THE NEW LEARNING TECHNOLOGIES IN A HIGHER EDUCATION INSTITUTION AS AN ECOSYSTEM

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Abstract

The introduction of new learning technologies is one of the major challenges facing Higher Education Institutions (HEI). The challenge is not in the technicalities of using such technologies but to the extent that these technologies may present a threat to the ongoing trends and how they may affect the welfare of the institution itself.

New learning technologies are considered as new tools to enhance efficiency and productivity of teaching and learning in HEI, since education is not only about tools but also about the integration of such tools in a wider vision of pedagogical innovations. On the other hand, while tackling the issue of "quality" the HEI tends to look at any institution as a whole and tries to maintain a high degree of homogeneity within the institution’s structure and at all its levels. While doing so, and to combine the needs of all these new tendencies in Higher Education, an institution may face obstacles due to internal discrepancies and sometimes unpredicted contradictions between the operational constraints.

The objective of this article is to show that by adopting a vision that considers any HEI as an Ecosystem, the institution can better integrate new learning technologies along with a renovated pedagogical approach that will enhance excellence and quality. The specificity of an Ecosystem is to adopt a holistic principle that links all the institution’s components by considering them as indispensable to each other and making the communication with the external stakeholders an integral part of the sustainability of the institution.

To support this hypothesis, the article will present the concept of the Ecosystem, its role in supporting excellence in a HEI, and how it helps the institution to avoid the dangers of fragmentation between its different components. The article will then develop the operational articulations that will lead the HEI towards innovation, excellence, and a total quality management. Based on that, the article will show how the new technologies may be better integrated in HEI within this concept and will help establishing the vision mentioned above. The article will stress also how new technologies will help adopting new teaching and learning methodology enhancing competence acquisition, critical thinking, productivity, group work and efficiency. Some examples will illustrate the way HEIs may use to adopt such new trends in university education.

Keywords: university education, ecosystem, innovation in education, competence, quality assurance.

1 INTRODUCTION

In the last two or three decades the many changes that have occurred in education have mainly influenced the teaching and learning processes in schools, while institutions of higher education remained mainly concerned with issues related to quality and accreditation processes. Relatively few Higher Education Institutions (HEI) considered themselves concerned with the innovations occurring on the didactical and on the managerial levels. Some leading institutions, by virtue of their experiences, their reputation and their potentials which they gained by adopting new innovations practices as a basic strategy for their academic evolvement became role models, and many HEI tended to adopt their policies without placing each institution in its context.

This is why, for a majority of HEI, adopting new technologies in teaching became a synonym of innovation in learning methodology; adopting a certain trend for accreditation became a synonym of quality enhancement; adopting new techniques in course delivery became a synonym of innovation etc. This is why, in many countries, Higher Education is facing a problem of "identity". While the basic question ought to be "how as an institution we can better serve the human welfare?", institutions tend to “market” themselves on the basis of some face lifting. For example, adopting new technologies in the learning process is considered as an objective by itself and is not always approached as a means for the development of the person and the society. At the same time, new technologies are considered
as a must for enhancing quality at the institutions’ level without questioning the type of quality the institutions have to aim for.

The problem that we face as educators is: how to avoid such discrepancy that creates a gap between the society’s needs and the strategies of HEI. The objective of this article is to show that by adopting: i) a vision that considers any HEI as an Ecosystem, and ii) by considering new technologies as a means for new teaching and learning methodology that enforces competence acquisition, critical thinking, productivity, group work and efficiency, the institution can better move towards excellence and quality enhancement. The specificity of an Ecosystem is to adopt a holistic principle that links all the institution’s components by considering them as indispensable to each other and making the communication with the external stakeholders an integral part of the sustainability of the institution.

The paper will begin by introducing the concept of Ecosystem applied to a Higher Education environment stressing its importance in terms of productivity and quality. Then it will propose a vision about the new learning technologies that will enhance their strategic role in the learning process. And as results it will show how the integration of both concepts will be beneficial for the learners and the society.

2 THE HIGHER EDUCATION INSTITUTION AS AN ECOSYSTEM

of plants, animals, micro-organisms and the surrounding still life interacting as ‘functional unit’. The characteristic of an ecosystem is to have a life of its own while being in symbiosis with its environment. So, an ecosystem is the complex coexistence of a large number of components; these components and the diverse relationships that manage their coexistence are equally important to the ecosystem. In the case of a HEI, we have two interdependent types of components: The first is that of the internal components which coexist and complement each other, and the second is that of the external components which are in dialectic relation with those of the precedent type.

Internally, the components are the human resources and the institutional strategy. The human resources are faculty, students, administrative staff, stewardship, and services personnel with all what this involves in terms of organizational charts, offices and committees. The institutional strategy, implies the existence of an educational vision, strategic planning, programs (studies and training) and evaluation systems. As part of the ecosystem these components are called upon to be in a permanent synergy.

The external type of components is less obvious and is rarely considered as an integral part of the HEI ecosystem. These components are mainly: the civil society, the national legal background, the professional communities, the university stakeholders and the international relations. While the internal components are in a normal synergy, the external ones are independent and can even be in conflict. This gives the institution's vision paramount importance in the choice of its priorities and how such priorities will influence the impact of the external components on the life of the institution considered as an ecosystem.

Finally, if we assume that the ecosystem, considered as a concept, becomes meaningful only when it "acts" within contextual situations, it becomes indispensable to go beyond a simple listing of the system's components, and to emphasize the importance of its dynamic elements: schemata, contextualization, and invariants/operators.

2.1 Schemata of a HEI ecosystem

It may not be easy to list the schemata of a HEI considered as an ecosystem, but we can at least mention the most important ones. Let us note that even if each scheme may seem theoretically sound and normal in a higher education environment but considering it as part of a “system” will change drastically its span.

For example: Let's look at the scheme "group dynamics to manage a diploma program". The classical process consists of: curriculum design, its implementation through trained instructors according to predesigned delivery techniques and evaluation criteria. But, this "dynamic" scheme requires a continuous evaluation of the results based on an ongoing feedback; such evaluation will involve different stakeholders (internal and external) capable of having a critical approach to the content, the forms and the pedagogies at stake. This requires the implementation of criteria, processes, continuous feedbacks, etc. Such dynamism may even lead to immediate changes or at least to the planning for alternatives.
These main schemata are:

a) The management of the teacher-student relationship both in terms of content (classical teaching) and in terms of personal development;

b) The group dynamics:
   o within student groups;
   o the groups of trainers;
   o in the management of diploma programs;

c) The interactive relationship between the university administration and the educational team within the HEI;

d) The transparency between the higher management of a HEI and its administration;

e) The dynamic relationship of a HEI and its social environment;

f) The dynamic relationship with the professional bodies of the private sector;

g) The dynamic relationship with other HEI locally and internationally;

h) The permanent dialectic with the national authorities.

From a cognitive point of view, a scheme does not operate by itself but necessarily "in situation". The efficiency of any scheme is rooted in the "in-act" process and of the human resources of the HEI and is responsible for the appropriation of all related patterns to act accordingly and wisely. A proper integration of any type of innovation, as the new technologies, will have to define the situations in which such integration can become an integral part of HEI performance.

2.2 Contextualization and situations of the HEI concept as ecosystem

Innovation is a state of mind peculiar to any institutional dynamism. Innovation in pedagogy is therefore the art of ensuring a strategy that prepares the future while being rooted in a given culture with the prospect of forming open, critical and communicative personalities. And if we innovate in pedagogy it is because its ultimate objective is the human development on both level: persons and society. Using new technologies is an integral part of this innovative process.

On the other hand, the efficiency of any innovative process, through the needed schemata is better realized in an adequate context. And when it comes to a HEI, it is obvious that this contextualization goes beyond its "physical" limits and will involve all the ecosystem’s components. It may be difficult to identify all possible situations, but I think that the following situations allow for the creation of the best conditions for the schemata’s operationality.

a) **The institutional vision** regarding the institution’s role vis-à-vis its students, its faculty, its administrative body, the society in which it is immersed and finally the whole of the local university’s world and international relations

b) **The societal vision** as to the strategic options of the programs offered.

c) **The pedagogical strategy** regarding the guidelines that frame the educational unity of the institution, through:
   o integrating the critical thinking, the entrepreneurship spirit and the group work in the curricula;
   o filling the gap between theory and practice (PBL and PrBL techniques);
   o the evaluation criteria;
   o the training role in human resources development;
   o the quality criteria.

d) **The academic strategy** for research development in relation with the surrounding human environment, the industry, and the social stakeholders.

e) **The administrative strategy** regarding the financial priorities that serve the best the strategic choices of the institution’s vision.
2.3 Invariants and operators in the HEI concept as ecosystem

Like adverbs, that are the invariants of the language (in any language), every concept has its invariants which are extrinsic to it and may evolve by themselves. In a biological ecosystem for example, the climate is an extrinsic invariant; if the climate changes the ecosystem may cease to exist or move according to biological, chemical or other laws. But what is unique about a HEI is that it is in dialectic with such invariants, because by nature it is called to play a dynamic role within its environment. So, being an ecosystem is not synonymous with passivity because it is in essence a place of development of human persons and the society at large. One of the great challenges of our universities today is that they are called, under the pressure of globalization on the one hand and the logic of the market on the other, to adopt a standardization that may not be in congruence with its vision or its role in society.

The invariants of the HEI as ecosystem are not numerous and remain in permanent change because of their very nature. These changes may be slow timewise, and it will be up to the University to know how to be a player in such existential development. It seems to me that the main invariants to emphasize are:

a) **The social environment**, which, if not well known by the institution, no strategy planning is possible.

b) **The financial conditions**, which can have a major impact on planning the implementation of strategies.

c) **The decision-making structure** in the institution, which can positively or negatively affect the quality, nature and level of participation within the institution.

d) **The transparency** principles and guidelines essential to create the climate of trust with the society and to establish a synergy beneficial to both parties.

e) **The accountability** principles and guidelines to create a professional auditing climate and culture.

Finally, these ecosystem operators are the human resources who are its dynamic factor. That is why it is essential to root this ecosystem culture and its "conceptualization" among the actors of the HEI as a first step for this institutional project implementation.

3 NEW TECHNOLOGIES AND THEIR IMPACTS

As statistics have shown, the past century has been fruitful in innovations of all kinds in both the Hard Sciences and the Social Sciences and Humanities. The new century has inherited all these scientific advantages. These dynamic, technological innovations, which have always existed in one way or another, have become more abundant, and despite their complexity, are now within the reach of a large number of users. Why do we question Technology at the anthropological level and how it is connected to Education and its future, and why the first quarter of the twenty-first century imposes this questioning?

Let us first note that the evolution of technology in recent decades has been exponential. The scope covered by technology is immense, it intervenes in all areas. Artificial intelligence, which is the basis of titanic programming, has led to the development of powerful, almost intelligent software, which is an indispensable support today for research and professional activities. Databases, free and open source software, communication tools have created a cybernetic sphere of immeasurable power. For the sake of efficiency, we do use this power without knowing necessarily all its implications and how it operates at the highest levels, and how and when it is really needed.

In the end, and as a fait accompli, we adapt to the requirements of Technology, but has it been adopted so far? To adopt certain aspects of Technology, it is not enough to know its practical aspects, the services it may render, and the profitability that results from that. We need to know more about the “hidden” aspects and their repercussions at the human level, and we need to have a critical mind that makes it possible to predict and to anticipate the future effects at the social level. It is about trying to analyze technological innovation as a challenge that gives us an opportunity for reflection, evaluation and adaptation when necessary. Here comes the role of Education.
3.1 New technologies challenges

Changes always challenge the status quo of any establishment. The challenges that come from new technologies do not derive from their technicalities but from their anthropological dimension. This why it is important to weight such challenges in order to overcome the difficulties that they may create on one hand, and to adopt a critical approach if need be.

a) **Time and space**: A first challenge lies in a new perception of time and space. Being able to establish a visual and audio link, within a very short lapse of time, and at a distance of thousands of kilometers, creates the feeling of being "present" virtually everywhere. This creates a new mental setting that modifies the relationship of the human person with his physical environment: each person becomes a citizen of a cybernetic supra-society. This cybernetic citizenship can potentially increase the ambient individualism that seems to characterize more and more our societies.

b) **Jostled habits and teared down barriers**: The second challenge reside in the impact on individuals of the surge of information and lifestyles from all sides, as well as of the indoctrination that the media convey. Technology has thus enabled the reception of all the types of messages in an individualistic way regardless of ambient wisdom, local culture or societal experience. Coupled with this distortion of the concepts of Time and Space, this media bombardment can make people live in a world without barriers, but also without any real attachment to the profound meaning of existence.

c) **Events impact and ideas exchange**: The third challenge is the ultrafast transfer of information. In few seconds any person may know about an event taking place here and there on the globe, but also in space, and follow it as if he/she is part of it. What Neil Armstrong called "a big step for Humanity", is great step that goes beyond the simple technical fact; this big step is in the potential future impact of this technological achievement. Indeed, this is a great opportunity to be informed almost immediately of what is happening in the world, and to be able to react through social media, but that poses a problem too. Indeed, because of this "differed direct", as called by technicians, the receiver has no control over the sources, no possibility of verification of authenticity, and especially has no idea of the objectivity of the issuer, which opens the way to uncontrolled impulsive reactions.

3.2 New technologies impact on the intellect

The Technology applications have been an engine of human evolution. But today the aforementioned challenges of Technology have the potential to enslave rather than free man, creating false needs, and making him live in false pretenses, offering him the illusory feeling of moving where he does not exist. And this has a direct impact on the Intellect. Historically, this dialectical relationship with new technologies has been through conflict, but it has been a continuation of benevolence, while currently we have to face possibilities of rupture.

a) **The generations level.** The new generations live, among other things, at the rhythm of a world that bombard them with data, very often new to their environment, transforming the generation gap into an existential disruption: youngsters adopt to the passive role of consumers, while the older generations are not provided with adequate tools to find the right answers. This is the case in families, schools, and even in some countries, where the indoctrination to which young people are subjected takes place under the helpless eye of society.

b) **The cultural level.** Wars, economic activities, population displacements have always led to an exchange between cultures, and sometimes to a beneficial "inter-culturalism" that we rightly call "Heritage of Humanity". But this process of acculturation is a long and slow process, reasoned and matured, and its actors are entire populations. But the individualistic logic of today, aided by the possibility of fleeing society by taking refuge in the cybernetic world, makes this process difficult, leading to a situation of rupture. The danger is that this rupture is a break within oneself, as much as it is a break with society. It is no longer an evolution of the human and societal framework, but rather the acceptance to live with a lack of cultural reference.

c) **The ideas level.** A historical reading of knowledge transfer through ages, shows that the exchange of ideas was at the base of the human heritage. Today we all refer to Aristotle, Plato, Cicero, Averroes, Ibn Khaldun, Thomas Aquinas, Pascal, Kant and so many others, as if they belonged without any discrimination to this common crucible in which we have all been nourished. The human values accumulated over centuries can be called into question if this
continuity is no longer guaranteed. We have currently the ability to quickly access a huge amount of information but without the critical tools for questioning them. We have thus moved from the appropriation of knowledge to the search for information, and we are replacing the process of assimilation of human wisdom by the so-called debates on social media. And this is an important methodological rupture too.

3.3 New technologies within the educational framework

It may seem that I am attacking the Technology and its applications. This is not the case. I tried to present the hidden side of the new devices that are within our reach nowadays. And if, as an educator, I am perhaps alarmist, it is because history teaches us that we must never go too far while dealing with issues related to being humans. This is why I have considered these challenges as anthropological and should, in my opinion, be treated as such by educators.

Let us be clear from the beginning, the goal of education is not to come to the rescue of a given political regime, or a specific heritage, or an ambient ideology (this may apply to an educational system that will treat Technology as an ideology). It seems trivial to say that preparing well-rounded personalities is the goal of Education. But the twentieth century is fertile in examples where the person is conceived in terms of "copy" at the expense of the specificities of individuals and societies. The question that arises to us educators is relative to the actions we need to undertake so that the person can blossom at the intellectual, relational and corporal levels in a spirit of complementarity and in a balanced process.

It is therefore not a question of denying or denigrating the importance of the contribution of Technology in the educational process, but of contextualizing it, evaluating its significance over time, and developing the critical potential of the technology applications users in order to streamline their use. These efforts are expected to be deployed on many levels, of course.

a) At the school and university levels. The first level that may concern us is the schooling and Higher Education one. This is where habits are formed, and this is where impact can be most important in shaping the internal integration of all the components of the human person. That's where the questioning is most needed right now. How important will be the participation of the person as a whole (body, mind and feelings) in the cognitive process despite the amount of information to which young people can have relatively simple access? What will we do to keep our young people socially connected, and to teach them how to value themselves as citizens of the real world around them?

Moreover, given the spirit of freedom that characterizes the maturity of young people at the university stage, it is normal that these questions become even more problematic. At a time of technological change in which distance education, MOOCs, and pedagogical use of social media are being considered, other questions need still be asked. When and how will we equip our youth with the tools of critical thinking so that they can judge, evaluate and decide properly and adequately? What strategies should we adopt to maintain cultural links between learners and their human and physical environments? Can electronic correspondence and cyberspace exchange replace such links, and at what cost?

And because Education is a shared responsibility, creating an atmosphere of coherence is, I think, the duty of society and the educational policies.

b) The conceptual aspects. Research in education is active and touches on several facets related to the different educational objectives of the curricula, especially in schools and universities. But some priorities seem to be emerging when it calls for a better integration of the new technologies.

- First is the mastery of high mental skills (HMS), which will become a cross-cutting need in order to be able to position oneself critically vis-à-vis the amount of information to which any learner is exposed.

- Second would be the auto-constraints to adopt before embarking on hasty affirmations, and that may quickly be considered as "magister dixit". At the procedural level, it seems essential to evaluate the lateral consequences "in time and space" of the pedagogical actions implemented within the learning methodologies in conjunction with new technologies.

- Last but not least is the methodological importance of interdisciplinarity. This interdisciplinarity does not only involve the sciences of education, psychology and sociology,
but it is meant to include the fields of technology, medicine, and engineering as part of this "anthropological" vision of education.

c) **Shared responsibilities.** It seems to me that the era of technological advances that leads to such important anthropological challenges is an opportunity for us to review our position as educators vis-à-vis other societal stakeholders. The future of education lies on how far we will make the educational responsibilities as shared ones. This will mean:

- **Slaughtering the ivory tower:** The first efforts to be made at this level relate to the intrinsic nature of the educators' community. It will mean leaving the ivory tower of theoreticians and curricula designers to meet the people who often question our results, and do not always understand the new strategies to which they as well as the younger generation are exposed. The pedagogical initiative, especially the one that uses new technologies, is to be shared with parents, scientific communities, political authorities, etc. for a better and more fruitful and rational implementation.

- **Importance of the responsiveness of educational circles.** The challenges mentioned previously result from the lack of responsiveness to technological developments. Therefore, it is important that the educators' milieu note the following: i) Science's duty is to evolve and evolve its technological applications. ii) The body of users is eager for newness and technology offers them the chance for so many applications. The lack of critical thinking will lead to a rush to an uncontrollable potential misuse. iii) The logic of the consumer society is a relentless logic, and it is currently magnified by the impact of media players. iv) The lack of training and information in a society at the level of pedagogy will result in making the educational community the only one to be sensitive regarding the seriousness of the situation.

We have almost no choice as educators: either we accept the fait accompli and let things happen and act only as spectators and consumers, or we react and propose new strategic choices.

4 **STRATEGIC CONCLUSIONS**

Based on the above, the ecosystem framework seems to be adequate in offering a perfect setting for not only implementing but also integrating new technologies in the teaching-learning process. Nowadays, new programs do not aim only for the acquisition of a diploma but are asked to become part of a lifelong process of learning based on the acquisition of competencies. Schools and Higher Education Institutions are required to graduate people able to work in unstable settings and the society will ask them to adapt themselves to new conditions of work. The adaptability of graduates is the responsibility of the educational institutions. Equally important will be: knowledge, knowhow and know-to-be. The new paradigm in education requires the ability to make the distinction between information acquisition and knowledge appropriation. New Technologies are a great potential for both but within the conditions stated above.

This is why, it is better to approach the whole issue of implementing new technologies in education from a strategic perspective, because innovation will become part of a system. And because we are proposing an eco-systemic approach, we think that this will enable the educational institutions to:

a) Be part of the conceptual phase of any new technology that may be a part of the educational perspective in answering questions like: How much will this technology help the learner in human development? How much will it serve the strategic goals of learning within specific societal conditions? How much will it help learners to better serve their society?

b) Maintain an internal unified strategic methodology of teaching and learning in which new technological techniques will act as catalyst and not only as a tool. As examples, we may ask: How do we transform the use of a computer from being a typing machine (even if it is a sophisticated one), to become indispensable for the learner's efficiency? How do we integrate any new technology in the framework of HMS acquisition? How do we maintain a logical framework in the acquisition of the contents of the different disciplines?

c) Develop internal strategies for personnel training. Getting aware of new technologies is not an issue only for educators. As part of an ecosystem, all stakeholders are called upon to realize the importance of the new technology in order to help in its acquisition, its implementation and its efficiency. For example: Why does a school, in a specific setting, need interactive boards in its
classrooms? What are the financial and the educational impacts? And how much, does such implementation help the learners become active members of their human environment?

d) Create a dynamic process within its environment by engaging all stakeholders to participate in reflecting about the new technologies and their strategic importance. The civil society and the professional communities are the final recipients of the educational institutions “products”. Their requirements in terms of graduates’ competencies, efficiency and flexibility are of the utmost importance. For example: Are our Engineering programs adequate to the market requests? Will new technologies help us offer a better setting for training and learning? What new didactical methods have to accompany new technologies to enhance their efficiency?

e) Work together, in harmony with researchers in education and in technology, to create a positive and efficient atmosphere that helps in developing not only didactical techniques, but mainly the needed supports for human and societal developments. Because technology is not a goal by itself, and because graduating with a university diploma is not a life objective, it is important to look at this dialectical relation between technology and education within local frameworks. This is the only way to make education attain its goals and allow technology to help in human and societal developments.

Finally, if we had insisted from the very beginning on the ecosystem framework, it is because education is not a technical issue under the responsibility of few players (managers, instructors, funders etc.) in the educational institutions. The new era we are going through is imposing on us a new vision for a new world and education will have to have a say. Schools and HEI have to become the heart of the world, if not, the whole world will become meaningless.

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