Technology Value Creation in Higher Education Examination

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Extended Abstract

The research aims to develop a new tool for the process of examination appointed ‘Hadaweth’. This technological instrument would facilitate, and would accelerate the process of examination in class and would ‘Save’ ink and paper. Also, it would be a first step toward a more extensive program of examination at a distance. Therefore, the questions of research are the following: 1- What are the benefits of the use of this kind of instrument by report to the traditional methods of examination? 2- What are the components of the managerial, technological, strategic aspects of ‘Hadaweth’? 3- What is the impact of these instruments on the curricula of learning from one side and the teaching from another side?

1- Swarm movements and particles solutions: How to be in two places at the same time?

According to the objectives of the theorem – to be in two places at the same time, we believe that it is supported specifically by other concepts as gradient descent and quasi-newton methods. We read these concepts to support our hypothesis:
Theorem

Particles to be in two places at the same time:
The function $F(x)$ in points a and b tries to be non-differentiable in both places:
$F(x) = (e^{\Delta E_1}a) \times (e^{\Delta E_2}b) + 1$
$X$: is the subject or object in the environment
$e\Delta$: the exponential rate of change of $x$ in the environment.
a and b: two local points in the environment
$\Delta$: changes of $x$ to adapt to the environment of point a and b,
The changes can affect $x$ in point a and b
1 and 2: are the objects, subjects and elements (OSE) in the environment of $x$
E1: Environment in point b
E2: Environment in point a
F: changes of point a and b to adapt to $x$ in the environment.
OSE: are the objects, subjects and elements in the environment of $x$

Swarm movements solutions to particles to be in two places at the same time (Figure 1):
The function $F(x_1, x_2)$ are the movements to be in two places according to the environment and to the changes. There is also the factor of neighborhood thus the movements can depend on the distance among point a and b. It can affect $F(x)$ switching to the following:
$F(x_1, x_2) = e^{\Delta E_1} x_1 + e^{\Delta E_2} x_2$
x1: stationary $x$ in point a
x2: stationary $x$ in point b
$F(x_1, x_2)$: is to be ready to respond to the swarm movement.

Swarm Movements in one place
$S(x) = [e^{\Delta E} x \times \Delta F(x)] \times O|x| \times W$
O: used to make the approximate or the exact $x$, determinant of $x$
E: used when it is not easy to define the changes occurring to $x$ (determinant of the changes occurring to $x$)
W: recognize and define the changes in $x$

Figure 1: Swarm particles solutions to be in two places at the same time
2- Use of algorithms, computational methods and measurements to develop solutions for the field of internet of things:

![Figure 2: The pillars for the examination process](image)

The technological components and a simulation (Figure 2)
- As a testing phase, the simulation on a software to explain the instrument and its use can be done (see link simulation 'Hadaweth for examination': http://youtu.be/xwz9-5FY6Gj), and then create a prototype and apply it on a sample of students during examination. As a first step of development with the simulation, the technological dimension would require the following components to automate the exams: tablets (the new invention PC) where there are the spreadsheets, an electronic spreadsheet to formulate the exams and the software for the creation of the spreadsheets. The creation of an intranet network closed which would connect the tablets of exams with the application on which there is the exams and from another dimension with the computer of the professor for the correction of the examinations (Figure 3).

![Figure 3: IT components of Hadaweth](image)

The strategic components and management (Figure 2)
This research also leads to the identification of various strategic and managerial hypothesis concerning the examination tool as follows:
Proposition 1: The profile of the examinee and the environment is also important for the success of the Hadaweth tool. The processed examination under the tool is adapted to the intellectual and social capital of the examinee.

Proposition 2: The IT-system and its surrounding computerized systems are composed of necessary efficient synchronized and non-synchronized technologies as the cloud computing. These types of synchronizations depend on the nature and step of the examination.

Proposition 3: These IT-systems goal is to create and to form an adequate environment for the examination. The user of the examination tool and the process of examination is also under certain conditions as for instance the condition type of constraint factors; breaks, no usage of other tools or books....

3- The professor dimension and the examination evaluation

- The professor dimension is related, in the testing phase, to the measurement of the satisfaction of the tool users and the performance of the prototype at all levels. Concerning the theoretical implications and managerial aptitudes, all stages of the development of the prototype and its application, and the analysis of the satisfactions of users lead to the development of the implications.
- The examination evaluation is one of the output of the learning process. Based on the report to the traditional methods of examination and the new mode of examination, the examination evaluation is now technological based and optimized.

Supporting hypothesis

Assignments for the prototype and testing:
The function D(X) describes the indefinite integral:
\[ D(X) = \int F(L) dL + K \]
X: the exam
D: the function of the design of the examination
L: learning process or accumulated knowledge
K: the competences to design the examination

The function \( \text{Ev}(X) \) represents the definite integral:
\[ \int F(C) dC = \text{Ev}(X) - D(X) \]
C: the content of the examination
Ev: the evaluation of the examination

Keywords
Learning process, evaluation, examination, higher education, technology management

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Biography

Nouha Taifi is assistant professor of management—since year 2010, at Industrial Engineering Department, Ecole Mohammadia d’Ingénieurs, University Mohammed V, Rabat, where she teaches courses at the undergraduate level in the fields of innovation management and technology management. She holds a PhD in eBusiness Management from the university of Salento, Lecce, Italy-2008 and a Master of Sciences in Business and Economics, Dalarna University, Sweden-2005 and a Bachelor in Business Administration, Al Akhawayn University, Ifrane, Morocco-2002. Her research interests are organizational management and development and networks systems in the automotive and aerospace industries. She also makes research in the field of service management and engineering in complex industries since year 2010. She is a member of a micro-financing institution—ATTADAMOUNE- since year 2012 where she makes research and development in this field, and a member of the research center CMERES since 2013 where she makes research in the field of the social enterprises. She is also the founder and CEO of the start-up ALOT (AsLongOperationsTrain)- since year 2011, that aims at the development of a software that tells people about professional trainings at the right time, and a member of the organization AEEA since year 2013 where she was reviewer in the conference and special issue proposer.