Constructivism 25 Years On: Its contribution, missed opportunities?

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In 2003 I published a book with a colleague on constructivism.

After 2 years, I now go back to constructivism with a different view:

- to recognise what its contributions have really been;
- to be critical of the same educational theory that I have myself advocated for so long;
- to explore the potential path forward following constructivism.

What am I going to do today?

In this presentation I will try and do the following:

- **trace the developments/shifts in science teaching;**
- **Identify the contribution of constructivism;**
- **highlight criticism of the theory;**
- **provide some defence;**
- **explore wider boundaries – how can constructivism grow?**

  Or is it to die a natural death…

Science Education these 25 years has seen a shift of focus:

This shift has been in two directions:

- **From teacher-centred to child centred;**
- **From a passive view of learning to one which considers the learner as the active participant.**

Historically science educational practice has changed:

Transmission approach

(traditional approach)

- It views learning as the simple transfer of knowledge;
- The teacher is the knowledgeable while the student is the less knowledgeable;
- The learner is passive, while the teacher is active.

Discovery approach (Nuffield Science)

This resulted in response to the poor quality of results with the traditional approach.

In Nuffield Science, students were given material and they were allowed to ‘discover’ things for themselves.

This was criticised by Driver as students either focused on wrong aspects or else resorted to trying to guess what they were supposed to learn.

Constructivism followed.

This occurred mainly on recognition that students come to science classrooms already with ideas (alternative frameworks) and that these ideas are often different from the correct scientific ideas.

It endorsed a child-centred approach and recognised the learning process as the active construction of knowledge.

What is constructivism?

Constructivism states that learning occurs through the active construction of knowledge by the learner.

It states that the learner must be cognitively active in the process of learning.

What are the contributions of Constructivism?

1. **Recognition of students' alternative ideas in science.**

As a theory it recognises that learning depends on prior knowledge and that students will construct new knowledge in the light of how it relates to the already existent knowledge.

2. It has provided insight into the learning process, providing a theoretical basis on which to develop teaching schemes:

- cognitive conflict where there is difference between what the learner predicts and the actual outcome of an experiment, or difference in ideas among students;
- Scaffolding where the teacher acts as facilitator of learning and provides support which s/he removes as student learns;
- Metacognition: where the student is aware of his/her own learning patterns/processes and can identify what process to use during learning.

3. **It helped to change the way we view scientific knowledge:**

Positivistic view of science was discarded.

Scientists construct scientific knowledge like learners do.

Scientific knowledge thus becomes what the community of scientists agree on.

4. Changed the role of language for learning science:

Language is not only the means by which to transmit knowledge but also as the vehicle for the construction of knowledge.

It has thus brought in to the science classroom, language activities such as group-work, presentations, reading and writing.

5. It has changed the role of practical work

In constructivism practical work is not to just illustrate concepts and processes described. Nor is it just to teach the process aspect of science.

Practical experiments have become the heart of the learning process as they provoke the active construction of knowledge.

Criticisms of Constructivism

Unfortunately one has to admit that constructivism is an overused word.

There are too many different types of constructivism.

This makes the theory either too vague with too many different versions, or else too wide a theory that practically.

In fact it has been criticised as not being much of a theory.

However my criticism comes from a different perspective:

Constructivism does not deal with the learning situation holistically.

Whereas it takes the psychological point of view in consideration, it totally disregards the sociological aspect of learning.

Constructivism takes into consideration the alternative frameworks that students bring with them to the classroom.

However, it is not sensitive to other constructions that students being with them as themselves as learners.

Aspects like motivation, self-concept, perceived priorities to young persons etc. influence the individual's will and potential to learn.

The sociological aspect of the learning situation is not given the importance it should have.

A word in defence of constructivism

Constructivism's failure to improve the learning of science may not be due to its limitations:

Constructivism was never given the chance to be fully adopted in schools:

- **syllabi in schools remain those that can be implemented with a transmission view of learning, theory laden and long.**

Constructivist teaching is time consuming and thus it is not possible to cover all the content material prescribed in most science syllabi.

A similar argument can be put forward with respect to assessment in schools.

Formative assessment is still predominant in many schools across the world.

Examinations promote the accumulation of knowledge rather than the actual understanding of knowledge.

Both learners and teachers may thus believe that the transmission view and rote learning are better and more fruitful strategies over constructivism.

Constructivism poses great demand on teachers:

Teachers need to prepare more, in a shorter time and in a more innovative way. This places greater demands on teachers.

Teachers may not have the necessary training.

Teachers may find it too demanding to adopt constructivism throughout the whole year.

Should constructivism die a natural death?

It has definitely been left a little stranded by science educators.

Changes in scientific research, particularly on issues like cloning, genetically modified foods and other ground breaking areas have made science educators focus on other things.

The focus on attitudes and values of science need not necessary make constructivism obsolete.

Constructivism may be that same vehicle that helps educators understand the process of learning attitudes and values in the same way as that of understanding concepts.

There is still a possibility of survival in the future.

A NEW PROPOSED MODEL

Learning depends on two aspects:

First there needs to be

Sociological readiness.

Then there needs to

Be psychological

readiness

This would result in

the construction of knowledge: Learning

With these thoughts now I turn to you for questions

Thank you