Turkish Curriculum: Claimed to be based on Constructivism

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Abstract

One of the major reforms in the Turkish primary education curriculum took place in 2005 and 2006. This reform was intended to make major changes in the Turkish primary education curriculum in line with constructivism. The author argues that such initiative should have taken the Turkish primary curriculum as a whole rather than focusing on only the implementation phase. To support the argument, the mathematics course book of 2011-2012 instructional year at the 8th grade in the second half of primary education in Turkey, has been examined with a view to counting the number of new terms, new concepts and new processes which were introduced the first time and expected to be "learnt" by the students. Based upon the results of this paper, it is argued that the said reform failed to consider the learnability aspect of the content of primary school curriculum of the Turkish primary education curriculum. It is further argued that with such a huge scope of content, it seems almost implausible for the learner to reflect on the terms, concepts and processes included in the content as required by constructivism.

Keywords: Turkish, Curriculum, Constructivism, Learning

1. Introduction

On a very general term, the curriculum development process involves planning, implementation and evaluation of learning experiences for students to have and to engage in. During the stipulation of the curriculum development process, one should think about the needs of the society, individual and the knowledge to be developed by the learner. There are different approaches and models of developing curriculum and curriculum design in the literature. However, it can be safely stated that the following are considered to be the main four components of a curriculum design:

1. Objectives,
2. Subject Matter & Content,
3. Learning Experiences,
4. Evaluation procedures.

The delicate balance must be observed and scrutinized between the above components during the curriculum development process. Unfortunately, not all curriculum designs and plans give equal weights to each component mentioned above. For example, curriculum whose content is overloaded is usually subject-centred rather than learner-centred. In subject-centred curriculum, learners are expected to absorb a large body of content under a number of subject matters. It can be stated that subject-centred curriculum underestimates the rights of the learner in the decision to choose the content which would be most meaningful to him/her. This also varies from one country to another. Some countries and societies put the emphasis on the subject matter and large content to be absorbed by the students while others stress mainly the learning experiences and/or the evaluation (Ornstein and Hunkins, 1998).

Obviously like everything else, curricula, at any level, are bound to change as a result of global forces, expectations of societies and individuals, developments in science and technology and the like. Change is inevitable! However, when one component of a system is changed, the other components need to be taken into account and considered accordingly. In this paper, it is argued that a major change introduced to Turkish curriculum at the basic education level in 2005-2006, claimed to be based on constructivism, had an influence, to some extend, in the implementation of it, but failed to consider one of the crucial components of the curriculum which is the content, especially the scope of it.

To support the said claim, the mathematics course book, for the 8th graders, is examined to see how many terms, concepts and processes are introduced the first time to the learner and expected to be 'learnt.' It is further claimed that 'learnability' aspect of the content of the mathematics course, at the 8th level, needs to be looked at more carefully and it has some implications for the other subject matters as well. The main argument of this paper is to compare the Turkish curriculum which was reformed at the basic education level initiated in 2005-2006, claimed to be based on constructivist approach, with the essence of constructivist paradigm and the nature of learning cycle.

2. Theoretical framework

Literal meaning of "curriculum" comes from a Latin word "currere" which means "a course to be run". A number of different definitions and understandings of the notion of curriculum can be found in the literature. For example, Tanner and Tanner (1975) claim that curriculum means planned instructional experience designed to help learners develop, grow and extend individual capability. According to Tyler (1949), the below given four questions need to be addressed in curriculum development:

1. What educational purposes should the school seek to attain?
2. How can learning experiences be selected to be useful in attaining these objectives?
3. How can these educational experiences be organised for effective instruction?
4. How can the effectiveness of learning experiences be evaluated?

One's philosophical stance and the way the nature of learning is perceived will influence the whole curriculum development process. This is what Ralph Tyler talked about the philosophical screen and the psychological screen in his curriculum development model (Tyler, 1949). According to Tyler, the selection of objectives is not only the first step to be taken during curriculum development, but also this is the key to the whole process. He added that the selected goals are based on the needs of children, needs of society and the thoughts of experts. The objectives and the goals are selected in line with the accepted educational philosophy and psychology. On the same issue, the importance of philosophy as a basis for education was also emphasized by John Dewey (1938). According to Dewey, philosophy plays an important role in deciding the goals of education, the content to be covered and organisation in general. Therefore, the impact of philosophy on curriculum design cannot be over-emphasised.
The followings are some of the questions and issues to be addressed during the curriculum development:

- What content and depth/scope of the content is to be included?
- What subject matter(s) is/are to be included?
- What learning activities and opportunities should be planned for learners?
- What kind of instructional strategies should be utilized?
- What educational resources will be needed?

Obviously, the answers to the above questions or the way we tackle them are directly affected by our philosophical beliefs and conceptions of human learning.

There are varying understandings and interpretations of content and the scope of it. It usually contains a collection of facts, information, concepts, interpretations and approaches, generalisations, principles and theories. The selected content and the scope/depth of it should be aimed towards helping students develop their own understandings and knowledge about it. The way the content is organised should be in line and in harmony with the cognitive level of learners. Content is not just something presented to students but rather something that students personally should construct. We must also think about helping students develop process skills (thinking and problem solving skills) while going through the content rather than considering the content only as a product.

As mentioned before, one of the decisions to be made, during the process of development curriculum, is to determine the scope of the content. What is meant by the scope is both the breadth and depth of the content including all the topics, new concepts and process skills to be developed, information and knowledge to be constructed, all the learning experiences and so on. Demands coming from society in general, parents, academic world, government(s), the business sector, religious institutions, NGOs, and so on are to be taken into account during the selection of the content. It is very challenging, if not impossible, to include all the demands from the above entities. Therefore, choices have to be made on what to include in the curriculum. Ornstein and Hunkins (1998) listed the following 5 criteria to be used during the selection of content:

1. Significance
2. Utility
3. Validity
4. Learnability
5. Feasibility

All of the above-mentioned five criteria have equal importance. Nevertheless, for the purpose of this present article, forth and the fifth criteria are to be stressed. For example, learnability may seem obvious as a selection criterion. However, it is crucial to think about the nature and the scope of the content to be selected considering the cognitive capacity of a particular age group and also the time factor to be allocated for the students to construct the content. If the scope of the content is not 'learnable' then teachers will end up rushing through the material and some students left behind not understanding the content.

With regard to feasibility, curriculum planners should again consider the time constraints and the resources needed to implement the content such as human and educational resources.

When we decide on the depth of the content the following questions are to be considered:

- How much of the subject matter should the students know?
- Is there a body of prerequisite information and/or knowledge required before the school term(s) start?
- What is the level of each subject matter required of students before they graduate from the school?
- Are the learning experiences planned in a way to enhance students' learning of the content as well as motivate them to continue for further learning?

We, educators, should not separate content and learning experiences since they both matter and play and important role in the construction of knowledge within each and every student. When the content is overloaded and determined without thinking of the learning experiences, scientific and other subject literacy among the students is ought to be low.

Hargreaves (2002) has indicated the characteristics and implications of the knowledge society for the following stakeholders; schools, teachers and learners. He stated that "Teachers who are catalysts of the knowledge society must try to make their schools into learning organizations where capacities to learn, and structures to support learning and respond constructively to change are widespread among adults as well as among children"(Hargreaves, 2002). In this new world of knowledge society rote learning has no value since employers and even government bodies are now demanding the new generation and graduates with problem solving ability, ability to create new ideas which are needed to transform the society. Therefore, schools must look at and understand more about the nature of learning and developing learning skills (Black and Broadfoot, 2004; Hargreaves, 2002).

2.1 Implications of constructivism for school curriculum

A typical classroom, according to constructivism, is not a place where a 'teacher' fills the empty vessels with his or her understanding of the world. Rather, the students are urged to become actively engaged with their own learning process and create their own knowledge. This is a dynamic process where personal conclusions are constantly being tested again and again. Facts are not there to be memorized but they are rather there to be explored. According to constructivism, students are not regarded as blank slates on which information and other people's knowledge and understandings are engraved. What is really aimed here is to guide and help students to learn how to learn via well-planned learning activities and opportunities. Asking questions is the first step to build one's own understanding. Therefore, inquiry is the key part of constructivism. The notion of constructivism has its roots in Socratic approach where students are asked well formulated questions.

Education specialists play an important the role as moderators, guides and coaches. The following saying best summarizes the real paradigm of constructivism for educators; 'Be a guide on the side, not a sage on the stage.'
The other important characteristic of constructivist approach is that students need to be encouraged to control their own learning process and reflect on their experiences.

At the end of each experiment or testing out, students are also urged to assess the whole learning process to see if their conclusions need to be revised, if they are incorrect, insufficient or invalid.

Collaborative learning is also encouraged in a typical constructivist classroom. This is because social environment and peer interaction directly influence learning process. Constructivism emphasizes collaborative learning and exchange of ideas among the peers. Students are encouraged to express their ideas and respect to each other's opinions. They are also given the opportunity to work together. These are important process skills which are needed in real life. Therefore, cooperation, collaboration and negotiation skills are part of constructivism.

Constructivism, in the realm of education, is basically concerned about how people learn. Some of the basic scientific research areas and topics that constructivism deals with are; the process of constructing ideas, parameters that influence perception, learning cycles and learning process.

Constructivists claim that human beings construct their own understanding and knowledge of the world, through having first hand experiences and reflecting on them (Reigeluth, 1999). According to constructivism, when a human mind encounters something new, it needs to be connected and reconciled with the previously experienced ideas, concepts and definitions already developed and made. As a result of the new concepts, ideas and definitions made, we may change the way we perceive the world, the things that we believe in, accommodate new ideas and or discard the old ones. One of the fundamental characteristics of constructivism is that the learner is and should be active during the learning process and construct his or her own personal knowledge.

To be able to achieve that the learner must have the opportunity to reflect, explore and ask questions on the things to be learned. On practical terms, the pre-existing knowledge or entry characteristics of the learner, as Bloom defined, must be known (Bloom, 1976). In so doing, the new ideas can be built on the existing ones. This is an important issue that educators* must address at the beginning of each new learning.

In view of the above, we, as educators, must consider two main points when it comes to creating a learning environment and design a learning process:

- Do we know the existing ideas and knowledge of the learner about the thing to be learned?
- Do we give enough time to the learner reflect and question the new ideas to be learned?

The hidden message in the second question above is that we must be selective and careful about the volume of the content so that the learner has enough time to reflect on the issues to be covered. Reflection is a sine-qua-non to be able to develop one's own knowledge. This means that the learner must have the opportunity to explore and experience the new ideas while being active during the learning process.

It can be stated that constructivism has its roots in cognitive approach since learning is thought to be an internal process rather than observable behavioural change as in behaviourism. In other words, behaviourism mainly deals with dynamics of changing the behaviour as opposed to cognitive approach which is interested in learning process in the cognition. Behaviourists consider learning as a process of changing the behaviour by conditioning the organism via using selected reinforcement. In this approach human mind is regarded as an empty vessel or a *tabula rasa* to be filled.

Unlike in behaviourism, in constructivism learning is regarded as a process rather than a product. In addition, learning is considered as a process of constructing meaningful representations of the world via personal experiences. On the whole, behaviourists claim that the content should be prescribed and transmitted to learners as opposed to constructivists who argue that the content should be constructed by learners via their own personal experiences. In the former, learners are generally at the passive end of the spectrum who receive of facts, concepts and generalisations of a subject while at the other end of the spectrum, in the latter, learners are encouraged to construct the meaning in relation to the content to be covered.

According to Glasersfeld (1995), learning is considered as: "From the constructivist perspective, learning is not a stimulus-response phenomenon. It requires self-regulation and the building of conceptual structures through reflection and abstraction" (p.14). Since learning occurs in the learner, the real role of the education specialist is to create an ideal learning environment where the learner have the opportunity to construct his or her own mental representational of the world. Mayer (1996) describes teachers as "guides", and learners as "sense makers".

It is planned and expected that when reflection is done continuously on the students' experiences, they grow on their ability to integrate new information into their existing mental scheme and turn it into knowledge. Therefore, the main role of the education specialist is to encourage the learning and reflection process. This should not be taken to mean that the role of the education specialist is minimized or underestimated. The education specialist is required to plan the whole learning process which includes the following:

Finding out the readiness level of the learner for the new topic/issue/concept to be learned,

- Constructing high level questions which entail thinking,
- Creating the ideal learning environment where the learner could explore and experience the subject in question,
- Prompt each and every student to reflect on and examine his or her own current knowledge and learning process,
- Design and help students carry out appropriate experiments through which they have the opportunity to construct their own knowledge.
- Help students formulate and test their own ideas, draw their own conclusions and inferences,
- Encourage peer collaboration and group work,
- Encourage inquiry-based learning and so on.

2.2 Basic Characteristics & Advantages of Constructivist Education:

- Learners are actively involved in the learning process rather than being passive listeners.
- Education concentrates on thinking, development of knowledge in the learner, understanding, rather than on rote memorization.
- Concepts learned, skills developed in constructivist learning environment are transferable to other settings since isolated learning is not desirable.
- In constructivism, students have the control and the ownership of what they learn.
- Learners in constructivism are encouraged to question things and to apply their natural curiosity into the real world.
- Creativity and personal understandings of the learners are encouraged by helping them form their own concepts based on their own learning experiences.
- Social and communication skills are emphasized since students are urged to ask questions, discuss and debate within group activities on various topics of their choices.
- Students are asked open ended questions through which they are expected to form their own individual belief and value systems.
- Instead of a standardized curriculum, constructivism encourages a customized curriculum based on individual needs and prior knowledge.
- Students are encouraged to learn to assess themselves rather than being exposed to standardized testing (Hoover, 1996).

Constructivism could be misunderstood as an approach or a theory that ostensibly encourages students to "reinvent the wheel." However, constructivism is based on the understanding that students need to be motivated to develop their own way of perceiving the world via their natural innate curiosity. They are expected to develop their own hypotheses and test them out against the real world and draw their own conclusions.

Thanks to relatively new FMRI technology and advancement in neuroscience which shows us that learning is a physical change in the brain rather than just a behavioural change as once believed. On the basis of this discover, it can be stated that educators have the responsibility to produce change in the learner's brain as desired.

Although the human brain is immensely complicated to simplify, educators and neuroscientists would agree with the following four basic functions of the brain as succinctly described by James E. Zull (2002):

I. Receiving information via sensory cortex – Gathering /concrete experience (this could be in the form of visual, auditory, tactile, olfactory, and gustatory information and/or combination(s) of them).
II. Making sense of the information received – Analyzing and reflecting / via back integrative cortex.
III. Creating new ideas from these meanings – Creation of hypothesis / via front integrative cortex.
IV. Acting or testing on those ideas – Acting / via motor cortex.

Information or inputs enter the brain through existing networks of neurons. It is agreed by the contemporary cognitive scientists that human beings learn by attaching and or relating the new information, inputs, concepts, understandings and so on to the existing ones. This process may modify and or completely re-arrange the existing networks of neurons. The implication of this mechanism is that we need to systematically find out the existing networks of neurons of each and every student to be able to build on them.

As Zull (2002) emphasized in his book called The Art of Changing the Brain, in order to complete the learning cycle as described above, learners need time for reflection and coming up with new ideas to be tested. If this is neglected which means that the learner's integrative cortex is not used, then memorization comes into play which does not require making wide networks of neurons. In other words, memorized information will be isolated and shallow. This could be adequate to pass a test but it is far from establishing basis for future learning. Completing the learning cycle takes time and maybe seen as time consuming. However, this is a sine qua non for real learning. Unfortunately, completing the learning cycle is usually not encouraged under classroom pressure to get through the overloaded content. Zull stressed that enough time should be allowed for the learner to make the deep connections and understandings.

As depicted by Zull (2002) and given in Fig.1. below, back integrative cortex marked as 'B' is responsible for the past memory of experiences, understanding of language, feelings of past events. It, on very general terms, represents 'the past' and it is at the receiving end. On the other hand, front integrative cortex marked as 'F' is responsible for making choices, decision to act, sense of responsibility, creativity and making a guess. Again, on very general terms, represents the 'future' and it is at the reflective end of the human brain.

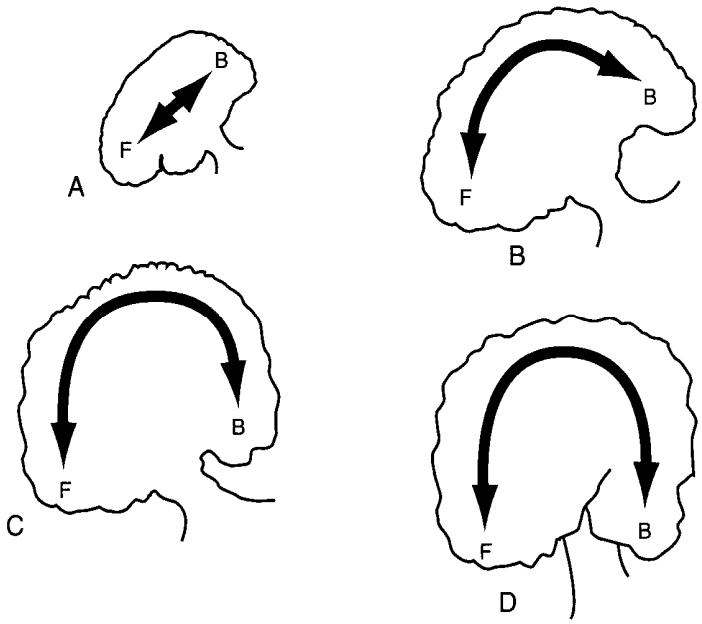

Fig.1. Balanced Learning

It is important to note that Zull specifically mentions the fact that in order to achieve balanced learning we should give the opportunity to the learner to bring past to future. According to him, as soon as we have heard a word or seen an object it becomes the past. In order to bring past experiences to future we need to ponder about them and ask question to make future connections. This is also necessary to complete the learning cycle as mentioned before.

3. Brief information on Turkish education system

Formal education in Turkey is governed by the Ministry of National Education at the pre-school, primary, middle and secondary education/high school level. In line with the recent legislation, each of the following educational periods namely; primary, middle and secondary schools takes 4 years. Therefore, Turkish school system is based on K-12.

Primary education is compulsory in Turkey from the age of 6 to 14 and is free of charge in state schools. Up until last year, the primary education was composed of two divisions; the first 5 years being first division of the primary education and the second division took 3 years being the second division of the primary education. Primary Education Diploma (Ilkogretim Diplomasi), was to be awarded to those students who successfully complete the 8 year basic education program. The basic education program includes Turkish language and literature, mathematics, social studies, science, civics and human rights, the history of the Turkish Republic and Atatürk's reforms, a foreign language (English, French or German), individual and group activities, religious culture and ethics, art/handicraft, music, physical education, traffic safety and first aid, career guidance, and elective courses.

In both TIMSS (Third International Mathematics and Science Study) conducted in 1999 and PISA (Programme for International Student Assessment) in 2003, 2006 and 2009 Turkish students were ranked very low. In fact, in the assessment of reading literacy, mathematics and science, Turkish students got 464, 445 and 454 points respectively out of the maximum point of 800 (TIMSS,1999; PISA, 2003).

In response to repetitive unsuccessful results of the Turkish students in those international assessments, Turkish authorities decided to review and revise the Turkish education system taking into account the best practices, especially in science education, in the world. To that end, Turkish Ministry of National Education decided to revise the curricula of primary education. The revised new curricula was claimed to be based on constructivism with the emphasis on encouraging high level thinking skills and creativity. The Turkish Ministry of National Education (MONE) has begun a massive reform initiative in the curriculum of elementary school since the beginning of 2004. The reform has been funded by a grant from the European Union. The new curricula had been piloted in about a hundred elementary schools in 6 different provinces before it was decided to put into practice all over Turkey as of 2005-06. As stated before, it was a major paradigm change which was intended to move away from a behaviourist approach to constructivist one. This major paradigm shift requires a substantial attitude change on behalf of the teachers. However, many researchers claim that there wasn't enough in-service training for teachers to prepare them for this huge endeavour (Babadogan & Olkun, 2006).

3.1 Results of the examination of the mathematics course book at the 8th grade in the compulsory Turkish basic education

The mathematics course book of 2011-2012 instructional year, at the 8th grade in the second half of primary education in Turkey, has been examined with a view to counting the number of terms, concepts and processes which are introduced the first time and expected to be "learnt" by the students. The following definitions were taken from Macmillan Dictionary: (http://www.macmillandictionary.com/dictionary/british/term):

Definition of a "term": A word or phrase used as a name or for describing someone.
Definition of a "concept": An idea of something that exists
Definition of "process": A series of actions used to make a product, or to treat it with chemicals.

In light of the above definitions, the number of terms, concepts and processes, which are introduced the first time to the students in the mathematics course book at the 8th grade, has been given below Fig. 2.

	The number
New Terms	109
New Concepts	105
New Processes	77

Fig. 2. Number of new terms, concepts and processes which are expected to be learnt by 8th graders

Examples for terms, concepts and processes taken from the 8th grade mathematics course book:

Example 1:
Term: The volume of a geometric shape
Concept: Volume of a cylinder
Process: (area of base) x (height) = π r2. h

Example 2:
Term: Number Sequences
Concept: Fibonacci Sequence. In the Fibonacci sequence of numbers each number is the sum of the previous two numbers starting with 0 and 1.
Process: This sequence begins 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144

8th graders took the mathematics course for two semesters during 2011-2012 instructional year. Each semester last 18 weeks and the course is scheduled 4 hours a week. In other words, 8th graders are expected to learn 109 new terms, 105 new concepts and 77 new processes in only 36 weeks. This was only the mathematics course. Together with that, 8th graders also take the following courses: Turkish language and literature, social studies, life sciences, science & technology, the history of the Turkish Republic and Atatürk's reforms, a foreign language (English, French or German), individual and group activities, music, religious culture and ethics, art/handicraft, music, physical education, traffic safety and first aid, career guidance, and elective courses.

4. Discussion & Conclusions

In line with the essence of constructivism which emphasizes the fact that any data and/or information entered into the brain of the learner, must be questioned and reflected to make the input to be part of the existing schemata of the learner. This is explained in a different, but a kind of a similar way by Zull (2002) as mentioned in section 2.2 of this article, that in order to achieve balanced learning, the learner must be given the opportunity and the needed time to reflect on the input, which is passively received, with a view to integrating that input be part of the existing neural network. This means that in such a limited time frame, it seems almost implausible for the learner to reflect on 109 new terms, 105 new concepts and 77 new processes in only 36 weeks. Together with the scope of other subject matters, the learner could only be expected to memorize the content of the mathematics course book at the 8th grade not to learn. However, it is worth distinguishing the difference between memorization and learning.

Without repeating the theoretical framework as given in section 2, policy makers must pay a special attention to the fact that when a change is introduced in one component of the curriculum, in this case it is the implementation, the other phases must be adjusted accordingly. When a major paradigm shift was introduced in the compulsory Turkish basic education in 2005 and 2006 as mentioned in section 3, it could be claimed that this initiative was intended to move away from behaviourism to get closer to constructivism. However, it is claimed that to make the reform, in question, to be based on a true constructivist paradigm, the scope of the content in the curriculum should have been lessened to be able to give the needed time to the learner to reflect on the terms, concepts and processes introduced the first time to the learner. This paper attempts to examine and compare the mathematics course book for 8th grade students in the Turkish basic education system against constructivism. Other subject matters, included in the basic Turkish education, could be explored to see if they need to be revised, as well, in light of main characteristics of constructivism.

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