CREATING TECHNOLOGY-ENHANCED LEARNING SCENARIOS FOR ADULT EDUCATION

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The 21st Century arrived with so many changes that we have been wondering whether the reality we witness is not science fiction. Without solid education, competence and multi-skills, one cannot live through. That is why alternative methods have been called forth as mandatory to complement and consolidate what once traditional, teacher centered education was doing. Technology-enhanced-learning (TEL) needs have already proven their worthiness, bringing students into the limelight. What we still fall behind with is educators' reluctance and lack of imagination in how to best employ these tools to students' best interest. The present paper gives models on how to create learning scenarios where TEL is involved.

Keywords: *TEL; 21st C skills; curriculum; user's experience; usability.*

There is no life boat or life-jacket but knowledge with everything it triggers. The Four Pillars in UNESCO's Task Force on education for the 21st Century speak for themselves: learning to know, learning to do, learning to live together and learning to be. We need to know how to tackle situations in life, how to approach people and be successful in all we do. For this we need to master concepts, apply them, analyze and then evaluate in order to later create and thus get ourselves immersed for real, into life's issues, effectively.

In this view, traditional education has started to pose questions for debate on whether it is still effective by itself, since alternative means have proven their worthiness and efficacy all along. We do not want to shed a different light on the system that rendered valuable people, yet the coordinates of the educational process are different in terms of skills to be developed for the 21st century, the type of students emerging from the coming generations, known as the N generations, millennial or digital natives (Spires: 2008) along with the labor market trends and evolutions, brought by globalization and rapid technological advances.

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Technology-Enhanced-Learning (TEL), along with the various definitions it entangled and the multifaceted approaches it benefitted from in relation to its applicability, is and still gains ground in becoming a resourceful educational method, provided it is used as a means to an end, the educational objectives per se. What research still has to cover is a rethinking of all the elements in terms of educational effectiveness, given this landmark has got new dimensions with the 21st century. Questions like "is TEL good for education or training?" have already been answered by inordinate numbers of research papers and case-studies. What we still do not know is to what extent TEL (and which tools comprising it) does teach and train, and-most importantly- how we can boost its use and effects to better serve education, irrespective of age, place, time, subject, performing characters (i.e. the student and teacher/ trainer), methods, curricula, objectives and skills, tools involved.

Were we to think of performance indicators for the TEL to draw a better assessment in terms of educational effectiveness, we should then start considering all the issues the educational process triggers, as the core of our approach:

A. At all times during the instruction/teaching session, one first thinks of:

a) what we want our students to be able to do at the end of the instruction
b) what their level is
c) what they already know
d) what skills are stirred to reach our goals
e) which are the materials we employ to best serve our scope
f) how we make use of them- sequencing, timing, practice and class management
g) how much we insist on certain aspects in the steps of the lesson- timig the events of instruction
h) how to warm-up and wind-down the teaching/training event to give it all a sense of closure and fulfillment

B. Speaking of **skills that a new millennium student must master**, it is worth mentioning Tony Wagner's "*The Global Achievement Gap",* where he advocated for seven survival skills among which one would hardly ever skip:

- critical thinking and problem solving,
- collaboration across networks,
- agility and adaptability,
- initiative and entrepreneurialism,
- effective oral and written communication,

- accessing and analyzing information,
- curiosity and imagination. `

However, in order to shape these new and complex skills up, basic cognitive skills are yet the cornerstone for acquiring knowledge- reasoning, perception, categorization, memory, knowledge representation, numerical cognition, language, thinking. These help individuals go beyond acquisition of knowledge, to search for meaning, apply ideas, analyze patterns and relationship, create and design something new, progress.

C. Thinking of the educational process globally, curriculum embedded, we must add that the curriculum itself these days calls for interdisciplinarity, integration and project based - activities. Thus, *the 21st century curriculum*:

- Is outcome based
- It focuses on what students know, can, do and on what they are like
- It focuses on the upper levels of Bloom's taxonomy-analysing, evaluating, creating
- It is research driven
- It is based on active learning- the student is no longer spoon-fed, but he is the one to help himself from the educational chunk – under more or less guidance according to age and moment of the lesson
- it is connected to student's interest, experience, talent, to his/her real world
- it allows for a certain degree of student's freedom of choice in choosing what he learns, when and how he does it, according to his cogntive and metacognitive abilities

The curriculum is best designed when it meets the objectives one envisages for the desired outcome. The question here is how we succeed in shaping the above mentioned skills? We need some instruments, educational alternative materials, TEL tools in our case. To what extent the materials we use in the educational process are good is a matter not only of the way we design them but also of when and how we use them.

D. Evaluation and assessment in TEL

1. **Educational effectiveness** of TEL can be measured only after we have clarified what we understand by the concept of being "effective":

- When do we consider education/ training to be effective? Research as well as practitioners say that effectiveness comes when the student masters the ability we had in focus for the end of the instructional stage. Let us

mention that our entire endeavour spins around building competences, abilities, not bombarding students with dry information.

- What is the time needed for a TEL sequence and how many stages should the process have to cover the objectives? Here, obviously, stages would vary according to the age group, bearing in mind the attention span grows with age yet the variety element must also be increased with age, the guided practice time getting lower with age, quite contrary to the free practice. How do we best achieve guided practice in a TEL sequence and to what extent can free practice be "free" indeed? To what extent can a virtual coach or an intelligent tutor supply a teacher/ instructor (should we refer to Virtual Learning Environments- VLE)?

It has often been said that the presence of a tutor within the instructional period is mandatory for the process to go complete. Where should intelligent tutor intervene (if need be) and how much does he complement the real instructor?

- Can TEL sequences be considered as lessons per se or should they be taken as alternative means of education to complement the instructional process?
- Where in the stages of a lesson can TEL events be introduced and which elements would make a perfect lesson out of such use? Here emphasis will lay on stages in a lesson - warm-up, introducing the topic, input, guided practice, free practice. What is the time allotted for each stage and how can all be split (if need be to cover more hours) so as to be assimilated to the real time of instruction ?
- Which are the elements of a learning scenario that lend themselves to certain goals in a lesson? Which are the proportions to be used in alternating events on the same goal before passing to the next stage in a "lesson"?
- Should evaluation segments or teacher's intro questioning be designed inside the TEL sequence, and if so, in what stage?
- How much/long of the testing elements should there be and what is the length of the "partial testing segment" so that the student still maintains curiosity , motivation, desire to get engaged and go throughout the process?
- Speaking about skills and objectives to be involved by TEL, CM Marlow (2009) considered that Serious and epistemic games offer people, through practice and variety, opportunities to experience the ways a particular discipline (or practice) considers and solves problems. They also represent an excellent response to the tendencies of many of today's students. Yet, TEL does not mean just games. TEL means any technology used in education, for knowledge transfer or skill development, either synchronous or asynchronous.

Should we look at students nowadays, they tend to prefer: (1) receiving information quickly from multiple multimedia sources; (2) parallel processing and multitasking; (3) processing pictures, sounds, and video before text; (4) random access to hyperlinked multimedia information; (5) interacting/ networking simultaneously with many others; (6) learning "just-in-time"; (7) instant gratification and instant rewards; and (8) learning that is relevant, instantly useful, and fun (Derryberry, 2007).

Narrowing down the gap, when we consider using TEL in foreign language education especially with adult students, we must envisage the following elements:

- The concept of *learnability*: How easy is it for users to accomplish basic tasks the first time they encounter the design? Here elements like frustration or pleasure must be measured, bearing in mind the Freudian pleasure principle.
- *Efficiency*: Once users have learned the design, how quickly can they perform tasks? Here one must bear in mind the various types of users, in relation to the exposure he/she has undergone to technology, especially that in this case it has educational purposes.
- *Memorability:* When users return to the design after a period of not using it, how easily can they re-establish proficiency? This might also answer the question of whether sequencing the stages in an instructional event is beneficial and if-imposed- to what extent it can be done.
- *Satisfaction*: How pleasant is it to use the design that the VLE offers? Distinctions must be made according to age, gender, background, level of instruction, users' needs; one needs also to define "pleasant" according to the aforementioned elements.
- Is the selected design appropriate for the ability we have set as an instruction goal ?
- Does it help both student and instructor in accomplishing the task to the envisaged educational objective?

Since there are so many tools to choose from in using TEL, one needs to know about certain characteristics the system employs, so that once choices are made, the user makes sure this covers as many of the traits as possible to ensure educational effectiveness.

In what follows we will mention some of the elements in Jakob Nielsen's list of heuristics as general principles for user interface design. Once one determines which guidelines are violated, the usability of a device (the learning management system or the educational games, the social media tools, the VLEs all in all) can be determined:

• *Visibility of system status*: To what extent does the system keep users informed about what is going on, through appropriate feedback within reasonable time?

• *Match between system and the real world*: Does the system speak the users' "language"? Is it tailored according to his needs in terms of expectancy, level of instruction, age, background? Does it follow real-world conventions, making information appear in a natural and logical order?

• *User control and freedom*: Learners nowadays are much more independent, with stronger personality stemming from either lack of parental control or life-survival skills. Consequently, how much freedom does the student need in the process of instruction in order to still stay on the track, yet choose his own path adjusted to his own structure and needs? (within certain limits that preserve the achievement of the learning outcome)

• *Recognition or recall*: To what extent does the user have to remember information from one learning sequence to another? Instructions for using the system should be visible or easily retrievable whenever appropriate.

• *Help and documentation*: In the instructional event, the user might need help and documentation. Any such information should be easy to reach, focused on the user's task, by means of either virtual coaches or intelligent tutor- if not implemented sequentially inside the traditional classroom activities, with a real tutor input.

3. As far as measuring the effectiveness of the Technology-Enhanced-Learning sequences in terms of **the appropriate technology used for specific targets,** we must again recall stages in education, as no matter what the instructional goal is, no matter the subject matter involved, all learning scenarios must follow a story-line or diegesis (de Freitas & Oliver, 2006), they must have a topic - first of all - in close relation to the competences envisaged as goal for the instructional episode, and must employ a set of actions, design, interaction and audio script to respond both to student's and instructor's needs: the students want to learn and be able to do a certain thing at the end of the "lesson", while the tutor wants to see that projected goal has been reached by immediate applicability into the real environment. According to some authors, (de Freitas & Oliver, 2006) there are four important elements to consider in the learning scenario mechanics - context, learner, internal representational world, and the process of learning.

• "Context, on the other hand, has been established as a critical factor for effective use of e-learning tools and content, and includes the wider historical context as well as the specific learning context, which may include access to tools, the tutor's own specific background and understanding, as well as the availability of the technical support. Context can become an

enabling factor for the learner's support, or it can provide significant impediments to delivery."

• The second element important for the learning scenario here is the learner, as the main beneficiary. We must have him in mind when developing learning scenarios, as well as when we use them. Learners are different ages- therefore they react to different stimuli, according to their emotional maturity; learners have different backgrounds- therefore they might be attracted and influenced by different actions, they might respond to familiar or unfamiliar situations, with complications that may look basic or complex.

Various tools have been used so far in TEL scenarios. It is important to mention here Gagne's Nine Events of Instruction which are considered to provide a perfect framework for the design and development of the already mentioned scenarios; consequently, tools in a TEL scenario design must respond to the elements in the chart below:

Nine Events Of Instruction	
1. Gain the learners attention	6. Elicit performance
2. Inform the learners of the objectives	7. Provide feedback
3. Stimulate recall of prior learning	8. Assess performance
4. Present stimulus or lesson	9. Enhance retention and transfer
5. Provide learning guidance and instruction	

It has often been said that an effective instruction process is always supported by the presence of a tutor, be it human, real or virtual. Consequently, since we mention the TEL learning scenarios, we must also mention the issue of the intelligent tutor or the presence of a virtual coach within the learning environment. In this respect, which type of activities do they perform and to what extent can they replace a real tutor is to be evaluated, as compared to the effectiveness of the real tutor support.

Consequently, for the educational process to take place, the way guided interaction is ensured and of how much help it is in answering and supporting students' challenges, as well as providing extra information at certain stages, is of utmost importance.

Moreover, for the process to reach its end in instruction, of equal importance to the already mentioned elements in a scenario's effectiveness, we must evaluate to what extent

4. Elements like **the ability to appeal to users, to capture his attention, and keep his concentration** have their say**.**

Much has been said on constructivism, in relation to the above mentioned elements. The concept defined by Vygotsky (1978) refers to the way an individual constructs meaning within a social context, based on the fact that new knowledge is built upon prior one. To this end, learning becomes most effective when students are mostly engaged in the learning process by discovering, questioning, discussion, reasoning, judgement making and opinion formation. Thinking of a constructivist classroom, Audrey Gray, considers there are several characteristics worth being taken into consideration:

- the learners are actively involved
- the environment is democratic
- the activities are interactive and student-centered
- the teacher facilitates a process of learning in which students are encouraged to be responsible and autonomous

All evaluations must yet consider, along with skills for the 21st Century and features of the 21st century curricula, the characteristics of andragogy and heutagogy for all individuals to be taught or instructed over the age of 18/ 21 in formal and informal education.

In relation to this, Knowles considers that adults benefit most from self-directed learning, where individuals take initiative in diagnosing their needs, formulate learning goals, identify resources, choose and implement learning strategies. Heutagogy adds to this that the instructor just provides resources, the learner is the one to design the course for himself. Last but not least, a precursory approach must also include Bloom's taxonomy on digital.

All of the above are but preliminary thoughts in what is desired to be the outset of a long road to benchmarking the elements concurrent to success in education via TEL scenarios, as alternative means, not as standalone learning environments per se- until proven other way.

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