Introducing the Knowledge Building pedagogy in Kindergarten

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Abstract

This paper presents the first part of the research realized in kindergarten which consists on the third degree children realizing investigations according to the Knowledge Building pedagogy with special emphasis in four of the 12 principles: Real Ideas-Authentic Problems; Idea Diversity; Pervasive Knowledge Building and Democratization of Knowledge. If the matter is to place the children in the complete process of knowledge creation from the early age, the first academic level is kindergarten and the goal is too to advance the borders of knowledge as they perceive them. It is possible to observe that the questions, as much as the answers, evolve in a combination of construction of knowledge and learning and although the children still do not know how to write well, they can organize their ideas and represent their thoughts through drawings. Also in this stage they develop their reading and writing skills and the Knowledge Building pedagogy helps them. The children from their first days in school, learn to ask, to look for answers and to organize their process of investigation in a way that results for them as a natural way to create and to construct knowledge, which is easier than to change the methods and processes of the traditional

education already dominated when they are in superior degrees like in primary school. The interests of the children with whom this investigation is realized are directed to the study of the dinosaurs and from the beginning the questions considered are: How is it that the dinosaurs appeared? Why are there no longer dinosaurs? We thought it possible to work with the Knowledge Building principles at the early stage when the children are learning to read and write. We have implemented some methodological bases to work with icons and drawings in a board as a shared space instead of the KF. The process of implementing the KB model for kindergarten has not been finished and we are in a period of observation of the first actions and its results.

Key words: Knowledge Building, collaborative learning in kindergarten, diversity of ideas, democratization of knowledge, shared knowledge.

Introduction

This research has as objective the introduction of Knowledge Building pedagogy in a kindergarten school located in a low-income area at the northeast of the city of Puebla, and to observe if it is possible for the small children to realize investigations according to this pedagogy even though they are in the process of learning how to read and write. This study does not try to find out if Knowledge Building favors the process of reading-writing like a primary target, but to find out if the children can develop their capacity to research and investigate according to the principles of Knowledge Building without using the Knowledge Forum. In addition it is not possible to use it in this context, since they lack equipment and Internet connection, being a school for children and families with limited resources.

The 12 principles of the Knowledge Building are not steps that must be given one by one, it is necessary to identify them according to the circumstances which one can be emphasized, and put attention and observe how the other ones can also be developed. In this study special emphasis is made in four of the 12 principles although obviously there are others more present. These principles are: Idea Diversity, Pervasive Knowledge Building and Democratization of Knowledge.

Characteristics of children in kindergarten age

The children have the need to explore, to know and to act on the world around them, that's how they construct and advance in their knowledge. They need to make decisions, to plan and to carry out actions, to control the atmosphere around them. For that reason it is necessary to provide the children experiences of mental, psychomotor, linguistic, social and emotional nature that enrich their life and facilitate the total development of their potentialities in the diverse areas of their personality, as well as in later learning. The capacity of perception of children in kindergarten age is impressive. Lauren Fingeret (2007) realized a study in which a group of children of 5 years old saw the film *"The March of the Penguins"* and used the book of the same name with the intention of determining whichever information the students learned from the film and how the professor used the text in the unit that contemplates the study of the penguins to maximize its impact. An oral assessment of the students was made before reading the book and watching the film and it was made again after reading the text four months later. Regular visits to the class were made with the purpose of observing the use of the text. It was possible to verify that the students learned and retained an enormous amount of knowledge on penguins.

Between the 3 and 6 years of age, the children have an extraordinary development of their abilities and motivations; to think about what they do, to predict the result of their actions, the use of language and remembering experiences, showing that they are significant for their integral growth. Nevertheless, recent studies have demonstrated that the academic level that generally is in superior levels to kindergarten is extremely low. That's not the serious part of the issue. What *is* worrying is that the interpersonal relations and the adaptation of the small children to new social groups different from home are more and more distorted. One of the possible causes of this problem is the deficiency in respects to the material and tools in relation with the needs of the teachers and the children. Of course that this is a problem that is urgent to solve, and it is precise to try an excellent preparation, but the material deficiency does not have to be an excuse for not doing a concerted effort. It shouldn't be an excuse to not incorporate the new pedagogical theories that would replace the material deficiencies with creativity and imagination, trying an optimal development of the children. It is necessary to try to improve the

intellectual and emotional development of the children and to enable the teachers better.

Concerning the development of the vocabulary of the kindergarten children, the students learn anywhere between 2,000 to 3,000 words per year. This makes us wonder on the vocabulary that is taught to the children, on methods that are used for it and on what is expected with learning the vocabulary. To choose what vocabulary to teach in depth is crucial. The impact that reading and writing has on vocabulary cannot be ignored. That is an important reason to impart daily reading activities for the children. The use of structured sentences is a good way to consolidate the basic knowledge with them. This is especially effective when they are accompanying the content with a specific subject or unit of study. These structured sentences can be used in paper cards, or in spaces that the Knowledge Forum provides.

The sense of KB in collaborative learning

In Kindergarten, collaborative learning is considered a descriptive process because one recognizes that a group of students who learn and collaborate is seen like the mechanism that causes the learning. Like a pedagogical process, the collaboration is seen like a prescribed method in which one asks one or more people to collaborate; because that's the way they learn more efficiently (Dillenburg in Stoilescu, 2010). Comparing these concepts with Knowledge Building, we found that this last one goes on more deeply, establishing not only a mutual benefit between the members but it also is committed with the advance of knowledge in that community. As the name suggests, the main goal of Knowledge Building is not to complete projects or tasks, but the knowledge creation (Scardamalia, 2003).

Discussion could be done from the perspective of exchanging information. Coordinating involves exchanging information and aligning activities for a common purpose. Cooperating involves sharing information, aligning activities and sharing resources. This level of partnership involves a significant commitment of time, a high degree of trust and sharing of 'territory' between partners. Collaborating goes beyond cooperation because it enhances the capacity of the other partner(s) for mutual benefit and a common purpose. For Scardamalia (2003), in knowledge building, theory collaboration takes place

through symmetry in knowledge advancement. This means reciprocal exchange among learners, "the fact that to give knowledge is to get knowledge". This is an important notion of the twelve principles of the Knowledge Building theory. Another important aspect from KB theory is that it tries to provide a scheme for learners for the advancement with ideas and knowledge (Stoilescu, 2010).

In the Knowledge Building theory the learners progress takes place by the epistemic agency of themselves. The students who present a high epistemic commitment and manage their own process are able to assess themselves. The epistemic commitment is one of the main preoccupations of the Knowledge Building theory although the aspect that probably acquires major importance in a Knowledge Building community is the "Rise Above" (Scardamalia, 2002).

Interacting within a community, the effort of synthesis in a KB class improves the capacities and abilities of the students reflecting how the different ideas are related and how they are possible to be integrated in the best way. This means that the students raise their understanding to a new level of knowledge. When a community satisfies that level, their members have the capacity to foment integration, to improve and to make a synthesis of new ideas originating understandings of different sources. Scardamalia and Bereiter (2003) recommended that a computer environment should not become overly prescriptive. Instead, a flexibility of the discourse that makes it consistent with the emergent goals should be pursued. Also, for a Knowledge Building community, they did not recommend the use of pure computer artifacts (such as intelligent agents, prescribed projects, fixed task sequences, templates) or any other tools designed to narrow-down learners to known endpoints. Instead they recommended "capturing the human capacity for inventiveness and help convert that inventiveness into something of social value" (p. 7).

Previous studies of KB in kindergarten

Studies like *"Knowledge Building and Early Literacy Development in Kindergarten"* and *"Building knowledge and literacy skills: Kindergarten junior"* realized by researchers of the OISE have demonstrated the advantages using Knowledge Forum with children from 4 to 5 years old in kindergarten. In a case, they worked with two different schools but in an equivalent manner; a group was formed by children of 4 year olds, whereas the other was constituted by

children of 5 years old. Both groups used a diary with photographs in paper to introduce them to writing. They did this activity during three months. The group of younger children used in addition the Knowledge Forum to discuss some topics that were treated in class. Measurements of alphabetization before and after, besides the samples of the degree of writing in diary and notes, were realized in KF. The results demonstrated that the group of younger children, the same that had used Knowledge Forum, had a major progress in alphabetization than the group of older children that did not use KF. In the second case, a group of children of "junior kindergarten" were piloted during a period of two years. It was a group of children of the "Institute Child Study Lab School" of the University of Toronto. The professor discovered that the children began to construct notes on those of other children's and to work with the ideas of their companions. Surprisingly, the conversations of the students went beyond the particular subjects. The notes written by the children demonstrated that those young kids are able to put in practice some principles of Knowledge Building (Halewood, Reeve, and Scardamalia, 2003).

Research context

The school is located in "La Guadalupana" neighborhood, in the periphery of the city of Puebla, and is considered a low-income residential unit. The residents are workers who receive low wages, that being a main reason why both parents in a household work. The residential unit has public transport, lighting system, potable water, but lacks paving in the majority of its streets. In one of these streets is the "Instituto Rabindranath Tagore" where the research takes place. Services such as telephone landlines and Internet are almost inexistent.

The kindergarten population is of 49 students; 23 in first grade, 18 students in second and 8 in third grade. The research is focused on the students of third grade whose age range is from 5 to 6 years old. The third grade group is made up of 3 boys and 5 girls. The children who attend this grade learn to read in that school year. Therefore at the beginning of this grade only one of the children recognized the letters well and could read simple phrases.

The research is lead by two researchers who already have experience in Knowledge Building pedagogy and in the use of the Knowledge Forum,

nevertheless it is the first time that they tried to work this pedagogy without technological support. The Kindergarten teachers and the third grade teacher did not have previous experience in this pedagogy.

Objectives

The intention of introducing K B in the third grade of kindergarten is:

- That the children realize research according to the Knowledge Building pedagogy without using knowledge forum working with special attention to four of the KB principles: Real Ideas-Authentic Problems; Idea Diversity; Pervasive Knowledge Building and Democratization of Knowledge.
- To verify the effectiveness of the pedagogy of Knowledge Building independent of the technology that supports it.

Design of the research

The research began in the 2010-2011 school year and will finish on the 2011-2012 academic cycle. Although the school year initiated in the month of August, the research began at the end of the month of October. The initial intention was to involve all children of the kindergarten in the project of introduction of the Knowledge Building pedagogy, but due to the difficulties that implies to work with children of three different levels, like the fact that they do not know how to read or write, and the ignorance of this pedagogy on part of the teachers, we decided to work only with the third grade. Like part of the academic activities, we decided on Thursdays to work the problem that the children decided to solve or the subject that they wanted to investigate.

Methodology

The research focuses on the four Knowledge Building principles selected under the criteria of which they are those that can be observed and better worked with kindergarten children; Real ideas - Authentic Problems because they can express what are their interests and what they want to know; Idea Diversity, because each child has his or her own idea, they ask their family and contribute

thinking they have a good answer; Pervasive Knowledge Building, because the doubts and preoccupations they carry home, involving their family asking them to read about the subject, help them answer the questions and be explained by their parents what they don't understand; and Democratization of Knowledge, because they must recognize the value of his or her opinions as well as those of his or her companions.

Role of the researchers

The role of the researchers is centered in the observation and data collecting, participating directly in a few occasions in the activities of the course. They are present every Thursday to realize these functions and to orient the development of the research from the perspective of Knowledge Building.

Data collecting

The researchers make recordings, filmic and photographic, as well as observation throughout the entire course. They register the research and the gathering of information on the dynamics of the children, the interventions of the teacher, the interventions of the children and the type of scaffolding used.

Role of the teacher

At the beginning, the video *Comconèixer* was presented to the teachers of the Institute and material of the Knowledge Building pedagogy was provided. Another session was realized to share the understandings and to solve any doubts. In this meeting the importance of the principles of the KB was emphasized. The following step consisted in making an agreement on the way in which the scaffoldings of KF would be realized and their name. We decided to use drawings of dinosaurs representing each scaffold, for best understanding of the children. A name and representative drawing for each of the scaffolds was selected, and are the following: My theory - I know that…. - a dinosaur

smiling. I need to understand - I do not understand… a drawing of a T-Rex baby with question marks. New information, a drawing of a dinosaur taking books. Shared knowledge - joining what we know … a drawing of dinosaurs crossing their necks. This categorization was put under approval with the children and they were very pleased with the colors and the expressions on the drawings representing the scaffolds.

The teacher worked with the subject of the dinosaurs like part of the curriculum and not as an additional activity, assigning specific time and resources to research activities. There were times in which the teacher worked more than once per week on this subject.

Description of the process

The research started with the initiative of the children, letting them choose the subject, problem or topic of their preference. After a dialogue and discussion among them, they decided to study dinosaurs.

The children by nature make questions about everything around them, the majority show a great imagination- and a very developed one at that-, and at this age they begin to express their ideas, show attention, and can follow with more concentration the thread of a narration. They like to play and work in groups, although there are moments in which they want to be alone. They also express their feelings and emotions when they are working in class, arising questions like: *Why were the dinosaurs extinguished?* Talking with the students on a subject that they would like to know about, arises in them curiosity and they ask: *what happened to the dinosaurs, that they are no longer with us?* It is a question that troubles the students and we took it like a real idea and authentic problem according to the principles of KB.

The same peculiar nature of children makes them ask about the world surrounding them, and express their understandings, ideas and desires through images or pictures that have much sense for them. It is necessary to mention that the students are in the process of the development of their reading and writing capacities, reason why the work was done with drawings and short texts.

At the beginning, two activities were realized, first a visit to a Jurassic town created by the City Council of Puebla, which presented the different ages in which the dinosaurs lived. The dinosaur's habitat was recreated, so that when visiting, the children found a real atmosphere of dinosaurs with sounds for each one of them. The dinosaurs were audio-animatronic so that the atmosphere was very real; the children really seemed to be in the authentic world of the dinosaurs. When visiting this place, the students were fascinated and it served them like an entrance scene since many questions were considered: *In what age did the dinosaurs lived? What did they eat? How did they reproduce? Why was the Tyrannosaurus Rex so strong? How long was the triceratops? Why were there dinosaurs with such long necks? Were there fruits, like the ones we have nowadays, and did the dinosaurs eat them? Why were they extinguished if they were so strong?*

The second activity was an expedition to a ravine near the institute with the purpose to understand what is a fossil. The students looked for stones and found incrustations with forms of tracks of dinosaurs, teeth or horns, bones and everything that their imagination suggested them.

After that, the methodology was the following: one of the children asked: *in what age did the dinosaurs live?* The teacher showed the drawing of the dinosaur- *I need to understand* and was placed in the blackboard and she said to the children that to answer that question it is necessary to look for information on the subject. The teacher indicated that they would look for that information at home with the help of their parents. They had to do a brief summary or a card. In the following class the information from each student was presented and placed near the *new information* scaffold card. Their understanding was presented and expressed in their own words, and they made drawings placing them near the *new information* scaffold. New questions were placed, and using the scaffolds cards, new knowledge was constructed. Putting their knowledge in common first in an oral way and later in a written form, with a drawing and a short text, the students could express the knowledge they shared and the way it was constructed.

Discussion and reflection

As we have explained, this firs part was to study how to implement kg pedagogy without kf ad to training teacher to follow kb principles, but also in this period also we can observe how the students learned to use scaffolds and how they can place their contributions in the corresponding category. The knowledge created from the contributions of the other companions is important for the construction of the knowledge. The icon scaffolds helped them organize the way to approach a subject. We can indicate as an important element the emotion aspect for the understanding of the subject; the students always showed interest since it was a subject chosen by them and they showed more and more joy when knowing more on the fascinating life of the dinosaurs. A shared and significant learning was obtained. In the next period, we will work in observe specifically how they work the four principles in which we re interested.

   They do work that, as Scardamalia (2002) points out, engage them directly in an investigative process in which they develop collectively their creativity, responsibility and build knowledge cooperatively.

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