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# THE REMOTE EXPERIMENT POSITION IN ACTUAL TAXONOMY

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## Abstract

*Taxonomy is a classification effort for establishment of learning/teaching operational objectives.*

*There are some famous taxonomies, Bloom's being the most quoted.*

*In spite of the fact that some researchers have tried to explain the position of e-learning in already known taxonomies, this subject was not too much in the general attention.*

*In the paper the authors intend to go deeply and to analyze the position of the new methodology-remote experiment-in the actual taxonomies.*

*In addition they have also some remarks about psychological implications of remote experiment, taking into account the fact that remote experiment networks contains some peculiarities regarding cultural barriers, language barriers and so on.*

**Key words:** *remote experiment, e-learning, taxonomy, virtual instrumentation*

## Introduction

The notion of "education" has normative implications. It implies the fact that education means "to lead" to conduct towards a goal. Something which deserves interest was transmitted in the deliberate way.

During of the times, some theoreticians have tried to attribute to the education a single goal: to prepare entering in the Good Kingdom, or to modeled a citizen who respect capitalist democracy, or a worker fair in the face with Marxist thinking, etc.

As a science of the classification, when it is referred at human sciences, its rigor is not enough exact as in the case of the science of nature. In the education case, all of the taxonomies have on the base four principles:

- Didactic principle - based on the great objectives groups followed in the education process;
- Psychological principle – with respect of the learning psychology;
- Logical principle – categories classified must to be articulate logically;
- Objective principle – the objective hierarchy do not correspond to the values hierarchy;
- Complexity principle – during education the memorization will be replaced with autonomy of thinking.

## Remote experiment and taxonomy

There are three levels in any taxonomy:

- Cognitive level;
- Affective level;

- Psychomotor level;

In many papers this classification is considered artificial, because the people-the subject of this classification-will act as a whole in the learning environment. We will consider these levels in direct connection with the remote experiment as follow:

- Cognitive level is in relation with knowledge acquisition.
- Affective level is in relation with the notions of avoiding, engagement, free choice, etc. determined when a learning stimulus is addressed to the student;
- Psychomotor level is in relation with rapid muscular answers with reduced conscious control.

In spite of the above short definitions, we want to stress the position of the remote experiment as learning methodology in these levels.

In the cognitive level, the succession of learning is done by the following schemes (fig. 1):

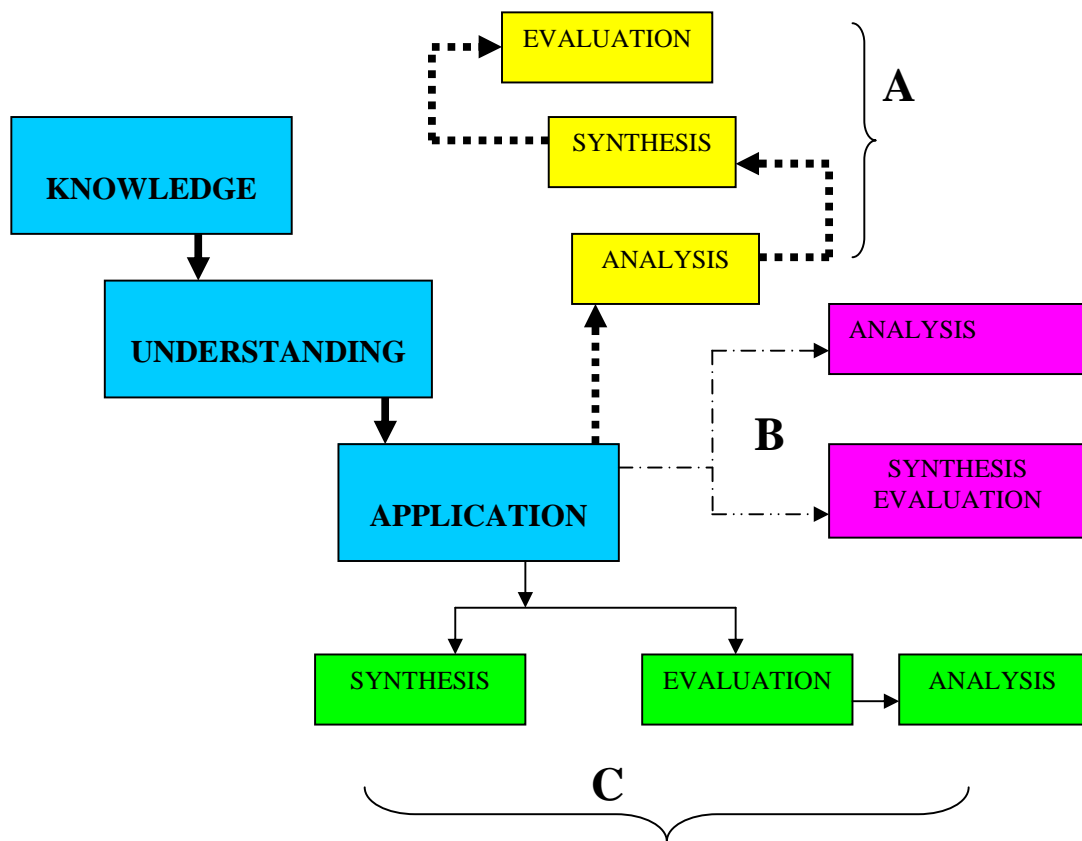


Fig.1. The six levels of efficiency in learning

In scheme there is present the succession of levels of learning. Knowledge, understanding and application belong of *acquisition stage*. After this stage the way “A” there is the *theoretical succession* of learning. In fact, when there is takes into consideration the factor “g”-general intelligence- *synthesis and evaluation will be*

*dissociate* by the rest because of their strong dependence by the “g” factor (scheme “B”). On the other hand, some researchers have considered that *evaluation is in fact a form of analysis*, situation which is illustrated by the scheme “C”.

The remote engineering is obviously a part of third level – “application”. All of abstract representations delivered for increasing of the knowledge and understanding, will be oriented towards concrete applications. In the understanding case, teacher will offer to the student all of information. Always in the case of applications, as a difference with understanding, one of the notions should be discovered during the practical problem solving. The best applications there are those in which the student must to yield personally supplementary information for problem solving. Metfessel N., Michael W. and Kirsner D. [1] have set up a correspondence between application, main functions delivered by the student and the parts of knowledge which are sustained (table 1). We add at this correspondence what will be the gained points determined by the existence of the network with the remote experiment:

Tab.1

Level	Main functions	Sustained knowledge	The remote experiment
<b>APPLICATION</b>	To apply	Principles	It is possible that in the remote experiment network, experiment to be set up based on the different principles in accordance with cultural area
	To generalize	Laws	Might be quite identically on the entire network
	To connect	Conclusions, effects	It will depend of the local or regional work market necessities.
	To choose	Methods	The remote experiment network will offers several methods for the same subject
	To develop	Theories, abstractions	The level of the school will impose the level of theories and abstractions
	To organize	Situations	The industrial level will determine level of experiment organization. Situations will be also in correlation with industry.
	To utilize	Processes	Industry has the decisive word about the processes on which will be focused experiments.
	To use	Generalizations	The connection on the remote experiment network will impose quite the same generalizations.
	To transfer	Procedures	The contacts between well developed laboratories and weak experimental levels will impose transfer of the best procedures improving in time the level of the network.
	To reorganize	Experiments	See above argumentation
To classify	Knowledge	The learner will be able to compare the quality of the knowledge between the remote experiment network	

The correlations presented in the table 1 are not exclusively bilateral. It is obvious that, for example: “to apply”, might be in connection with “laws”, “methods” “procedures” and so on. It means that application is a very complex level, regarding *internal correlations* of the content.

It is also of large complexity and regarding its *external connections*. For example, many aspects of “analysis” there are in fact influenced by the applications (table 2):

Tab.2

Level	Main functions	Sustained knowledge	The remote experiment
<b>ANALYSIS</b> (relations seeking)	To analyze	Relations	All of the experiments posed on the network will determine not only analyze of the relations inside of the local acquired knowledge and experiment but also analyze of the relations between local knowledge and experiments delivered in other places
	To compare	Interrelations	Will be compared all of experiments focused on the same theoretical subject
	To distinguish	Errors	Together with experiment errors analyze, will be considered errors in the experiment setting up using comparisons with other solutions from the network
	To infer	Ideas, arguments	The remote experiment will allow to the students to complete their inference rules with addition of the others generated by the network knowledge.
	To contrast	Cause-effect	For the same process, the cause-effect analyze will be more complete as in the case of the single laboratory work
	To detect	Indirect ways, original ways	The whole picture of the applications at which the student has access on the network will allow increase capabilities to discover original ways

Similarly, we can refer at correlation between application and synthesis and application and evaluation.

The conclusion of all above information is the fact that, in taxonomy considered as a tool for establishment of the learning objectives, the main disadvantage is that the successions proper of any classifications keep hidden the correlations existed between classes and levels.

Regarding the correlation between the remote experiment and affective level, we intend to discuss about the objectives adopted in the remote labs which are able to modify the student’s attitudes, values, interests and adaptation capacity. It means that before or together with learning of the “*ready made knowledge*” from actual laboratories the availability at new, creativity and tolerance must be between the selected objectives when we design the content of laboratory works.

The analysis of the actual content of the laboratory works, entitle us to declare that there is a very weak connection between the level of cognitive part of the laboratory works and its affective content. Doing this analysis at limit, we are entitled to affirm that the wrong stress only at cognitive level might exert a negative effect on the affective level.

The main problem of the affective level there is the absence of the measurement tools. We will try to do a positioning of the remote experiment in correlation with affective level with very concrete intention. Let us to mention the intention after the positioning.

In the table 3 we will present the parts of the remote experiment in the affective level landscape:

Tab.3

Main functions		Affective attitudes	Elements of influence	The remote experiment position
Receptivity	Conscience	To differentiate	Images, sounds, events, intentions, arrangements	<i>All of these attitudes are meets in the cyberspace. The problem is that the influence on conscience has the provenience from virtual not real world. It may modify the real world perception.</i>
		To separate		
		To isolate		
		To divide		
	Volition for receptivity	To accumulate	Models, examples, configurations, cadences, size	<i>The models as teachers or scientists disappear. Examples and models have the provenience from virtual world. Cadence, size and configurations gain other signification. Too much remote experiment may modify the receptivity in real world</i>
		To combine		
To accept				
Preferential attention	To choose	Answers, alternatives, rhythm, nuances	<i>The rhythm is clearly modified. Sharing time replace sharing place. Alternatives will be at disposal more than in real world without the effort of displacement. Nuances are in attention due to the sharing experience in virtual space not due to own experience</i>	
	To answer			
	To hear			
	To control			
Answer	Consent	To comply	Directives, laws, behavior lines, demonstrations, instructions	<i>As a quantity of information the virtual world is over than real ones. This quantity may disturb the capacity of selection, and to do confusions between own real space and virtual space described more complete than the student neighborhood. The increase respect for virtual space rules and instructions and weak respect for the same in real world</i>
		To follow		
		To assure of		
		To approve		
	Volition to answer	To offer spontaneous	Instruments, games, parody, dramatic opera	<i>Games and instruments offered by the virtual space are also over than in the real world. Discussions and practice are only in written forms so that the ability to sustain</i>
		To discuss		
		To play		

				<i>spontaneous real discussions will be out of practice. Virtual play will replace the real play.</i>
	Answer satisfaction	To applaud To acclaim To leisure To increase	Speech, presentations, literature pieces	<i>Virtual world do not offer this type of answer satisfaction. Even leisure is of special shape. Answer satisfaction is concentrate on forums and chats, and applauds and acclamations are synthetic, if they are</i>
Valorization	Acceptance of a value	To increase competence through To increase quantities of To renounce To specify	Using group, doing friendships, giving to other, renounce in the other favor.	<i>Virtual space increases the collaborative tools and collaborative environment. The renouncement is an event which happens in the virtual world and we do not have the possibility to transfer this behavior in the real world as similar.</i>
	Preference for a value	To assist To subsidize To help To encourage	Arguments, to project, point of view	<i>These manifestations are of high intensity in virtual space. To help and encourage is a characteristics of virtual space, because it stress collaboration between members of a network. Cultural barriers might be a source for good understanding of some attitudes.</i>
	Engagement	To deny To protest To debate To argue	Deceptions, abdications, un rational manifestations,	<i>Because the student is hidden in the back of the computer these manifestations are more powerful in virtual space as in real ones where enter in the role social conveniences.</i>
	Conceptualization of a value	To discuss To theorize on theme To compare	Parameters, codes, standards, goals	<i>After exceeding the period of accumulations, virtual space is perfect for these manifestations. The language limits can be a strong brake, because conceptualization of values is referred at entire Internet offer not only at network</i>
Organization	Organization of a values system	To harmonize To organize To define To formulate	Systems, approaches, criterion, limits	<i>With own effort, due to the curiosity, virtual space is the best environment for these elements of influence of the affective behavior</i>
	Generalized order	To revise To change To complete To pretend	Plans, behaviors, methods, efforts	<i>This is absolutely necessary in the front with so many information, so many offers, so many methods and so rapid change of the information</i>
Characterization through values	Characterization	To be appreciate by the equals for an action or for a quality To be appreciate by the superiors for an action or	Excess, conflicts	<i>Majority of the elements presented are in strong connection with real world. To "avoid" and to "solve" there is a normal behavior of the network inhabitants. Appreciation of the equals is also</i>

	for a quality		<i>possible, on the network.  To “conduct” is only the function in relation with experiment, not with direct contact with subalterns.  To “resist” is also a virtual function, meaning “in the front of the computer” not in fight with real world challenges</i>
	To be appreciate by the subalterns for an action or for a quality		
	To avoid		
	To conduct		
	To solve		
	To resist		

Regarding psychomotor level, remote experiment in particular and virtual space in general do not act on the learners as in the case of face to face system.

Nonverbal communication as a part of psychomotor level (gestures, corporal expressions, mimics, facial expressions, etc) there is an important tool for socialization.

On the other hand, small want of skills in movements, which might have negative influence on the learner progress in face to face system, disappear in the virtual space, being hidden in the back of the computer screen so that integration in a group do not depend of skills and abilities. Virtual space covers these aspects, skills being more intellectual than manual or corporal.

Ragsdale [2] have proposed a classification of the psychomotor domain:

- Driving manipulation activities with main criteria: speed and accuracy;
- Motive language activities with speak organ motions, ocular motions, written motions;
- Driving emotional activities contains attitudes, emotions and feeling communication using motion.

There is a general view on psychomotor activities, but enough to understand that in the virtual space many of above characteristics do not activate. In the real world speed and accuracy have importance because learning can depends of these qualities. In the virtual space the learner has the occasion to try many times on the screen to adjust some functions and speed is out of discussion. In rest all of mentioned psychomotor characteristics there are not manifested in virtual space.

## Conclusions

1. Taxonomy of learning in the virtual space is not tackle as a whole;
2. The above remarks underlines the facts that some of today classifications used for learning objectives establishment, are not useful in the case of e-learning of remote experiment;
3. Internet has impose some modifications in social life (table 4)

Tab.4

SKILL OF BEHAVIOR	DESCRIPTION OF THE CHANGE
MANAGER	Is “ <b>typist</b> ” at own laptop and the secretary have other tasks and assume further duties
SERVANTS	<b>Become technicians</b> with advanced skills in driving complex washing machines, cleaners, kitchen, interphones etc.
TEACHERS	Do not prepare lessons and figures. They prepare power-point, multimedia lessons, video-conferences. The <b>pencil was replaces</b> by the software and computer.
CORRESPONDENCE	Writing was replaced with <b>talking correspondence</b> with or not with image.



PAYMENT	Instead of pay-office of bank desk we sit in the front of the computer and know to use <b>e-banking, e-payment, and e-shopping</b> .
DREAMS	We replace the reverie moments after a good book of poetry with <b>virtual reality</b> with more power to create different worlds, different cultures, different scales of value,
LIVING	We stop to live at home, town region, we start to live in a <b>communication system, we living in a program segments</b> .
HOMELESS	At classic homeless categories, the new evolution has added new homeless: <b>“digital homeless”</b> . I. e. the people who do not accept new media and are not able to handle them
PAPERLESS	More and more people prefer to read the information’s direct from the screen. Other prefer to print and after to work on it. The <b>quantity of paper</b> used for printing is now an important indicator of evolution and important <b>indicator of evolution</b> in electronic culture.
FAMILIES	Before, the sense of development was from the individuals towards the family. Society is developing now from the <b>family towards individuals</b> .
SCREENAGER	He has two stages: <b>active</b> in the front of the computer as worker and <b>passive</b> in the front of the television as consumer
PARTNERSHIP	The stabile partnership given by the family or working team has change. Now, partnership is determined by <b>common interests</b> . If interests are changed, partnership will be cancelled. The parents-in the past-could “order” something to children. Now they must justify it before to ask not to order.
THE GROUP	In the past-working group was essential both in economy and in education. The new e-learning environment stress also the group work importance, BUT this is new ones-it is the <b>virtual group</b> . These groups are formed under rules of interest not as geographic location. The Internet brought together people from different countries, under the rule of same objective, preoccupation or hobby. They do not know each other in the classic manner. They are a picture, a name a small digital movie. The <b>new kind of “friendship”</b> has emerged.
VIRTUAL NEIGHBORHOODS	Was change the old importance of <b>the “place”</b> which was in the past the base in the neighborhood definition. The new virtual neighborhoods share the <b>same “time”</b> not the same place.
INDIVIDUALISATION	Is concentrate in four words : <b>now</b> (nobody wants to wait); <b>here</b> (capacity to access in network every place and information’s); <b>for me</b> (individualist mentality of the new environment <b>“computer and I “</b> )

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