

**Designing information by Using the hologram
technique in educational signs**

Rasha Mahmoud Elsayed
Assistant professor, Advertising Department,
Faculty of Applied Arts, Helwan University, Egypt

Key words : Designing information, educational signs, education technology, hologram technique.

Abstract:

The development of education in the knowledge and information age; requires improving and developing of methods and techniques of teaching to comply with the important development of information technology and communication, and this development opens major new horizons in the field of education in terms of the available means to the new and used techniques that can be utilized from modern scientific implications.

Signs are a part of our daily lives symbols through its use in various fields. Data is presented in a more creative, faster and easy way than memorizing words in a closed or open space. In education, signs are used to explain and display information by changing the size or number of the formal elements.

Signs can be used by using hologram technique to support the learning process and to increase positive interactions with the student by presenting symbols that are formative and legible to design the information to the learners in a new image with a certain amount of gravity (these images may be natural pictures, abstract pictures or maps).

The effect of signs using hologram, as an educational method, can be more effective to the students and contributes to the access of information away from the boredom that may be caused by traditional methods that contain great deal of stereotypes in presenting and designing information. Using hologram technique in presenting these signs could help in making communication with students of different cultures and languages easier and more effective.

From such point, it was necessary to shed some light on one of the used technological methods, *i.e.* hologram technique, in educational signs to highlight the benefits of this way of teaching and illustrating how to use them in presenting and designing information to achieve the highest benefit.

Introduction:

In the face of rapid technological changes and international transformations, the education system is challenged by the need to provide useful and attractive education. Many educational institutions are already facing this challenge through the development of distance learning programs by using audio and video, or by presenting information and printed materials.

One of these techniques is using holograms, which helps to make digital learning experiences new dimensions by improving the way of studying and exploring things and presenting information.

Hologram is a technique that can be applied in many fields ranging from games at home to even university lectures. It can be used as an educational tool both in interactions with scientific data directly, or recording lectures in three dimensional (3D) which saves the costs of calling international lecturers to teach in a particular university. So that, this can give a lecture of particular lecturer in several universities at the same time.

Since the signs are a visual language designed and developed for all people with no need for the ability to speak, read or write, with no doubt using educational signs with hologram technique (such as pictograms, icons and symbols) is characterized by large amounts of interactions between them and students. It may help in supporting the ideas and lead to strengthening the memory. It was possible to formulate feelings and desires more easily and it is easier to communicate with students faster in different languages and abilities. Indeed, this method is an opportunity for those who are less fortunate, both in terms of time, distance or physical disability, as well as contributing in raising the knowledge base of the teacher and learner at the same time.

Research problem:

The problem of research is summarized in the following questions:

1. How does the use of modern technological techniques affect the development of the educational process?
2. To what extent does the use of educational signs as a visual language contribute to the interaction of learners?
3. To what extent does the use of hologram technique in designing the information through the educational signs contribute to the success and activation of the educational process?

Research aim:

The research aims at shedding some light on the importance of using hologram technique as one of the modern technological techniques in designing the information through the educational signs in order to support the educational process and to achieve most of the benefits of the information provided to students in a non-traditional form in the age of knowledge and information.

Research importance:

The importance of research is to confirm the benefit of using the modern technological technique such as hologram technique, to develop the educational process and helping to introduce the information and support them to be received by the learner in more attractive and easier way.

Research Methodology:

The research follows the inductive method in presenting the importance of using modern technological techniques in education to make it more effective. Analytical descriptive approach is adopted in describing and analyzing the educational signs using the hologram technique as one of the modern technological techniques used to improve and develop the design of educational information to the students at different education levels.

Education system:

"The education system is a set of interconnected and integrated elements with each other so that each of them affects the other in order to perform functions and activities to achieve the results through this system."(2)p.3

The process of teaching and learning consists of two human elements, (the teacher and the learner), and four elements other than human (objectives, content, methods of teaching and evaluation), the education system arrange and organize these elements in a systematic manner that not overwhelm an element over other elements and not to disrupt the process of teaching and learning.(8)p.50

Also, it can be defined as: procedures and activities that occur in the classroom, which aims to give learners theoretical knowledge, practical skill or positive trends. It is a knowledge- system consists of inputs and outputs; inputs are the learners and the treatment is the process which organizes and understands information, finds a relationship between them and links them to previous information, and the output is to graduate clever students.(11)p164

Education Technology:

At the first, technology is defined as a humanitarian effort and the way of thinking in the use of the information, skills and experiences, to solve human problems and satisfy their needs and increase their abilities.(2)p.3

Technology is seen as a valuable asset in education, which can be more effective than traditional education. Learning effectiveness has been a major issue in recent researches with the advent of new technologies that call for greater depth and breadth in technological studies.(5)p.15

"Education technology means all methods, tools, materials, equipments and regulations used in a particular educational system for educational purposes, not previously identified for the development of the educational program and activate it".(9)p 2

UNESCO definition: Educational Technology is a regular curve for the design of the educational process and implementation depending on specific targets stemming from researches results in the field of human education contact.(2)p.5

Modern techniques in learning play a big role in how students learn including discovery learning, effective learning, experimental learning, multiple intelligences and cooperative learning.(3)p3

How technology changed education:

There is no doubt that the use of technology in education greatly helps to raise self-efficacy of the learner, which in turn contributes to improving educational outcomes.(5)p.18

The use of technology has changed ways of learning through two points:

1- Saving the information .

2-Using technique of the imagination and thus stimulates and activates the brain and thus the students can solve problems and can create in more effective way.(11)p.171

Technology and information will continue to affect our academic, practical and personal lives and to work effectively at all levels; individuals will need to be aware of these technologies and information. It is no longer a viable option for universities to deal with the development of that technology or incorporate technology to present and design the information into the curriculum, while it should not be of a high degree of difficulty or a complex process that is difficult to deal with In order to create goals and to apply technology.

The difference between the technology and the technique of education:

The concept of educational technology is not limited to the use of equipment, devices and techniques with multiple educational possibilities. The concept extends to the use of mental abilities and the application of thinking system in the educational program design, implementation, evaluation and development of them. From this we conclude that the technology of education is a complex process that includes individuals, procedures, ideas, methods and organizations to solve problems, innovate, implement, evaluate and propose the best solutions to educational problems .In another way, educational techniques can be considered as an alternative to educational media and are related only to the physical (applied) aspect of the educational technology system. Therefore, the concept of educational techniques does not exceed the narrow limits that are limited to the methods of application, while the concept of the technology of education beyond this concept and even proceeded by several stages. It is an integrated process based on applying a structure of science and knowledge of human learning and the use of human and non-human sources of learning to achieve educational goals and reach more effective learning.

"Hologram" as a technique:

Display technologies considered as main projects that concern mankind nowadays. Three dimensional (3D) technical approach was a wide step in this area. Hologram was one of the most important areas of competition in speeding technology development, effectiveness and efficiency of technology.(7) p.19

"The word, hologram is composed of the Greek terms, "holos" for "whole view"; and gram meaning "written". A hologram is a three-dimensional record of the positive interference of laser light waves".(6) p.695

It is a technique used to display objects in a three-dimensional image, so that they can be seen with the human eye in the same way that a person sees everything in his environment.(1)p.1

Signs as an educational media by using hologram technique:

First, we should know what is "educational media" means?

"Educational media defined as a 'material used by the teacher to help him to deliver educational article and information well. It may be model, image, graphics, symbols, devices, or the same subject.'"(11)p164

There are some criteria that must be met in the educational media:

- It must be provided to be related to the topic of learning .
- It must be available to be used in the classroom .
- It must suit displayed with learner's growth level.
- It must be economical in cost and benefit.
- It must be accessible to the teacher and the learner and easily referenced in the time of need.(11)p164

Second, What is sign?

A sign is all that can convey meaning, it is any meaningful unit that is interpreted as substitute for something else.(4)p.9

It may exist in physical form such as words, images, sounds, and actives. This physical form is a tool carries what a sign implies of suggesting symbols and indications. The sign becomes a sign only when users give it a meaning.(4)p.12

The purpose of the use of the signs is to try to link different human knowledge to each other. Over-specialization has led to the isolation of different fields from one to another. The goal is to interact the fields of knowledge with each other without tyranny of one field to another.(4)p13

The signs could be icons, pictures, pictograms, ideograms, statistics , graphs, maps, charts or symbols.

The use of signs as a dynamic visual hologram in education is a form of interacts of the learners with presentations based on modern techniques that differ from visual or audio textual information. The continuous quest to understand how this technique can affect education greatly helps to develop them which is based on the reactions of users whether teachers or learners. The ways in which students use this technique are necessary to understand their impact on learning.

Knowing when and how to use these new techniques contributes to the achievement of educational goals in a specific and effective manner.(12) p.14



Fig(1) shows some forms of images and signs presented by hologram technique

- There are many areas where hologram signs are used in different forms beside education field, such as medicine, art, recreation, display of commercial products, statistics and graphs, industry and architecture, as shown in the following models:



(A)



(B)

Fig (2): (A) shows the use of Hologram in a visualize mock-up of an urban project, (B) shows the use of Hologram tags to display commercial products in a symbolic image



(A)



(B)

Fig (3): (A,B) shows forms of mathematical and visual images and equations using Hologram technology in industry



(A)



(B)

Fig (4): (A) shows the use of the hologram technique which is used to call a famous character in 3D form.(B)shows the use of hologram technique to display 3D shapes as a form of play and recreation



(A)



(B)



(C)

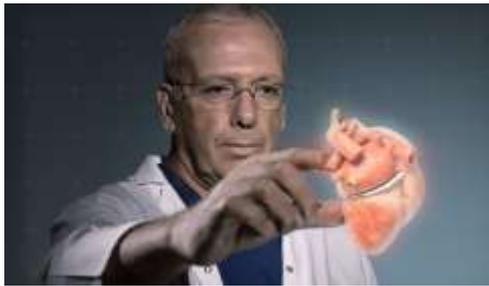
Fig (5): (A,B,C) shows the use of hologram to display graphs and statistics



(A)



(B)



(C)



(D)



(E)



(F)

Fig(6): (A,B,C,D,E,F) shows the use of hologram technique in the field of medicine through displaying 3D signs of parts of the human body in a natural form



(A)



(B)

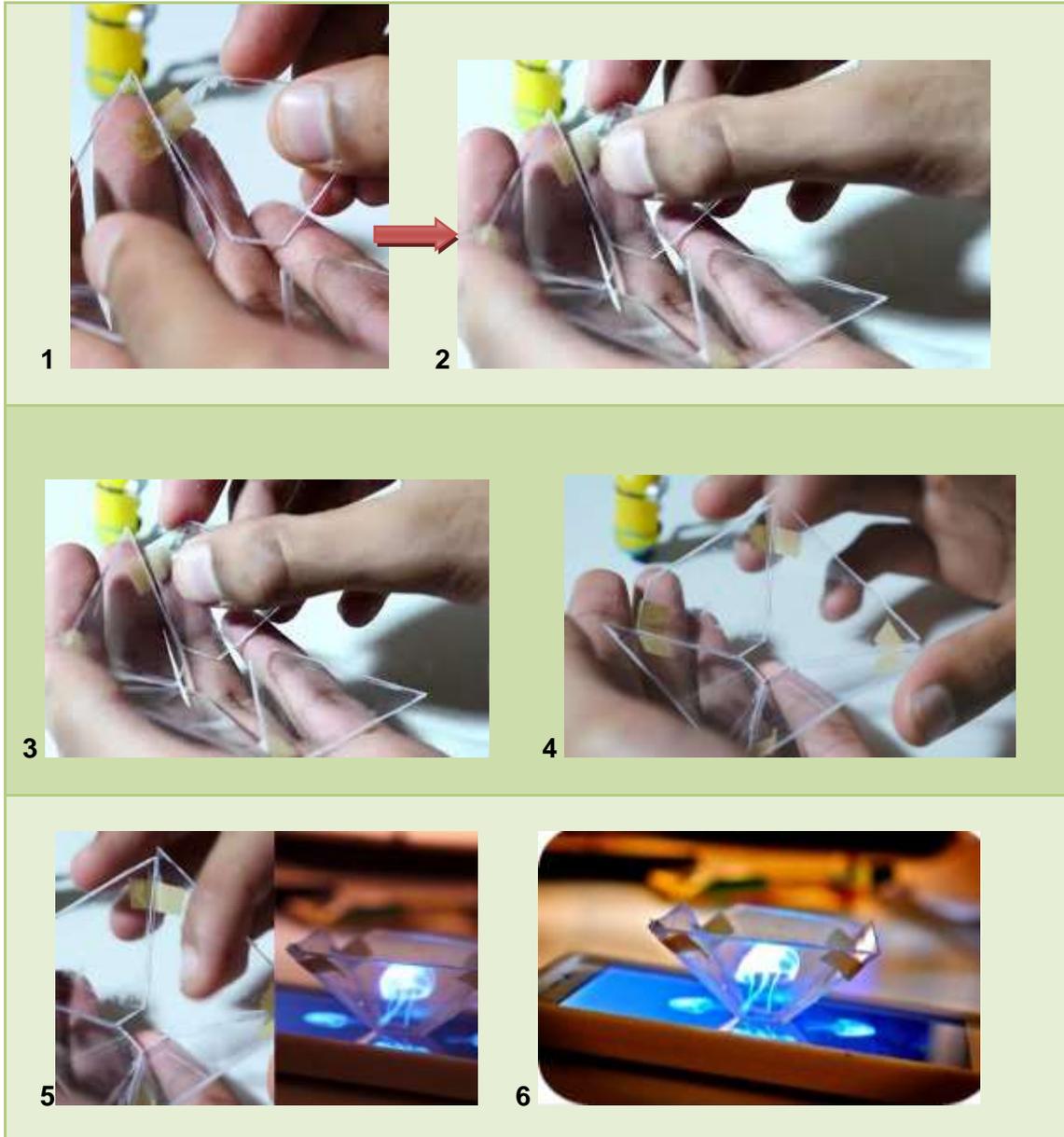


(C)



(D)

Fig (7): (A,B,C,D) shows the use of smart phones in the implementation of Hologram technique in education and the possibility of applying in different places outside the universities and schools



Fig(8) shows the stages of a simplified model that simulates hologram technique by using smart phones to display natural or symbolic shapes of signs.

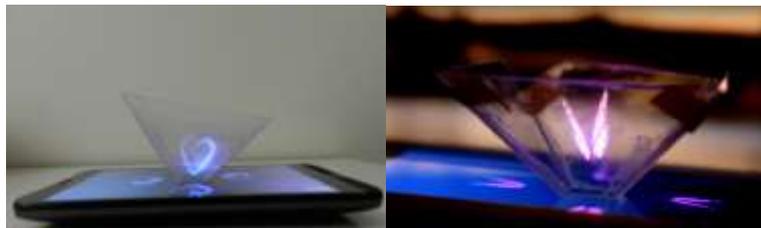




Fig (9) shows some models simulating Hologram technology by using smart phones for abstract or natural signs

Designing the information:

First, What is an information design means?

Information design is the presentation of information in such a way that can be effectively understood and interacted.

It is the detailed planning of the specific information that will be presented to a particular audience to achieve specific goals. The designer may create an information structure that specifies the general pattern or structure imposed on the information design and information plan which can define the information units and explain how they are completed. The output of information design is sometimes expressed in written instructions, drawings, signs, symbols, or traditional formal specifications.(14)

Design information can include content design, page design, web site design, graphic design, printing decisions, etc. The design of information can be applied on a single job, such as designing city map information, a complete set of customer information or designing an instructional course with specific content.(14)

When designing information; data are presented efficiently and effectively as possible by one of the following images:

Visual image: where the information is represented in a visible image.

Audio Image: Information is represented in a way that can be heard.

Animation images: where the information is represented in a way that can be touched. (15)

To be successful, educational information must be designed to achieve a balance between contents and goals, and prepare students for any future development in future education.(5) p.73

Second, why should we pay attention to information design in education?

The importance of information design is due to two main reasons:

- The arrangement and representation of information, in a calculated manner and on thoughtful and appropriate bases of the educational content, helps to understand it faster and more easily and this is the main goal of the successful educational process.

- Adopting the design of information on the comprehensive study of the characteristics of the learners such as their cultures, preferences, ages and everything related to them helps

to achieve the process of learning more easily if it is presented by using the appropriate method in presenting the required educational information.(15)

Designing the information through using hologram in educational signs:

Educational signs which are using the hologram technique, are expressions of symbolism which are delivering information in various sciences for different ages, and includes readable signs or figures (pictures, symbols, pictograms, numbers and equations, maps and charts ... etc). The processing capabilities for these signs are working on available systems of icons in specific ways which able to display receive, storage and retrieve, organize and translate information, so it can be easier to interact and evaluate it.(12) p.10

When designing information using technological technique, a set of points should be taken into consideration:

- 1- Modernity: it means the appropriate of the technology which is used with technological developments incident in all sciences .
- 2- Importance: there are important technologies and there are technologies more important must be used.
- 3- Integration: between different forms of technology which is used in education.
- 4- Pupils' levels and abilities: technological experts must have sufficient information concerning the pupils and their expertise in each level to choose the suitable technology on a scientific basis.
- 5- Teacher qualifications: it means the ability to use technology, there is a need to provide teachers who are able to use technology and achieve higher educational benefits.
- 6- The nature of the subject: each study material scopes and structures with their own cognitive.
- 7- The available material resources: the technology should fit with the available material resources.(2)p.15

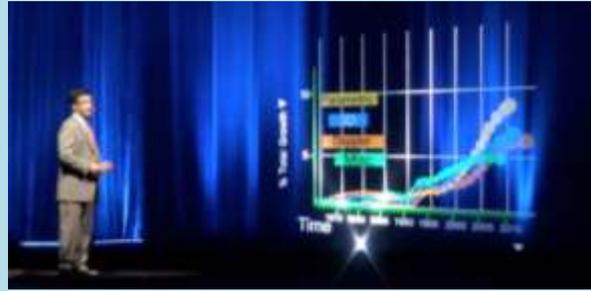
Analytical Study:

In this study, a variety of models were analyzed where the educational information were designed through the use of different signs and presented by using hologram technique.

(First model)



(A)



(B)



(C)

Learning method	Fig (A,B,C) are showing Lecture using Hologram technique
The used signs	Graph, statistical and natural image of the globe
Information Design	<p>Stages of Information Design:</p> <ul style="list-style-type: none"> - Compilation of data for the topic of the lecture - Differentiating written information from formal information - Arranging and organizing the various data presenting - Translating the data into a visual image in the form of signs (graph, statistical and image of the globe) and displaying them by using hologram technique

(Second model)



(A)



(B)

Learning method	Fig (A,B) are showing Scientific lecture using Hologram technique
The used signs	natural image of part of the human body
Information Design	<p>Stages of Information Design:</p> <ul style="list-style-type: none"> - Compilation of data for the topic of the lecture - Arranging and organizing the various data presenting - Translating the data into a visual image in the form of signs (natural image of part of the human body) and displaying them by using hologram technique

(Third model)



Learning method	simplified design of a model that simulates hologram technique using smart phones in learning.
The used signs	written sign (letter A)

**Information
Design**
Stages of Information Design:

- Specify the data for the subject of the lesson.
- Translating the information needed to be displayed in the form of written sign (letter A).
- Design of the mini model simulating hologram technique using smart phone.

We can brief the importance of taking advantage of hologram in designing information through educational signs in the following points:

- 1- Allows the student to learn in a new and more attractive way without a teacher by using the hologram-sign technology.
- 2- Can interact with all students at the same time, which contributes to break the barriers and distance.
- 3- Adding movements and sounds to the educational signs to promote a lecture, which adds an attractive innovative dimension in the educational process to encourage students.
- 4- Enabling students at home to participate in the educational process without any explanations from the teacher.(6) p.697
- 5- The elimination of the traditional educational process, which is based on memorization, makes students just a negative recipient of information .
- 6- The student becomes the key role in the self-learning process and becomes responsible for research and access the information easily from the interactive signs.
- 7- Improving the quality of the educational contents by overcoming educational material inflation problems and short-comings of traditional teaching methods by using the function of communication of signs.(10) p.8
- 8- Solving the problem of the construction of the educational institutions and laboratories that are too expensive.(10) p 9
- 9- The attractiveness of style of the signs approach entices students to be involved.
- 10- Interactivity of the sign in new technique to explain some points and easily provide information.
- 11- Legibility of information without conveying the data quickly and clearly and without complications.

In addition, students' skills are developed through:

- Upbringing on higher-order thinking skills and imagination thinking skills.
- Attempt to develop self-confidence.
- Development of communication skills.(3)p32
- Development of a sense of belonging to the community and the possibility of communicating with the individual in the light of modern developments.(3) p33

Conclusion:

The technological technique used in education helps to increase the interest of students and to keep them interested and attracted to the lesson. Also, it is working to overcome some of the educational problems such as lack of focus.

This is in addition to the use of signs in education by using a new technique as a hologram, may help to form of perceptions and build a scientific concepts in more active way, some words can reach the meanings required for students more faster, when using signs as a simple and direct visual language. In addition supporting the design of information in education by using new techniques may increases the quality of the teaching.

Results:

- 1- The age of information technology requires the development of educational methods to achieve the highest efficiency in the educational process.
- 2- Low efficiency in the educational process led to the need of adopting modern means of education in a larger scale to provide different solutions.
- 3- Hologram technique is an important technology one which is used in many fields such as games and education.
- 4- Hologram technique which is used in education needs not only good knowledge of its details but also a better understanding of human capabilities.
- 5- The use of signs in education (such as pictograms, symbols and icons) ,which are universal language, in providing information far from the boring texts; contributes to the arrival of information more easily, keeps it and remembers it more readily.
- 6- The use of hologram technique in presenting and designing the information by using signs may helps in achieving high degree of communication with students in different cultures and languages in an attractive and easy way.
- 7- The increasing knowledge of the designers of hologram technique that is used in education, especially how students are looking to this technique, to build unambiguous codes and users' common errors would help to improve the efficiency and effectiveness of designing educational information by using such technique .

Recommendations:

- 1- The need to increase trends emphasizing curiosity, research and creativity skills for the students would encourage students to use the technology in education.
- 2- The need to use modern teaching aids, which encourage students to gain applications of knowledge, would help in solving the problems
- 3- The need to develop the cooperation and social responsibility between students by using interactive technological techniques such as hologram technique.
- 4- The need to attract the attention of the modern methods in designing the information that are provided to the student to stimulate the interaction with them through the use of modern techniques such as hologram technique.
- 5- The need to stay away from the stereotypes of boring texts in education and to take advantage of symbolic signs and strengthen their role in facilitating access to the information in an attractive and interesting way by using the hologram technique.

References:

- 1- A. Blanche , A. Bablumian, R. Voorakaranam, and many others, "Holographic three-dimensional telepresence using large-area photorefractive polymer", Vol 468 , Macmillan Publishers Limited, 2010.
http://www.physics.oregonstate.edu/~ostroveo/COURSES/ph681/Notes/Nature2010_3D.pdf

- 2- Arwa Alsaeed Aljundi , " Reasons for introducing technology into education- Technology introduction criteria " , Faculty of Education ,University of Benha , Curriculum and Teaching Methods Department, Professional Diploma , Division of Curricula and Education Programs,2011.
- 3- Center for Educational Leadership and Technology,"sympols and pictograms can be seen from a good distance", Technology Enhanced Learning Environments Guide, LOS ANGELES UNIFIED SCHOOL DISTRICT.
<http://www.lausd.k12.ca.us/lausd/techplan/lausdtele.pdf>
- 4- Daniel Chandler,"Semiotics for Beginner", translation by Shaker Abd Al Hamid, Reviewed by Nahla Salihah, Academy of Arts, Publishing Unit, Critical Studies, 2000 .
- 5- David Carbonara,Technology Literacy Application in Learning Environments, Duquesne University, USA,Published in the USA and UK by Information Science Publishing , Idea Group Incacy, 2005
- 6- Husain Ghuloum," 3D Hologram Technology in Learning Environment",Proceedings of Informing Science & IT Education Conference (InSITE),University of Salford, Department of Built and Human Environment, Manchester, UK, 2010.
<http://proceedings.informingscience.org/InSITE2010/InSITE10p693-704Ghuloum751.pdf>
- 7- Khalid Ibrahim," Hologram", National Center for Excellence, 2016.
http://ncd.sy/upload/projects/project_file_398.pdf
- 8- Mahdi Saeed Mahmoud Hassanein,"Employment of teaching technology in distance learning programs in the Faculty of Education from the point of view of faculty members", Palestinian Journal of Distance Education,University of Khartoum, Sudan, Volume III, Issue 5, 2011.
- 9- Mustafa Namer Damos, "Learning Technology and Learning Computing", Dar Ghaida, Amman, Jordan, 2007.
- 10- National Symposium on the Development of Teaching and Learning Methods in TVET Programs using ICT, Tunisia, 2006.
http://www.lattice.rnu.tn/arabe/full_paper.pdf
- 11- Nour al-Din Zamam, Sabah Soleimani,"Evolution of the concept of technology and its uses in the educational process",University of Mohamed Khiedr Biskra, Journal of Human and Social Sciences, Issue 1, Algeria,2013.
<http://dspace.univouargla.dz/jspui/bitstream/123456789/6279/1/S1112.pdf>
- 12- Robert B. Kozma, "Will media influence learning: Reframing the debate", The University of Michigan, Educational Technology Research and Development, 42(2), 7-19, (1994).
http://robertkozma.com/images/kozma_will_media_influence.pdf
- 13 - <http://searchcrm.techtarget.com/definition/information-design>
- 14 - <http://study.com/academy/lesson/what-is-information-design-definition-examples.html>