

(RESEARCH ARTICLE)



## Design of educational scenarios of activities in a learning situation for online teaching

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### Abstract

Through this work, based on research works concerning e-learning in particular works dealing with e\_learning project management systems, adaptive hypermedia systems and decision-making systems on the one hand. Work on the impact of project-based learning on self-regulation in teaching and the design of pedagogical scenarios for classical education and in particular for modular online education on the other hand. Our work concerns the design and scripting of a modular online education by proposing different possible scenarios according to the nature of the learning or assessment activities linked to a learning situation without taking into account the nature of the discipline and the nature of the concept to be addressed.

**Keywords:** Design Scripting; Online teaching; Modular teaching; Online teaching scenario; Learning activity; Learning situation

### 1. General context

In most societies, the university is considered the guarantor of the academic and pedagogical quality of higher education. However, this institution is faced with the consequences of the development of Information and Communication Technologies (ICT), vectors of wider information, modern tools at the service of training but also sources of profit through the arrival of online course. The university must respond to a sharply increasing demand for initial training and lifelong training. The integration of ICT in higher education enables the development of several solutions of using online education as a supplement to traditional education at virtual campuses or digital universities that provide a fully online learning environment. Online education enables remote management of both learning, access to resources and interaction between all stakeholders in the education community. In fact, in online education, learners must change the way they learn, this change is essentially linked to the necessary adaptation to ICT, knowing how to use them, knowing how to search, knowing how to make connections, etc. , online education requires skills on the technologies, their uses and on research around these technologies in use in the context of university training in addition to the conceptual, theoretical and methodological skills required by conventional education.

Based on research work concerning e-learning in particular work dealing with e\_learning project management systems, adaptive hypermedia systems and decision-making systems on the one hand. Work dealing with the impact of project-based learning on self-regulation in teaching and the design of teaching scenarios for traditional teaching and in particular for online teaching on the other hand. Our objective in this work is the design and the scripting of an online education by the proposal of the different possible scenarios according to the nature of the learning or evaluation

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activities linked to a learning situation without taking into account the nature of the discipline and the nature of the concept to be treated [1; 2; 3; 4; 5; 6; 7; 8; 9; 10]

In this work, we will first show the difference between classical education and online education and specify the questions to ask to design online education by identifying its advantages for the learner, the teacher and the institution. . Secondly, we suggest the different steps to follow for setting up online education. In this work, we are mainly interested in the pedagogical scenario and in particular the proposal of the different pedagogical scenarios that can be encountered in online teaching for a learning situation (module). Thus, through the third part of this work, we define the concepts of scriptwriting and the online educational scenario and we propose the different types of educational scenarios for online teaching.

## 2. Theoretical framework

In this part, which concerns the theoretical framework of this work, we will first differentiate online education from traditional education by identifying the advantages of this education for the learner, the teacher and the student. institution. Secondly, using pedagogical engineering methods, we identify the different stages allowing the implementation of online training by describing the tasks to be carried out for each stage. Third, we define the educational scenario and the steps to follow for the design of a scenario. In the fourth and final step, based on previous work, we offer an overview of the educational scenario by differentiating between the predictive scenario and the descriptive scenario, the learning scenario and the supervision scenario and, finally, between the learning scenario and the learning device.

### 2.1. Online teaching

When we approach online education, we can discern many arrangements, from the simple lesson plan / textbook / downloadable handout to the course integrated with modern communication tools (forums, chat, and mailing lists) where teachers interact with their learners through Information and Communication Technologies (ICT). To be more precise, in online teaching, it is important to differentiate between the online searchable document originally intended to be printed and / or studied / commented on in class and the online searchable document intended to be studied as and when. Measurement by a learner probably alone in front of his computer and more in charge of his own learning process. An online course is therefore not a simple PDF or Word document, but rather an online learning space that uses ICT to mediate educational content and encourages the learner to interact with these tools and possibly with a virtual community the other learners.

So when we decide to put an education online, we tend to think of uploading a conventional course prepared in Word, PowerPoint or turned into PDF on a website or distance education platform. Classical education is generally designed and defined in terms of content. However, from the perspective of distance education (EAD), it is essential to move from a logic centered on content to a logic centered on the skills that teaching aims to develop in the learner. This requires a conscious effort to break with the mode of reasoning that the teacher is accustomed to follow in his classical teachings [11; 12]. The table below summarizes the main differences between classical education and online education.

**Table 1** Differences between classical education and online education.

	<b>Classic course</b>	<b>Online course</b>
Approach	Transmissive mode	Interactive / collaborative mode
Role	The teacher plays a central role in the transmission of information / knowledge	The learner plays a central role in the construction of new knowledge and the acquisition of skills
Learning environment	Temporal and spatial co-presence	Teaching delayed in time and space, mediated content

Putting an education online offers many advantages, for the learner, the teacher and possibly the institution. It is the way to personalize training, learn when you want and, often, lower training costs. In addition, putting education online makes it possible to provide a vision of knowledge that is different and complementary to that of traditional education and thus contributes to the evolution of teaching practices within the institution. Thus, online education provides benefits for the learner, the teacher and the institution.

Among the advantages for the learner, we cite the individualization and personalization of learning, support, and interactivity, the spirit of research and synthesis and freedom of access.

Among the advantages for the teacher, we cite a dynamic course support, technological communication and exchange tools to develop the quality of contacts between the teacher and his learners and the participation of learners in the construction of their knowledge.

Among the advantages for the institution, we cite, the possibility of increasing the number of learners and of diversifying the target populations, the reduction in costs and staff travel times, the good management plus the multiple educational paths and the establishment of a quality assurance system through the history and traceability of learners on the administrative side and on the educational side.

## **2.2. Steps in setting up online education**

In general, online lessons are a useful way to supplement traditional classroom lessons in order to improve the effectiveness of learning and encourage learners to become more autonomous and proactive in their learning process, learning. However, their effectiveness largely depends on the quality of their design. Indeed, well-designed online courses may be better than traditional courses in some training contexts. The implementation of online education goes through stages based on educational engineering methods such as the ADDIE method and / or the SAM method.

## **2.3. Educational scripting**

### *2.3.1. Definition*

With the integration of the audiovisual as a teaching medium in the classroom, media scriptwriting has introduced a new way of presenting knowledge using images and sound to facilitate understanding. While it replaces one of the teacher's duties, it does not supplant all of them. However, it invites us to rethink learning and, consequently, teaching, to review the teacher's intervention and to reconsider the way in which learning takes place. The overhaul to which the teacher is invited is nothing other than the revision of the scenario of his teaching. In the new scenario of its activity, the task of conveying knowledge is left to the media; that of the teacher is to go beyond the presentation of knowledge and exploit the interaction between the learner and the medium; this naturally results in the scripting of the learner's activity.

Screenwriting is above all a work of content design, organization of resources, planning of the activity and mediations to induce and support learning, and orchestration, that is to say integration contributions from the various specialists working on the design and production of the scenario in the environment. In educational settings, this working model has remained confined to the production of audiovisual resources without having been transferred and generalized in teaching practice. Although there are currently widely accessible banks of educational scenarios, already in 2007, a study showed that the real uses of scenarios are not well known, that their content is not uniform and that few teachers know their usefulness or know how to use them [13]. Such an observation invites us to look into the difficulties which slow down the development of educational scripting. What is preventing teachers from appropriating this approach and building a different teaching practice? Without having been able to make a reflective return to better understand why the pedagogical scripting approach has not been adopted by teachers in the era of educational audiovisuals, we have passed into the era of educational computing. And ICTs to see that the issue is more topical than ever. Currently, pedagogical scriptwriting must be characterized in the context of computerized learning environments in order to highlight the challenges it raises for the practice of teachers [14].

The pedagogical scenario is a form of activity generic to the practices of the pedagogical activity, aiming to sequence all the stages of the creation of a training module, of a set of corpus to be taught, or of a part of it. learning itself. Behind this sequencing of stages of creation hides a scientifically established thought, which aims to make intelligible once assembled the educational element designed, with a view to facilitating the paths and the acquisition of this object of knowledge in the form of knowledge. [15 ; 16].

The script aims to build an exhaustive educational process, accompanied by the media coverage selected. It therefore provides for the themes that will be treated in training, as well as the forms in which they will be approached: text, sound, illustration, video, animation, etc. Thus, scriptwriting is a work of content design, organization of resources, activity planning and mediations to induce and support learning. It is also a work of orchestration, that is to say of integrating the contributions of the various specialists who work on the design and realization of the scenario in the environment [17].

The objective of educational scripting is to help the educational designer, so that he can set objectives relating to the needs of the training and the learner according to defined educational stages. The script then corresponds to the organization in time and space of all training activities. It also corresponds to the formalization of the stages linked to educational activities.

### 2.3.2. Stages of scripting

The design of a scenario must follow a certain number of essential steps of which there are five.

- Define the objective (s): For the design of an educational scenario, it is essential to define the educational objectives to be achieved. For this, a set of questions to ask you to let go that concern the target audience, the skills desired to be mastered by the target audience, the time organization chosen and the material available.
- Sequencing: through this step, it is a question of fixing the themes, the activities and / or the workshops which will be used to achieve the traced educational objectives. Each sequence to which we associate the notion of minimum pedagogical unit, or even pedagogical grain must correspond to a precise learning objective which contributes to the achievement of the general objective of the training.
- Scenario development: the scenario development stage is the stage of scenario realization. Structuring and consistency are essential for all the sequences used in a scenario. It is therefore essential to choose the content, educational tools and technological tools that must be adapted to the target audience. In order to develop a good scenario, it is important to take into account 4 elements: the characters, the context, the challenges and the consequences.
- Implementation: Once the tools have been chosen and adapted, it is necessary to choose a digital space or (a platform) most suited to the project, and consequently to the target audience, to implement the scripted and mediated content.
- Evaluation: the interest of a scenario is to achieve its objectives. To ensure that the objectives have been achieved. Evaluation is important both at the level of the learner which allows him to position himself in relation to the skills or not acquired. Likewise, it is important both at the level of the designer who allows him to control what the learner has retained, that is to say, if the educational objectives are achieved, but also to control the effectiveness of the training system. , namely the chosen tools, media and digital space.

### 2.3.3. Online teaching scripting tools

There are two main tools for online teaching scripting. These tools are effective insofar as they help to approach the scripting process according to an organized and rational methodology.

- The Activity Diagram (DA): The role of each of the actors (teacher, learner and group of learners) in the scenario is clarified in an activity diagram (DA) inspired by the UML (Unified Modelling Language) diagrams used. For the management of IT projects. The DA must highlight the unfolding of the scenario by locating the intervention of the three categories of actors in the sequence of activities. The following figure provides an example of an activity diagram [18].
- The Specification Table (TS): A succession of phases as presented in a DA is often insufficient to describe the scenario. It must be supplemented by a description of each of the tasks offered to the learner by reference to a series of dimensions of which we quote:
  - Nature, origin and purpose of the material submitted to learners and the results expected from them;
  - Sequence of tasks envisaged and the criteria for this sequence;
  - Organization of groups (collaborative work) and distribution of roles among members;
  - Modalities of follow-up and interactions.

## 2.4. Online educational scenario

### 2.4.1. Definition

At the beginning of the 2000s, according to several researchers, the problem of the design of learning situations by the teacher occupies a strategic place in the field of ICT. After focusing on questions of creation, pooling and reuse of resources, research in educational engineering insists on the need to take more account of the learner's activity and puts the notion of a learning scenario back into the picture center of debate [19; 20; 21; 22].

Indeed, according to Vantroys and Peter, “educational scenarios arouse great interest in the field of Human Learning Computing Environments (EIAH). They provide mechanisms for the management and orchestration of activities within learning units. They can thus be at the center of training engineering and are means for defining the use of tools and

educational objects during a module or a task in which the users are involved. In fact, the benefit of using educational scenarios lies in the fact that the main focus is on the learning activities that must be carried out to achieve the educational objectives [23]. Through what follows, we try to clarify the difference between conceptions of the educational scenario in order to choose the scenario to be used in a training course.

#### *2.4.2. Predictive scenario and descriptive scenario*

Pernin and Lejeune define the pedagogical scenario as being "the description of the course of a learning situation in terms of roles, activities and the environment necessary for its implementation, but also in terms of manipulated knowledge" [24]. These authors distinguished two types of scenarios:

- The predictive scenario: defined as established a priori by a designer with a view to setting up a learning situation;
- The descriptive scenario: defined as a scenario this describes a posteriori the course of the learning situation, including in particular the traces of the activity of the actors (mainly the learners) and their productions.

#### *2.4.3. Learning scenario and coaching scenario*

Quintin and his collaborators distinguish between a learning scenario and a coaching scenario. Thus, when designing a training course, they consider the educational scenario as a structured and coherent whole made up of two parts:

- The learning scenario, the role of which is to describe the learning activities that will be offered and to define their articulation in the educational system, as well as the outputs that are expected from the learners;
- The coaching scenario which specifies the role of teachers and the modalities of interventions intended to support the learning scenario.

According to these authors, the existence of a separate supervision scenario makes it possible to draw the attention of the designer (s) to the importance of specifying the interventions of the actors in charge of supporting learners in their training [25].

#### *2.4.4. Learning scenario and learning device*

For Depover and his collaborators, in an educational scenario, it is necessary to differentiate between the learning scenario and the learning device [7].

- The learning scenario is the sequencing of the implementation of all the structuring elements of the learning situation. It is the result of the choice of a learning strategy in relation to a specific learning content which is described as a succession of stages, of compulsory or optional nature that the learners will have to take for an explicit pedagogical purpose. Depending on the case, the scenario may be more or less prescriptive and the variety of individual courses that will be implemented will be more or less extensive.
- The learning device is all the human and material resources to be mobilized to carry out the learning scenario.

### **2.5. Adaptation of an educational scenario**

By considering the pedagogical scenario as a sufficiently consistent and relevant model to approach the engineering of ILE, Cottier and his collaborators affirm that the concern of a teacher who wishes to use computer science for his teaching is not to do research in EIAH, it is to design a teaching situation that responds to the pedagogical problem that arises. Note that in classroom teaching situations, the usual practice of teachers and trainers in face-to-face teaching does not lead them to precisely script the teaching activity: if the content of training is well defined a priori, a simple general idea and little detail of the organization of the educational activity is enough for the teacher, his skill and his experience allowing him to adapt his method and to improvise according to the progress of the activity. Yet in online education, despite work aimed at removing certain obstacles related to distance in particular, and to facilitate the practice of teachers and learners, technologies do not always have the flexibility required for use in the educational context which requires very often rapid adaptations to new and often unforeseen events [26].

Thus, the adaptation of an educational scenario can be done during two main phases of its life cycle: either during design, or during execution.

As for adaptation during design, the designer teacher must take into consideration all possible cases for the implementation of an adaptive learning situation. In fact, most of the work is based on IMS-LD (level B). These works try to help the teacher-designer to define adaptation rules of the type: "if condition then action", this by using properties

and conditions. These rules will be applied during execution according to the values of the properties which make it possible to specify whether the conditions are satisfied or not [8].

However, in the case of adaptation during execution, teachers and / or the system must react according to the events triggered by the learners in real time and throughout the course of their learning sessions. This type of work consists in orienting the course of the sessions implicitly by the system, for example based on software agents or explicitly by the teachers who can enter the necessary adjustments [27; 28].

## **2.6. The modular structure**

In the language of Open Distance Learning (ODL), we very often refer to the concept of module to characterize the educational organization of online education. We are talking about modular education, modular training or even modularization of content. Thus, a module is above all made up of a set of learning situations organized as a coherent whole. What gives coherence to this set is both the objectives pursued and the educational strategy implemented. To be qualified as modular, this set of learning situations must:

- Be organized in such a way that it constitutes a whole which is both independent and capable of being easily integrated into a larger training package;
- To be polyvalent; in a way that it can be combined in different ways with other modules so as to constitute different learning paths from a limited stock of modules.

A training module consists of three systems with which specific functions are associated. Thus, we locate:

- An entry system that manages access to the module, as its name suggests, it is through this system that the learner accesses the training module.
- A learning system, also called "body of the module" supports the training itself which must be adapted to the learner according to the activities to be carried out;
- An exit system that manages the end of the module and the orientation that is necessary following it depending on the acquisition of knowledge and the mastery of skills by the learner.

Based on what is treated in the theoretical part, we will propose in the next part which concerns our own work the design of the models of constituent systems an online teaching of the different pedagogical scenarios for a learning situation and the different activities learning outcomes.

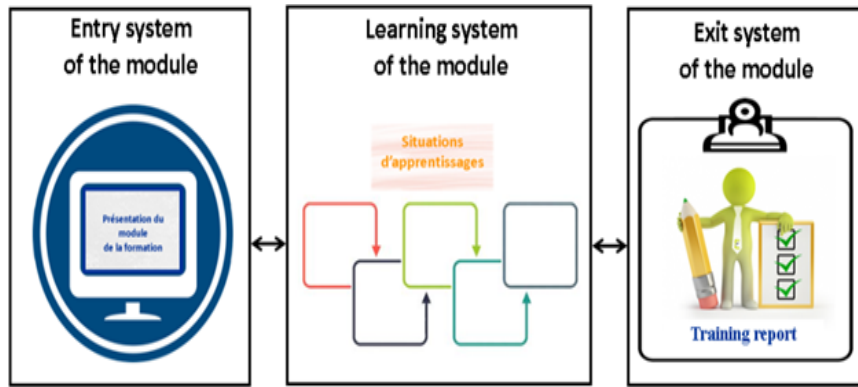
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## **3. Design of models of different pedagogical scenarios in online education**

Thus, based on the work of Burgos concerning adaptation during the design of an educational scenario, on the work of Depover and his collaborators concerning the differentiation between the learning scenario and the coaching scenario, on our previous work concerning the pedagogical scenario architecture of a learning situation [5; 6; 7; 8].

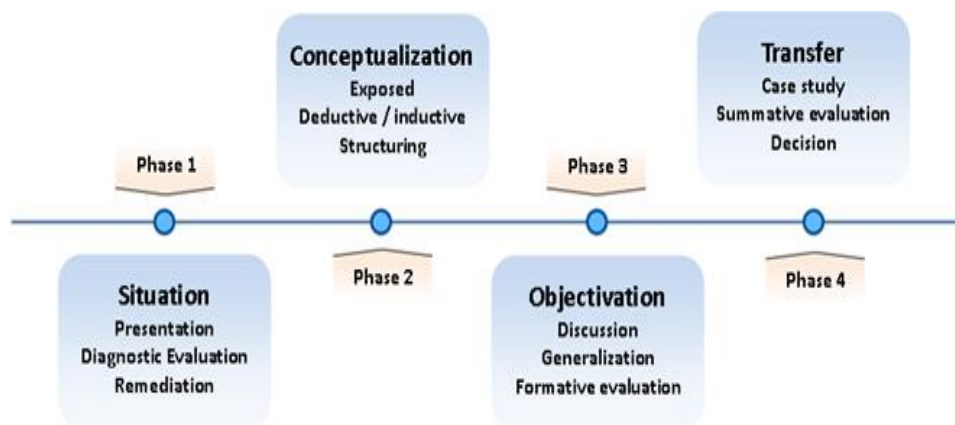
By inspiring work carried out in the field of process flexibility, in particular that of Schonenberg and his collaborators, we find it useful to better understand when, how and with what approaches, to adapt educational scenarios according to the changing circumstances of the situations teaching / learning [9; 10].

Thus, we focus in this work our study on the proposal of different types of pedagogical scenarios of a learning situation and the associated learning activities that we can confront in an online teaching for a module without taking into consideration nor the nature of the discipline nor the nature of the concept to be treated. Indeed, for a training module in online teaching, it corresponds to learning situations, the following figure illustrates an example of a global scenario of the constituents of an online teaching of a module.



**Figure 1** Example of a global scenario of a module in an online course

Whereas a learning situation of a module in an online education corresponds to learning activities. The following figure illustrates an example of the life cycle of a pedagogical scenario of a learning situation.



**Figure 2** Example of the life cycle of a pedagogical scenario of a learning situation

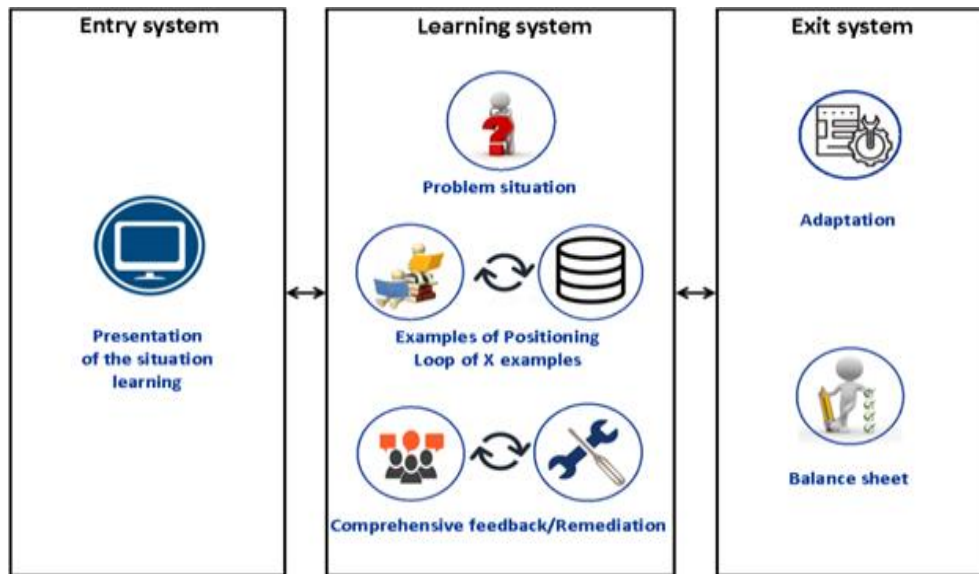
Based on this example of the life cycle of a pedagogical scenario of a learning situation, we propose the different scenarios of the different activities in a learning situation of a module in an online teaching which are numerous of six.

### 3.1. Scenario of the scenario of a learning situation of a module in an online teaching

According to the life cycle of a learning situation proposed above, the activity of the scenario is the first phase of the cycle. In our case, we use the scenario activity as an introduction to a learning situation and at the same time as an assessment tool to test the prerequisites of the learners. The following figure illustrates an example of the scenario of the simulation activity of a learning situation consisting of three systems.

#### 3.1.1. Scenario entry system the bet situation

The scenario input system for the scenario activity concerns the presentation of the learning situation by defining the objectives to be achieved at the end of the situation, the knowledge to be acquired and the skills to be mastered by the learner or group of learners and finally the necessary prerequisites to follow the situation.



**Figure 3** Example scenario of a learning situation scenario

### 3.1.2. Scenario learning system the bet situation

The learning system of the scenario of the scenario activity, concerns first of all, the definition of the problem situation in which a cognitive imbalance is created for the learner which is due to the perception of a difference between what we think we know and what we see. Examples / positioning exercises will be offered to the learner concerning his previous achievements which allow us to locate his state of knowledge at the beginning of the learning situation and at the same time to locate it in the disciplinary field to make a statement of his knowledge and / or its conceptions (initial representations). Finally, based on technological communication tools, a substantive feedback is carried out near a remediation to fill the gaps of the learners and correct their erroneous learning, in order to place them in relation to the new learning situation.

### 3.1.3. Scenario exit system the bet situation

The scenario exit system from the scenario activity concerns the adjustment and adaptation of the learning scenario of the learning situation by subsequently proposing a course and resources adapted to the level of the learning situation. 'learner. Finally, an assessment of the activity of the scenario is disclosed.

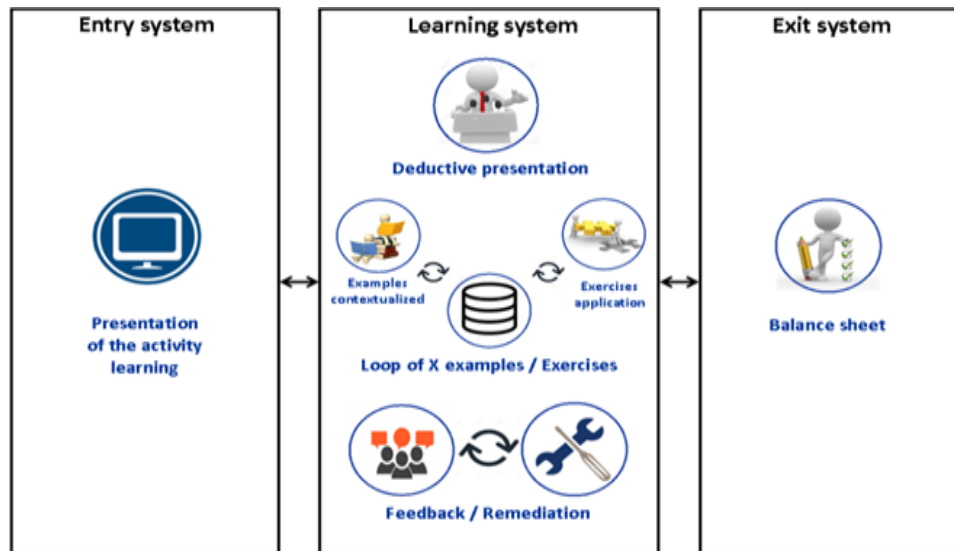
## 3.2. Scenarios of the conceptualization of a learning situation of a module in an online education

Still according to the life cycle of a learning situation proposed above, the activity of conceptualization is the second phase of this cycle. It concerns structuring by moving from action to formulation based on the obstacles encountered during the activity of the scenario. It promotes the construction of meaning around specific knowledge, the use of knowledge and its integration into the development of skills, at the end of the learning situation. This phase concerns two case scenarios depending on the approach adopted. Indeed, depending on the context and the situation, the proposal for a learning activity requires us to choose between two approaches, the deductive approach and the inductive approach.

### 3.2.1. Scenario of the conceptualization of a learning situation of a module in an online education for a deductive approach

The deductive approach (or logical deduction) consists in going from the general to the particular, from the principle to the consequence. It is a scientific method which considers the conclusion to be implicit in the premises. We start from the statement of the concept or / and the rule to go to verification by examples. Thus, to present a concept, it is necessary to use this approach which obeys the direct teaching strategy which is strongly guided by the teacher. It is a conception of explicit teaching: a transmission of knowledge and the acquisition of skills by the learner. The following figure illustrates an example of the scenario of the activity of conceptualization for a deductive approach of a learning situation made up of three systems.





**Figure 4** Example of a scenario of the conceptualization of a deductive approach to a learning situation

Conceptualization scenario entry system using the deductive approach

The input system of the scenario of the activity of the conceptualization of a deductive approach, concerns the presentation of the learning activity by the definition of the objectives to be reached at the end of the activity, the knowledge to be acquired and the skills to be mastered by the learner or group of learners.

Conceptualization scenario learning system according to the deductive approach

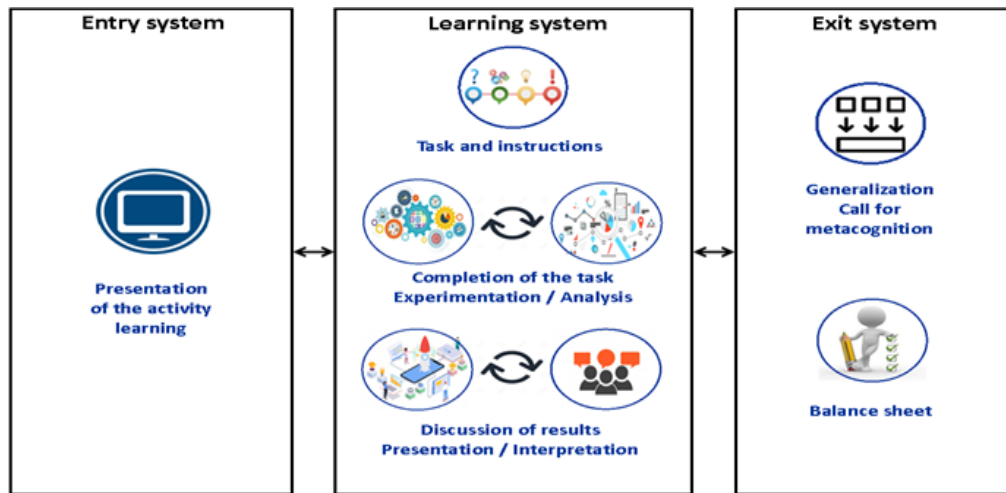
The system of learning the scenario of the activity of the conceptualization of a deductive process which consists of going from the general to the particular, from the principle to the consequence. It is a scientific method which considers the conclusion to be implicit in the premises. We start from the statement of the concept or / and the rule to go to verification by examples. For our system, it offers first of all a presentation of a talk according to the nature of the concept to be treated (presentation, films, documentary, ...). Then the proposal of contextualized examples that the learner can choose from a resource (x examples to be done and redone) to check the understanding of the knowledge presented in the presentation and the proposal of the application exercises that the learners in the same way can choose them from a resource (x examples to be done and redone) to test the acquisition and application of this knowledge. Finally, feedback is provided near a remediation based on technological communication tools to fill the gaps of learners and correct their erroneous learning.

Conceptualization scenario exit system according to the deductive approach

The system of exit from the scenario of the activity of the conceptualization of a deductive approach concerns a review of the activity of the conceptualization of the proposed deductive approach.

### 3.2.2. Scenario of the conceptualization of a learning situation of a module in an online education for an inductive approach

The inductive approach consists of going from the particular to the general. It is a scientific method that obtains general conclusions from individual premises. It allows the learner in a learning activity to experience and discover the meaning of a concept for himself. It makes it possible to move from observations, particular or specific analyzes, to more general perspectives. Thus, generalization (objectification) invites the learner to describe his approach and to name the processes involved (call for metacognition). It promotes the coherent assembly of all the objectives achieved through discussions to pool and generalize the results. The following figure illustrates an example of the scenario of the conceptualization activity for an inductive approach of a learning situation consisting of three systems.



**Figure 5** Example of a scenario of the conceptualization of an inductive approach to a learning situation

#### Conceptualization scenario entry system using the inductive approach

The input system of the scenario of the activity of the conceptualization of an inductive approach, concerns the presentation of the learning activity by the definition of the objectives to be reached at the end of the activity, the knowledge to be acquired and especially in this case, the skills to be mastered by the learner or group of learners.

#### Conceptualization scenario learning system using the inductive approach

The system of learning the scenario of the activity of the conceptualization of an inductive process which consists in going from the particular to the general. Thus, it is necessary to use the inductive approach which obeys the indirect teaching strategy which is learner-centered. Indeed, Inquiry, Induction, Problem Solving, Decision Making and Discovery are terms that are used interchangeably to describe indirect teaching. Indirect education promotes creativity and the development of skills in the area of personal relationships. For our system, it first offers a presentation of the task to be performed according to the nature of the concept to be treated (experience, problem to be solved, investigation, etc.).

The next step concerns the realization of the proposed task according to the nature of the group of learners (individual or group work), passing through several steps: accomplish the task by the organization and the distribution of roles in the case of a group work without denying time management; provide concrete experience for analysis by asking questions, encouraging testing, manipulation and hypothesis formulation and planning procedures and materials and finally providing feedback by encouraging successes, improvements and means of self-correction and helping to identify and use errors. Note that the performance of the task must be reinforced by the offer of a set of digital resources that will be offered to support the learner / group of learners in his / her work and the proposal of technological tools for communication to facilitate interaction between the various training actors (teachers and learners).

The last step in this learning system concerns the discussion of the results obtained by the different learners / groups using the different technological communication tools, first of all through the presentation and communication of the results of each learner / group of learners. to all the actors (teachers and learners) and then by the interpretation of the results obtained to justify the empirical results obtained and to confront them with the laws and theoretical rules.

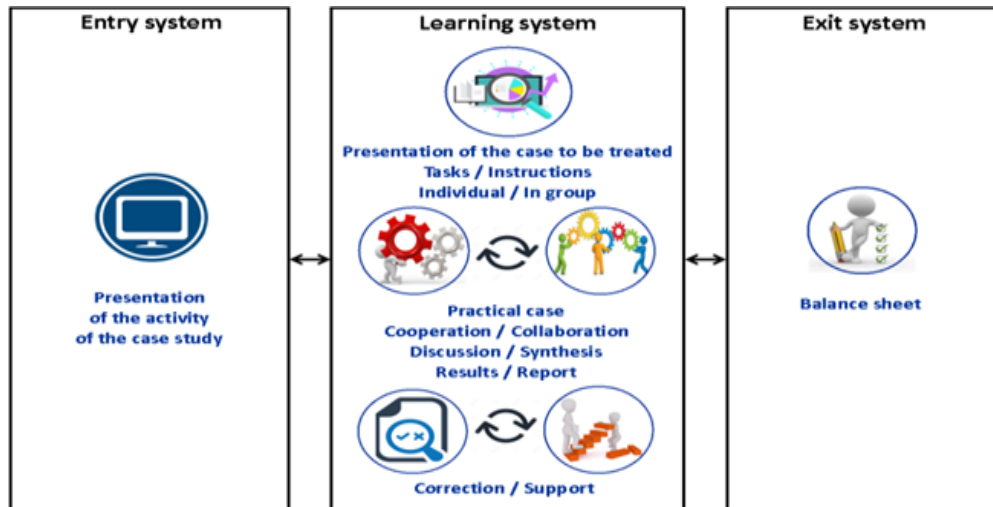
#### Conceptualization scenario exit system according to the inductive approach

The system of output of the scenario of the activity of the conceptualization of an inductive approach, concerns an assessment of the activity of the conceptualization of the inductive approach proposed by the generalization by appealing to metacognition by the release of a model or laws through a mathematical formalism.

### 3.3. Scenario of a case study of a learning situation of a module in an online education

Case study is an activity that presents a problematic situation to a group, which must find a solution. The case study is especially indicated for training in diagnosis and decision-making. A teaching, by the case method, aims precisely to allow the application of theoretical or abstract knowledge, acquired beforehand or during the case study itself, to the resolution of concrete problems. The conditions for its effectiveness are based in particular on the quality of the cases

proposed. The main phases are generally three in number in addition to a preliminary step which consists of learning about the case. Indeed, the first phase which allows each member of the group to formulate his point of view on the case to be treated. A second phase concerns a return to the facts with the information available to choose a work strategy. Then a third phase which concerns the conceptualization and research of the findings to arrive at a synthesis and a result. Finally, a final synthesis is drawn up by presenting a report [29]. The following figure illustrates an example of a case study scenario of a learning situation consisting of three systems.



**Figure 6** Example Scenario of a case study of a learning situation

System for entering the scenario of a case study of a learning situation

The input system of a case study scenario concerns the presentation of the evaluation activity by declaring the learning situations / activities to be addressed by the study by identifying the objectives of the case study to treat.

System for learning the scenario of a case study of a learning situation

The case study scenario learning system which consists, as a means of applying theoretical or abstract knowledge, acquired beforehand or during the case study itself, in solving concrete problems. For our system, it first offers a presentation of the case to be studied, specifying the tasks to be performed and their instructions according to the nature of the group (individual / group). In this case, we suggest working in a group so that the realization of the work allows interactions and exchanges between the members of the group. Cooperation and collaboration are two essential elements in carrying out the work. Indeed, according to Mead, cooperation describes a state of mind and a mode of behavior where individuals conduct their relationships and exchanges in a non-confrontational or non-competitive manner, seeking the appropriate modalities to analyze together and in a shared manner. Situations and collaborate in the same spirit to achieve common goals or acceptable to all by using structured methods of collaboration encourage introspection of behaviors and communication [30]. This will be done based on the various technological communication tools to impose and structure discussions between the members of the group to lead to a synthesis and results presented in a report. Finally, corrections and support for the different groups must be offered by the teacher.

Scenario exit system of a case study of a learning situation

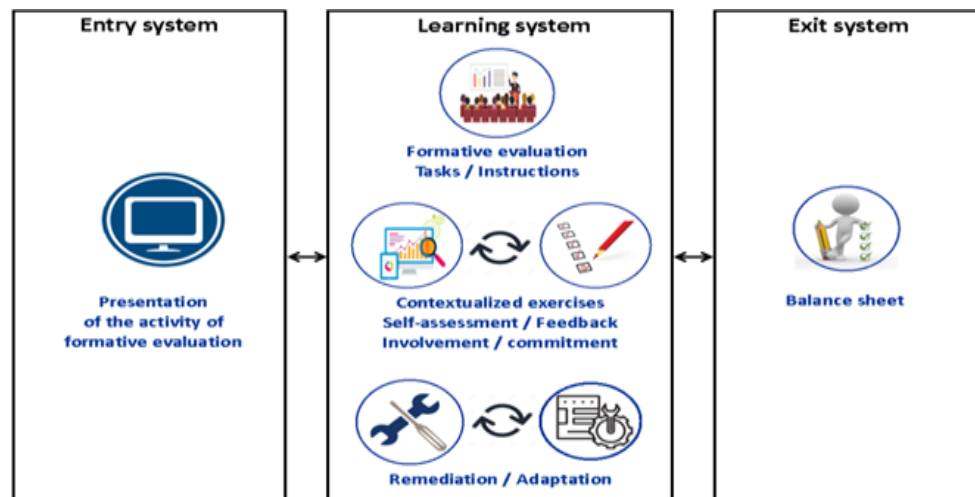
The case study scenario exit system concerns a review of the evaluation activity taking into consideration the objectives set out in the entry system.

### 3.4. Scenarios of an evaluation of a learning situation of a module in an online education

The evaluation is a summary statement on the results, the level, the success, and which is based on data coming from various sources and measures (observations, exams, etc....), there are different types of evaluation, and thus we quote, diagnostic evaluation, formative evaluation, summative evaluation, normative evaluation, self-referenced evaluation and criterion-referenced evaluation. In this work, we focus only on formative evaluation and summative evaluation.

### 3.4.1. Scenarios for a formative evaluation of a learning situation of a module in online education

Formative assessment is an assessment that is an integral part of the learning process and occurs at all stages of it. It consists in collecting information making it possible to know the degree of mastery reached and to situate the possible difficulties of the learners in order to propose them or to make them discover means of overcoming them. It is intended to be a support tool for both the teacher and the learner. Formative assessment is an integral part of mastery pedagogy and differentiated pedagogy since it is the means used to inform the teacher and the learners about the help and remediation to be provided to achieve the set objectives [31; 32]. For the teacher, it makes it possible to better explain his practice and his pedagogical expectations as well as to verify the effectiveness of his teaching in order to be able to adapt it to the characteristics of the learners. For the learner, it allows them to locate their difficulties in order to find the means and methods to overcome them. The following figure illustrates an example scenario of a formative assessment of a learning situation consisting of three systems.



**Figure 7** Example of a scenario of a formative evaluation of a learning situation

#### System for entering a scenario for a formative assessment of a learning situation

The formative assessment activity scenario entry system concerns the presentation of the assessment activity by declaring the learning situations / activities to be assessed by identifying the knowledge and skills to be tested in the learner.

#### Scenario learning system for a formative assessment of a learning situation

The formative assessment activity scenario learning system which is used as a means to educate the teacher and learners on how to help and remedy to achieve set goals. For our system, it first offers a presentation of the tasks to be performed and their instructions according to the formative evaluation proposed (exercises, questions to be solved MCQ, etc.). The next step concerns the completion by the learner of the proposed tasks by trying to test for himself the level of knowledge acquisition and mastery of skills and his ability to apply them in the situations posed on the one hand and by analyzing its implication and its commitment in the construction of its knowledge on the other hand. It should be noted that the performance of the various tasks must be reinforced by the offer of a set of digital resources that will be offered to support the learner in his work and the proposal of technological communication tools to facilitate interaction in the different players in training (teachers and learners). The last step in this learning system concerns above all the teacher who must remedy the difficulties encountered by the learner and adapt his learning according to the context and the situation, always using the various technological communication tools.

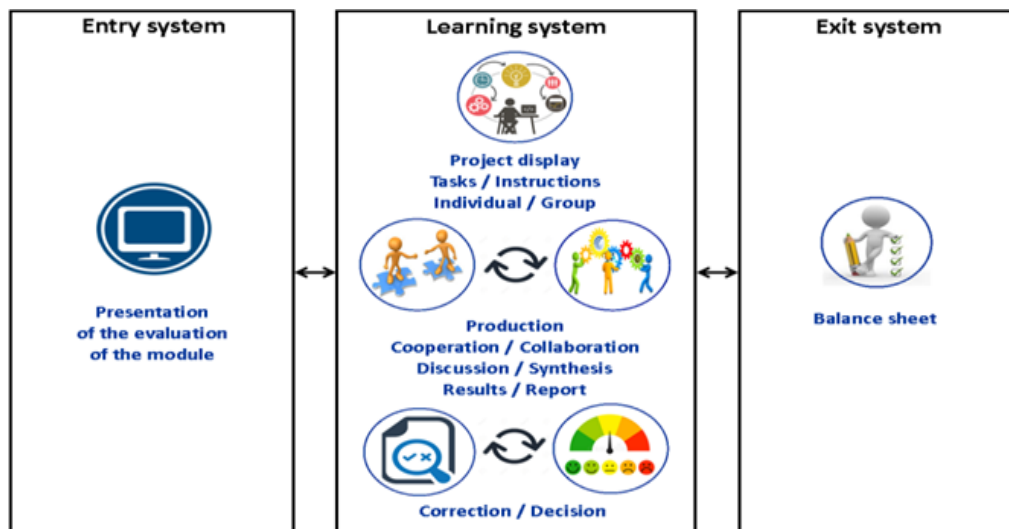
#### System for exiting the scenario of a formative assessment of a learning situation

The formative assessment scenario output system concerns a review of the assessment activity taking into consideration the results of the remediation and adaptation already processed in the learning system.

### 3.4.2. Scenarios of a summative evaluation of a learning situation of a module in an online education

The summative evaluation aims to assess whether the most important knowledge has been acquired at the end of the training. It aims to estimate the learning acquired at the end of a training process, by comparing it to a previously

established level to be achieved. This evaluation process takes into account the weightings given to the elements evaluated. If the summative evaluation process is only used in a certification function, it is also called certification evaluation, that is to say when there is the issue of a diploma after the training action and aimed at check that “the acquisitions targeted by the training have been made. So the summative or certification evaluation has the function of attestation or recognition of learning. It occurs at the end of a teaching process and serves to sanction or certify the degree of mastery of the learning of learners. It is the responsibility of the teacher and must be carried out in a fair and equitable manner. Indeed, the choice of the evaluation method depends on the taxonomic level to be reached at the end of the training, or on the skill to be developed. Depending on the level of expertise of the learners, the desired learning objectives will be of a higher or lower level. Beginner learners will be able to know and understand, while expert learners will be able to reach higher levels such as analysis and synthesis. The type of guidance offered to the different types of learners is intertwined in the choice of an assessment method that corresponds to the targeted taxonomic levels. Indeed, a summative evaluation adapted to the level of the learners and which relates to the content actually taught will directly promote the success of the learners [31; 29]. The following figure illustrates an example of a scenario for a summative assessment of a learning situation consisting of three systems.



**Figure 8** Example Scenario of a summative evaluation of a learning situation

#### Scenario entry system for a summative assessment of a learning situation

The summative evaluation scenario entry system concerns the presentation of the evaluation activity by declaring the learning situations / activities to be addressed by the summative evaluation by identifying the objectives of the evaluation to be processed.

#### Scenario learning system for a summative assessment of a learning situation

The summative evaluation learning system, which consists of estimating the learning acquired at the end of a training process, by comparing it to a previously established level to be achieved. For our system, it first offers a presentation of the project to be carried out, specifying the tasks to be performed and their instructions according to the nature of the group (individual / group). In this case, we suggest working in a group so that the realization of the work allows interactions and exchanges between the members of the group. Cooperation and collaboration are two essential elements in carrying out the work. This will be, based on the various technological communication tools, to impose and structure discussions between the members of the group to lead to a summary and the results presented in a report. Finally, corrections must be proposed by the teacher to reach decisions.

#### Scenario exit system of a summative evaluation of a learning situation

The summative evaluation scenario exit system concerns an assessment of the evaluation activity taking into consideration the results obtained for an adaptation and improvement of learning for a future training.

#### 4. Conclusion

As a conclusion to our work, concerning our theoretical framework, in a first level, after having defined online education by comparing it to classical education, we proposed its various advantages for the learner, the teacher and the institution. In a second level, based on pedagogical engineering methods, we have proposed the different steps necessary for carrying out online education where each step is characterized by tasks to be performed. In a third level, we have defined the notion of educational scriptwriting by identifying the steps necessary for the design of a script and at the same time, we have defined the two main tools of online teaching scriptwriting, to note, the activity diagram (DA) and the specification table (TS). Indeed, scriptwriting is above all a work of content design, organization of resources, planning of activities and mediations, to induce and support learning towards a clearly defined and explicit objective. In the fourth and final level, we defined the notion of educational scenario by differentiating, according to the authors, between the setting of a learning situation and its unfolding according to different names. Then, we mentioned in an online teaching, the problem of when and how of the adaptation of a pedagogical scenario considering the importance of the flexibility of the process according to the evolution of the circumstances of the learning situation. . Finally, we have proposed the three constituent systems of modular education in online education after defining the concept of a module.

Concerning the design of models of different pedagogical scenarios in online education. After having proposed an example of a global scenario of the constituents of an online teaching of a module and an example of the life cycle of a pedagogical scenario of a learning situation in general, we have proposed six examples. Scenarios of the activities of a learning situation of a module for online teaching. Each example scenario is offered under three systems: an entry system, a learning system, and an exit system. We have proposed for each learning system a set of actions to be carried out according to the nature of the activity, specifying each time the actions to be carried out by the learner / group of learners and at the same time the actions to be carried out. by the teacher without neglecting the various interactions between the different actors based on technological communication tools.

In view of this work, we hope in a future work to concretize our research by the realization and the experimentation of the different pedagogical scenarios proposed in this work with pedagogical teams based in the first place on the choice of a discipline and a level of university education.

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#### Compliance with ethical standards

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##### *Disclosure of conflict of interest*

The authors declare that they have no conflict of interest

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