Curriculum Reform in Hong Kong and its Effect on Pupils’ Cognitive Development

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Abstract

The curriculum in Hong Kong was designed along the line of the behaviourist learning theory. Knowledge is broken into bits for pupils to take in using mostly the mechanism of reward and punishment. Learning is therefore quantitative, atomistic and linear. In order to enhance the quality of teaching and learning, an initiative called the Target Oriented Curriculum (TOC) has been introduced and is being implemented in the primary schools.

The aim of this paper is three-fold: first, to find out the overview of TOC; second, to describe the TOC principles of learning; and third, to analyze these principles in the light of current cognitive learning theories and recent research. Methodology is on the review of the relevant government archives, curriculum documents, books and journals. Implications will be drawn to the need for a change in the teacher education programmes to cope with the curriculum innovation.
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In order to respond to the rapid changes in Hong Kong and many other places in the world in recent years, the Hong Kong education system has to be revised for a better future. The change is mostly geared towards enabling learners to learn how to learn, to think independently, to solve real problems, to work in harmony with others, and to communicate effectively with those of other cultures and value systems (Clark et al, 1994). In this connection, Education Commission, the education policy-making body of Hong Kong, in its Report No. 4 recommends that “It is time to improve the quality of education to respond to new global realities and to ensure the success of the expansion in upper secondary and tertiary education” (Education Commission, 1990). One of the recommendations is to launch the Target Oriented Curriculum Initiative (former name was Targets and Target-related Assessment), hereinafter referred as TOC in short.

The preceding paragraph summarizes the context of curriculum renewal in Hong Kong. Five main sections follow in this paper. The first section outlines the features of TOC. The second section describes the theoretical base of TOC in conceptualizing learning. The third section scrutinizes the theoretical base in terms of the major theories of cognitive development. The final section concludes the paper with implications on teacher development and education.

Features of TOC

Education Department (1994a) in the Report of Advisory Committee on Implementation of TOC points out that TOC is a major curriculum reform aiming at enhancing the effectiveness of teaching and learning. Three main components of TOC are spelt out: learning targets, learning tasks and assessment.

Learning targets are set for each subject of the four Key Stages of learning from primary one to secondary five. At the present stage, implementation of TOC is restricted to three subjects: Chinese, English, Mathematics. Targets set out the aims and directions for learning (Education Department, 1994b). Range of purposes and the most important aspects of learning in each subject are reflected in the targets. Targets are of different levels --- from the most general targets for the subject as a whole, through dimensional learning targets for the subject, to specifically learning objectives for each Key Stage.

Learning tasks are activities that help pupils to achieve the learning targets. They describe what pupils do in order to learn, and involve them in using knowledge and purposes which go
beyond merely practising elements of the subject (Education Department, 1994b). A learning task involves a purpose for doing the task, a context in which the task takes place, a process of thinking and doing required in carrying out the task, and a product or the result of learning and doing.

Assessment is criterion-referenced in which the progress of individual pupil is measured in relation to learning targets. This kind of target-related assessment is done by means of assessment tasks for formative and summative purposes (Morris, 1996). Pupils can then be categorized in terms of bands of performance at different key stages of learning. Eight bands of performance are used to describe progress in performance from Key Stage one to Key Stage four. Each band of performance describes pupils’ expected performance in relation to targets, showing how and how well the pupils do.

Theoretical base of TOC

Cognitive learning theory

According to Clark, a chief designer of TOC, learning is conceptualized as an active, holistic, purposeful process of constructing, using and reconstructing knowledge (Clark et al, 1994). Knowledge is constructed rather than transmitted, and people learn through interaction between thoughts and experiences rather than passively reacting to them (Cheung, 1996). It is held that progress in learning is qualitative rather than quantitative, holistic rather than atomistic, and cyclical rather than linear.

Clark et al (1994) list out the constructivist view of learning in a set of overlapping principles, the majority of which is summarized as follows:

- learning involves the active construction of knowledge through processes of inquiry, thinking, problem solving, creating, performing and communicating;
- learning is purposeful. It derives from the desire to make sense of the world and act upon it;
- learning is based on previous knowledge. Existing knowledge is the basis on which further learning is built;
- learning involves accommodating new insights within the existing framework of knowledge;
- learning is interactive. Learning is more effective when learners are engaged in interaction with the teacher or the peers;
- learning occurs in a context of use. Context relates to the situational and interactional circumstances in which knowledge is constructed and use;
- learning is holistic. It is more effective when tasks are undertaken as a whole, rather than when they are broken down into bits; and
- knowledge is developed through language and is expressed in language.
Scrutiny of theoretical base of TOC in terms of cognitive theories

This section attempts to examine the theoretical base of TOC in conceptualizing learning. Learning theories have a rich and diverse heritage. Hergenhahn & Olson (1997) classify learning theories into four paradigms: functionalistic, associationistic, cognitive and neurophysiological. Judging from the theoretical base of TOC as listed in one of the TOC documents, “Improving the Quality of Teaching” (IQT), it is apparent that TOC is designed under the cognitive paradigm. Considering the scope of this paper, two approaches of cognitive paradigm have been chosen for scrutinizing the TOC theoretical base of learning, namely the constructivist approach and the socio-cultural approach.

Constructivist approach

According to Piaget, an intelligent act is one that causes an approximation to the conditions optimal for an organism’s survival (Piaget, 1966). Intelligence therefore changes when the child lives in different environment. An act regarded by a child as intelligent may change as he grows and becomes more sophisticated in handling things. For example, the behaviour of a child grasping a rattle is as intelligent as an older child solving a complex problem (Hergenhahn & Olson, 1997). So, Piaget’s notion of intelligence can be used to explain the statement children are not born with a fixed level of overall ability which determines what they can learn as remarked in the IQT document.

Piaget’s notion on schema, assimilation, accommodation and equilibration can be used to explain the following learning principles postulated in the IQT document: learning involves the active construction of knowledge through process of inquiry, thinking and problem solving; learning is based on previous knowledge; learning involves accommodating new insights.

A schema can be physical or mental and is looked upon as an action or a process that are used repeatedly by a child to attain goals or solve problem (Piaget, 1952). A child after birth will by instinct actively respond to things happening in the environment. It is through using sensory organs to interact with the environment that he begins to understand the environment. The action and process of the child in responding to the environment become the child’s schemata. Hergenhahn & Olson (1997) illustrate the grasping schema as the general ability to grasp things. Grasping schema is physical. As the child grows up and has more experience, physical schema becomes more complicated and sophisticated and mental schema is developed. Therefore, the schema can be made sense of as a child’s cognitive structure and will determine how the child responds in the environment.

When a child comes across a new thing in the environment, he will compare it using his existing schema to see whether the new thing can match his schema. If it can, the new thing will be incorporated into his existing schema, expanding it. For example, when the child learns a machine called car, and the car he sees is a red one, then his schema for car is a red car.
Later when he comes across a yellow machine that looks very much like the red car he has learnt, if he can still call it a car, then the yellow car has been subsumed under his schema for car, so his schema for car is thus expanded. This process is called assimilation.

However, using the above example, if he cannot make sense out of the yellow machine before his eyes, assimilation cannot take place. In order to sort the matter out, he has to modify his existing schema for car to include both the red and the yellow cars. This process is called accommodation. A modification in the existing schema by accommodation results in learning (Strauss, 1972). Piaget (1980) asserted that it is essential to confront a child with discrepant ideas for knowledge growth. Thus the statement *learning is based on previous knowledge involving accommodation* in the IQT document can be explained by Piaget’s theory of cognitive development, the term *previous knowledge* held to be referred to the child’s schema or cognitive structure.

That the child either assimilates or accommodates every new event he comes across is explained by the fact that an organism will try his best to attain a state of equilibrium which Piaget called equilibration. Piaget felt that a child will try to self-regulate himself to adapt to the environment (Piaget, 1952). Both assimilation and accommodation can bring about learning. For example, when a child encounters a new situation that he does not have the experience, it causes a cognitive disbalance. Piaget regarded that an organism prefers a harmonious relationship with the environment. Thus the child will try to modify his existing cognitive structure to incorporate the new elements of the situation to attain equilibrium. Should the new elements of the situation that has been accommodated appear in another context again, the child can just assimilate them. The modified cognitive structure will then form a basis for new assimilation and accommodations. This explains the idea *we all have ever-improvable capacities in all the domains of learning* as expressed in the IQT document.

According to Piaget, a child even at sensorimotor stage is active to make sense of the environment. He uses his sensorimotor schemata for interaction. Unlike the behaviourist learning theory which describes the child as a passive learner who reacts to stimulus of the environment. A behaviour will form when it is positively reinforced. Therefore little learning will occur in the absence of stimulus or positive reinforcement. In Piagetian learning theory a child is intrinsically motivated to learn. The cognitive structures and processing strategies they possess at a particular stage of development make them select from the input what is meaningful to them and to transform what is selected according to their cognitive structures (Flavell, 1992). So he is active in the learning process and has a purpose to learn as expressed in the IQT document as *learning is purposeful*. It derives from the desire to make sense of the world and act upon it.
**Social-cultural approach**

Vygotsky can be said to represent this approach in explaining children’s cognitive development. Two aspects of Vygotsky’s theory can be drawn to explain some of the theoretical base of TOC: the importance of language or speech in children’s cognitive growth, and the notion of the zone of proximal development.

**Language and thought**

An important contribution of Vygotsky in cognitive development is his view on thought and speech. Speech does not merely serve as the expression of developed thought. Thought is restructured as it is transformed into speech. It is not expressed but completed in the word (Vygotsky, 1978). Speech and thought are therefore intertwined, and each can facilitate the development of other.

When pupils have more chances to participate in group to discuss important content, it has a long-term effect on their cognitive development as Pressley & McCormic (1995) interpret Vygotskian theory as “The opportunities to engage in interpersonal problem solving and thinking stimulate the development of personal problem-solving and thinking skills, in that many of the processes that the group carries out together eventually are internalized by individual member of the group”. This explains the role of language in learning as listed in the IQT document: knowledge is developed through language and is expressed in language. Having said that, we have to be cautious in the generalisation of the statement as pointed out by Rogoff (1990) that in some cultures, verbal instruction may not be the only way of developing thinking, nor is it the most important method. This is because people in different cultures have different ways of helping children to learn, and different skills are needed and valued in different cultures.

**Zone of proximal development**

Vygotsky noted that a child may not be able to solve a problem solely on his own. However, if he is given a hint or the like, he can accomplish the task which he is not capable of doing before. Vygotsky (1978) explained this phenomenon using the notion of the zone of proximal development which is “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.” If the task is within the child’s zone of proximal development, he can ultimately perform the task without assistance (Pressley & McCormick, 1995). Should the task fall out of the child’s zone of proximal development, the assistance provided cannot help him to internalize the process of learning for him to undertake the task independently.

In fact Piaget’s theory has also a social element as he emphasizes interaction in learning. This notion is confirmed and expanded as Kutnick (1996) quotes “Human life is essentially collective and social life constitutes an essential factor in the creation of growth of
knowledge”. This is echoed by Light (1996) who points out that Piaget himself did not agree to his being criticized for adopting an individualistic point of view on development. Because the social element in Piaget’s thinking is not stable, his thought in this aspect has been misinterpreted (Duveen, 1996).

Later Wood et al (1976) used the notion of scaffolding to describe the help given by the expert or the teacher to the novice or the pupils to solve a problem which they cannot work out only by themselves. Literally, scaffold is used to help the erection of a building. Upon the completion of the building which can support itself, the scaffold can then be removed. Great care has to be taken to provide adequate support to the child so that he can learn within his potential development without failure. However too much assistance may result in the reliance of the child on the adult without the ability to perform the target job. It is therefore important to determine the child’s actual level of development and his potential level of development in order to work out the amount and the type of help that is needed by the child to internalize the learning process leading to the child’s ultimate independent accomplishment of the task. Thus, Vygotsky’s notion of the zone of proximal development and the subsequent notion of scaffolding explain the statement that learning is interactive and is more effective when the learners are engaged in interaction with the teacher and with other students as expressed in the IQL document.

**Situated cognition**

Much of the learning theory emphasizes that learning takes place in the individual mind. As Piaget reiterated, a child uses his cognitive structure to assimilate or accommodate a new event during the learning process. Advocates of situated cognition have a different view in learning. Situated cognition stems from the Vygotskian sociocultural theory of learning in that human minds develop in social situations, and that they use the tools and representational media that culture provides to support, extend, and reorganize mental functioning” (Lave & Wenger, 1991). They believe that learning is a process of coparticipation and they are concerned with the kinds of social engagements that set the proper scene for learning to take place. Moreover in order to learn something or a skill, the learner has to participate to a limited degree and with limited responsibility in the actual process with an expert or a master in that field. This kind of participation is called legitimate peripheral participation which is vital to the acquisition of the skill.

Sharing the same view as Lave and Wenger, Brown et al (1989) think that knowledge is learned from the actions that give rise to it and from the culture in which the actions are performed. That is to say knowledge is interwined with the activities and environment in which it develops. For example, a doctor learns how to perform a surgical operation when he observes and then shows legitimate peripheral participation with his senior surgeon at the operating theatre where the ordinary practice of operation is performed.
Brown argues that if knowledge is a product of the culture in which it is developed and used, then pupils should be engaged in the authentic practices of their culture, but not the culture of schooling, authentic activities meaning the ordinary practices of the culture. Therefore, it will be difficult for pupils who have learnt bodies of knowledge and skills in school to apply it elsewhere since knowledge is socially situated and not separable from the activities in which it is developed.

Using the notion of legitimate peripheral participation, Lave & Wenger (1991) illustrate apprenticeship, a model of learning, as an approach of learning in which the learner in the process of acquisition of skills which are legitimately valued to the culture does not have full participation as his master’s until he becomes an expert of the skills. Using scaffolding, the master provides just the right amount of support to the apprentice so that he will not fail, nor will he become dependent on the master. Finally the apprentice accomplishes the task with full participation and responsibility. The notion of situated cognition thus elaborates the statements *learning occurs in a context of use. Context relates to the situational and interactional circumstances in which knowledge is constructed and use* as expressed in the IQT document.

Having said in the above paragraphs that authentic activities enhances learning, Anderson et al (1997) emphasizes that learning need not be bound to the specific situation of its application, and it is often possible for generalization of instruction to occur from the classroom to the real life situations. Though Anderson et al (1997) and Greeno (1997) have different opinions on situated learning, they do agree that knowledge can transfer between different kinds of tasks; that abstract instruction can be effective; and that there is no need for instruction to take place only in complex social situations (Anderson et al, 1997).

**Conclusions and Implications**

This paper begins with a review of the contextual base of TOC, a curriculum innovation in Hong Kong. Features of TOC are highlighted, followed by a description of the theoretical base of TOC which is then examined from the perspective of cognitive learning theories. Review on relevant literature demonstrates that the principles of learning adopted in TOC orient from the Constructivist and the Socioculturalist. Focus is laid on Piaget and Vygotsky.

Regarding Piagetian theory, the concept of schema, assimilation, accommodation and equilibration. The social nature of Piaget’s theory has also been dealt with.

As for Vygotskian theory, the sociocultural side which influences learning and the relation of language with thought have been examined. The notion of the zone of proximal development leading to scaffolding in practice, as well as the model of apprenticeship has been explored after a discussion of the situated cognition.
The theoretical base of TOC seems to accord with Greeno’s view in his response to Anderson et al (Greeno, 1997). Greeno argues “The cognitive perspective takes the theory of individual cognition as its basis…. The situated perspective takes the theory of social and ecological interaction as its basis …. The best strategy for the field is for both perspectives to be developed energetically”.

While a change in learning theories is noted in the design of TOC, it will inevitably lead to crucial changes in the theories of instructional design (Zheng & Wong, 1997). This in turn will require the teachers who are implementing TOC to have extra qualities if they are to succeed in teaching. They need to be active, creative, flexible, knowledgeable, and good at interpersonal skills (Cheung, 1996).

Teachers are no strangers in the culture of school and schooling so they should not find it difficult to design activities that are authentic to that culture. However, it will be difficult for the teachers to plan activities for the classroom that is authentic to a culture they have only little understanding (Clayden et al, 1996). For example, teachers must first be familiar with the culture of mathematics and the mathematicians before they can design authentic mathematics activities for the classroom. It implies that teacher professional development has to be sought, and a curriculum change has to be considered in the teacher education if the apprentice model is to be adopted in teaching.
References


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