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Welcome to GRT

THEORETICAL PERSPECTIVES OF E-LEARNING MODULES IN BIOLOGY WITH SPECIAL REFERENCE TO GAGNE'S INSTRUCTIONAL DESIGN

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ABSTRACT

We are living in the age of science and technology. The modern world is a scientific world and today science is everybody's concern. In recent times there has been rapid addition of knowledge to the world of science. Great advancement in science and technology and the use of this scientific achievement in promoting the well being of mankind through their application.

KEYWORDS:E-Learning Modules , age of science and technology.

INTRDUCTION:

To understand the world around us and to improve the quality of life of the society. Students today need a proper attitude towards science. From the beginning of the human civilization, human beings have tried to understand the nature around them. The nature comprises of plants, animals and their life patterns are contents of biology.
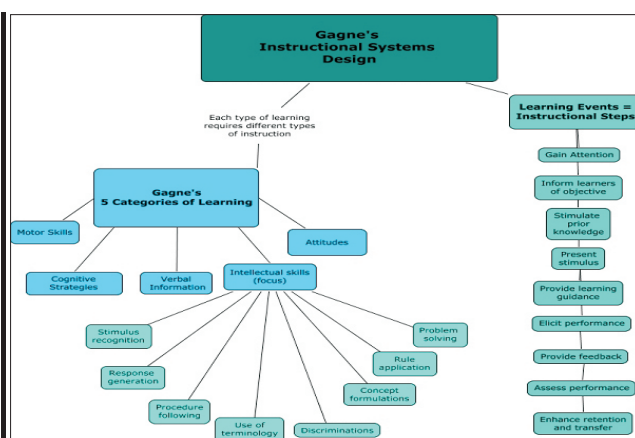
Need For Technology in A Teaching Biology

The knowledge of biology is useful to know about the taxonomy, anatomy, physiology, ecology, genetics, morphology and reproduction on living organism. To understand the basic concepts, student's involvement in the subject is very important. This can be brought with the help of technology which is a tool in the hands of teacher to enhance teaching and learning process. The ordinary chalk and talk method alone is inadequate in achieving the objectives of teaching of Biology. Students can understand the fundamental concepts more effective when graphics, animation, picture and AV aids are used. They will be able to see the different states and functions of learning object which they cannot see through naked eyes. The repeatability or reusability of technology based learning system meets the needs of all the differently capable students of understand better. Therefore the technology based floral parts and their structure and function in plants are simulated and assimilated in the e-learning modules.

E-LEARNING MODULE

The e-learning module is a king of instrumental tool which is complete in it and student-centered. The module's aim to help students gain knowledge and meet the stated learning objectives. This is supported by Moon (2002) who said that "Modules are complete in them and are assessed". Similarly Virginia (1990) stated that, e –learning module is a competence-based tool focused on what a learner will know or be able to do as a result of using the tool. Modules are usually designed as self-instructional units for independent study,

however group based modules are also found. The personalized system of instruction (PSI) and Audio tutorial systems are two types of course management systems that are designed around modules.

The reading materials used in a PSI course, for example may be designed in the module format. If so these modules become part of the PSI technology of instruction. However, it also those modules become part of the be designed in a conventional prose style and to be used in a conventional teaching method.

COMPONENT OF MODULES

There are many different formulas for designing instructional modules, but certain components are agreed upon:

1.Rationale
An overview of the content of the modules and explanations of why the learner should study it.

2.Objectives
What the learner is expected to gain from studying the module, started in performance terms.

3.Entry test
To determine if the learner has the pre-requisite needed to enter the module and the check whether the learner already has mastered the skills to be taught.

4.Multimedia materials
A wide variety of media formats to involve learner's activity and to utilize number of their senses. Most media formats lend themselves to be used in module.

5.Learning Activities
Methods: Presentation, demonstration, drill and practice, tutorial, stimulation, discovery and problem solving. All the methods described above may be incorporated into modules. A variety of methods and media increase student's interest and meet student needs.

6.Self- Test:
A chance to review and check one's own progress..

7.Post-test:
An examination to test whether the objectives of the module have been mastered.

E-LEARNING MODULES ARE DEVELOPED IN THE FOLLOWING PHASES
a.Content understanding.
b.Visualization and story board.
c.Designing the program engine.
d.Designing multimedia elements.
e.Audio video scripting.
f.Sequencing the presentation.
g.Audio recording/ video shooting.
h.Incorporating audio/ video assets.
i.Testing.
j.Integration with LMS.

E-Content
✦ The e-content is all forms of digital information that is used for multiple purposes in difficult fields and areas.
✦ The e-content use electronic or digital technologies to communicate with an to serve the general public.
✦ An innovative application of computer in the teaching and learning process is e-content. This may be intranet based which includes text, video, audio, animation and visual environment.
✦ e-content is digital information delivered over network based electronic devices. ie symbols that can be utilized and interpreted by human actors during communication processes, which allow them to share visions and influence each other's knowledge, attitudes or behavior.

✦ e-content is the advancement of technology to design, deliver, select, administer and extend learning.

Advantages of E-Content

E-content in education is a powerful tool that may be used effectively and efficiently within the class room to create more exciting learning environments and deliver a higher level of educational expertise to students. Teacher can design their lesson plan to supplement classroom lectures with multimedia presentations either on small to explain difficult concepts through graphics, live examples and environment.

Besides these e-content

✦ Motivate students.
✦ Focuses attention.
✦ Reduces verbalism.
✦ Bring the world into classroom.
✦ Makes abstract concepts more concrete.
✦ Add interest and involvement.

Types of E-Content

✦ Assembled e-content,
✦ Short course/unit/module,
✦ Full courseware,
✦ Short reusable learning objects.

FORMATS OF E-CONTENT
The e-content can be developed in several formats some of them are:

1.Video Based Program
a.Video based educational programs focused on subject matter like video lectures.
b.Video based educational programs in and around a subject such as enrichment program.
c.Video based short learning objects in the form of question and answers.
2.Web based program
a.Web based educational programs in hyper text/ XML from.
b.Web based educational programs in text and visual forms with the support of multimedia input live images, graphs, charts, animation. Process demonstration, integrated navigation and so on.
c.Web based learning repository in searchable mode, archival library mode such as video and text clips.

Features of E-Content

1.Multisensory learning experience.
2.Digital convergence.
3.Principle of chunking.
4.Accessibility
5.Reusability
6.Interoperability

Guidelines for Creating Inputs for Development of E-Learning Module

For an effective and optimum development of both textual and visual e-learning module material certain guidelines need to be followed these guidelines have several components. These are listed below along with brief descriptions of each. All are integral to e-learning module design.
a.Objectives.
b. Module.
c. Assignment.

d. References.
e. Glossary.
f. Summary.
g. Quiz.
h. Frequently asked questions (FAQS).
i. Discussion.
j. Case study.
k. Feed back.

OBJECTIVES

In the development of any e-learning module the first essential is a statement of objectives and description of the desired learning outcomes makes it clear to the users how the module will benefits them. The stated objectives enable then to organize their study effectively.

Module

Module refers to a configuration of sections, each having an independent theme leading to a coherent set of competencies. Beginning with overview, each module contains a presentation of the content and self check exercises. Each term is explained below.

An overview

Overview represents a framework in which the contents of a module are presented. The content is divided into main sections and sub-sections. Each section presents at least one new point and generally helps the learners to see what constitutes the module and thus to organize their study.

Content

The content required for presentation refers to the script about topic. This may be equivalent to a narration of about 30- 40 minutes duration. The audio- visual material related to the content is to be based on theories of instructional design.

The following essentials elements must be kept in mind when preparing text material for conversion into e-content.

a.The criteria if relevance to the learners.
b.The correctness of content.
c.The content should be broken into suitable small and relevant components rather   than all to be dealt with at once stretch.
d.The material should be arranged in a local order keeping in view the following criteria:
   ✦ Moving from known to unknown.
   ✦ Moving from specific to general.
   ✦ Moving from simple to complex.
   ✦ Moving from basic to advance.

Assignment

To check whether the learner has fully understood the material and can apply what has been learnt and/or, provide reinforcement to the learner, assignment can be frame the question set for assignment may be shot answer type or essay type. The question set must cover the entire unit and must emphasize on application analysis synthesis of the material by the learner.

References

To tell the learner where the author found the specific information references must be sited. Reference consists of documents including journal articles, book chapter, technical reports, computer programs and unpublished work, entitled as "Guidelines for writing References".

Glossary

This refers and alphabetical list with meanings/ explanation of the words or phrases used that may be difficult for learner to understand, for the e-content develop if considered necessary, glossary of the keywords used in the contents may be developed.

Summary

This expresses all the main points in the important task concepts, characteristic etc covered in the module IT enables the learners to check that they completed all the necessary inputs. A Summary may either be developed in the form of a simple outline of concepts featured etc. or be stated in the form of a list of key points covered.

Quiz

This refers to a set of certain multiple choice questions. Learners are given no time no time for preparation but are required to answer to there and then. The answers can be checked with help of the computer so that the learner is provided immediate feedback.

Frequently Asked Question (FAQ)

Very Often in the formal education system a teacher while planning a lesson envisages certain question in advance and incorporates them in the course of his/her lecture. In the development of e-learning module material these question and their readymade answers are provided separately to the learners under what is now commonly known as FAQs. The purpose of these FAQs is to emphasis certain important aspects of the subjects and to provide reinforcement to the learner.

Discussion

To increase comprehension to sustain interest through enhanced participation and provide reinforcement, provision must be made for discussion for this purpose three or four board areas related to the module may be outlined.

Feedback

Feedback means seeking opinions regarding the material studied, to get the right kind of feedback a questionnaire comprising of related items may need to be designed.

Instructional Design

The sequence of events or teaching acts that a teacher plans, organizes and carries out in order to create a learning environment is called instructional designs. It is concerned with the structure of content to create a suitable learning environment, the selection of appropriate teaching strategies and methods, and the assessment of the performance and the level of students. Instructional design also known as instructional system design is the analysis of learning needs and the systematic development of instruction

According to Broderick (2001) Instruction designs is the art and science of creating an instructional environment and material that will bring the learners from the state of not being able to accomplish certain takes to the state of being able to accomplish those takes. Instructional design is the process of translating general principles of learning and instruction into plans for instructional materials and learning activites –seels & Richie (1994). A closer look at the literature reveals instructional design has been as a process, discipline, field study, a science, and even a reality- Alessi & Trollip (1991)

Historical Background of the Instructional Design

Much of the foundation of the study of instructional design was laid in World War II, when the US Military faced the need to perform complex technical takes, from field stripping a carbine to navigation across the ocean to building a bomber. Drawing on the research and theories of B.F skinner an operant conditioning, training programs focused on behaviors.

After the war, the success of the wartime training models was replicated in business and industrial training, and to a lesser extends in the primary and secondary classroom. The approach is still common in the US military.

In 1956 Benjamin Bloom published on influential taxonomy of what he termed the tree domains of learning cognitive, Affective and Psychomotor. These taxonomies still influence the design of instruction. In 1956, Robert Gagne published his influential book. The condition of learning, in which he describes his instructional design theory which initially was behaviouristically based but later shifted to a more coginitive approach. Gagne's ID model influenced many other design approaches and among them are the works of Dick and Carey, Duffy. In the latter half of the 20th century, learning then began to be influenced by the growth of

digital computer. Later in the 1980's cognitive load theory began to find empirical support for a variety of presentation techniques.

Robert Gagne's Instructional Design Model

1.Gagne created a nine step process called the events of instruction.
2.The events of instruction are related to the learning process.
3.The events of instruction lead to various learning outcomes.
4.The events of instruction support the internal process of learning.

According to Gagne (1985) there are nine events which helps for effective learning. They are as below:

1.Gain attention
Capture the attention of the learner using photograph, magazine, article, demonstration or any other media. Display on outline of the lecture plan in a visual form. (e.g. an illustration, a summary, a diagram, or chart).This gives learners a framework into which they can organize subsequent content.

2.Inform learner of objectives
+ Create expectancy
+ List of learning objectives
+ Level of expectation for learning
+ Motivate the learner to complete the lesson

3.Stimulate recall of prior learning
Relate the new lesson to situations or knowledge that the learners are already familiar with, e.g. the previous lesson

4. Present stimulus material
Describe the key points in the lesson, emphasizing distinctive features, using a variety of techniques if possible. For example, use photos, drawing, the real things etc. vary the format in order to maintain attention and increase comprehension.

5.Provide learner Guidance
Present the instruction in small steps (chunking) leading from simple to complex.

6.Elicit Performance
Involve learners in questioning, discussion and demonstration to confirm that they have learnt from the instruction, to increase comprehension and to maintain through active participation.

7.Provide feedback
As learner respond to the questioning, provide them with reinforcement or remediation when necessary.

8.Assess Performance
Use a quiz or assignment to confirm mastery of the objective.

9.Enhance retention and learning transfer
Provide the opportunity for learners to apply the outcome of their training in a real world environment. (e.g.) realistic assignment using real data and equipment. Incorporate the full experiential learning cycle into activities so that students are encouraged to reflect on and analyze their experiences.

Instructional Design Should Help Achieving the Following Outcome of Learning

1.Ability to process the information and report.
2.Ability to critically evaluate the information and make comments.
3.Ability to solve problem.
4.Ability to apply the knowledge to real life situation.
5.Ability to relate the subject / problem in larger and global context so as to see full implications of the issues.
6.Ability to develop a world view which helps the development of mankind.
7.Ability to transfer the knowledge effectively to others.

Development of E-Learning Modules

For an effective and optimum development of e-learning modules the investigator included the following components in the developed e-learning modules as given by the CEC-UGC.

Objectives

In the development of e-learning module the first essential is a statement of objectives.

Modules

Modules are independent structural experience containing objectives, learning activity and self check exercises.

Assignment

To check whether the learner has fully understood the material and can apply what has been learnt and/or, provide reinforcement to the learner, assignment type questions can be frame the questions set for assignment may be short answer type or essay type. The questions set must cover the entire unit and must emphasize on application analysis synthesis of the material by the learner.

References

To tell the learners where the author found the specific information or where to look for more related information references must be sited. References consist of document s including journal articles, book chapters and unpublished work.

Glossary

Important words were scanned in the video presentation and were made available as GLOSSARY.

Summary

This expresses all the main points in the important task concepts, characteristic etc covered in the module IT enables the learners to check that they have completed all the necessary inputs. A summary may either be developed in the form of a simple outline of concepts featured etc. or be stated in the form of a list of key points covered.

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Frequently Asked Questions (FAQ)

Very often in the formal education system a teacher while planning a lesson envisages certain questions in advance and incorporates them in the course of his/her lecture. In the development of e-learning module these questions and their readymade answers are provided separately to the learners under what is now commonly known as FAQs. The purpose of these FAQs is to emphasis certain important aspects of the subject and to provide reinforcement to the learner.

Feedback

Feedback means seeking opinions regarding the material studied, to get the right king of feedback a questionnaire comprising of related items may need to be designed.

The main objective of this study is to develop the e- learning module on Solanaceae for higher secondary students. The investigator first formulated objectives of the selected topic to develop the e- learning module.

Based on the instructional objectives, the investigator prepared a frame work and script for e- learning module with the help experts in studio, the investigator prepared e- learning modules. By using software like Adobe Photoshop, Adobe premiere, Macromedia Dream weaver etc. In video, to produce real experience the investigator has used real video clippings to explain various fact and concepts.

Steps in E-Learning Modules Development

The development of the E-modules in the present study, include the following different steps.
- ✦ Designing of e-modules.
- ✦ Script writing based on Gagne's Nine Events of Instruction
- ✦ Story board

✦ Video shooting
✦ Integrating multimedia components and Editing.

Designing of E-Learning Modules

In the present study, the investigator decided to develop the e-learning modules in HTML format based on the instructions objectives. In this stage, the topic divided into sub topics and to present it each sub topic the investigator decided to collect appropriate images, animations and videos.

Script Writing For Video

The investigator writes the script based on the Gagne's Nine Events of Instructions. The investigator prepared this in two columns. Audio and visual were carefully planned and sketched out. The audio part of the script was what would be said and what sound effect would be recorded. The visual part of the script shows every shot that will be used in the final production.

Story Board

The first step of the video shooting, the investigator prepared a story board, which is the working document of video in the e- learning modules. The story board gives a general outline of the material that intended to produce in video format. The investigator used three column formats the first column contains content part, second column contains proposed visuals and the third column contains visuals of e- learning modules.

Video Shooting

A professional videographer was arranged for shooting. The shooting was made in specially arranged room. The shots were made according to the scenes such as long shot, medium shot, close-up shot, and zoom in and zoom out etc., given in the script

Integrating Multimedia Components and Editing

Editing was done by the investigator with the help of expert in the studio. The video programmer covers the topic solanaceae. The e-modules in HTML format, it contains text, images, video and animations. The investigator prepared the video and animation to explain the concept according to the instructions objectives.

CONCLUSION

Technology has touched every sphere of our life, the society is highly networked to create, share, use and protect knowledge. Educational institutions are gearing up to provide the information networks to give students access to the digital resources. Thus technology results in new designs and devices as well as new ideas and processes. Thus the a learning module task is to provide a credible reality and a challenge to our existing mental processes, to provide us appropriate level of cognitive conflict and motivated us to continue the process of knowing.

E-learning module provides us with some wonderful new approaches to this aspect of intrinsically motivated learning. The present study has found out that e-learning module is more useful in teaching biology also effective in all subjects in order to achieve the efficient and effective teaching and learning.

BIBLIOGRAPHY

1.Alice madhu sheela (2008), Effectiveness of e-learning in biology at secondary level', M.Ed dissertation, from Bharathidasan University, Tiruchirappalli.
2.Al-shehri Abdullah Mohammed (2004), 'Instructional design based on the principles of learning'; M.Ed dissertation: information retrieved from the website: www.scirus.com
3.Amutha (2007), 'developed and validated an e-content on cloning in biology', M.Ed dissertation, Bharathidasan university, Tiruchirappalli
4.Felix (2007), 'development and validation of e-content on rDNA technology 'for post graduate students, 'M.Ed Dissertation, Bharathidasan University, Tiruchirappalli.
5.Janani (2009), 'Effectiveness of e-content on protein synthesis in biology at tertiary level'; M.Ed Dissertation, retrieved from Bharathidasan university, Tiruchirappalli.

6.Jeya shanmugaraja (2007),'Influence of multimedia in enhancing attitude towards biology at secondary level, M.Ed Dissertation, Bharathidasan University, Tiruchirappalli.

7.Lokesh koul (2006), 'Methodology of Educational Research', vikas publishing house, New Delhi Pvt.,ltd

8.Mc Laughlin (2004), ' Toward a   new paradigm for teaching and learning a case study of the process of integrating instructional design and technology at Florida community; information accessed from the website www.scirus.ETD.com.

9.Nimavathi (2008) studied the Effectiveness of multimedia program in teaching science" M.Ed dissertation, retrieved from Bharathidasan university Tiruchirappalli.

10.Nim and Jacob (2007) development and validation of e-content on capillarity in physics M.Ed dissertation, from Bharathidasan University Tiruchirappalli.

11.Padma shobana (2008) effect of animated power point presentation with audio for learning periodic table of elements at higher secondary level; M.Ed., dissertation, Bharathidasan university Tiruchirappalli.

12.Parchoma Gale Ann (2007) faculty integration of computer mediated learning technology into teaching retrieved from the web-recourses'. www.scirusETD.com

13.Rekha (2007) development and validation of e-content on DNA replication in botany at higher secondary level; M.ED., dissertation, Bharathidasan university Tiruchirappalli.

14.Selvi (2009) empowerment of rural women by creation awareness on soil fertility through multimedia M.ED., Dissertation, Bharathidasan University, Tiruchirappalli

15.Udhyakumar(2008) development and validation of e-content on RNA for under graduate student M.ED., dissertation ,Bharathidasan university Tiruchirappalli

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