In the Artificial Society of Impetus Electronic Textbook in widespread use

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Abstract: In the Artificial Society, Digitization is a perfect combination after the high technology development. We can pass the procedure of digitization to reappear everything. Textbook in the 21st century is expanded to the electronic textbook from the paper. Computers and mobile phones are not only transmissive tools, but they can be multimedia. The digital content should be an E-book. It must combine the high-quality course content material, and the high-quality teaching activity, and appropriate carriers.

Keywords: Artificial Society, Electronic Textbook, Digital Content, Sciense and Technological

1 Introduction

Entering 21st century, people met the change without stopping. With the progress of the times, under human development, the technology progress is fast and complicated. The computer can remember and deal with a large amount of complicated information. The computer is like the brain, and has a function of solving the problem.

Bill Gai Zi says: 「Technology will not replace a teacher. But, technology will influence the transition of the teacher's role in the future[1]. For a long time, schools have adopted the traditional teaching which is on the paper. However, this way is easy to cause students' lack of learning motivation and interest. Because the development and creating newly constantly in information technology, and the development of technology of the computer and technology of the multimedia. Let the way of exhibition of information have great changes too. It impels teachers to consider using the computer in teaching [8], especially to use digital content. Education of nature and life technology should pay attention to the whole people's accomplishment of science and technology[2] [3] . So,The course goals of nature and life technology emphasize the training for ability. Electronic Textbook combines the functions of characters, sound, pursuing the shelf, cartoon, etc., Let teachers pass the design of Electronic Textbook, put the teaching goals and tactics of the courses of nature and life technology into teaching[4] [5].

In an digital era, with the appearances of video-information multimedia, network, long-distance teaching, e-book,etc., textbook is disintegrate stratum of knowledge and the way to transmit step by step. This way has ignited the great change of teaching and learning between teachers and students. Digital Content becomes more important that with the environmental condition is different from demand condition, Even we can expect: It will replace the traditional textbook or other publications, become the most important publication model and study the products. So, the way of utilize Electronic Textbook to assist study, will create one of pluralism, open abundant academic environment[6].

2 Literature review

Probe into the theoretical foundation and meaning of Digital Content, narrate like behind:

2.1 The theoretical foundation of Digital Content

The cognitive theory comes from Gestalt psychology, Gestalt psychology pay attention to the consciousness.

So, when students are facing an academic environment, they can produce and study relying on two conditions[7]: The first condition is the intensity that accord with new study situation and old experience. The second condition is the link and recombinate of new and old experience. The cognitive theory emphasized students' initiative. Scholar of cognitive psychology think of the cognitive course is through the way of knowing, distinguishing, understanding, and thinking , then students can obtain course of new knowledge[8] . Scholar of cognitive psychology Explain the behavioral change of study into the cognitive course, they think of the necessary condition of study is student's understanding of things.

In the cognitive learning theory, natural and life science and technology teaching influential psychologists include: JS Bruner, RM Gagné and BS Bloom and so on. Bruner on the natural and life science and technology education in the important impact of advocates spiral curriculum and teaching methods was found, but Gagne's information processing model and Bloom's mastery learning method to promote both the natural and life science and technology teaching of great revelation.

Bruner thinks: Development of the ability of children's intelligence is through the way of three kinds of thinking of Enactive representiation, Iconic representiation, and Symbolic representiation. In addition, There are four principles which Bruner's System of Representation is applied to teaching[7]:

(1) principle of motivation : There should be motives to learn. As children like studying, they will like to study. Like this, there is a result in teaching.

(2)principle of structure : In the studying of knowledge, the teaching material should accord with students' study psychology. It could reach the results of learning.

(3)principle of sequence: When the teacher is teaching, they must prepare the appropriate teaching material to cause students' motive, and maintain students's interesting.

Like this, if the teaching material accords with students' age and ability, make new or old experience connect each other. Then students' study efficiency will certainly get twice the result with half the effort.

(4)principle of reinforcement : Children's study is initiative, positive. Produce the behavior of studying because of being curious, meet curiosity because of behavior of study. Thus, students will produce the result strengthened to the activity of study.

Bruner emphasizes that students must probe into and depend by themselves. Find principle and concept from the changes of the things, this's a main factor which forms study[9] .At the same time, he always emphasizes the importance of the " structure ". He advocates to utilize the spiral course way to organize the teaching material of course. And application Discovering Teaching to lead students to find new knowledge voluntarily. Let students of different knowledge intensities to study effectively, and reach the effect of learning transfer.

In the research of cognitive development, Gagne has put forward the information processing model to explain the systematic course on function of cognition.

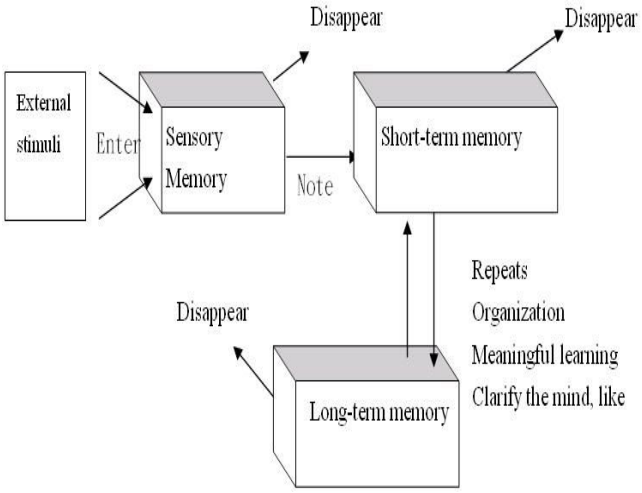

Fig1. Human memory system schematically

Gagne think of: the type of students' learning will accord to condition that wants to strengthen being different to some extent. The teacher's teaching activity will always follow the type of different studythat take different ways to go on. So, Gagne utilizes course of the information processing model to propose a set of teaching principles.

Because human memory is dynamic and complex MHS, allowing for the handling of messages through the deliberate, review, there would likely be sent to long-term memory area are stored. The short-term memory in a limited period of time, in addition to receiving incoming messages received

by the senses and do a timely response, the other also has working memory function. Working memory refers to the learner right message for further awareness and understanding, understanding what to do after deliberate retention, which is converted to the message key to long-term memory. Stored in long-term memory area, if the message can be successfully recalled, the message can be repeatedly used.

The constituent elements of the internal mechanisms of learning, is the act of learning stages and are presented below.

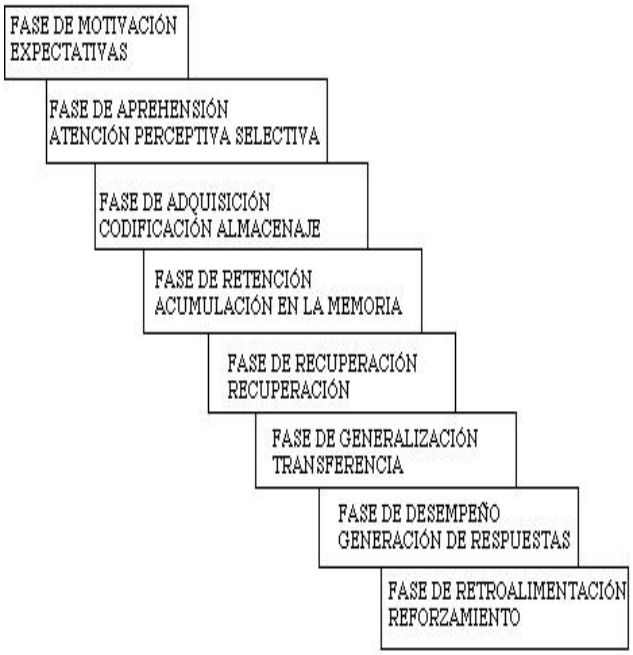

Fig2. Information Processing Model

Gagne suggested that teachers use a bottom-up class, identifying a lower-class students learn the skills, then help students to develop into the new information on the mental framework, by providing meaningful learning materials for students so that students in the environment the use of tools and resources to develop their own knowledge. Through identification, encoding, decoding, operation, storage, extraction and so on, can help students to reason, thinking, understanding and problem solving high-level mental activity, so materials had been able to have the structure presented in meaningful ways, Learners will be able to reduce memory workload, enhance their learning.

Bloom think: If the distribution of students' ability is the normality, the teacher's teaching way and teaching material are suitable for each student. And students have enough study time, most of students can reach the precise familiar level into the course. Mastery learning is a kind of implementation of teaching course. It is a kind of course which composit by students' demand and feedback and correction of students[1] . These tests have the course of feedback and correct. Utilize this way to diagnose students' study difficultion and appoint special procedure of remedying. When students are in this kind of study situation, everybody can study is very good and study the content skillfully in fact.

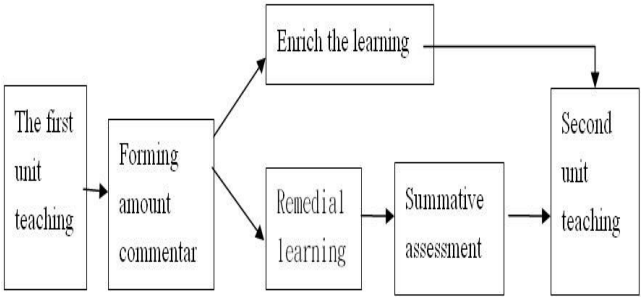

Fig3. Mastery learning

According to this assumption, application Mastery learning in teaching that have important steps[10] :

1.Course according to the properties of the teaching material, divide into several units of studying.
2. Each unit stipulates the goal of teaching, offer teaching, correct individually and Test data。
3. Stipulate the minimum standard of each unit of studying. This standard can't be too high, avoid reducing the interest of studying.
4. As study, employ the progressive way to study each unit.
5. After each unit of studying, should implement the taking shape commenting amount. And use to diagnose students' study effect.
6. To not reaching standard students, find out the question, then adopt various methods to remedy.
7. After studying the unit, need to implement the commenting amount of summing-up, In order to diagnose whether students reach the set teaching goal.
8. According to this kind of result of taking shape commenting amount and commenting amount of summing-up, in order to improve the teaching method and teaching material.

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Fig4. Bloom's Taxonomy of learning

Looking above, the perception is an individual acquisition, conversion, storage, extraction and use of intelligence information the role of history, is also the individual's perception, thinking, knowledge, decisions to form over meaning, whose purpose is to enable individuals to solve the problem, the formation of a new rule or truth, or do a clearer understanding of those involved. In other words, cognition is the sum of the individual within the message handling, but also thinking and learning ability.

In addition, cognitive psychologists also believe that the success of learning is required to treat the new situation with the old line with the extent of the experience, and learn from the experience of the establishment do not rely on fragmentary form, but the old experience-based to absorb new knowledge. Thus, in learning situations in a timely manner will help to stimulate increased awareness and understanding of learning at the same time, and given sufficient time to mastery learning, so students have better academic achievement, their high motivation to learn and even improve the their learning efficiency.

Use the teaching media in the course of teaching appropriately that will let study be more efficient, teaching have effects that make teaching activity more lively and more vivid, more noticeable too even more. [6] Think: Mankind's course in process information is and not dealt with by two major systems of language through the language. In 1991, Hegarty, Carpenter, and Just think the vision is stimulated to often offer the most direct most effective janitor way of scientific or technical knowledge. So, the design of the teaching material will be designed according to the operation course of student's information processing, besides being able to reduce students' cognitive load, still can obtain the greatest results of learning from hitting.

point out: The acquisition of human knowledge, with indirect experience directly. Direct experience is that everybody passes the sense organ, for example[9]: Received the result in personally various activities of participation in vision, sense of hearing, sense of smell, sense of taste, sense of touch,etc., and the experience is direct and concrete, need to receive experience from trying the wrong course after even sometimes, from running but the middle school is successful. and indirect experience can know the achievement of others' experience through the picture, characters, symbol, TV, film, broadcast, thinking. Dale has proposed experience Pyramid (the cone of experience) according to the human experience Way.

This way has revealed the relation among various medias, and the important role that each conspicuous media accounts for in studying the course. The media of bottom of the Pyramid, the experience offered is direct and concrete, the more develop towards upper strata, the more abstract. Dale explains the influence on studying the effect of different matchmaker's body forms with experience Pyramid, the images, figures are concreter and easier to study than the characters symbol, facilitate the diversification of the teaching media indirectly, and Bruner has similar opinions. According to studying the course, different experience needs getting from different learning methods. These learning methods include: From running the middle school, from observing the middle school and from pondering over three kinds of middle schools.

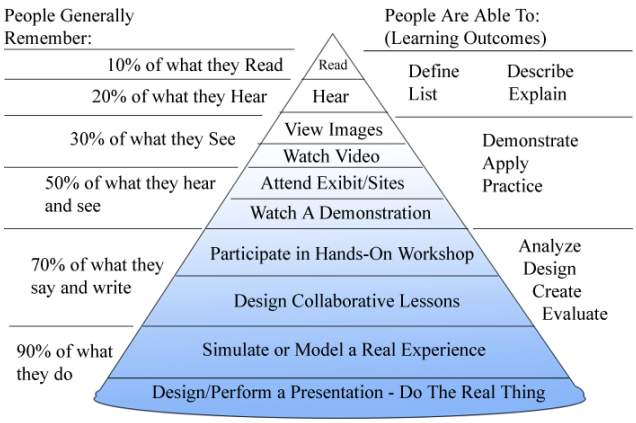

Fig5. Dale's Cone of Experience

By Dale's Cone of Experience theory, be able to tell, the more the upper, and its more abstract concepts, the more the students is not easy to understand, teachers have to spend longer time to explain, but children may not necessarily be aware of their concept, the other hand, more lower, and their ideas more concrete and easier to understand the students, the teachers do not need to spend too

much time on, you can allow students to learn concepts. In addition, this theory also explains the process of teaching a variety of experience is gained from concrete to abstract, from direct to indirect, Youyidaonan step by step, and with each other to form a strong link to get good results. Therefore, if the students should be able to learn the effective use of more abstract information, they must first establish the specific experience of many databases, so in order to abstract symbols give meaning to the facts described in [11]

3 Research method

3.1 Meaning of the digitisation teaching material

Digital Content refers to utilizing science and technology, computer and various medias, combine technology such as the characters, picture, sound, video-information, cartoon in the content of the teaching material, appear in the form of electronic digitisation, store teaching material or theme unit course in the electronic medium. In order to offer teacher teaching and student to study, it can have reusing, keeping for a long time, such characteristics as pluralism appears [3]. Present digitisation teaching material appear way in accordance with it, can divide into webpage type, person who lecture, analog, video-information type, e-book five way [3]. So, the digitisation teaching material is directed against the particular course content, after joining the multimedia functions of vision and sense of hearing, offer a teaching material of the repeated learning opportunity constantly to learners, in order to reflect interest and result of study, and it study the result to feedback appropriately.

3.2 Design of the digitisation teaching material

The traditional type digitization of teaching material will be a basic characteristic of the scientific and technological society of the information. Lai A-Fu[18] think under the environment of such digitization, the environment of learning aid has characteristics such as virtual, far distance type, interdynamic, timeliness, requirement and demand guide and combining,etc.., therefore can replace the position of study of traditional teaching material gradually. Zhang Zheng-Liang [9] Elements formed are like Table 1 while thinking digitization teaching material design:

Table 1 mould group type digitization what teaching material commit want one

The design of the digitisation teaching material wants one	Arrangement contrast of the traditional teaching material
The copyright declares, the author, unit name, unit goal, Ability indicator, time dispose, the applicable grade	The teaching notes are designed and written
Unit content, written historical materials, note Picture, sound, cartoon, film	Textbook content
Homework, commenting amount	Student's exercise
Teaching guides, the reference material, relevant websites	Teachers' manual

(The source of the materials: Guide and flash from a policy, 2001)

In addition, Mention that should notice the following principles in design of the digitization teaching material:

a.Multimedia principle: Use the characters, picture to present the content of the teaching material in step, its result of teaching is better.

b.The continuous principle of space: Put the distance between characters and picture to enter, healing can reduce the chance that students disperse attention, receiving benefit to student's message.

c. Consistency principle: Reduce the picture and text having nothing to do with the content of courses, in order to reduce student's cognitive load, increase the results of learning.

d. Heavy-duty attitude principle much: Utilize cartoon collocate teaching material of voice collocate to appear result to be good characters than cartoon. In addition, equilibrate the characters (the pronunciation is explained) It is the focal point needing to pay attention to too.

3.3 Characteristic of the digitization teaching material

The study of digitization has changed the idea of traditional learning aid. Among traditional teaching activity, teacher with of the same generation to study main source of knowledge student. But in the study of digitization, the source of knowledge makes pluralism very much. And there are the following several advantages in teaching in the difference between digitization teaching material

and traditional teaching material and digitization teaching material of the application:

a. Have function of the hypermedia, break through the linear way to read the teaching material of the tradition.

b. The academic environment has true situation, let students cross over the hedge of traditional classroom, make the academic environment and true world exactly mix together.

c. Do not receive the region and time restriction, can study whenever and wherever possible.

d. Information appears in pluralism, impel students to study voluntarily, it is apter to understand the information that the teaching material transmits too.

e. Pay attention to specific chemistry to practice, let students have greater achievements, help right teaching to promote.

f. Course of repeated study, offer numerous remedying the teaching chance by studying precisely and familiarly.

g. The consistency of the teaching material, accord with environmental protection and economic demand.

h. Offer appropriate feedback, achieve the interdynamic teaching purpose.

i. Can record students' study situation, comment the learning aid effect of the ancient bronze mirror as the basis that will improve teaching in the future.

4 Conclusion

4.1 Experimental design

This research is mainly to probe into benefit of incorporating nature of primary school and scientific and technological teaching of life of the electronic textbook. Main purpose to understand why it will be digitisation impact on student's learning motivation and study achievement of teaching of teaching material. After teaching, test to experiment group and study achievement and learning motivation scale controlling the group after implementing study, and investigate to the study opinion after the experiment group carries on the teaching material teaching of digitization. Fig. 3 is the experiment design, prove as follows:

Group	Have examined ago	The experiment is dealt with	And then examine
Experiment group	O_1	X_1	O_2
Control the group	O_3	X_2	O_4

a. It is two groups to receive sample duty, including experiment group, controlling the group.

b. Before the teaching experiment is dealt with: The experiment group and controlling the group to accept nature and life science and technology " The study achievement is tested " Construct and examine(have examined ago, O1, O3) .

c. The teaching experiment is dealt with: The experiment that the experiment group accepts teaching material teaching of digitization is dealt with, last six weeks (X1) . Control the group and accept teaching of this teaching material of traditional paper, last six weeks (X2) .

d. After the teaching experiment is dealt with: Experiment group and control accept naturally group with life science and technology " whether achievement test to study " construct examine (and then examine, O2, O4:) , and investigate to the study opinion interview after the experiment group carries on the teaching material teaching of digitization.

In addition, this research adopts the single factor altogether the parameter is analyzed and counted. Its research changes one to prove as follows:

a. Change one by oneself - This experiment changes one by oneself "

b. In accordance with changing one -

（a）Learning motivation: Research is in accordance with changing one in this, learning motivation is four in ARCS model of Keller to degree: A（attention）、R（relevance）、C（confidence）、S（satisfaction）, Consult IMMS (Instructional Materials Motivational Scale) that Keller has not been published, teaching material motive scales adapted, as the learning motivation scale of this research.

（b）Study achievement: The ones that all adopted a researcher and made up by oneself in the learner's study achievement were tested with the scientific and technological study achievement of life as the survey tools of this research naturally.

c. Change one altogether - In order to cooperate with the school administration and actual teaching situation, this research adopts and allows the experiment to study the law, carry on teaching by class, so unable to assign at random with controlling the students of group to the experiment group.

d. Control and change one - This research is besides utilizing statistical method to control the possible interference to change one, also adopt the control

method of the experiment and get rid of and interfere with the factor other releva

(a) Control two groups of teaching material contents, teaching process and teaching hours,etc. and interfere with changing one.

(b) While choosing controlling group's class, consider in order to control group's student's speciality, family background, parents' society similar to experiment group through the position and academic credits,etc., Minuted and collected relevant materials to count before again, one could lower the interference that different student's specialities may cause by this.

(c) In order to control the going on of teaching experiment, among them test group and person who controls group's teaching all served as by oneself by the researcher, in order to observe student's study situation at the time of implementing the teaching material teaching of digitization.

4.2 Handle the course in experiment

Because " function of strength " of this research and two units of " knowing plants " etc. are one of the course progress. So, experiment group and controlling the content of courses of the group with the nature of primary school and life first textbook (a edition in the south) of science and technology " function of strength " and two unit unit contents of " knowing plants " etc. are the main fact.

4.3 Study tools

The research tool that this research institute used includes: Learning motivation scale, Test with the scientific and technological study achievement of life naturally, Teaching material software of digitisation (electronic textbook), Interview outline of the opinion after the study of the digitisation teaching material.

4.4 The materials are dealt with and analyzed

It is at experiment the group with controlling for group the members it examine before being finish accepting, after after not examining, the researcher employs each experimenter's materials separately SPSS software carry on every statistics and analysis.

a. The independent sample T is tested: Test and test the independent sample T with learning motivation scale total points with the scientific and technological study achievement of life naturally to experiment group and primary school which controls the members of the group.

b. Independent sample form factor the parameter is analyzed together: May influence the having nothing to do and changing one of experimental result while getting rid of the experimental design.

(a) Examine mark as parameter together before the scale with learning motivation analyze, the teaching of teaching material, in order to change one by oneself, learning motivation examine marks after the scale for in accordance with changing one, then carry on the parameter analysis altogether of the single factor. (b)Examine mark as parameter together test, with life scientific and technological study achievement naturally with primary school analyze, the teaching of teaching material, in order to change one by oneself, the primary school test with learning motivation examining marks after the scale with life scientific and technological study achievement naturally for in accordance with changing one, then carry on the parameter analysis altogether of the single factor.

Make use of and talk the materials through interview of opinion after the study of the digitization teaching material, in order to expect deep one understanding student to digitization idea and suggestion of teaching method of teaching material, and then probe into whole state and its impact on student that course carries on.

5 Discover

As to nature and scientific and technological field course of life, include fields such as physics, chemistry, living beings, geoscience, life science and technology, etc.. Content range is broad, and is full of complicated, abstract concepts in course that can be regarded as a professional subject, it is necessary to offer the teaching of scientific and technological support, assist students to study.Use the digitization teaching material in the nature of the primary school and scientific and technological teaching of life, can reach the learning aid result of complementing each other even more.

Motivation to learn refers to the students to learn about nature and scientific and technological field course of life has shown, when driving force from within. Data by single-factor ANCOVA results showed that: Acceptance of different modes of teaching students motivation to learn have significantly high scores($F=34.196$, $p<.001$), Said: acceptance of nature and scientific and technological of digital teaching materials for students in learning performance was significantly better than the motivation did not accept the teaching of digital teaching materials for students. Also on behalf of the

digital materials into the nature and scientific and technological field teaching and learning of students have a greater attraction. And dynamic visual effects and curiosity so that students find courses include fresh, and that can trigger students to learn than the wishes and interests. Also based on digital materials for teaching and learning for elementary students in learning is helpful, This is also in line with the current teaching and publications are the trend toward digitization.

In addition, academic achievement, this study refers to students to learn about nature and scientific and technological field, the mastery of teaching content. Data by single-factor ANCOVA results showed no significant level of the test F value ($F=.065$, $p > .05$). Said: acceptance of nature and scientific and technological field of digital teaching materials teaching the performance of students in academic achievement is not significantly better than the digital teaching materials did not accept the teaching of students, The results show that teachers do not use a different mode of teaching certainly can enhance student achievement.

In studying the course, the teaching material is playing a very important role.There are a lot of teaching materials of present digitization, some teaching materials can only attract student's transient interest. After interacting with digitisation teaching material, the learning motivation of the weakening students that will be very fast. Whether so, could maintain the learner's learning motivation continuously and design the difficult problem that the digitisation teaching material needs overcoming. If students lose the stimulating of learning motivation, have no consciousness in studying.

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