Towards the Process of Designing the Architecture of an Online Learning Activity from the Abstract to the Concrete of the Kolb Cycle According to the Deductive Approach

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ABSTRACT: *Kolb suggests that experiential learning is a continuous, cyclical process that involves actively exploring new experiences, reflecting on those experiences, conceptualizing the concepts that emerge from them, and ultimately applying those concepts in new ways. new situations. Abstract concepts and the concrete play an essential role in this process as described by Kolb. This article aims to contribute to the development of the architecture of an activity in a learning situation corresponds to the transition from the abstract to the concrete and the learning styles that manifest themselves for each learner in teaching. online through a deductive approach at the method and practical level. Our work highlights the importance of considering learners' learning styles when designing e-learning activities.*

KEYWORDS- *Concrete and abstract, Deductive approach, Kolb cycle, Kolb's learning style, The architecture of abstract and concrete activities.*

I. INTRODUCTION

The Kolb cycle is a learning model that emphasizes the process of transforming experience into knowledge ([1]). According to Kolb, the learner follows a cycle in order to assimilate new knowledge and skills by marking preferences for a dominant style of each learner, this cycle contains four stages: Concrete Experience, Reflective Observation, Abstract Conceptualization and Active Expiration, the combination of 2 successive steps result in four styles, divergent, assimilating, converging and accommodating. It is in this sense that individual differences act as filters in the way of thinking, processing and expressing is important for choosing activities that adapt and in a way consistent with the learning style of each learner, ([2]). In this article, we explore in a first step how the learner in experiential learning and in the context of Kolb highlights the importance of the abstract concept through abstract conceptualization and concrete experience through the intermediary of active experimentation, and the transition between its two stages according to the deductive approach. Then towards the process of conceptualization of a learning situation following the conceptual model of Tennyson and Park and the structure of the learning situation. Finally, the design of an architecture of an activity from the abstract to the concrete in online teaching.

II. THEORETICAL FRAME

The theoretical framework presented, the course of the Kolb cycle and the styles resulting, the authors approach in more detail each stage of this model and its impact on the skills and the capacity of a learner in the act of learning, then they treat the key concepts in learning, the abstract and the concrete and the deductive approach as a tool for the passage between the two to allow the learner to gradually build more practical knowledge and skills from a general theory . Then the consideration of the life cycle of a scenario of conceptualization of a learning situation to finish with the proposal of the architecture of a learning activity from the abstract to the concrete in online teaching .

1. The kolb experiential learning model

According to ([3]), the learning model constitutes a representation of a particular type of learning process. The Kolb cycle is a learning model developed by ([4]), emphasizes how individuals assimilate new knowledge and skills through a sequence of distinct phases.

1.1 Les étapes du cycle de kolb

According to ([5]), Learning is conceived as "The process by which the transformation of experience generates knowledge" (p.38). Kolb suggests that learning takes place in four stages concrete experience, reflective observation, abstract conceptualization and active exhalation. Each step presents a different way of interacting with information and transforming it into meaningful knowledge, which occurs in a cyclical manner meaning it can be repeated repeatedly to deepen understanding and experience. These steps form a continuous cycle in which each step informs and influences the others, and learning is considered effective when all steps are integrated, ([1]).

According to research in the field, the kolb cycle allows learners to develop knowledge and skills in an iterative and cyclical way, continuously transforming concepts from concrete to abstract and verca. Figure 1 presents the kolb cycle, based on two axes which presents perception and transformation.

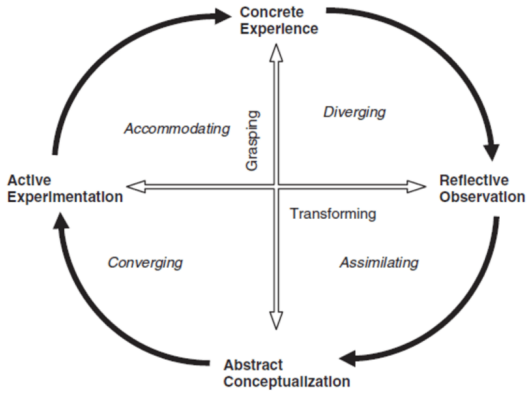

Figure 1 The experiential learning cycle and basic learning styles ([6]).

According to figure 1 the learning cycle of kolb in four stages. Immediate concrete experience is the basis for observation and reflection. These observations are assimilated to a theory from which we can deduce new implications for action: abstract conceptualization. These implications or hypotheses then serve as guides to act and create new experiences this is active experimentation. So, experience-based learning refers to the involvement of learners in concrete activities that allow them to experience this they learn and the opportunity to reflect on these learning activities and provide individuals with opportunities to put their knowledge into practice. ([7][8][9]).

1.2 Les styles d'apprentissage de Kolb

Kolb gave a name to the different types of learners, according to the phase of the learning cycle he prefers.

Figure2 presents the kolb cycle and the resulting styles:

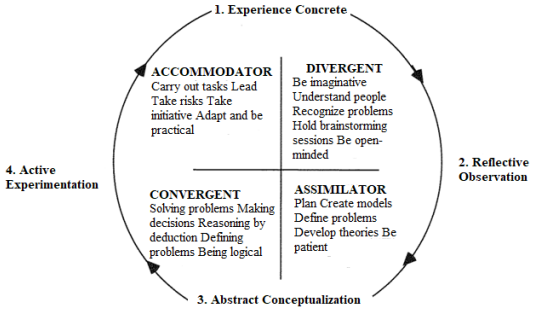

Figure 2 Phases of the learning cycle)([10])

Although the use of these four learning processes allows the student to complete the acquisition of his knowledge, Kolb observed that each student has a preference for the use of two processes of the cycle. He deduced four learning styles, Kolb (1984), detail below:

The divergent: He prefers the phases of concrete experience and reflection on this experience. Divergent are interested in people and emotions. He has a sense of observation; he is skilled at perceiving an object or a problem from different angles. He appreciates innovative activities; he has a fertile imagination and varied interests. He is interested in people and values feelings. He enjoys learning through experience.

The assimilator: He prefers the phases of reflection on an experience and abstract and theoretical conceptualization of an experience. Assimilators like to create theoretical models and are less interested than others in people and the practical applications of knowledge. He logically reorganizes information, juggles with ideas and

theories. He appreciates the theoretical lessons.

The convergent: He prefers the phases of abstract and theoretical conceptualization of the experience and application of the idea/action. Convergers like to be practical and tend to be unemotional. Additionally, they prefer to deal with things rather than people. He prefers to solve problems so the solution is unique. He is adept at technical tasks and decision-making. He appreciates self-managed projects and activities

The accommodator: He prefers the phases of concrete experience and implementation of the idea/action based on this experience. Accommodators adapt easily to new experiences and tend to find solutions. He learns through manipulation, carrying out tasks. He likes to be involved in planning and carrying out activities, he works by trial/error rather than logic; He tends to trust the thoughts of others rather than his own analysis, he easily accepts taking risks. He enjoys small group exercises.

1.3 The capabilities of each stage of the kolb cycle

In experiential learning, various experience-based learning methods can be used. ([11]), It is important to note that the skills and abilities acquired during the learning experience may vary based on specific learning areas and types of experiences. However, by following the Kolb cycle repeatedly and actively engaging in each step. The stages of the Kolb cycle can contribute to the development of different skills and abilities. ([12]), summarizes Kolb's thinking well. The learner, to be effective, must acquire four different skills. Based on the stages of the kolb cycle, we propose through Figure 3 below the capacities and skills for each stage of the kolb learning cycle and the corresponding styles:

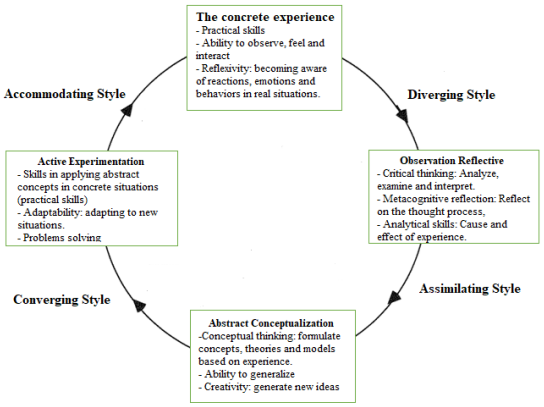

Figure 3 the journey of the kolb cycle the stages and the resulting styles

2. Deductive approach: the abstract and the concrete in the kolb cycle

The deductive approach is a scientific method of logical reasoning that starts from general propositions to arrive at specific conclusions. It is at the starting point of the experimental, theorized approach which starts from general principles which sets out a rule, a theory or a specific observation, to deduce logical and precise conclusions. ([13]).

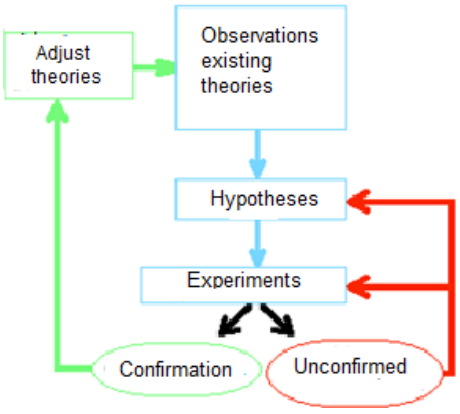

Figure 4 Steps of the scientific method ([14])

Concrete and abstract are two opposing notions that are often used to describe different aspects of knowledge. The concrete is all that is real, perceptible by the senses. The abstract, also known as the capacity for abstraction, designates the capacity of the mind to create and use concepts in reasoning, it allows mental operations to be carried out which make it possible to categorize, to know, to understand, to judge and to reason.([15]).

In this article, we propose the architecture of an online learning activity in the KOLB environment, going from the abstract to the concrete according to the deductive approach. This approach in the kolb

cycle consists of moving from the abstract to the concrete in learning to understand and apply theoretical concepts in practical situations, the kolb cycle highlights the interaction between the two concepts.

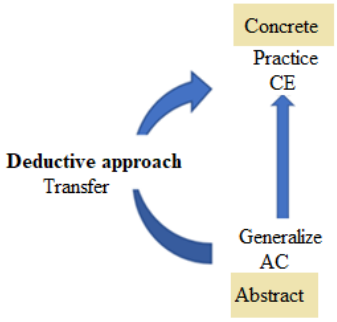

Figure 5 From abstract to concrete following the deductive approach

Figure 6 presents the Kolb cycle seen from the abstract to the concrete which illustrates the deductive approach which allows general principles or concepts to be applied to new situations. By following this process, one moves from an abstract understanding of a principle or concept to a concrete understanding of how it applies to situations.

2- The life cycle of an educational scenario of an online learning situation.

Defining a pedagogical scenario of activities makes it possible to manage the different aspects of a learning situation which would aim to differentiate the activities taking into account the characteristics of the learners (diversity, heterogeneity of level, motivation, learning styles, etc.) . We propose in our work of the architecture of a learning activity associated with the deductive approach starting from the abstract towards the concrete which can be confronted in an online teaching for a module without taking into account nor the nature of the discipline nor the nature of the concept to be treated. The following figure 6 illustrates a life cycle of an educational scenario of an online learning situation.

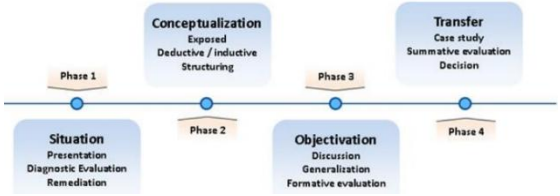

Figure 6 Example of the life cycle of an educational scenario for a learning situation ([16])

On the basis of structure, we propose the conceptualization scenario in order to structure the activities, from the abstract to the concrete of an online teaching module, according to the deductive approach of the kolb cycle.

2-1- The process of conceptualizing a learning situation

Based on the conceptual teaching model based on empirical research developed by (Tennyson & Park, 1980)[22], and the structure of a learning situation, we rely on its two methods to structure the situation. learning through the following stages:

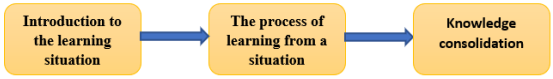

Figure 7 The structure of a learning situation and the model of the activity of conceptualizing a learning situation ([17])

This section describes the context of the educational activity. The main objective is to draw a portrait of the educational situation in order to highlight the particular needs, constraints, advantages and other relevant characteristics allowing the planning of a learning activity better adapted to the students and to the course in general. This portrait is broken down into five aspects:

- **Introduction to the learning situation**
- Presentation of the context and learning objectives.
- Definition of key concepts that will be covered.
- **The process of learning a situation**
- **Acquisition of knowledge**: Presentation of the rules and principles of the concept.
- **Analysis and understanding**: Identification of problems or questions posed by the situation.
- **Formulation d'hypothèses et de prédictions** : Formulate hypotheses and make predictions based on acquired knowledge.
- **Logical deduction** : Application of relevant rules and principles to resolve the problems posed.
- **Verification of conclusions**:Evaluation of conclusions drawn from hypotheses.
- **Knowledge consolidation:**

- Summary of key concepts and conclusions drawn.
- Integration of new knowledge into a larger framework.

III. PRACTICAL SIDE

The practical framework includes the proposal of an architecture of an activity of conceptualization of a learning situation according to KOLB from the abstract to the concrete according to the deductive and presented approach, the structure of an e-learning module and verify the capacity of a learner in the act of learning, the course of the Kolb cycle and the resulting styles and the deductive approach as a tool for the passage between the abstract and the concrete and build knowledge and practical skills to starting from a general theory with a consideration of the life cycle of a scenario of conceptualization of a learning situation to provide this architecture of a learning activity from the abstract to the concrete in teaching online a more practical aspect.

1. Architecture of the conceptualization activities of a learning situation according to KOLB from the abstract to the concrete

Learning involves the application of abstract concepts that can be applied flexibly in a variety of situations, in order to confirm theoretical rules. It is important to emphasize that our work on the proposal of this architecture combines the stages of conceptualization and the deductive approach in the context of Kolb to have a solid and effective tool in the form of an approach which promotes the understanding of concepts and develops problem solving skills based on deductive logic and recruits the use of this approach based on this approach, an architecture of the activity of conceptualizing an online learning situation according to a deductive approach in based on the three systems of modular learning:

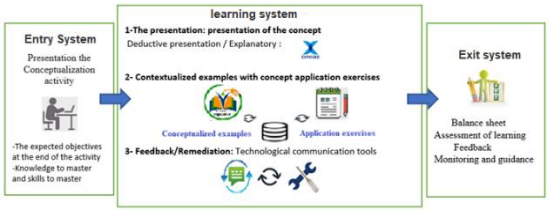

Figure 8 Architecture of a conceptualization activity for a deductive approach to a learning situation

This architecture aims to guide learners in their conceptualization process by favoring the deductive approach in the kolb cycle. It promotes memorization, understanding and application while allowing learners to consolidate their knowledge and apply it in other situations through self-assessment and upgrading using technological communication tools to validate student learning. learners, while benefiting from the richness of styles by favoring the dominant learning style, from a learning situation which consists of three systems:

1.1 Entry System

Entry systems concern the presentation of the learning activity by defining the objectives to be achieved at the end of the activity, the knowledge to be acquired and the skills to be mastered.

1.2 Learning system

The e-learning system refers to the set of tools, technologies and methods used to deliver training and enable learners to acquire new skills or knowledge at a distance. It must be designed in such a way as to provide an educational experience interactive, engaging and effective for learners while meeting training objectives. In our case the learning system consists of going from the abstract to the concrete, from concept to application. We start from the statement of the concept or/and the rule by contextualized examples to be done and the verification of understanding to carry out application exercises and validate the theory, self-assessment is done in a recurrent way. Our system, first of all, offers:

• A presentation of a presentation according to the nature of the concept to be treated (presentation, films, documentary, video, content, Images, etc.), the purpose of which is to present the basic concept and motivate the learners and for further explanation and diversification of advanced resources it is recommended to accompany the presentation with content, while integrating the technological tools of communication by effect of back and feedback, for an upgrade.

• The proposal of contextualized examples that the learner can choose from a resource (x examples to be redone) to verify the understanding of the knowledge presented in the presentation and the proposal of application exercises that the learner in the same way can choose them from a resource (x examples to do and redo) to test the acquisition and

application of this knowledge. Online on-line interaction often allows learners and trainers to interact through discussion forums, live chats, study groups, question-and-answer sessions, and more. This promotes the exchange of ideas and helps with learning.

• Finally, feedback is carried out alongside remediation based on technological communication tools to fill learners' gaps and correct their erroneous learning, and fill in the gaps. Learners can receive feedback on their performance through personalized or automated comments on their work. Assessments can be used to measure knowledge and skill acquisition throughout training.

1.3Output system

The exit system for online training refers to the steps and elements that occur at the end of training, when learners successfully complete their online learning program. In our approach, the output system concerns an assessment of the activity of the conceptualization of the deductive approach proposed by an evaluation and validation of acquired knowledge, as it aims to provide a clear and satisfactory conclusion to the training, while allowing learners to accumulate the knowledge acquired and progress in the learning journey.

IV. DISCUSSION

Referring to figure 6, of the life cycle of an educational scenario for a learning situation, phase 2 presents the conceptualization which can be defined as the process of developing a concept. The process of conceptualization is largely based on the abstract: it is the passage from particular cases to the identification of a common structure ([18]) .Through figure 7 which presents the model of the activity of conceptualization of a learning situation, and by using the kolb cycle for the passage from the abstract to the concrete, according to a deductive approach which allows the learning to follow a logical approach to modeling according to an abstract activity which is a task or exercise that involves the reflection, conceptualization, analysis and synthesis of abstract and complex information. It is often used in academic and theoretical fields. This approach helps learners develop thinking skills and better understand complex concepts by providing structure and resources. Theoretical learning activities can be carried out in groups or individually and can be adapted to different levels of learning. In Figure 8, the structure of this architecture proposes that the learner and when moving from one system to another has certain characteristics and skills. Indeed, for the transition from the entry system to the learning system the learner must be an abstract and conceptual thinker, and work starting with abstract ideas and theories, then applying them in practical situations, which involves he must be good at finding practical solutions to problems and making decisions based on logical and analytical thinking, works with structured and organized information and likely to be good at analyzing data and using it to make decisions. Its characteristics correspond so much to the convergent style of the kolb cycle. So, the learner in our system for the transition from the input system to the learning system must be able to take abstract information and apply it to practical situations, planner , organizer and evaluator. While moving from the learning system to the output system the learner must learn through practical experience, he adapts to new situations and reacts quickly to changing circumstances. He must be a problem solver and prefers to discover things on his own rather than following instructions or reading manuals, his characteristics so closely match the accommodating style of the Kolb cycle. From the above and from our vision this clearly explains that convergent and accommodative learning styles are criteria for effective learning.

Finally, depending on the proposed architecture, it is important to choose the learning activities that best suit the learning styles of the learners, which allows us to say that styles are factors that influence learning in terms of quality.

IV. CONCLUSION

Learning styles have been the subject of numerous studies, with the aim of improving the instructional design of courses and understanding how students learn. Four learning approaches were examined: (1) personality, (2) information processing, (3) social interaction, and (4) teaching preferences. ([19] [20] [21]).

The information processing approach examines how students absorb and use new information. David Kolb's Experiential Learning Model and Learning Style Inventory (LSI) is the most important theory and instrument used. This model is a circular process and for effective learning to occur, the learner must experience the

entire cycle. Most learners favor one part of the cycle over others, hence their preference in terms of learning style.

Kolb's experiential learning theory posits that individuals have different learning styles that influence how they learn and process information. The abstract mode is an information processing mode of the kolb cycle that helps understand how learners learn and develop. The model or architecture of the conceptualization activity for a deductive approach to a proposed learning situation, in strong coherence with Kolb's learning styles, is an aid for learners, in order to improve their ability to learn and solve problems more effectively in an online environment. This work presents the architecture of a global scenario for designing learning activities for the transition from the abstract to the concrete where reflective observation and active experimentation lie between the two, reflective observation being more observational , and active experimentation being more convenient. Understanding the different learning styles according to Kolb's experiential learning theory is crucial to designing effective activities. According to the discussions proposed by integrating activities adapted to each learning style, we generate a more inclusive and engaging learning environment where learners can maximize their potential and achieve their learning objectives.

In conclusion, the Kolb Learning Cycle is a powerful model that helps learners understand the best way to approach learning activities and their preferred learning styles. By identifying the dominant learning style, learners can better engage in different types of learning experiences and develop their skills in the abstract mode. However, concrete and abstract modes are two complementary approaches to learning and It is important that learners develop their ability to use both modes in order to improve their overall performance, so the concrete mode will be presented in the next article.

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