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The Effectiveness of a Suggested Hyper-Book and Speaking E-Library – Based Science Program for Enhancing First Stage Basic Education Language School Students' Acquisition of Scientific Concepts and Some Basic Science Processes

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Introduction :

The vast technological revolution has led to increasing knowledge and its uses in various fields under the age could be described as the explosion of knowledge age, and as an inevitable result of what developed by human as tools, equipment and sophisticated technology that transform easily information from place to another in seconds through the Internet, e-mail, etc. Consequently, we are in a urgent need for a new kind of education. An education that develops creative minds and enable them to face local and international challenges in various areas of life.

The science curriculum at the forefront of the curriculum, which contribute to prepare a good citizen that be able to face the challenges of this age and keep in touch with scientific and technological progress, as anticipated in the curriculum of the structure of cognitive science contribute to the building of the students' mind and his personality and gaining scientific concepts and skills or mental processes (basic and integrated science processes), which qualifies them to deal with the knowledge structure of science and practice the ways of investigation and the techniques associated with them, which lead to increase learners' confidence and make them more able to face the problems and explain phenomena and the ability to predict events based on the circumstances of fact and activation of their capabilities and skills.

The acquisition and developing of scientific concepts and basic science processes, is one of the most important aims which science education tries to achieve during the

teaching process, particularly in the first stage of basic education, the study is concerned with scientific concepts as they lead to achieve the meaning of scientific knowledge Unlike the rest of the knowledge structure of science as facts, principles, laws and theories, and acquiring them correctly helps students in the explanation of scientific phenomena and practice scientists' behavior to predict scientific phenomena, while helping first stage of basic education students to gain basic science processes in developing students' ability to explain many of the phenomena and solving problems they face by linking teaching problems with practical life and make it similar to the life problems facing the student at home, school and community, and help them in searching for scientific knowledge and study of the surrounding environment, in addition, students' gaining basic science processes is considered the basic foundation for the acquisition and practice of integrated science processes in the later stages.

With increasing global openness and intercultural increased interest of the establishment of many language schools in various stages of education, especially at the stage of basic education, while Several studies suggest that there deficiencies in the acquisition of students of scientific concepts and basic science processes common schools (taught in Arabic), notes that the situation is not much different in language schools, but it is getting worse and this was confirmed by the survey carried out by the researcher, as well as a personal interview conducted with some students and science teachers and supervisors of language schools which concluded the following:

- different language education weakens the ability of students to retrieve experiences and previous scientific knowledge.
- Leak of illustrative examples in the school book.
- Lack of coherence and integration between the parts and units textbook.
- Lack of coherence and integration between the parts of books across different school grades.
- The desire of teachers for teaching in one school grade weakens their ability to know previous experience for students and related subjects under study.
- Lack of appropriate educational software.
- The weakness linguistic of preparation for the teacher weaken his ability to express, despite having scientific material.
- Lack of Simplified foreign scientific references covering all curriculum subjects.

In scientific and technological progress of computer has become of many uses in the field of education and learning, particularly in light of the inflation of intellectual production, where it became necessary to provide appropriate information to students in a proper time and amount, and this is what can not any book or author and paper can achieve, so the number of schools and educational institutions in the developed countries provide many of the academic programs that rely entirely on sources and multiple forms of e-learning.

The hyper-book and speaking e-library are one of the sources and forms of e-learning, and the idea of hyper-books is based on building integrated structure on content of

knowledge as well as multimedia elements superior such as text, sounds, shapes and illustrations, video clips and experiences and virtual electronic library, so that the student can display his arrival to any part needs to be clarified that can pass through the hyperlink to another place to do the experiment of explanatory or watch a video clip or gaining more about the topic or concept and studying it deeply, and when he is coming back again to the point that came out of it to follow the main topic.

The hyper-books are better than textbooks in providing an attractive electronic environment to learn and include many of the educational methods, and high multiple media learning that help in overcoming all boundaries of time and space, size and severity, and cross referencing enhanced learning tests, default interactive activities and experiments; can conduct all activities and scientific experiments.

In light of this, the researcher finds that the developments in the current era must be accompanied by developments at the level of the curriculum generally full elements its system, and science curriculum particularly given the characteristic of those curricula of kept up with the nature of the ages, especially scientific content, which provides for students in various educational stages, where should rooted in the nature of science and its operations so as an essential corner stone of science education, and formulated in an environment that supports the linking of its components and its parts in a functional and achieve the integration and interdependence between the elements of curriculum, and working to create an appropriate and healthy environment for

the teacher and the learners for each other to do turn real in the educational process, providing the learner with an attractive environment for interactive learning, and reduce how much burden on the teacher (such as measuring the former learning, and identifying gaps in the learner, and processing of scientific knowledge and expertise necessary to fill these gaps, providing learning resources appropriate, and identify interrelated elements within the present method or through different approaches, ...) and replacing with automated intelligent systems, and provides them time and effort to guide students and follow their learning, so come the current study for this purpose to adopt the idea of designing and developing a program based on the use of hyper-book and speaking e-Library.

Problem of the study:

The problem of current study lies in the low level of schoolchildren languages achievement of scientific concepts and some of basic science processes, which may be due to the low status of paper textbooks and loose its parts, and the weakness of its ability to contain the multi-media and learning resources to suit the nature of the students of this phase, in addition to non-consideration of the losses from the experiences of the students, and poor vocabulary for students and teachers, and the lack of appropriate well prepared educational software.

Hence the current study attempted using of a suggested program based on the use of hyper-book and speaking e-library in teaching science for students in the first stage of basic education language schools and measure the

effectiveness of this program to assist students in the acquisition of scientific concepts and some basic science processes.

In light of the foregoing the current study tried to answer the following main question:

What is The Effect of a Suggested Hyper-Book and Speaking E-Library – Based Science Program for Enhancing First Stage Basic Education Language School Students' Acquisition of Scientific Concepts and Some Basic Science Processes?

The following sub-questions could be derived:

1. What is the scientific concepts contained in the 2nd and 3rd units of science book scheduled to sixth year primary students (second semester) language schools ?

2. What is the basic science processes appropriate to the content of the two units and the level of students study sample ?

3. What is the topics included in science curricula that students study sample studied and related to the topics of the two units under study ?

4. What is the structural standards for the design and development of Hyper-Book and Speaking E-Library program ?

5. What is the form of Hyper-Book and Speaking E-Library program ?

6. What is the form of the suggested Hyper-Book and Speaking E-Library Based Science Program ?

7. What is the effect of using the suggested program on each of :

- The Acquisition of Scientific Concepts of the study sample ?
- Developing Some Basic Science Processes of the study sample ?

8. What is the Effectiveness of using the suggested program on each of :

- The Acquisition of Scientific Concepts of the study sample ?
- Developing Some Basic Science Processes of the study sample ?

The objectives of the study:

The study seek to achieve the following objectives:

1. Measuring the effect of using the suggested program in:

- The study sample students' acquisition of scientific concepts.
- The study sample students development of some basic science processes.

2. Measuring the effectiveness of using the suggested program in:

- The study sample students' acquisition of scientific concepts.
- The study sample students development of some basic science processes.

The importance of the study:

The significance of the current study is as follows:

- The current study is one of the first Egyptian studies (may be Arabic), which aimed to achieve functional interdependence and integration of curricula across

different grades.

- The current study is one of the first Egyptian studies (may be Arabic) which aimed to design and develop a program based on the use of Hyper-book and speaking e-library in general and in the grades of the first stage of basic education in particular.

- The current study is one of the few Egyptian studies that aimed to increase the level of achievement of scientific concepts and the development of some basic science processes of language schools.

- The current study is a new addition to the Arab Studies on the domain of the effect of the using e-books in general, Hyper-book and speaking e-library in particular on the level of achievement of scientific concepts and the development of some basic science processes.

- The study addresses a very important topic in the teaching and learning of science, which is enhancing the first stage of basic education achievement of scientific concepts and development of some basic science processes.

- The study provides a set of tools that may be useful for researchers in conducting studies on the scientific concepts and basic science processes.

- The study provides a set of tools that may be useful for designers and developers to design and develop educational software based on the use of hyper-book and speaking e-library.

- The study provides Ministry of Education and universities with information and new technologies to help them in organizing the content of the curriculum

and in designing and developing of software or interactive sites serve the teacher and the learner.

- The study provides units two (Electric Energy) and three (The Universe) of science course to sixth-grader primary language schools (second semester) and topics associated in the form of software and educational site based on the use of hyper-book and speaking e-library, as well as guides of using, designing and developing, which can guide the teacher when designing other units.

- Provide a procedural model for how to use the program based on the use of hyper-book and speaking e-library in teaching science, which may help science teachers and the planners of teacher preparation courses to serve in the development of modalities and methods of teaching science.

- Cope up with the nature of science in terms of attention to science processes in the teaching of science by providing a model for training students to practice some of the basic science processes, and that would convey the effect on other life learning situations.

- Provide substantive tools, namely: achievement test of scientific concepts and basic science processes test, could benefit science teachers in building similar tests.

- Provide students in the first stage of basic education language schools with basic science processes, which contributes greatly in building the base and the basis for the development of integrated science processes in the second stage of basic education.

The limitations of the study:

The study is limited to:
1. A random sample of sixth year primary students language schools in Fayoum governorate .
2. The second unit (Electric Energy) and third unit (The Universe) of the science book taught to students in the study sample in the second semester .
3. Scientific concepts involved with these units.
4. Some basic science processes suitable for students in the study sample and content of the two units .

The sample of the study:

The study sample consisted of two classes were chosen randomly from sixth grade classes of Azza Zidane Experimental Language school in educational administration of west Fayoum, which was chosen randomly from language schools in the Directorate of Education in Fayoum governorate, and one of these two classes was also selected randomly to be the experimental group (6/2) and the other to be the control group (6/1), and this was done in the academic year 2011/2012.

The hypotheses of the study:

The study aimed to test the validity following hypotheses:
1. There is no statistically significant differences between the mean of scores of the students of two groups: experimental and control groups separately in two applications: pre and post of the scientific concepts test.
2. There is no statistically significant difference between the

mean of scores of the students of two groups: experimental and control groups in the post application of the scientific concepts test.

3. There is no statistically significant differences between the mean of scores of the students of two groups: experimental and control groups separately in two applications: pre and post in each skill of the skills measured by the basic science processes test individually and in the total score of the test.

4. There is no statistically significant difference between the mean of scores of the students of two groups: experimental and control groups in the post application in each skill of the skills measured by the basic science processes test individually and in the total score of the test.

5. The suggested program Achieves significant effect size in increasing the level of achievement of scientific concepts compared to the usual method.

6. The suggested program Achieves significant effect size in developing each skill of the skills measured by the basic science processes test individually and in the total score of the test compared to the usual method.

7. Both of the suggested program and the usual method Achieve significant efficacy in increasing the level of achievement of scientific concepts.

8. Both of the suggested program and the usual method Achieve significant efficacy in developing each skill of the skills measured by the basic science processes test individually and in the total score of the test.

The Methodology of the study:

The researcher used the development studies method based on using the systemic approach, through using one of the Educational design and development models (Mohammed Attia Khamis, 2003), and the researcher used the following approaches:

- **Descriptive analytical approach:** in the extrapolation of contemporary educational thought by refer to Arab and foreign studies relevant to the subject of the study and some educational literature, as well as in the analysis phase and identify the characteristics and needs.
- **Constructive approach:** in the design and development phases when building some of the tools and educational materials used in the study.
- **Empirical approach:** At the assessment stage (assess the effect and effectiveness) when applying the suggested program on sixth graders of basic education language schools.

The experimental design:

The researcher used the experimental design based on two equal groups: experimental and control groups, while it was treated as follows:

- The assessment tools (scientific concepts test and basic science processes test) implemented formerly.
- The two units of the study presented to the experimental group with the suggested program and presented to the control group in the usual method.
- The assessment tools (scientific concepts test and basic science processes test) implemented later.

The tools of the study:

The current study relied on three types of tools:

1. Analytical tools:
   - A list of the scientific concepts involved with the two units under study (prepared by the researcher).
   - A list of basic science processes involved with the two units under study (prepared by the researcher).
   - A list of topics included in science curricula that students already studied and related with the two units under study (prepared by the researcher).
   - A list of the structural standards for the design and development of program based on hyper-book and speaking e-library (prepared by the researcher).

2. Educational tools and materials:
   - Teacher's Guide to the suggested program based on the use of hyper-book and speaking e-library (prepared by the researcher).
   - Hyper-book and speaking e-library software (prepared by the researcher).
   - Manual of using Hyper-book and speaking e-library software (prepared by the researcher).
   - Characterization of Hyper-book and speaking e-library software (prepared by the researcher).

3. Assessment tools:
   - Scientific concepts test (prepared by the researcher).
   - Basic science processes test (prepared by the researcher).

The study procedure:

The study followed the following procedure:

the researcher presents the theoretical framework for the study by extrapolating contemporary educational ideology by reference to Arabic and foreign studies and some educational literature in the following fields: e-learning, and hypermedia, and hyper-books, and speaking e-libraries, and scientific concepts, and basic science processes, so the current study have included five chapters included the theoretical and applied aspects adopted by the researcher in achieving the objectives of the study, the following outline shows the contents of these chapters :

The first chapter displays the Study problem, its hypotheses, objectives, importance, limitations, methodology, experimental design, sample, tools, procedures and terminology .

The second chapter displays the hyper-book and speaking e-libraries in four items; where the first item included hyper-book, and the second item included electronic library, and the third item included instructional design, and fourth item included standards for the design and development of Hyper-Book and Speaking E-Library program .

The third chapter displays the scientific concepts and basic science processes in two items; where the first item included scientific concepts, and the second item included basic science processes .

The fourth chapter displays the design of the suggested program and the preparation of educational and measuring tools in four stages: analysis stage, design stage, development stage and preparation of the educational and measuring tools, and the final evaluation stage .

The fifth chapter, displays the results of the study, discussing and explaining the conclusions and recommendations of the study .

The study results:

The current study reaches the following conclusions:

- **The results of scientific concepts test:**

There is a statistically significant difference between the mean of scores of the experimental group pre and post applications of the scientific concepts test at the level (0.01) in favor of the post test, and the value of gain ratio for Mac Jojian more than (0.14) which confirms the effectiveness of the use of the suggested program to increase the level of students of the experimental group' achievement of scientific concepts .

There is a statistically significant difference between the mean of scores of the control group pre and post applications of the scientific concepts test at the level (0.01) in favor of the post test, and the value of gain ratio for Mac Jojian more than (0.14) which confirms the effectiveness of the use of the usual method to increase the level of students of the control group' achievement of scientific concepts .

There is a statistically significant difference between the mean of scores of the experimental and control groups members in the post applications of the scientific concepts test at the level (0.01) in favor of the experimental group, and that the value of effect size "$\eta 2$" more than (0.06) which confirms the preference of using the suggested program to increase students' achievement level of scientific concepts

compared with the usual method.

- **The results of basic science processes test:**

There are statistically significant differences between means of scores of the experimental group members in the pre and post applications of the basic science processes test at the level (0.01) in favor of the post test in the following processes (observation, classification, inference, and prediction), as well as in the total score of the test, and the value of gain ratio for Mac Jojian is more than (0.14) in each of the skills measured by the test as well as in the total score of the test, which confirms the effectiveness of the suggested program in developing the previously mentioned processes of the experimental group members.

There are statistically significant differences between means of scores of the control group members in the pre and post applications of the basic science processes test at the level (0.01) in favor of the post test in the observation process, and at the level (0.05) in favor of the post test in the inference process as well as in the total score of the test, and at the level (0.05) in favor of the pre test in the prediction process, while there is no statistically significant differences between means of scores of the control group members in the pre and post applications of the basic science processes test at the level (0.05) in the classification process , but for the prediction process the negative sign of (T) value means that the means of scores of control group in the pre applications is higher than in the post, and this means that there is a reduction of the level of students in this skill, which consequently means that the usual method helps in creating a

uni-dimensional generation characterized by limited thinking which is highly dangerous, and the value of gain ratio for Mac Jojian is less than (0.14) in each of the skills measured by the test as well as in the total score of the test, which confirms the ineffectiveness of the usual method in developing the previously mentioned processes of the control group members.

There are a statistically significant difference between the mean of scores of the experimental and control groups members in the post applications of the basic science processes test at the level (0.01) in favor of the experimental group in the following processes (observation, classification, inference, and prediction), as well as in the total score of the test, and that the value of effect size "$\eta 2$" more than (0.06) which confirms the preference of using the suggested program in developing the previously mentioned processes of the experimental group members compared with the usual method.

The study recommendations:

In the light of the study problem, procedure, hypotheses and results, the researcher recommends the following:

1. designing and developing the hyper-books and electronic libraries in accordance with the standards reached by the results of the current study.
2. Using hyper-book and speaking e-library – based Science program that have been developed in the current study for developing other educational skills.
3. developing a number of other educational programs

based on hyper-book and speaking e-library for developing other educational skills in other courses.

4. Driving the attention to the development of scientific concepts and basic and integrated science processes, especially in the first and second stage of basic education.

5. Using hyper-book and speaking e-library – based Science program to do what textbook can't do in primary schools and try to take advantage of them in the light of available resources.

6. Driving the attention of software designers to design and develop educational software based on hyper-book and speaking e-library, commensurate with the nature of the various courses.

7. Training science teacher on designing and using educational software based on hyper-book and speaking e-library in different stages.

8. Re-organizing the content of science curriculum in different stages to increase the level of integration and interdependence between content elements within the classroom or across different classes.

9. Increasing the number of activities and experiments included in science courses, whether real or virtual that help in developing of basic and integrated science processes.

10. Training student teachers on using methods of teaching that help the development of basic and integrated science processes and provoke their students thought and imagination.

11. Increasing the number of computer labs in schools and

equip them with means of communication and appropriate software for the development and use of e-books in general, hyper-book and speaking e-library in particular.

12. Adoption of the principle of excellence in teaching and learning in other courses.

13. Holding Training sessions for faculty members and some supervisors and school teachers on how to design and develop educational software based on hyper-book and speaking e-library.

14. Producing educational software based on hyper-book and speaking e-library within the ministry of education or under its supervision with the participation of teachers and researchers in their preparation to ensure suitability of the content and the nature of the students and the educational objectives and the coherence between the content of the different approaches.

Suggestions for further studies:

In the light of the study results, the following studies are suggested:

1. The effectiveness of a suggested program in other branches of science and other courses based on the use of hyper-book and speaking e-library for the development of some basic and integrated science processes and thinking skills of students at different stages of education.

2. The effectiveness of a suggested program based on the use of hyper-book and speaking e-library for the development of some other aspects of the educational process of students at different stages of education.

3. The effect of training teacher-students to build and use

software-based on hyper-book and speaking e-library on the development of scientific concepts and basic and integrated science processes with their students.

4. The effectiveness of using other technological methods for the development of some basic and integrated science processes of students at different stages of education.

5. Evaluation study for science curriculum to identify its achievement of coherence and integration in the provision of scientific knowledge and its implementation of activities which assist in the development of basic and integrated science processes.

6. Studies like the current study in other fields and other educational stages.