



Sociological Study of Developmental Literacy Education with Emphasis on Virtual Education and Reference to Iran

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

This paper goes through the potentials of information and communication technology, and specifically computer-based education, in equipping students with developmental literacy (social, cultural, scientific, and environmental) which is instrumental in the realisation of national development. One of the main goals of the education system, everywhere, is to teach students the life skills and equip them with the ability to live and play an effective role in the society's reconstruction and maintenance; therefore a development-based education should provide skills along with knowledge to this aim. In this paper capacities of a computer-based education will be reviewed and some lights will be shed on its role in removing the present educational barriers in training development-oriented citizens—especially in the developing countries. After some theoretical arguments in support of this assertion, the paper will demonstrate some practical evidence concerning the educational system in Iran. For this purpose, the educational goals prescribed in educational policy documents are extracted, compared, and contrasted with the concrete situation and the present functioning of educational programs there. After scrutinising on

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the education policy texts and documents, this has been done through an in-depth interviewing with headmasters and teachers of "smart" schools in Tehran. To overcome this discrepancy between "theory" and "practice", the paper ends up with suggesting the implementation of developmental literacy measures in education programs via computer-based education— to break the traditional and obsolete structures of education and reform the educational processes, aiming at creating critical thinking and changing attitudes and methods of students assessment, initiating new learning techniques around student-centered learning, increasing the education quality and accountability , and promoting and diversifying communication and other life skills.

Keywords: Computer-based education; developmental literacy; national development; learning methods; Iran.

1. INTRODUCTION

One of the objectives in modern education systems is to provide life skills with the students and give them the ability to live and play their effective role in the society; therefore, development-based education will provide skills as well as knowledge transfer to train citizens who play expected roles in the development of the country.

Moreover, the ideas, principles, and values embedded in education will have a strong influence on the process of internalising beliefs and values, discipline, and consequently in achieving the country's future goals. Modern tools such as information and communication technologies and virtual education can be used to realise the intended goals of education with a focus on developmental literacy. Because the existing Iranian education system is static and non- developmental, ICT can, through changing the obsolete structures, bring in new tools and innovative mechanisms, and reform the functioning of the system and increase its efficiency.

2. LITERATURE REVIEW

Today in advanced countries Information and communication technology is the driving force behind the realisation and implementation of the information society. They are facilitating and ensuring the effectiveness of information services and systems, and a valuable instrument for restricting the social exclusion phenomenon and for promoting social and geospatial coherence [1]. The study carried out by Papadakis [2] gives an example of application of ICT services in promoting educational cooperation and describes that the European Commission e-Learning Programme, since 2014, has launched eTwinning which is integrated into

Erasmus+, the European Programme for Education, Training, Youth and Sport, since 2014, and has the participation of more than 358,000 teachers from 36 European countries and 155,000 schools and implemented more than 40,000 projects.

Scheuermann [3], Correa et al. [4], Yunus et al. [5], Papadakis & Kalogiannakis [6] emphasise the great impact and the constructive role of technology in the educational environment. Papadakis & Kalogiannakis [1] carried out another research on the application of ScratchJr in Greece pre-service kindergartens. The results confirmed that it is an appropriate educational environment as a platform for the development of educational resources to support science teaching and learning. But no doubt the efficient use of ICT in education has other requirements too; they include the need for ongoing technical support and training [7]. Sufficient and effective technical support regarding infrastructure is a necessary condition for sustainable integration of ICTs, also is the adequate teachers & educators training to function effectively [8,9,7]. In this line, another recent study indicates that the availability of educational software, teachers ICT training, perceived self-efficacy, and teaching concepts influence class ICT use even more than school hardware and internet-connection infrastructure [10]. The success of ICT in education is related to even more general aspects of the human world and the social-psychological realities are encompassing the educational setting and learning atmosphere; Social and cultural issues related to ICT use, for example [11].

Some further theoretical standpoints and assessments concerning different aspects of virtual and computer-based education and its success which are present in the literature will be mentioned, later, in the section dealing with the theoretical foundations.

But some sources on Iranian education system, though there are very few which specifically researched on ICT application in Iranian education. A national report on the challenges of traditional/classic education system sorts out some of the important weaknesses of education in promoting and reinforcing the necessary attitudes and values of Iranian students [12]. These weaknesses are mentioned in cases such as teamwork, critical thinking, communication skills, responsible actions, and group and social interaction.

Another research embarks on the Iranian education system versus globalisation and its challenges in the cultural domain [13].

Karami and Hajizadeh [14] differentiate and analyse the gap between the Intended and Implemented Curriculum in Iranian Junior High Schools. Their work is based on the UNESCO's definition of elements in Peace Education.

There are also studies that confirm that information and communication technologies help students and teachers to learn and promote the generally missing values and norms in Iranian school such as critical and creative thinking [15].

To have a more concrete account of the potential consequences of the application of ICT in Iranian education—and they are different positive and negative aspects- more research should be carried out yet.

2.1 Definitions and Indicators

Developmental Literacy: Of the ten component developmental literacy which is considered necessary, by UNESCO, for students, the four most important are social literacy (Being responsible, having communication skills), cultural literacy (familiarity with celebrities, figures, and the heritage), scientific literacy (curiosity and inquiry) and environmental education (familiarity with environmental issues and environmental protection).

Information and Communication Technology: it is considered as an interconnected set of methods, hardware, software, and communication equipment that collect, store, retrieve, nurture, transfer, or supply information in various forms including sound, image, and text.

Intended Curriculum: The intended curriculum refers to the goals and objectives regarding

contents, methods of teaching-learning, and the system of evaluating learning and achievement in a curriculum.

Implemented Curriculum: The content, the method, and evaluation system—as it is, in practice.

The questions to which this study tried to answer are:

1. Whether social, cultural, scientific and environmental literacy education has been included in the goals and plans approved by the country's education system?
2. Whether social, cultural, scientific and environmental literacy education has been included in the 2025 Vision document of education of the country?
3. Whether students' developmental literacy is included in the existing textbooks?
4. What are the potentials of information and communication technology in removing the obstacles of developmental literacy in high schools?
5. What are the potentials of ICT in educating development-oriented citizens?

2.2 Theoretical Foundations

In the following, we passingly review the theoretical standpoints which have been used in the research leading to this paper:

- Critical Approach to Literacy: Ilyich, Freire and Giraud are among those theorists, who are supportive of the advantages resulting from the use of Information and Communication Technology. Ilyich [16] says, schools are designed on the assumption that there is a secret to everything in life and only teachers can properly reveal these secrets(p:76), but we can provide the learner with new links to the worlds instead of continuing to funnel all education programs through the teacher(p: 73).

In classical education, the student plays the role of a repository, and learning is limited to receiving, memorizing, and consuming data [17]. He, instead, suggests a dialogue-based education because dialogue, debate, and question-and-answer interaction with each other gradually expand the individual power and ability to perceive and respond to issues that are shaped in the environment. It promotes dialogue not only with others but also with their inner world.

-Theory of Constructivism in Education: Technology is one of the main features of the constructivism theory. Constructivism approach to teaching and learning is based on the premise that cognition (learning) is the result of mental construction; in other words, students learn by fittings new information together with what they already know. Constructivists believe that learning is affected by the context in which an idea is taught as well as by students beliefs and attitudes [18].

According to this theory, learning becomes more effective and efficient when the learner is in the actual context and the field under discussion. Learning becomes significant when it comes to the connection with the context of the problem context; traditional training classes do not have much effect because they are dependent on specific time and place and cannot provide an actual and proper context for learning. Printed texts are also problematic due to special constraints that are nothing more than text, image and linear layout. So, some researchers point out a strong relationship between information technologies methods such as learning in cyberspace and constructivism theory.

Theory of the Network Society: The social networking community is a society which processes and manages information and uses micro-electronic based technologies [19].

Power in the networking community is at the hands of those who control communication capacities between networks and groups within the networks. Castells introduces three types of communication: mass communication, interpersonal communication, and a new type that he calls spontaneous mass communication. According to Castells, the biggest impact of IT is through spontaneous mass communication. A spontaneous mass communication takes place on the Internet, whereby a person generates a message and spreads it widely. As a result, a new form of communication emerges which is between mass communication and interpersonal communication.

These theoretical approaches formed the theoretical framework which was present in the background of the researcher's mind throughout this research.

2.3 The Method

This paper first examines the existence of the concept of developmental literacy with four

social, cultural, scientific and environmental literacy characteristics in the educational plans, and then reviews the potentials of information and communication technology in providing developmental literacy and its capacities in delivering development-oriented citizens. As a result. In this study, two techniques have been used. To analyse the intended programs, we used the documentary method, and by using the in-depth interview method we recorded views and attitudes of the stakeholders who had comprehensive information about the process of high school education and its problems; headmasters, teachers, and educational technologists at schools in Tehran(34 interviewees).

2.4 Validity and Reliability

One way to determine the credibility of the interviews was to check formal credentials, to see if the contents of what was said are correct and what was said to be socially appropriate, and whether the respondents expressed their opinions honestly. For this purpose, the interviewers and respondents were chosen from different settings. We did the same to enlist the diversified and even contrasting sources, research, reports, and documents in the process of text analysis. To increase the validity of the research, we have exploited previous research too, to confirm the findings of the present research.

To increase the research reliability, not only interviews have been recorded, but they have been monitored by the respondents themselves during interviews.

3. FINDINGS

Here we report the findings of the study in response to the 5 questions. The first three answers are extracted from the main official educational policy documents of the country, and from the textbooks which are officially distributed, used, and taught at schools nationwide:

1-Social, cultural, environmental and scientific literacy:

a) At the level of macro "educational goals":

- *Educational and Scientific Goals:* Strengthening research motivation, reasoning and thinking, studying and scrutiny, critique and initiation.

- *Cultural and Artistic Goals*: cultivating the spirit of preserving the artistic and historical heritage, recognition of Persian literature as a high artistic, and the manifestation of the country's national and social unity, recognition of history, culture and civilisation of Iran and the world with an emphasis on contemporary culture.
 - *Social Goals*: Developing the spirit of responsibility, and participation in religious, cultural and social activities.
 - *Environmental Goals*: Strengthening the motivation of public health, and preservation of the environment.
- a) Demanding to educate students to become God- believer and committed to the duties in front of God, and velayat-oriented
 - b) Emphasising the role of the public education system and the family education system in the development of the country.
 - c) Requesting an effective and efficient system of human resource management based on Islamic criteria.
 - d) Mobilising to reach the first place in education in the region and the Islamic world.

The answers to the first and second questions of the research are summarised in the Table 1.

b) at the level of High School “education goals”:

Planners, principles, and all those involved in the students' education and training are required to plan, organise, and perform their respective duties, so that the students could achieve the determined goals by the end of the study period.

- *Cultural-Artistic Dimension*: The cultural-artistic achievements of the Iranian community to become a part of their national identity. To become familiar with artistic and cultural pride and their use. To evaluate artistic and cultural works and recognise their geniusness.
- *Scientific and Educational Dimension*: To be interested in thinking and debate and being familiar, in practice, with the research method.
- *Social Dimension*: To try to strengthen the emotional and social connections among family members, neighbours and friends. To Understand the responsibilities of individuals in the community and behaving appropriately regarding them.
- *Environmental Dimension*: To Participate in environmental preservation and revitalisation activities [20].

From what is said above, it can be confirmed that developmental literacy education is seen, somehow, among the objectives, and the education system expects, verbally, students to have acquired the developmental literacy and the related skills at the end of their high school education.

2-social, cultural, scientific and environmental literacy education in the 2025 Vision document of education

To find out the reply to the second question of the research, we went through the educational goals of 2025 Vision Document:

3-The Presence of Developmental Literacy in the Textbooks:

To answer the third question, first, we concentrate on the question of the presence of developmental literacy in textbooks. Then we report the lack of effective content of textbooks in this regard as seen by the interviewees.

a) *Social Literacy*: The majority of respondents believed that there is a sense of responsibility and communication skills in the content of social science textbooks. Interviewees, nevertheless believed that although the concepts are available in the textbooks, these concepts do not affect the student's behaviour and action and do not make them responsible persons. Therefore, the teaching of concepts alone does not imply developmental literacy, and the emphasis should be on practical learning of concepts and ultimately on activating social responsibility and communication skills in students.

b) *Cultural Literacy*: Concerning cultural literacy, some interviewees stated that cultural literacy is addressed in the textbooks.

c) *Environmental Literacy*: Regarding environmental education in high school textbooks in Iran, the majority of interviewees believed that in the biology, chemistry and geography books there are discussions about preserving the environment and not destroying forests and trees, but some believed that textbooks do not address the environmental issues properly.

d) *Scientific Literacy*: About scientific literacy, less than half of interviewees admitted that the training and activity sections in the books respond to this need of students and cause more curiosity.

Table 1. Developmental literacy in education policy documents

| Objectives | Exemplary development literacy | | | |
|--------------------------------|---|---|--|--|
| | Social | Cultural | Scientific | environmental |
| Educational Macro Goals | Promoting the spirit of responsibility and participation in activities | Encouraging cultural heritage and recognising Iranian Islamic history and culture | Promotion of participating in scientific activities | Strengthening the spirit of environmental protection |
| High School Goals | - Advising to enhance communications -asking to be responsible | -Promoting familiarity with culture and art figures - Promoting cultural and artistic works | Promoting Interest in thinking and debate | Promoting Preservation and restoration of the environment |
| 2025 Vision Document | - Advising to Committed to the duties in front of God, and Velayat-oriented, others and nature -Respect for social rights and responsibilities | -Emphasising Public Culture - The development of Iranian civilisation - Consolidation of national unity | - Advising to Truthful, wise, reasonable -Strengthening the scientific spirit | -Advising to Committed to responsibility for nature -Promoting health and environmental practices |

4-ICT Potential for Overcoming Educational Obstacles for Developmental Literacy of Students:

In examining this question we review ICT potentials in:

-Reforming Educational Structures: One of the important impacts of technology on the educational system is deconstructing the status quo including its structure because the modification of education and learning is not going to be realised merely by the introduction and use of ICT. different aspects and components of the educational system should be adapted and modified accordingly. Only using such comprehensive change in the educational body, one can expect to have human beings who are constructive, interacting and sustaining a new form of society that is called the information society [21].

-Restructuring students' Assessment and Evaluation: One of the structural challenges in the current situation of Iranian education is the classic examination and improper evaluation system of students' knowledge. ICT-based method questions such a traditional evaluation and assessment. In the new methods, the criteria

are not specific and predetermined texts, but the training of skills for knowledge acquisition from multiple sources. To implement ICT into education, We need to change the components of the traditional model into components that are in line with the new model; a new teaching-learning activity.

-Facilitating educational processes, procedures, and contents: One of the important potentials of ICT is the facilitation of the educational processes and procedures. ICT helps the education to have more efficient administration, formal processes, and contents in the schooling system. It cannot be limited to the transfer of theoretical and traditionally memorizable knowledge which is dominant in the old teaching system; The results of this research confirms that one of the major problems of Iranian education system is related to the educational content of education.

Moreover, classic education does not respond to the learning needs of today's students who are constantly working with electronic devices. Information technology has made it possible to go beyond the boundaries of knowledge present in ordinary books and has opened avenues to new learning styles.

-Student-Centered Learning: Ease of access to diversified sources of information and knowledge through ICT enables students to play a central role in learning. ICT also makes the participatory learning possible through interaction between teachers and learners. The new educational technologies enable the student to search and analyse information in the virtual world and to reduce the information abstractness, and to look at the information within a critical and evaluative perspective. In this way, using new information and communication technology helps students to learn and promote critical and creative thinking. This is confirmed in Iranian schools too (Seyyed Alawi, 2014: 44-45).

-Improving Educational Quality: Majority of respondents believe that the use of films, pictures, animations and virtual labs has a greater impact than classical discourse and that it enhances the students understanding and improves the learning quality. It is part of the impacts of information and communication technology (ICT) in improving teachers ability, changing the education structure, providing more comprehensive learning opportunities, promoting the teaching quality, and improving its methods.

Through information and communication technologies, teachers can access new educational resources easily and acquire and transfer high-quality knowledge. Moreover, these technologies promote the quality of students learning. The answer to the fourth question of this study is briefly summarised in the Table 2.

5-Virtual Opportunities in Nurturing Development- Oriented Citizens

The last research question concerned the functions and opportunities of virtual education in nurturing development-oriented citizens; the expressed views and the written material indicate

how this type of education can shape better the future performance of students:

-Internalisation of accountability: The respondent's comments in this study showed that 73% of them believed that discussions about communal and environmental accountability are included in the textbooks. The teachers, however, stressed that these materials have little effect on students' beliefs and behaviours, and that the information and communication technologies have the potential to make book material more effective on students.

-Increase in students knowledge and scientific awareness directed to the future needs of self and society: One of the problems in learning is the students' lack of motivation and inner interest. Respondents consider this to be due partly to disinterest in the "dry" old fashion textbooks and, partly, to the new attractions such as the Internet, cellphone, Internet games, and the excitement of law aversion during adolescence. The use of information and communication technology and virtual education provides students with the experience of learning in a new environment. This may increase the students' interest and motivation and their involvement leading to academic activities, creativity, social concern, and entrepreneurship.

-Promotion of communication skills and social participation: Different national reports about the challenges of the traditional/classic education system in Iran acknowledge the weakness of education in reinforcing the positive attitudes and behavioural aspects of students, things such as teamwork, critical thinking, communication skills, responsible actions, group and social interactions. On the other hand, studies show that civic participation in society, for example, will be strengthened by using new technologies and virtual training. This happens in response to

Table 2. Information and communication technology (ICT) potential to fix classic education problems

| Classic education problems | ICT potentials |
|--|---|
| Dissemination of Predetermined Knowledge | -Expanding the knowledge boundaries of textbooks -Facilitating critical thinking |
| Learning Based on the Transfer of <i>Cliche</i> Scientific Knowledge | -Diversifying information resources |
| Reliance on Memorization | -Improving the quality of education - Providing Sustainable Knowledge |
| Time and Place Restrictions | -Giving access to information outside the classroom (overcoming time and space) |

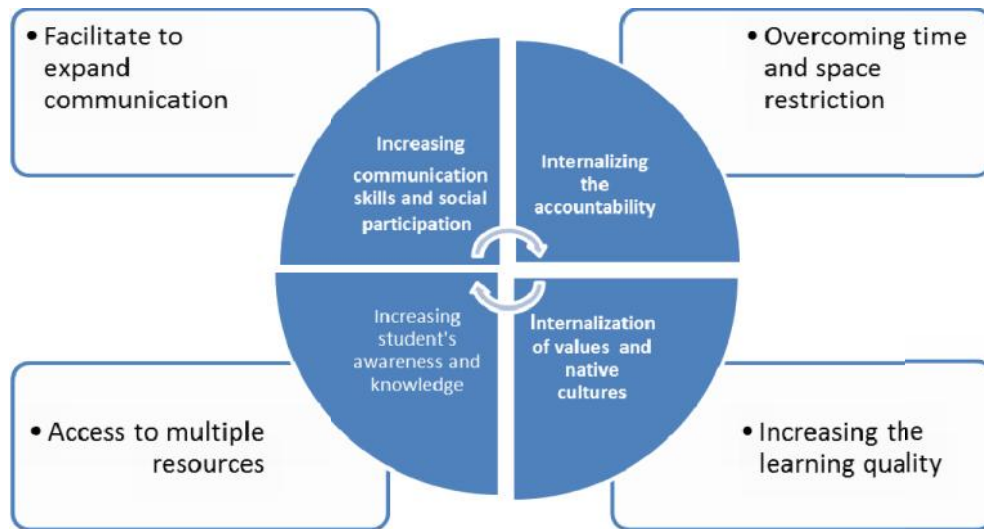


Fig. 1. Virtual opportunities in nurturing development-oriented citizens

social needs which comes to the minds of students via cyberspace. Similarly, the adherence to social values and unity may be strengthened (ibid).

4. CONCLUSION

The education system in Iran is considered to be an institution whose main task is a cultural reproduction in society, and its main goal and centre of attention is to educate people with Islamic attitudes and values.

Our study of the existing literature on the macro educational objectives showed that the pre-requisites of educating development-oriented citizens which are identified by UNESCO in the framework of developmental literacy and acknowledged by various international circles are also existent, somehow, theoretically in macro education documents and curricula in Iran. But the point is that these goals are not attained at the practical level; in reality. This has resulted from our study that evaluated educational content and teaching methods in the sample high schools in Tehran, by using in-depth interview technique—in addition to findings extracted from the critical reports on the Iranian educational situation.

To overcome this problem, ICT-based education can be of a great assistance. In traditional practice, learning involves receiving some amounts of facts and ideas and then memorizing them, while information society theorists believe that with the help of information and

communication technology, the goals of contemporary approaches to learning and education which go far beyond this can be achieved – through break away from the traditional structure, method and content of education. Interviewees of this study also supported this idea that the ICT not only affects teaching content and teaching-learning methods, but it changes the attitude toward education as well. By changing traditional structures, ICT transforms the schooling setup into a knowledge infrastructure. Training and learning that take place in cyberspace, by changing the role of the teacher as a sole instructor, and classroom functions, headmasters and teachers as the only source of knowledge will undergo a radical change. But ICT-based education can be fully realised only when the education system changes both at the macro and micro structural levels.

As we saw in the previous sections of the report of this research, virtual training opportunities for nourishing development-oriented citizens can be realised through the internalisation of social roles and responsibilities, teaching communication skills and social participation, internalising positive traditional cultures and values, and enhancing scientific understanding and knowledge. Using such education we can prepare and introduce students to a society whose actors can act responsibly to protect the rights of other people and play effective civic roles. Citizenship norms and behaviours can be internalised within them in this age of Information Society because students are in the effective and

critical socialisation cycle. And this is a solution for the missing piece in the education puzzle.

In this study when we reached the major shortcomings, weaknesses, and challenges of the existing education system we suggested, that the Information and communication technology can be successful as a solution along with reforming educational structures at the macro and intermediate levels. This suggestion was confirmed by our research elements--and they thought such a move can realise, along with other things, developmental literacy.

5. SUGGESTIONS FOR FUTURE RESEARCH

As we said before there is a shortage of factual studies and fieldwork research on ICT in education in Iran. To have a more concrete account of the potential consequences of ICT-Based and virtual education in Iran, more research should be carried out on its specific themes, problems, and challenges in the way of its implementation, and on different positive and negative outcomes.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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