IMPACT OF TECHNOLOGICAL ADVANCEMENT ON PEDAGOGY

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ABSTARCT

To improve the quality of learning, pedagogues have prescribed different pedagogical approaches (constructivist, cognitivist…). However, the effective implementation of the majority of these approaches has not been possible only after the advent of new forms of learning (E_learning, M-learning…). These forms are closely related to technological development. Later with the emergence of technology (pervasive computing, Artificial Intelligent …) a new form of learning is established. It is called Pervasive Learning "P-Learning". P-Learning is a social process that connects learners to communities of devices, people, and situations in a transparent and independent manner. This learning form goes far beyond the predictions suggested by pedagogue. Learning can then take part outside the learner via technology, which will be an extension of his brain by unloading the cognitive practices he performs.

The aim of this paper is to answer the following questions: What alliance is there between pedagogy and technology? Are we in need of a new pedagogical approach in the new learning environment "P-Learning"? What are the new pedagogical challenges to resolve?

Keywords: pedagogy, technology, Connectivism, P-Learning

INTRODUCTION

Previously, we talked about teacher-centered teaching where learning was a process of passive transmission of knowledge. Nonetheless, with the need to ameliorate the quality of learning, pedagogues and psychologists have changed direction towards learner-centered learning. Several pedagogical trends were then born, among which we cite:

- **Behaviorist pedagogy: It is based on behavioral approach. The teacher depends on the subject's observable behaviors such as his answers to questions or the steps he uses to solve problems. Behaviorism focuses on the teacher's role rather than that of the learner. It puts more emphasis on the teacher-knowledge axis of the pedagogical triangle (Figure 2).**
- **Constructivist pedagogy: It is oriented towards the construction of knowledge and not to its transmission by encouraging the leaner-knowledge axis of Houssay's triangle (figure2). Learning comes from learner but not from the teacher. The learner builds his own universe from his experience and prior knowledge by actively contributing to knowledge construction. The constructivist pedagogy relies chiefly on the interactions between the learner and the social environment to give meaning to the knowledge that he builds (Tomlinson, 1995).**

- **Social constructivist approach: it is derived from constructivism. It takes into account the social parameters. This approach matches the principle of constructivism in the construction of learner-based knowledge, with focus on the causal relationships between social interactions and the individual's cognitive changes.**

All these approaches are interested in enhancing learning, but their application, especially of those that are more learner-centered (constructivist, cognitivist...) proved difficult at the time when teaching was more teacher-centered (traditional teaching). Nevertheless, with the technological advancement several forms of learning (ICAL, E-Learning, M-learning ...) were established; gradually adopting the most interesting currents of pedagogy (cognitivist, constructivist, social constructivist ...).After all, with the emergence of new concepts (Pervasive Computing, Ubiquitous Computing...) a new form of learning has emerged; namely Pervasive Learning (P-Learning). In P-Learning environment, learning is a social process wherein the learner has access to various devices, people and other pervasive learning situations in a transparent and independent manner. The question that arises now: In this new learning environment do we need a new pedagogical approach or will it be sufficient to implement the existing ones?

In what follows, we will tackle three sections: The first section focuses on the impact of technological evolution on on-line learning forms as well as on the pedagogical needs posed. The second section sheds light on the impact of technology on pedagogy and the need to adopt a new pedagogy for P-Learning. The final section presents the evolution of the pedagogical understanding models related to the evolution of learning forms. It also identifies a few pedagogical challenges posed by P-Learning associated with connectivism.

IMPACT OF TECHNOLOGICAL ADVANCEMENT ON LEARNING FORMS

Technological progress has brought great changes in all areas, including learning. For sure, technological evolution has pushed learning community actors to renew its teaching modes and learning tools. Several forms of learning have emerged with the objective of overcoming the spatio-temporal limitations caused by classical education; and as a result, have improved the quality of learning. Let us recall the first correspondence course that is the first form of D-learning (Distance Learning). It was created in 1840 in England thanks to the development of office services. This type of learning called at that time "second chance learning", was able to tip up the transfer of knowledge from learner-teacher axis to learner-knowledge axis in order to ensure a learner-centered learning. This allowed people who had problems of access to places of trainings (disabled, geographically isolated, etc) to continue their studies. Thus, the major objective of D-Learning was to overcome the spatiotemporal problems by putting the new technologies (post office at that time) to the service of learning.

Despite the advantages of D-Learning, the learner was almost isolated because the tutoring was generally done by correspondence (as in the case of correcting work). Afterwards, D-Learning has shown some amelioration by broadcasting educational programs (academic) and implementing audiovisual devices (television ...). Nevertheless, despite all these efforts, D-Learning was not able to answer the requirements of the collaborative learning because on one hand the interaction between teacher and learner remained limited to the correction of the works by correspondence or by telephone, and on the other hand, the interaction between learners was nonexistent. After the technological evolution especially that of computer science (appearance of microcomputers) in 1980, several computer specialists and pedagogues united their efforts to improve distance learning.

Teaching assisted by computer using the CD-ROM then the multimedia CD-ROM appeared. This was able to offer an interactive and animated learning. With the appearance of the Internet (especially the development of Web) and the development of the ICT, a new form of learning came forth under the name of E-learning (electronics learning).

This type of learning has evolved proportionally with the technological evolution; giving rise to other forms of learning (M-learning, P-learning).

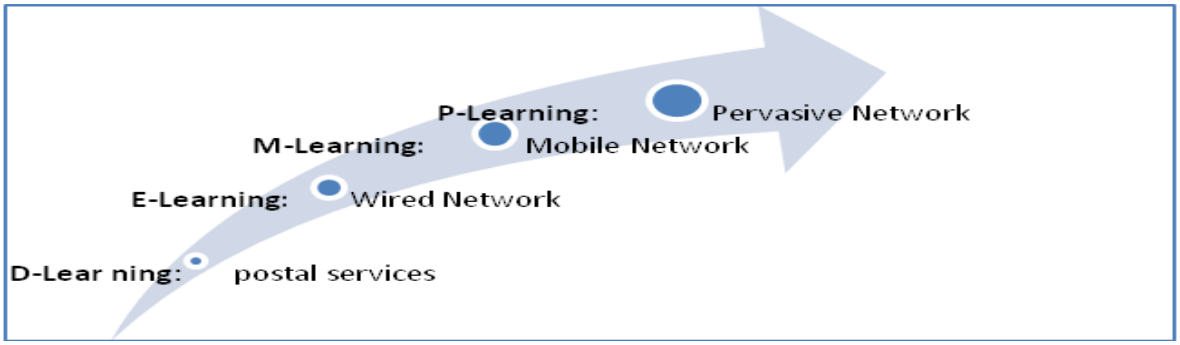

Figure: 1
Evolution of learning Forms

Therefore, we present in what follows the various learning forms (eg: Figure: 1) which come from the technological evolution as well as the pedagogical challenges posed by them.

E-Learning

The European Commission proposed a definition of E-learning, which we translate in what follows : E-learning is the use of the new multimedia technologies and Internet to improve the quality of learning by facilitating the access to resources and services, as well as exchanges and remote collaboration. This definition clearly shows the pedagogical and technical challenges of remote learning. Indeed, to surmount the limitations of the traditional education such as the spatiotemporal constraints, E-learning has faced several technical challenges (the access, the re-use, the shares of information) to assure the management of the components of the learning system and the exchange of the contents (Jonassen, 1995). Besides technical challenges, E-learning needs were also taken into consideration at the pedagogical level. So, according to the various pedagogical currents evoked by pedagogues (constructivist, differentiated, socio-constructivist) two major pedagogical challenges were raised by the e-learning namely:

- **Learning personalization: That is the individualization of the learning process according to the learner's characteristics (Abik, 2009). This constraint is the object of most of pedagogical currents (constructivist, socio-cognitive). To satisfy this pedagogical challenge, didacticians had to take sufficient measures during the elaboration of the contents so that the learning systems could assure personalization. Those systems had to display some mechanisms to trigger off learners motivation, management of the experience, self-assessment ...;**
- **Collaborative learning: based on constructivist approach, psycho-cognitive and socio-cognitive. It is about an internal and individual mental process that is based on an approach of group to ensure the elaboration of viable representations.**

It is strengthened by exchanges, pooling, interactions, confrontations as well as contradictions of viewpoints; which provoke questionings and stimulate new learning (Jonassen, 1995). To ensure a collaborative learning, the learning system had to manage interactions and communication (synchronous and asynchronous) between actors (learner-learner, learner-teacher).

To overcome the challenges evoked by the pedagogues, several remote platforms called also LMS (Learning Management System) or LCMS (Learning Content Management System) have emerged (WebCT, Moodle, Claroline). These platforms accommodate the didactic contents, facilitate the implementation of the educational strategy and enable the tracking of learners by gathering all the necessary tools (educational content, chat, quiz, video conference) to assure a pedagogical learning (tracking process learning of the learners, evaluation, communication...). Most of these platforms provided distance-learning with maturity on the pedagogical plan, by regrouping four types of actors: author, learner, administrator and tutor.

However, the key point of E-learning which was the access anywhere and anytime to contents is weakened more and more with the whims of the new generation of users. In fact, E-learning requires microcomputers and\or laptops connected to the wired networks. This assures only a certain nonpermanent mobility, which is called residential (Samuel, 2003), because the learner loses connection between the various workplaces. In spite of the important evolutions of the wired networks, certain geographical zones remained deprived of these technologies because the difficulties of installation (i.e. Mountains), aesthetic problems (i.e. monumental zones) or sometimes because of financial constraints.

In parallel, network users have become more demanding in term of availability services anywhere, anytime and even when moving. The mobility has developed particularly during the first decade of the third millennium «And has become in a few years an essential function claimed by the users at first for the telephony then for the data transmission» (Pujolle , 2006).

Face to this increasing need, wireless networks have emerged and the process of miniaturization continued its evolution to create mobile terminals that can be easily transported. So, by taking advantage networks and telecommunications, E-learning has been extended to yield other form of distance learning called "M-Learning".

M-Learning

Parallel to the development in the E-learning field, a remarkable evolution in mobile technologies has marked this beginning of the third millennium. Nonetheless, as at the dawn of all educative technological revolution (as the use of computers), mobile technologies have had their impacts on learning giving rise to the Mobile learning (M-Learning). Since its appearance, several attempts to define M-learning have been elaborated. It was defined by Malley paving the way to Mobile learning (M-Learning). Since its appearance, as "a kind of learning which occurs when the learner is not in a fixed place, or when the learner takes advantage of mobile technologies" (Bertrand, 2006). This definition misses precision, because even in the case of E-learning we can attend learning in several places. Undoubtedly, a learner can start the learning with his home computer and then goes on his activities in a library by using another computer. Other definitions were proposed by the committees of standardization such as that given by the committee JTC1 of ISO stipulating that M-learning can be defined as learning using mobile and wireless computing technologies in a way to promote learners' mobility and nomadic nature (Shon, 2008).

From these definitions we can say that M-learning is a logical continuation of E-Learning. It is more intended to be used in the environments which are less favorable to learning such as public transportation. M-Learning uses most of E-learning components (actors, pedagogical resources ...) and if necessary adds other services (sms, mms) related to the mobility notion which follows the appearance of wireless technologies and mobile devices (PDA, cellular phone, etc).

Thus, the elimination of the constraints related to time and to space aimed by M-learning is remarkable because it compensates for the time lost while moving. M-learning is a learning environment which allows access to contents and communication between actors (learners / teachers) by exploiting mobile technology.

Now, if in the mobile learning the technical challenges (i.e management of disconnections) have found echoes, pedagogical challenges still lie ahead:

- **Learning in real contexts: The learner, with his mobile device is able to monitor the content of classical learning such as courses, multiple choice questions, and tutorials. In addition, mobile devices provide flexibility and ease of access in geographical areas not easily accessible with a classical computer. M-learning seems to have a better opportunity to engage the learner in his learning by allowing learning in real context (also known "situated learning") which is based on the cognitive approach;**
- **Collaborative Learning: thanks to mobile devices, which represent an excellent medium of communication, interactions between the various actors can be performed through several means such as email and forums. These communication tools allow creating pedagogical spaces (blogs, wiki, forums, video-conference...) that permit the exchanges between actors (learner-learner, learner-teacher...). In addition, these spaces constitute real centers of produced and accessible resources. Hence, They favor a collaborative learning wherein the learners construct their knowledge, experience and skills**
- **More creativity and more autonomy: Mobile technologies have provided the learner with flexibility of learning regardless of time and space. This autonomy and flexibility equip both of the learner and the author more capability of invention and creativity.**

Parallel to the development of the wireless networks which are the base of M-Leaning, new technologies were born such as Pervasive computing, Ubiquitous computing, Ambient intelligence and Context awareness. The major objectives of these technologies are to guarantee that the communicating objects will be perfectly integrated and adapted to the daily lives of people. They should be able to generalize and trivialize the wireless communications networks by making all the technology behind it invisible to the user. They have to make access to information more transparent according to the place and the current context by establishing a more transparent, friendly and thus natural interaction between human society and digital society (Senouci, 2004).

Therefore, by exploiting these new concepts in education, it has been possible to join M-Learning up with an interaction dimension having intelligent spaces that take into account the context and an invisibility of the technologies behind. This brought in a new form of learning called Pervasif Learning " P-Learning ".

P-Learning

Being based on the new concepts mentioned below, P-Learning seeks the continuity of communication and the access to services in a transparent and optimal manner so that the actor (learner, tutor) would be in touch anytime and everywhere. This allows to go on working depending on the context in which the actor (office, home, train…) is located with the equipments at his disposal at a certain time (PDA, digital watch). Several definitions were proposed for P-Learning concept such as: "Pervasive learning is a social process that connects learners to communities of devices, people, and situations so that learners can construct relevant and meaningful learning experiences, that they author themselves, in locations and at times that they find meaningful and relevant" (Agarwal, 2011).

According to the definition presented above P-learning consists of three major factors. The first factor is community because P-learning is a social process that is composed of the learner, communities of devices, people and other pervasive learning situations. The second factor is the autonomy because learners can act on the process of their learning, and have the ability to perform actions and intervene while evaluating it. The third factor is localization since learning can take place anywhere.

Another definition than we cite concerning the concept of P-Learning is: « Pervasive Learning refers to an environment for the student where the computer becomes completely transparent and where the machine adapts to human needs. Access is everywhere, no matter the location of the equipment. This dimension calls for new paradigms to reduce the gap between the mechanical representation and human relations in a communicating space. The learner is at the center of an ecosystem that allows learning through a network of services and access. The user structures his learning through a human network interaction that takes into account the ubiquity of a spatial, temporal and cognitive multi dimension, as well as multiple channels and multiple access methods tailored to the learner » (Preteux, 2008). By referring to this definition, P-learning environment is characterized by: the total transparency with regard to the infrastructure used in the learning process, the automatic adaptation of the learning process or the services to the user's need and to the access anywhere and anytime independently of the localization of the used equipment. Besides these characteristics, the learner structures his learning process through his interactions with his environment.
Hence, the main issues of a P-learning environment are the management of the context and the access to the contents (media) or to the learning activities by learners anywhere, anytime and through any environment. The global vision of pervasive learning can be summarized in these points:

- **The use of different environments;**
- **The adaptation of content and learning activities according to the context**
- **Continued learning through different contexts to ensure the coherence of learning activities;**
- **Management of the mobility;**
- **Structuring learning by learner through his interactions with his environment.**

In P-learning, with the all possibilities offered by the new concepts, it is easy to involve the learner in the production of knowledge and to motivate him to share activities with others in an environment where knowledge is both distributed and shared by many disciplines. This knowledge can also come from any object other than the individual. It is true that after the integration of different technologies in the learning process, new opportunities of learning have appeared.

These technologies have served as a medium of communication and dissemination of pedagogical contents. However, all projects of learning, based only on technology without the effective integration of pedagogy, have not showed remarkable results.

Certainly, early works in this area have overestimated the performance of technologies. Yet, once in action, it proved crucial to integrate the adequate pedagogical approaches to assure the quality of learning.

Then, what is the alliance between pedagogy and the technology? Do we need a new pedagogical approach in the new learning environment "P-Learning "?

IMPACT OF TECHNOLOGICAL ADVANCEMENT ON PEDAGOGY

As we mentioned previously, in education, pedagogical currents' aim is to better learning. Nonetheless, the application of these trends, especially of those that are more learner-centered such as constructivism, ended up to be hard in the period wherein teaching was more teacher-centered. However, according to the technological advances several forms of learning (ICAL, E-learning, M-learning) were established adopting gradually the most interesting pedagogical currents (cognitiviste, constructivist, Socio-constructivist).

Chronology of application of the pedagogical trend's implementation

In the 60s, the first attempts of the Computer-assisted learning (CAL) were based on the theoretical model of behaviorism. The computer played the role of a particular tutor for every learner. It managed the answers to the questions put to the learner. After the tutorials the simulations appeared; this allowed the learner to take initiative, to act and to observe the outcome of his actions. Subsequently, CAL has been detached of behaviorism taking into account the learners characteristics.

In 1970, when the first U.S. conference on 'computer assisted learning' in America, CAL becomes ICAL where "I" means "intelligent" thanks to the contributions of artificial intelligence and intelligent tutoring. In the late 70s, another trend emerged; it is "microworlds and the guided discovery". In these systems, the computer does not play the role of the teacher; it is used as a means of expression and experimentation. The microworld 's function is to use the learner's knowledge on the functioning of real objects and, from there, to allow him to convert and formalize them to establish a semantic link between the real and the formal (Zampa, 2009).

With the evolution of the Internet, new systems were developed with an emphasis on the distributed and cooperative aspect of learning. Besides, by taking into account the different of communicational and human aspects that intervene in the learning processes, the ICAL was transformed to ILE (Interactive Environment for Learning) in 1998. This latter is based on the socio-constructivist theory studied in Human and social Sciences associated with the computing theories (Grandbastien, 2006).

By leaning on the concepts coming from ILE communities, and through its learning platforms, E-learning was able to reach a pedagogical maturity validating the majority of the approaches and the theories treated by pedagogues. As for M-learning, which is an extension of E-learning, it was able to increase the level of exertion of the various approaches or pedagogical theories supported by E-learning by favoring other pedagogical constraints such as situated learning (eg section 2.2).
With M-learning, the existing theories of pedagogy were able to satisfy the pedagogical needs due by to the use of new technologies. The question that comes to light now: Is there a need to adopt a new pedagogical approach in P-learning?

Pedagogy in the new era of learning

The evolution and the convergence of the wireless technologies (WiFi, 3G), the mobile devices (Smart Phone, PDA, games consoles…), the sensors (GPS, sensor) allowed the emergence of mobile and pervasive learning. In parallel, the networks evolution and the technological emergence have also promoted the evolution of Internet (Internet of objects) and of Web (pervasif Web). Unquestionably, Internet is becoming an informational ecosystem constituted of networks nodes connected to each other by links. This new Internet is going to make of us nodes surrounded by a set of other communicating nodes. Consequently, Internet will no longer be a technology of information and communication but rather a technology of relation (Rosnay, 2008). Regarding the progress of Web, the latter has known three major eras:

- **Web 1.0 which is the first era that spreads information to passive users.**
- **Web 2.0 which is more participative and wherein users create content (blogs, wikis, …)**
- **Web 3.0 which is based on the semantic in order to ensure an intelligent search on the web by giving signification to all Web resources.**
- **Web 4.0 named also "Web pervasive". It is the future web that will enable communication between different technologies such as mobile Internet, Web 3.0 and intelligent environments.**

The evolution of Web has played an important role in the remote learning, especially on the application of the most important approaches of pedagogy. The first generation of Web included services that facilitated collaborative learning such as chat, e-mail, forums allowing the constructivist learning. The second Web generation 2.0 included other services such as Wiki, blogs and social networking. These have offered users the opportunity to contribute, share information and communicate between each other. Web 2.0 has transformed the existing concepts of learning by trying to replace the conventional manner in which the teacher provides the knowledge and the student is evaluated on the product by a way in which the learner is immersed in an environment with resources that he should use individually or in groups (Lebrun, 2009). George Siemens wrote an article (in 2004) in which he spoke about a new pedagogical approach called Connectivism. This approach leans on some existing theories such as chaos and neuroscience. The main idea of this approach is that learning does not exist in individuals contrary to other theories such as that of the behaviorist approach where we are more interested in the answer than the behavior.

It is true that in the socio-constructivist approach there is an interaction between the members constituting a team, but according to Siemens this approach remains an individual vision of the learning. Indeed, with the technological evolution and the emergence of social networks a new shape of grouping appears. Siemens through the connectivism approach asserts that it is inside these groupings reside learning and intelligence. Thus, according to the connectivism approach, learning does not lie only in the individuals, but also resides in the networks and their connections. The basic principles of this pedagogical approach can be summarized as follows (Siemens, 2004):

- **Learning and knowledge emerge in the diversity of sources;**
- **Learning is a process that can pass through the interconnection of specialized nodes or sources of information;**
- **Learning can occur by using devices external to human beings;**
- **Learner autonomy is more sophisticated than what we have in the educational area;**
- **Encouraging and maintaining the connections are needed to facilitate continuous learning;**

- **Ability to identify connections between fields, subjects, ideas and concepts is a core competency.**
- **The value (specifically, in terms of an update knowledge) is for all connectivist activities of learning;**
- **Decision making is itself a learning process (ex: choosing what to learn).**

However, Web 2.0 is not sufficient to meet the principles laid down by connectivism. Nor, does it help to have access to knowledge in an intelligent way at a time when this one is distributed in the networks and the capacity to learn has turned out to be more and more important. Hence, we do not need to benefit from the third generation Web3.0 that is based on semantic Web and have to skip to Web4.0 to be able to assure pervasive learning. Once again, the new pedagogical approach should wait the technological evolution for its effectively application.

New Pedagogy for P-Learning: Connectivism

Until now, learning is made by the learner via his internal representation of his mental scheme (i.e cognitivism) either by constructing knowledge from his own experiences (i.e. constructivism) or by constructing knowledge from his experiences and his interactions with a limited group of learner (Socio-constructivist). In addition, the existing pedagogical approaches are more interested in the acquisition of knowledge based primarily on a structured learning process and not how to reach it. However, with the new P-Learning vision, learning can be tack place outside the learner by intelligent technology that will be an extension of his brain by releasing him from cognitive practices he exercised; such as the search and the storage information.

By Taking advantage of this new form of learning where knowledge is distributed, several theories can be applied such as complexity theory and chaos theory. The interest of the use of these theories is to assure the order in an environment characterized by the disorder and ensure the non-linearity of the learning process. Hereby, comes the need to use a new pedagogy.

With the advent of Web 2.0, connectivism has appeared. The need to use this approach is not justified in E-learning or in M-learning because the existing approaches can answer the different pedagogical challenges.

However, In P-learning if we want to provide a non-structured learning by taking advantage of the benefits offered by technology, the need to adopt a pedagogical approach that focuses on the distributed learning process is needed. Here shows up the interest to adopt the connectivisme for P-Learning since its objectives join more the concepts offered by this approach.

For example the fact that P-learning is interested to connect humans to communities of devices answers the two main concepts of connectivism: "Learning and knowledge emerge in the diversity of sources" and "Learning can occur by using devices external to human beings"

PEDAGOGICAL CHALENGES IN P-LEARNING

The technological evolution, which has played an important role on pedagogy, can be summarized in two dimensions; Network evolution and Web evolution (Table 1). The following table summarizes the relation between the dimensions resulting from the technological change and the learning approaches.

Table: 1
Comparative table of different learning forms

	Network	Web	Pedagogical Approach
D-learning	_	_	Near of Constructivist
E-learning	Wired	1.0 2.0	Constructivist, Socio-constructivist
M-learning	Mobile	2.0 1.0	Socio-constructivist
P-learning	Pervasive	3.0 & 4.0	Connectivism

The technological evolution through its two dimensions has completely changed the vision of education world. This has led to changes on the model of understanding pedagogy. Before, hand learner was obliged to be in front of the teacher in the same place and at the same time. Teaching was based on the pedagogical triangle (eg: figure2) defined by Houssay in 1988 (Pastiaux, 1997). In this model the learning situation is represented by three axes (learner, knowledge and teacher). Knowledge transfer is only assured by two poles of the pedagogical triangle (teacher-learner, learner-knowledge, teacher- knowledge).

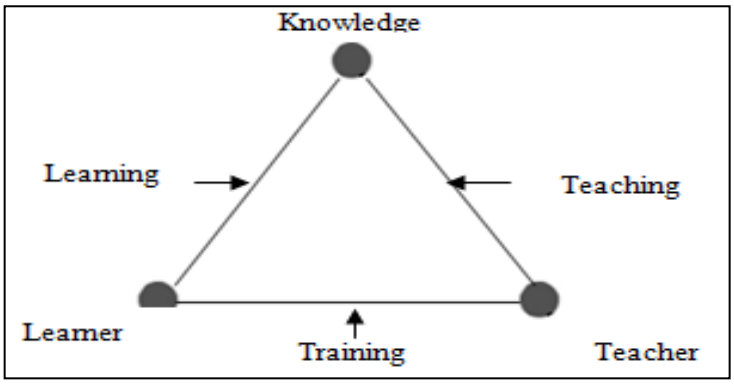

Figure : 2
Pedagogical triangle

With the appearance of E-learning the pedagogical triangle has evolved towards a pedagogical tetrahedron (Figure3).

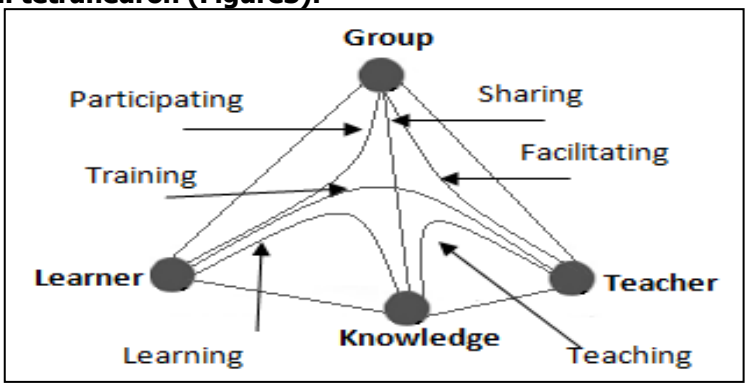

Figure: 3
Pedagogical tetrahedron

Therfore, with the evolution of the wired network and Web (web1.0) the relations between the poles have become mediated by a device while they were in direct face-to-face.

The virtual environment that played an intermediary role between the poles has integrated into the pedagogical triangle.
Taking advantage of this environment the pole "groups" is added; transforming the triangle into a tetrahedron and offering the best conditions for the socio-constructivist approach (Faerber, 2003).

This representation has produced in addition to the three processes (training, learning, teaching) other process: participate, share and facilitate. With Web 2.0, another process called "contribute" can be added to the pedagogical tetrahedron at the level learner-knowledge.

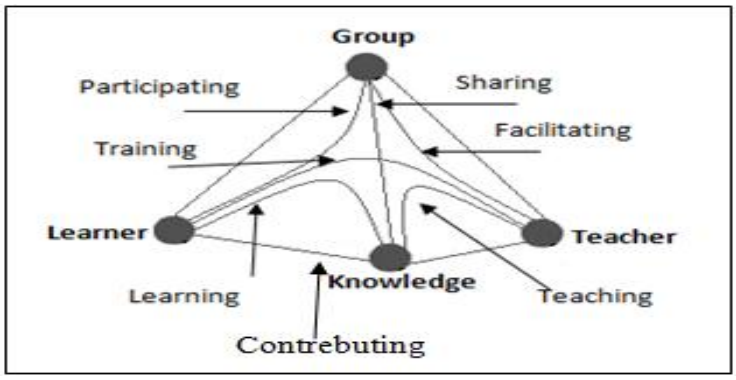

Figure: 4
P-Learning and Web3.0

However, by combining P-Learning and Web3.0, learning that takes place inside the tetrahedron (where knowledge is a pole) will be rather inside a network of people and communicating objects wherein knowledge resides in the meshed connections(eg: figure 5). In this network, learner will be surrounded by nodes. These nodes can be human (learners, tutors, experts ...), group, community, systems or objects interact and communicate by building knowledge.

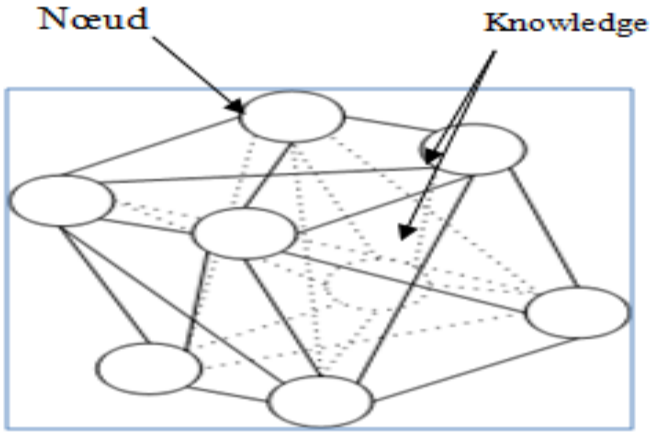

figure: 4
Pedagogical Network

In this network, learning is a process of creating connection with specialized nodes (human sources of information) to select the needed information to acquire based on the initial knowledge. Knowledge is distributed over the network and exists in it. Hence, when the learner connected to a specialized node to acquire knowledge, all nodes connected to this learner take advantage from this knowledge. This is why in the new "learning network", connectivism finds all its reasons to be used.

So, being aware of the need to adopt this new pedagogical approach, several questions are now to be forged such as:

- **Scenarization of the learning contents: In the new mode of learning, the didactician is not the alone responsible for the content; it the responsibility of all the nodes that constitute the learning network.**
- **Recently, to assure an effective learning, the didactician creates a generic course. The structuring of this course is made in a hierarchical way by considering the various personalization criteria (skills, knowledge…) in order to assure the specific generation of the courses according to the learner's profiles. Several standardization works were interested in courses scenarization(SCORM, IMS-LD). But in the new context all the nodes that constitute the network will contribute to a dynamic scenarization of learning content. The didactician will set the structure in terms of objectives and if it's necessary, he will provide some contents to initiate learning. The content will be enriched dynamically through the interactions between nodes. The teacher will become a moderator and a validator of the contents coming from various nodes. Thus, several questions come forth: how can we assure the dynamic structurating of content? Can we adapt existing standards?**
- **Scenarization of nodes connections, which are always in competition: Indeed, because all nodes in the learning network can participate to build knowledge, what are the most relevant ones? Here emerges the need to use protocols of discovery service for pervasive environments by keeping Tracks of scenarization of nodes connections in the learner profile. These protocols will have besides the selection criteria related to environment, the criterion concerning the pedagogical relevance satisfying the learner's need.**
- **Evaluation modalities : knowing that it is not only the result which must be evaluated, but rather all the adopted process by using the adopted nodes' scenarization located in the learner's profile**

CONCLUSION

To sum up, technological change creates more changes in our ways of thinking and, consequently, on our way to learn and acquire knowledge. It has given rise to many forms of learning such as the E-learning and M-Learning. These forms of learning allow the application of the most interesting learning approaches such as congnitivisme, constructivism and social constructivism, which were created before the technological development. Recently, following the development of Web 2.0, a new pedagogical approach has emerged: the connectivism. Nevertheless, the effective implementation of this approach will not be outstanding only by associating it with the new form of learning "P-Learning". This association will not necessarily provide a linear learning in an environment where returns the learning process more and more complicated because knowledge is distributed and shared by several discipline.

It should be noted that what is presented here will not replace what already exist because the learning can be seen like a puzzle. To ensure an effective learning it is important to combine several facets be it structured or not at a time when information and knowledge evolve quickly. Certainly, structured learning, as it is known, is important for the transmission of basic knowledge but at a certain level the learning that adopts connectivism will ensure the specialization in domains which are more and more multi-displinary thanks to the infrastructure offered by technology

Several research works are interested to solve the technical problems of P-Learning (Agarwal, 2011; Preteux, 2008). Within our research team LeRMA (Learning and Resherch in Mobile Age) we answered several technical challenges through our architecture MADAR-Learning (Daoudi, 2010) such as the Context awareness (Elbouzekri, 2011) and the Adaptation (Elhamdaoui, 2010;2011). Recently, besides to the technical challenges we are also interested to answer the pedagogical challenges mentioned in this paper starting with the Scenarization of the learning contents and the Scenarization of connections of the nodes.

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Acknowledgments
The authors wish to thank Ms. Hind Sidki for the validation of the English version of this document.

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