

STORY-TELLING – A CONSTRUCTIVIST TOOL IN SCIENCE TEACHING

Tanu Tandon

*Lecturer, Amity Institute of Education
Amity University, Lucknow Campus
Uttar Pradesh*

Constructivism asserts that knowledge is actively constructed by the learner through interaction with the world and social negotiation, learner explores the world and transforms his understanding of the world. Story-telling, is also an integral part of our lives, in understanding and communicating with the world. Science, on the other hand, is a subject which rests upon inductive reasoning and analytical thinking, and also requires social negotiation and classroom is the social unit where knowledge is constructed. This paper discusses how story-telling can be used as a constructivist tool in teaching of science.

Visualise a science class going on. What will come in your mind? Use of model and pictures, question and answer session going on. Now picture this, a science class, going on the topic of structure of flower with teacher holding a hand puppet of honeybee and a large puppet of flower and narrating a story with full expressions and proper voice modulation about baby honeybee. "A baby bee goes to the garden for the first time and sees a beautiful red flower in centre of the garden. It goes round and round, buzzes with excitement, pokes inside the flower and it's so curious about the flower and wants to know everything. You all are baby bees and you all come to mummy bee (teacher) and together they go on a trip to garden to explore it and to know parts of flower". This is followed by a slide show on the structure of flower.

Science has always been associated with scientific rational thinking skills and story-telling always reminds us of a literature class but these two put together can prove to be very effective. This paper

will discuss story-telling approach in teaching of science. Science has always been associated with experiments, demonstrations, inductive – deductive reasoning and analysis and for this reason scientific concepts are consistently described as challenging to learn and difficult to teach.

Enhancing students higher thinking, logical reasoning, scientific skill has always been a considerable challenge in education. The Dearing Report (Dearing, 1997) has re-emphasised their importance and the need to introduce tasks to foster reflective thinking and skills to enable students to learn how to learn. The emphasis on skills is needed to develop the lifelong learners who will effectively be able to be part of the future learning society. This supports the constructive learning approach.

A constructivist approach to education emphasises upon the learner and how they construct representation of reality through their interaction with the world and their discussions

with others (Bruner, 1986). The learners are, therefore, encouraged to explore their world, to learn by doing, to look at things in different ways, to discuss their world view with others and as a result to continually transform their understanding of the world in light of these experiences.

Many of our encounters with the world are not direct, our meaning and interpretation about an event is constructed through reflection on it with others. Bruner (1986) suggests that we need to encourage a situation whereby information is not presented from one dominant view and where reflection, discussion and opposing views are included in the process. Education shapes our thoughts and ultimately the way in which we represent and view our world.

Constructivism in Science Teaching

Constructivism both radical and social asserts that knowledge is actively constructed by the learner. Learning is perceived as a cultural apprenticeship and that cognition is argued to be situated in the specific context (Lave, 1988; Brown *et.al.* 1989). Driver *et.al.* (1994) stated that scientific knowledge is symbolic in nature and socially negotiated and classroom is the social unit where knowledge is constructed and negotiated.

Constructivism in science teaching is an approach which focuses on each student, treat her/him as a unique case with her/him own set of realities, experiences, values and culture. Constructivism emphasises that students should be taught in natural settings with multiple representations of reality and varied experiences.

The opportunities to explore, observe and discuss, should be provided to children. Students should be encouraged to ask questions, share their experiences, carry out analogies and reach to conclusions and draw inferences. Negotiation of outcomes is equally important so that students can compare their reality with others and correlate their knowledge with the outside world. Constructivist learning has emphasis on all three—past, present and future. The students are actively involved in construction of knowledge by reflecting upon old and new knowledge and thus evolve new knowledge and learns, unlearns and relearns in this process.

Story-telling – A Constructivist Tool in Science Teaching

Story-telling is one of the constructivist approaches that can be used in science teaching. Story-telling is one of the basic to our everyday lives in communicating with and understanding the people around us and the world we live in (Schank and Abelson, 1995). The stories we tell are more about how we experience and perceive events than about how things really are. They can help us deal with unexpected situations and consider the possibilities for what could have happened as well as what actually transpired (Bruner, 1990). They are an excellent constructivist tool, enabling us to explore the many representations of our worlds. Story-telling has been extensively used in child education as a valuable and creative tool. Construction of stories requires students to actively engage in making sense of their experiences to present stories from different view points. Students were able to set

their own goals, thus enabling them to become self-organised and independent learners. McDuray and Alterio (2003) have proposed a five stage model of reflective learning through Story-telling, which they have mapped on to Moons (2000) five stages of learning.

Story-telling, thus enables the students to make their own decisions, share their views and experiences, and this is the basic premise of constructivism, to construct own knowledge.

Story-telling in science teaching can be used to make it more effective as analogy uses the learner's existing knowledge to generate new understanding (cognitive constructing project). Yanowitz (2001) demonstrated that their 3rd grade children can actually answer inferential question about a science concept that they had learned analogically. Elaborated analogies tend to be more effective when explaining, because they allow the learner to predict which as the basics of establishing causal relationships, one of the key scientific skills. According to Glynn (1991) at it's simplest analogy is the process of identifying similarities between different concepts.

Harrison (2002) points out that the ability of analogies to raise students interest levels is at times more important in the motivation for learning. Analogies matched to developmental levels are more likely to result in effective learning partially because they are more likely to be interesting and accessible to the learner. For nearly 50 years (Oppenheimer, 1956), science educators have been concerned with how children use analogies to create new understandings in science. The purpose of analogy in science education is to effect conceptual change specifically in terms of new or attended

understanding. A complex, boring class can be transformed into simpler and more interesting class wherein students can connect with their past experiences and construct the own knowledge, ideas, relate the new knowledge with old one (analogy) and come up with new ideas.

Story-telling in Teaching of Science—A Practical Experience

This approach was used during practice teaching wherein the pupil-teacher used Story-telling as constructivist tool to explain the concept of translation of DNA. Instead of starting the class in usual inductive manner, the teacher narrated the story about the candy factory and corelated with translation process. This not only enhanced the aesthetic aspect of pupil and teachers, but the 'affective domain' which is always seen as a neglected aspect in science teaching. The use of figurative language, to explain aesthetic ideas can be combined with logical analytical reasoning of sciences. This also supports the constructive point of view cementing the thought that the multiple realities and multiple understandings can coexist.

The teacher started the lesson with narration of story about David the boss, who owns a candy factory. "David is a rich man who has candy factory and he makes delicious candies of the world. And he has the library of all the recipes stored in his office. As the recipes are with the boss David, similarly the recipe to make the protein is stored in the DNA (boss of the cell) and as the candies are produced in factory, the proteins are produced in the protein producing factories called the ribosomes, as messenger or

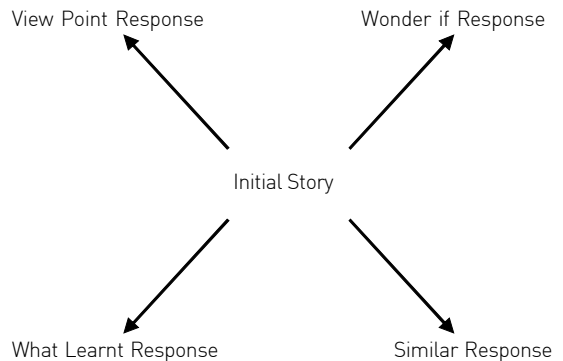
the peon would deliver the recipe of the candy to the workers from the office to the factory, same way the mRNA is the peon or the messenger in the cell which delivers the message from the DNA– the boss from the nucleus (office of the boss) to the ribosomes (factory)”. Thus analogy between candy production and protein synthesis was established through this story.

This approach also agrees with Dynamicist theory which sees cognition as a multi-dimensional space all possible thoughts and behaviours that is traversed by a path of thinking (Van Gelder and Port, 1995)

Story-telling method can be further improvised by adding various dimensions to it as given by McDrury and Alterio’s in 2003 as five-stage model of Story-telling.

- a “View Point Response”, which explores different views.
- a “Wonder if Response”, which considers all the different possibilities.

- a “What Learnt Response”, which encourages students to think about the lessons learned.
- a “Similar Response”, which calls for students similar experiences.



Story-telling is one of the constructive tool which can be used in science teaching, there are various other ways in which we can make our lessons interesting and effective. We just need to challenge our thinking and push ourselves a bit more beyond the envelope to make an impact.

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