

Evaluation of the Level of Use of Electronic Technologies for Performance of School Assignments as Indicated by Science Curriculum Help Books of Primary School Students (Case Study: Very Green Science Curriculum Help Books)

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Abstract: This research was performed with the purpose of evaluation of the level of use of electronic technologies for performance of school assignments by students as indicated in science help books (very green) in primary schools of the country of Iran. Electronic technologies (Information and Communication Technology) refer to use of various electronic equipments such as: camera, video, sound recording instruments, computer and the internet. Statistical population includes all science help books (very green) for 1st-6th grades of primary school by Very Green Publications. Unit of analysis was school assignments. Results of the research show that from the 1st year of primary school in 1/4 of assignments students are requested to use ICT and 1st grade involves the least use of these technologies. The most use of ICT occurs in the 6th grade (46%). The kind of technology recommended is also different for the 6th grades such that assignments in the 1st grade involves use of audio and visual instruments and in the higher grades, more complex technologies such as multi media and global network are used.

Key words: Primary school, electronic technologies, science curriculum textbooks, very green curricular help books, ICT

INTRODUCTION

Education and development centers in the modern millennium face the question of how to adapt with changes and opportunities that Information and Communication Technology (ICT) creates (Breen, 2001). Thus, experts and specialists in the education and development field endeavor to integrate ICT with teachings and school curriculum, present various strategies and introduce various viewpoints in this pathway.

A national survey in America in 2005 speaks about attention to an effective group in curricular planning namely the parents. The 5669 schools participated in this internet survey and parents and teachers expressed their opinions regarding how to improve the present educational situation.

As one of the ways to improve education in accord with future work, they mentioned use of ICT and its integration with school curriculum. This survey shows that the role of parents like other factors is important in planning school curriculum.

Beauchamp and Parkinson in a study titled "Pupils' Attitudes Towards School. Science as They Transfer from an ICT Rich Primary School to a Secondary School with Fewer ICT Resources: Does ICT matter?" reached the conclusion that even though high school students were unhappy about lack of sufficient access to computers and other ICT technologies yet, they were able to enjoy their science classes with the help of their science teachers. In this study performed in a primary school in the city of Wales in England, 30 6th grade students (10-11 years old) were randomly selected to participate in the study and they were interviewed regarding teaching method in the school and the course of science. The same students attended an average high school for continued education. In this high school access to computers was limited and teachers were gradually developing their computer skills. After 3 months, the students were again interviewed regarding science classes and the method of instructors' teaching. They stated that even though they were unhappy about lack of ICT in the class yet, their teachers had endeavored with use of active methods of teaching

and performance of assignments and practical activities with the students to make up for computer deficiency and had made the course work enjoyable for them.

Lim (2007) in his book titled "The Science and Art of Integrating ICT in Singapore Schools" reports about case studies in developing and advanced countries and the way ICT has been integrated in the school curriculum in Singapore. He considers one of the reasons for the country of Singapore being a pioneer and progressive despite presence of various barriers in use of technology to be attention of policy makers and educational planners to the important role of ICT in the curriculum and its integration in school programs (Lim, 2007). On the other hand, some specialists evaluate integration of ICT in the curriculum from another angle and with a more holistic approach. For example, Osborne and Hennessy in 2003 in a research titled "Literature Review in Science Education and the Role of ICT: Promise, Problems and Future Directions" evaluate the effect of use of ICT in the curriculum. In their research, they reach the conclusion that the national content oriented program has been a barrier to development of school classes based on ICT. Mehr (2004) in the plan for formulation of strategic policies for application of ICT in education and development has evaluated the dimensions of teaching, psychology, sociology and philosophy of opportunities and threats of using ICT and global outlooks and experiences of other countries in this context and presents strategic policies for use of ICT in education and development. A year later, Imamjomeh (2005) in his research performs a comparative evaluation of integration of ICT in the general education and development curriculum of countries of Singapore, Southern Korea, Australia, Finland, England and Iran to present an appropriate model for Iran. His proposed model is as follows:

- Curricular outlook with ICT integration approach
- Formulation of values and principles of learning based on ICT curricular integration approach
- Formulation of ICT curricular integration strategies (Imamjomeh, 2005)

Badrian and Rastegar (2006) in his research titled "Comparative Study of Science Teaching Standards in the General Education Programs in Successful Countries and Iran" evaluates standards of science teaching in the general education programs of the countries of Singapore, Japan, England, Australia and America. The results of his research show that the curricular content of science in Iran has not changed with development of science and technology. Science teachers are still trained by

traditional methods and there is need for them to become more familiar with the new approach (Badrian and Rastegar, 2006). Time research analysis shows that attention to the spirit of research, science orientation and creativity in primary school science books is found more frequently in the countries of America and England compared to Iran (Zamani and Azimi, 2008). In addition, results of the TIMSS international studies in 2003 show weakness of Iranian students in the fields of science and mathematics (Kiamanesh and Kheirieh, 2002). Daily increased emphasis on the topics of science and mathematics which has a long time historical background across the world and among advanced and developed countries is becoming more applied and practical in the course of science and various researches have been performed in this regard. In our country the number of such studies is few. For example, Karami (2003) in his research evaluates the effect of creation of multimedia on the level of learning in the course of science of girl 5th grade students. The results of his research show that development of media in classrooms in the opinion of students has had positive effect on the level of learning science (Karami, 2003).

From what was mentioned above it can be concluded that research in this regards has been very diverse. This issue on the one hand shows necessity for consideration of specialists and people in charge of curricular planning of effective forces in design of curriculum and involving them in this matter. On the other hand, deficient domains are shown that especially have not been considered for integration of ICT in the curriculum. Therefore, it is necessary that the deficient domains are evaluated and curriculum planning specialists, teachers, principals and education and development officials respond to this need in collaboration with each other.

Therefore, the main purpose of this research was familiarity with level of application of ICT in curricular help books for performance of school assignments at the primary school level. The other purpose was to determine how ICT is taken advantage of in the dimensions of education, research, communications and construction in school assignments indicated in curricular help texts in primary school.

Research questions:

- How is the level and kind of application of ICT in science assignments in primary school as indicated in curricular help books differentiated by class level?
- To what extent is the kind of media used (tape recorder, camera, computer and internet) for performance of assignments based on various class levels different?

- In which of the dimensions of education, communication, application and construction is use of ICT found more commonly in school assignments based on curricular help texts?

MATERIALS AND METHODS

In this research using the method of quantitative content analysis, the data under consideration was described and analyzed. For description of how ICT is used in curricular help books for science (very green), the descriptive-analytical approach was used. For content analysis, the evaluation checklist formulated by the researcher derived by Zamani and Azimi (2008) was used which includes 31 indices in 6 different subjects (with reliability between 81 and 86%). The unit of content analysis consisted of school assignments where their method of teaching has been brought in the very green curricular help book. Additionally, the statistical population of this research includes very green curricular help books for experimental sciences for the 1st-6th grade of primary school in the country of Iran published by the very green company.

Data analysis method: Content analysis was performed using evaluation checklists. The unit of information recording consisted of school assignments indicated in very green curricular help books which were analyzed descriptively and analytically. In the descriptive section, with study of student assignments indicated in very green help texts, assignments that required ICT for completion were extruded and organized in Table 1-7. In the analytic section, the assignments were analyzed based on six topics and indices which have been shown in Table 8.

First topic (ICT an instrument for education (educational)): In this kind of assignment students are requested to use ICT as a private teacher, educational help instrument, play and recreation or simulation.

Table 1: Indices for each topic

Topics	No. of indices
1: ICT for teaching and educational help	7
2: ICT an instrument of research	4
3: Applied role of ICT	8
4: Constructive role of ICT	4
5: Communication role of ICT	4
6: Evaluating role of ICT	4
Total	31

Table 2: Use of ICT in school assignments indicated in the very green help book for 1st grade

No. of course work	Title of assignment	Use of ICT
5	World of plants	Use of compact disks
7	Earth our stone home	Use of digital cameras
11	Cold and warm world	Use of temperature sensor

2nd topic (ICT as an instrument for research (research)):

In this kind of assignment students are requested to use ICT for internet exploration, finding articles and other needed information.

3rd topic (facilitation and enhancing tasks (applied)):

Involves use of ICT as an instrument for rapid and simpler

Table 3: Use of ICT in school assignments indicated in the very green help book for 2nd grade

No. of course work	Title of assignment	Use of ICT
6	Find the coded message	Use of tape recorder
9	Story of the seed	Use of compact disk and internet
10	I grow up	Use of graphic software for creation of diagram
11	Inside the nest	Use of data base software for creation of identification card for various animals and recording their details

Table 4: Use of ICT in school assignments indicated in the very green help book for 3rd grade

No. of course work	Title of assignment	Use of ICT
2	Food	Use of internet and compact disks
4	Measuring material	Use of spread sheet software for drawing rod diagrams
11	Plant and see	Use of compact disks and the internet
12	Each in its own place	Using desktop publishings, create class posters

Table 5: Use of ICT in school assignments indicated in the very green help book for 4th grade

No. of course work	Title of assignment	Use of ICT
6	Rocks	Compact disks and the internet
7	Magnets in life	Research with internet investigation
9	Our body	Compact disks and the internet
11	Invertebrates	Create posters using desktop publishings

Table 6: Use of ICT in school assignments indicated in the very green help book for 5th grade

No. of course work	Title of assignment	Use of ICT
2	Material changes	Using the lexicography software, show the cycle of water in nature in several pages
8	Tasks get simpler	Use of data base software for creation of identification card for various automobiles and recording their details
10	Valuable soil	Investigate using compact disks or the internet
11	Plant and consume	Create poster using desktop publishing
12	From root to leaf	Using the internet, compact disks and lexicography software, create poster

Table 7: Use of ICT in school assignments indicated in the very green help book for 6th grade

No. of course work	Title of assignment	Use of ICT
3	Paper factory	Using compact disks or internet, research about paper making and using desktop publishing, create poster
5	Dynamic earth	With internet investigation, research about earthquake and history of volcanoes and using desktop publishing, create poster
7	Sports and force	Using desktop publishing, create poster
9	Traveling of energy	Using compact disk and internet, research about energy transformation
12	Who does the jungle belong to?	Using desktop publishing, create poster (food chain) for the class
13	Let us stay healthy	Using the internet, investigate about a few diseases

Table 8: Comparison of level and kind of application of ICT in the five grades of primary school

Grades	Topics (No.)					
	1: Educational	2: Research	3: Applied	4: Construction	5: Communication	6: Evaluation
1st	3	1	3	2	2	1
2nd	2	1	2	2	1	1
3rd	2	2	2	2	2	2
4th	3	3	1	1	1	2
5th	1	2	4	4	4	3
6th	2	4	4	4	6	4
Total	13	13	16	15	16	12

performance of assignments. For example, use of computer for typing a report and writing an article, drawing or using spreadsheet for data recording, diagram and chart formation.

4th topic (creative and innovative role (construction)): Involves use of computer for creation of unique products with the help of multimedia, content production and creation of website.

5th topic (communication role): Involves use of ICT for establishment of communication with others, information and data acquisition and transfer of the results of research to them.

6th topic (evaluating role): Involves use of computer as a tool for evaluation.

For each of these topics, indices have been selected. Numbers of indices for each topic are shown in the following tables.

Assignments were evaluated based on indices indicated for each topic. Findings of the research are first shown descriptively and next analytically.

RESULTS AND DISCUSSION

Descriptive findings

1st year of primary school: From a total of 13 curricular assignments from the very green subject help text in 3 assignments students are requested to use ICT for performing them. The method of using ICT has been shown in Table 2.

As shown in Table 2, for the 3 assignments, 3 different forms of ICT have been used but computers are not used.

2nd grade of primary school: From 14 total course assignments in the very green help book in 4 assignments students are requested to use ICT for performing them. The method of use of ICT has been shown in Table 3.

As the information in Table 3 shows, for performance of 2 assignments computer is used and in one assignment tape recorder and in the other compact disks are taken advantage of. The most important software used in assignments for second grade is graphic and data base software (Table 4).

As the information in Table 4 shows in performance of 2 assignments, investigation and research topics, ICT has been used and use of compact disks and global network are recommended for finding information. In 2 assignments also computers are used to draw diagrams and prepare poster.

4th grade of primary school: From 13 course assignments from the very green help book, 4 assignments have requested students to use ICT for performing them. Description of use of ICT has been shown in Table 5.

As the information in Table 5 shows in 3 assignments students are requested to use the global web network or compact disks. Only in one case, students use computer for graphic work.

5th grade of primary school: From total of 12 course assignments from the very green help book in 5 assignments students are requested to use ICT for performing them. Description of using ICT is shown in Table 6.

As the information in Table 6 shows in 4 assignments ICT is used as an application instrument for facilitation and enhancement of performing them (lexicography, desktop publishing, spread sheet for data base). In 2

cases, it is taken advantage of for investigation and research. Additionally, ICT is considered as a tool for construction (creation of brochure, poster and journal).

6th grade of primary school: From 13 course assignments from the very green help book, in 6 assignments students are requested to use ICT for performing them. Description of use of ICT is shown in Table 7.

As the information in Table 7 shows, level and kind of application of ICT in 6th grade are more than other class levels. Most of the indices are related to the topic of construction and evaluation. The reason is that 4 items of 6 assignments request students to use computer software and design posters, brochures or maps. Activities such as creation of poster and brochure and design in addition to developing a force of creativity in students are considered as tools of evaluation for instructors. The second use of ICT is investigation via global networks or using compact disks.

Analytic findings: Which dimensions (education, research, communication and construction) is ICT taken advantage of more frequently for assignments in the very green help book?

The instances of using ICT for performance of course assignments based on various domains of education, research, communication, application and construction have been evaluated using checklist of indices and analyzed in Table 8. The summary is shown.

Since, it is possible that any assignment indicated in the very green help books is relevant to more than one topic, sum of all frequencies from adding all totals is higher than the sum of assignments related to ICT. Based on the information in Table 8, the highest frequency of using ICT (16) for performing school assignments belongs to the applied and communication roles. The second highest frequency (15) belongs to the topic of construction. The topics of education and research are ranked third in frequency (13). On the other hand, distribution of frequencies of the topics in the 6 grades of primary school varies.

CONCLUSION

As the results of description and analysis of school assignments indicated in the very green help book in this research show in all grades of primary school, ICT is used for performing them. Yet, level of taking advantage of ICT varies in different grades. The highest frequency of use belongs to the 6th grade (6 from a total of 13

assignments). In lower primary school years, sound and visual technologies (tape recorder, camera) and in higher grades, modern technologies such as multi media and global networks are used.

As the research findings show, use of computer in primary school begins with performing graphic assignments and entering data into the computer (data base) and continues with creation of multimedia products. The most application of computer in most grades is its applied role for facilitation and enhancement of tasks (making them more rapid) and performance of matters such as typing, information input, diagram and chart formation, desktop publishing for creation of posters, journals or reports.

Additionally, the findings suggest that with increased grade level, the educational role of ICT is gradually decreased and its communication, construction and evaluation roles increase. In the 5th and 6th grades, students are requested to take advantage of ICT for research and present the results of their research in the form of poster, brochure or other frames to others. Preparation of poster, brochure, film and other products of ICT helps the teacher in evaluating the students and on the other hand leads to development of creativity in the students. The results of this research agree with findings of Ager (2004) and Postholm (2004) and show that use of ICT in various curricular programs has been integrated in schools of progressed countries.

REFERENCES

- Ager, R., 2004. Information and communications technology in primary schools. London: David Fulton, 2: 12-32.
- Badian, A. and T. Rastegar, 2006. Comparative study of educational standards of science in the general education of Iran and successful countries in the TIMSS test. Collec. Articles Congress Innovat. Primary Sch. Curriculum, 14: 123-143.
- Breen, A., 2001. The role of information and communication technologies in a university learning environment. Stud. Higher Educ., 6: 167-189.
- Imamjomeh, T., 2005. Comparative study of integration of information and communication technology in general education and development curriculum in the countries of Singapore, South Korea, Australia, Finland, England and Iran with the purpose of presentation of an appropriate mode for Iran. Depar. Educ. Res. Plan. Res. Plan. Inst. Educ. Curriculum Innovat., 12: 67-90.

- Karami, Z., 2003. Evaluation of the effect of multimedia construction by students on their level of learning the course of science in fifth grade girl schools of district 16 of Tehran. Dissert. Tehran Teach. Train. Univ., 14: 122-132.
- Kiamanesh, A. and M. Kheirieh, 2002. Trend of change of inputs and outputs of science teaching based on TIMSS and R-TIMSS findings. Tehran Res. Inst. Educ. Dev., 21: 43-54.
- Lim, C.P., 2007. The science and art of integrating ICT in Singapore schools. British J. Educ. Technol., 38: 377-377.
- Mehr, M.M., 2004. Plan of formulation of strategic policies for use of ICT in education and development. Tehran Depart. Res. Educ. Plan. Curricular Res. Plan. Inst. Educ. Innovat. Higher Council Inf., 10: 345-356.
- Postholm, M.B., 2004. The teachers role when pupils work on task using ICT in project work. J. Comput. Assis. Learn., 20: 50-58.
- Zamani, B. and A. Azimi, 2008. The method of taking advantage of ICT in performing science assignments in primary schools of the country of England. J. Educ. Innovat., 11: 213-222.