**

Camtasia (formerly Camtasia Studio) is a software package, created and released by TechSmith, for creating video tutorials and presentations directly through a screencast or using the direct recording plug-in for Microsoft PowerPoint. The screen area to be recorded can be freely selectable. In contrast, audio or other multimedia recordings can be done at the same time or added separately from any

other source and integrated into the Camtasia product component. Both Camtasia versions started as enhanced screen capture programs and evolved to incorporate screen capture and post-processing tools for the educational multimedia and information development market.

Camtasia consists of two main components:

Camtasia Recorder - a separate tool to capture both audio and video from the screen.

Camtasia Editor - the component for which the entire product is developed, it is a multimedia authoring tool with the industry standard "timeline" interface for managing multiple clips in a stacked track form.

One of the best technologies on the market to develop high-end contents for EaD classes.

## **12.9 Urkund**

Urkund is a fully automatic machine learning-based text recognition system designed to detect, prevent and deal with plagiarism, regardless of the language you are writing in.

## **12.10 Scanning Tables**

It is a computer peripheral and doesn't work by itself. Its function is to operate as a classic classroom board for writing and, especially, drawing. By using a special pen commonly called a "stylus", everything drawn on the tablet is automatically scanned in the computer and then displayed to students (useful for synchronous and/ or asynchronous lessons).

### 13. Concluding overview

This document sought, in a clear and systematized way, to present a set of references of the pedagogical model for the distance learning courses of ISTE (Higher Advanced Technologies Institute of Lisbon).

Based on the institution's experience over several decades of computer-mediated education and training, not only face-to-face but also at a distance, as well as on a vast literature of the subject, it sought to define theoretical, methodological and even administrative guidelines to support the distance learning offer at the Institute.

This document is also in line with the Educational Project from (1) the search for its students' high-level qualification; (2) its researchers', teachers' and other staff's activity valorization; (3) its diffusion, knowledge transfer and economic valorization; (4) and by the promotion and organization of activities to support the scientific and technological culture. Likewise, it is aligned with national and international policies from the digital transformation, INCoDe.2030, or the Action Plan for the European Social Rights Pillar that will be approved in early 2021 during Portugal's presidency of the Council of the European Union.

As a concern for inclusive education and the development of a Lusophone culture that goes beyond the national territory, seeking to contribute to the cultural, academic and scientific development of Portuguese-speaking citizens, a set of assumptions was defined as student-centered Learning, in which the student assumes an active role in their knowledge development as well as in the sharing and cooperation with their peers.

Therefore, this model is based on the principles of Meaningful Learning (through pedagogical methods of exemplification and practical work related to students' personal, social and professional contexts), Motivation (through the constant presence of the teacher and the use of gamification techniques), Guidance (with pedagogical mediation and feedback), Interaction (with the various educational agents and educational resources) and Inclusion (promoting equal access to education for audiences in which this access is sometimes denied or hindered).

It is, therefore, through active methodologies (e.g. project-based learning, problem-based learning) and current educational content regarding the Networked Society in which we live that ISTECS's distance education offer will be focused.

This model also presents the virtual campus that was developed to meet the student's different needs within this teaching-learning model, which includes various portals such as the virtual learning environment, the academic management platform, webmail, the Institute's educational offer, as well as access to Azure and scientific repositories (among others). The attention to the use of different technological, administrative and academic tools that will support communication and interaction within our educational and academic community at all levels (e.g. students and contents, students and teachers or students and their peers) is also explained and described. Exemplifying, namely, the tools to be used in synchronous learning moments, but essentially, in asynchronous moments of both learning and interaction with the administrative services.

As regards the application of the pedagogical model, the design and organization of the courses as described, listing a set of documents of utmost importance such as the course guide (which more than an informative paper is the guide that will follow the student throughout his training), the curricular unit guide (existing for all the curricular units and that includes activities scheduling to be developed throughout the weeks).

Moreover, it also describes the organization of teaching work, which includes the course director's role, as well as the teachers responsible for the curricular units. This technical-pedagogical staff will support the development of educational resources as well as the tutor's role, essential in distance learning models, tending to have a larger number of students and with an increased need for interaction and feedback. Additionally, a tutoring plan is provided, whose model can be verified in an appendix, which clearly defines the role and the tutor's intervention in the curricular unit.

Although the average ISTECS student is someone with medium or high digital literacy (the result of the actual educational offer we provide), there is no such requirement in this regard. In fact, for each distance learning course, an online

environment module is designed for the technological tools and the teaching model to be used. This module is optional, formative and will not be reflected upon the students' evaluation, but will have great importance for integration into the Institute's educational community and for understanding the model to follow.

Specifically, regarding learning, it will be based on simulated issues and projects, on a paradigm of learning by doing, without neglecting the theoretical structural component. Therefore, the student develops skills related to the solving of simulated issues, while seeking the solution to this simulated issue, while learning the intended concepts and achieving the learning objectives, always assisted by a teacher and a tutor.

The pedagogical model, in technological terms, is also innovative, as it proposes curriculum development in technological laboratories that are fully supported by cloud computing platforms. Ensuring synchronous communication with students through point-to-point and multipoint group encryption, creating the safest possible environment, innovative within the EaD context in Portugal. As such, this document describes the different resources that will be employed and their framing in the areas or curricular units where these make greater sense.

Technologically speaking, it incorporates the state-of-the-art technologies for this area, including the latest version of Moodle in Azure with full and double tier integration, encrypted communication for classes and Cisco synchronous communication, the development tools for multimedia and LMS from TechSmith, the generic and global anti-plag system, Urkund, Microsoft Teams for collaborative work as well as all the tools from Microsoft and Office 365.

Finally, it should be noted that this model incorporates a knowledge evaluation concept based on a digital portfolio, in addition to other cumulative instruments of summative and formative evaluation. This evaluation model is not intended to be rigid or a closed one, instead, it is designed to be flexible and adapted to each curricular unit's context, with different instruments that both the teacher and the student can use according to the context.

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## ANNEXES

### **Curriculum Unit Guide Template**

CURRICULAR UNIT: \_\_\_\_\_

CODE: \_\_\_\_\_

NUMBER OF ECTS: \_\_\_\_\_

TEACHING STAFF:

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OTHER TEACHERS/TUTORS (IF APPLICABLE):

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DURATION OF THE COURSE UNIT:

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LEARNING OBJECTIVES:

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PROGRAMMATIC CONTENTS:

Topic 1:

Topic 2:

Topic 3

ETC...

METHODOLOGY:

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**TECHNOLOGICAL MEANS TO USE:**

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**EVALUATION:**

The evaluation will be based on a formative evaluation component (continuous) and a summative evaluation component (final exam). Taking into account the nature of the distance study cycles as well as the learning methodologies already described, the assessment will be based on a formative evaluation component (continuous) and a summative evaluation component (final exam). 60% - continuous evaluation, 40% - summative evaluation).

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## SCHEDULING

We present a chronological forecast of curricular development, including the evaluation part and the expectancies of what is to be expected in terms of the student's goals. The model is recognizably abstract to be adaptable to all kinds of curricular units.

SEPTEMBER	EXPECTED OBJECTIVES - STUDENT
1st Fortnight	Presentation of the course's overall objectives as well as of all the Curriculum Units. Including digital platform operation. (...) (...) (...) Description of the work methodologies adopted. (...) (...) Setting up working groups.
2nd Fortnight	Carrying out formative activities. (...) Lab presentation. (...) Development of training work to validate the student's integration into the overall learning infrastructure. (...)
3rd Fortnight	Student work development on the

	<p>platforms.</p> <p>(...)</p> <p>(...)</p> <p>(...)</p> <p>Analysis of asynchronous curricular development documentation.</p> <p>(...)</p>
4th Fortnight	<p>Work sharing and discussion in Group Forums.</p> <p>(...)</p> <p>Works exhibition in the specialized Forums.</p> <p>(...)</p> <p>(...)</p>

## Course Guide Template

DEGREE IN:

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## 1. INTRODUCTION

We would like to welcome you to the Higher Advanced Technologies Institute (ISTEC), the course you will attend will be an active and dynamic process supported by technological innovations, in which you will always have the full assistance and cooperation of the Course Team (Director, Teachers, tutors and pedagogical technicians).

This document is a synthetic guide on what the course is like and how it works. All these elements are available as part of the ISTEC Virtual Campus.

## 2. OVERALL INFORMATION ON ISTEC

(Content is updateable on an annual basis).

(...)

(...)

(...)

## 3. OVERALL COURSE ORGANIZATION

(...)

(...)

(...)

## 4. COURSE OBJECTIVES

(...)

(...)

(...)

## 5. RECIPIENTS

This degree is intended for:

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6. TRAINING PROFILE AND PROFESSIONAL OPPORTUNITIES

(...)

(...)

(...)

7. DEGREE GRANTED ACCORDING TO THE EUROPEAN QUALIFICATIONS FRAMEWORK

Graduated

in:

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8. ADMISSION REQUIREMENTS (IF APPLICABLE)

(...)

(...)

(...)

9. TECHNOLOGICAL REQUIREMENTS

(...)

(...)

(...)

10. PLAN OF STUDIES

CURRICULAR UNIT	YEAR/ SEMESTER	WORKING TIME/ HOURS	ECTS

#### 11. METHODOLOGICAL PROPOSAL

(...)

(...)

(...)

#### 12. Information regarding applications and registrations.

(...)

(...)

(...)

#### 13. Information on structuring regulations.

(...)

(...)

(...)

#### 14. Framing in the institution's strategic plan.

(...)

(...)

(...)

#### 15. Quality Management System.

(...)

(...)

(...)

#### 16. Fees.

(...)

(...)

(...)

#### 17. Protocols.

(...)

(...)

(...)

#### 18. Assessment and Classification.

(...)

(...)

(...)

19. Course coordination, teaching team and technical support.

(...)

(...)

(...)

20. Online environment.

(...)

(...)

(...)

21. Information on accreditation and on-going course evaluation.

(...)

(...)

(...)

## **Tutoring Plan Model**

**CURRICULAR UNIT:** \_\_\_\_\_

**CODE:** \_\_\_\_\_

The Tutoring Plan is intended to establish a set of guidelines for the Tutor, specific for each curriculum unit. This document is prepared by the teacher responsible for the course unit and validated by the course director.

### **TUTOR'S ROLE ALONG WITH THE CURRICULAR UNIT**

- To assist in the design of the tasks to be undertaken by the students
- To moderate the curricular unit forums:
- To motivate students to participate
- To encourage student participation in the course activities (paying particular attention to those students who are less involved).
- To guide, moderate and facilitate learning.
- To establish contact with students at intervals of up to three working days (you will need to check the subject Moodle page regularly to avoid compromising this principle).
- To provide constant feedback to students, both in their interventions in the various communicative spaces and the works developed;
- To answer academic and/or technical questions (being able to make the connection between the students and the pedagogical technicians when necessary);

### **SPECIFIC ACTIVITIES TO BE DEVELOPED THROUGHOUT THE COURSE UNIT**

(Here the activities to be mandatorily developed by the tutor must be listed)

#### **1. Reception of students**

**DATE:** 1st day of the semester

**ACTIVITY DESCRIPTION:** To leave a welcome message to the students, in the corresponding Moodle course, within the "General" Forum, expressing the availability for questions clarification.

## **2. Presentation of the Curricular Unit Guide (CUG)**

**DATE:** 1st day of the semester

**ACTIVITY DESCRIPTION:** Make CUG available in its Moodle course in "General Resources". To place, in the "General" Forum, all the information regarding the availability of the CUG, calling the students to express their doubts about this paper. To clarify students on possible doubts regarding CUG.

## **3. Making available the educational resources related to the Program Content Introduction to HTML**

**DATE:** Middle of 1st week of the semester (for instance October 15)

**ACTIVITY DESCRIPTION:** Making available, in the corresponding Moodle course, the educational resources X and Y in "Educational Resources". To include in the "Introduction to HTML" Forum a message about the availability of educational resources

## **4. To create a "Work" activity for carrying out hands-on work on the development of a web page.**

**DATE:** October 22nd

**ACTIVITY DESCRIPTION:** To create, in your Moodle course, a "Work" activity with the following features

Designation: \_\_\_\_\_

Description: \_\_\_\_\_

Additional files (if applicable): \_\_\_\_\_

Deadline for work submissions: \_\_\_\_\_

To place, within the "Introduction to HTML" Forum, a message informing the activity's beginning and end with a link to the specific activity. To express the availability to clarify doubts on the activity.

**5. To carry out a synchronous session for clarifying doubts.**

**DATE:** From October 29 to November 12

**ACTIVITY DESCRIPTION:** To schedule a synchronous session for doubts clarification. To place the information related to the synchronous session (e.g. date, time, link and other access data). To hold the synchronous session clarifying the existing doubts and calling the students for the discussion.

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