

Seed-germination teaching and learning theory net-distribution tissue methods

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Abstract

Based on an analysis of updated teaching and learning theories, this paper proposes some new ideas including a new learning theory, a new teaching theory, a new view of the relationship between a teacher and a learner, and a new concept of the required standard of a good teacher.

Introduction

As we look back at the process of the development of human civilization, we can see that theories of teaching and learning have enjoyed quite a long history. Many theories have been proposed to meet the needs of teaching and learning, for instance, constructivism, behaviourism, information process theory, student-centred teaching, problem-based learning, case study, Gardener's theory of multiple intelligences, etc.

Unfortunately, these theories all have their weaknesses, consequently, no single one of these is suitable for use in all cases of teaching and learning. Hence, this paper attempts to extend and combine these theories, and proposes some new theories. In this paper, five issues are highlighted: learning theory; teaching theory; relationship between a teacher and a learner; current approaches to teaching and learning; and new methods of teaching and learning.

A new learning theory: seed-germinatism

There are many updated learning theories which are demonstrated and their weaknesses are identified as follows:

Transmissionism

This sees the learner as an empty container, which is ready to be filled up. Hence, what a learner needs to do is just listen and read and the learning process is very passive.

Behaviourism

This emphasises that only the outer behaviour of a learner is the proper subject of study, because a learner's internal thought process cannot be observed directly. Therefore, a teacher should focus on the learner's outer behaviour, (their demonstrated behaviour) the learner's correct response is rewarded, and wrong response is punished. This theory is of value only in some aspects such as computer aided instruction.

Information processing theory

This theory borrows some concepts from computer theory in order to describe the process of learning. Within this perspective, the process of learning should be as follows: when a learner learns new knowledge, he first encodes the new information; translates it into another form; and then relates it to the knowledge existing in the learner's memory so as to store the new information in his memory. When the information is needed, the learner can retrieve it. This theory also states that the learning process is influenced by personal beliefs. As we have seen, this theory is realistic, but it is also simplistic because it does not address which factors influence the learning process most and it does not consider the development of a learner's ability.

Constructivism

This claims that the learning process is an active one, and knowledge is gained through a process of active construction. It also says that procedural knowledge can be formed step by step, and new knowledge should build on existing ideas in memory and linked into structures. In other words, they can be organised into a

schema. Another aspect of this theory is that the role of a teacher lies in coaching and stimulating a learner. As we know, this theory is of value, and it has many branches, such as social constructivism, radical constructivism and so on. Nevertheless, this theory has also its weaknesses, we have seen there are many criticisms of this theory. In my opinion the process of learning is not necessarily always active, and a learner can learn passively. For instance, a learner can learn English by only listening whilst he is washing or cooking or even through dreaming. And the schema should include more information than knowledge. Again the process of learning is not necessarily step by step, sometimes we do not know which step is followed by another step. In a word, updated learning theories have their weaknesses, we must develop a new theory to define the whole process of learning.

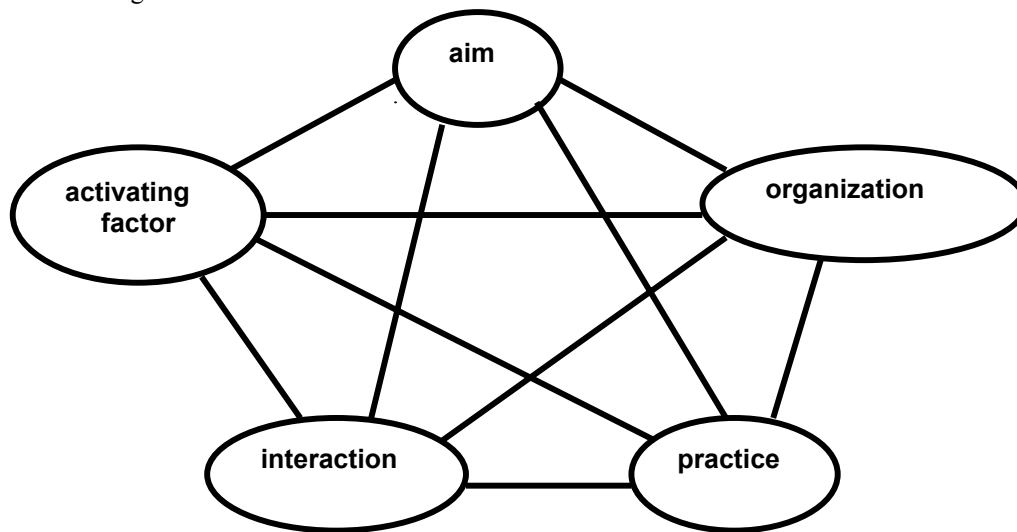


Figure 1. Interactions in the learning process

The cell tissue consists of many factors and these factors are linked to each other, forming into a net-distribution, so it is more complex than the idea of a schema espoused within constructivism. The tissue contains the schema and develops the schema into a fuller form. So it extends the concept of the schema of constructivism. Also the process of learning can start off at any point in the tissue. A learner can study from doing some practical work, from an interesting problem, or through interaction with other learners. Moreover, the process of learning is not necessarily step by step, just as when a seed is developing, we cannot distinguish which part will develop first. Different parts can germinate at the same time, so the author emphasises that the process of learning is the development of knowledge, interest, ability, and so on. The process is a mixture of these.

In a word, the learning process is described as follows: first the activation of the cell tissue existing in memory; then based on the old tissue, the learning of new knowledge with the learner's aim, interest and so on. Next, the learner needs practice in order to form a new tissue. Finally, the new tissue must link to the old tissue so as to develop a tissue net.

Seed-germinatism

In this part, a new learning theory is proposed.

When a student is in the process of learning, he can be viewed as a seed, and the learning process is defined as the germination of the seed, or the development and growth of the seed. Before the learner enters the classroom, he has his existing information, including his aim, motivating factor, organisation, practice, and interaction. This paper argues that a learner will bring not only his knowledge but also his interest, ability, and his pre-existing links between different aspects of knowledge. Furthermore, the old (pre-existing) information can be thought of as 'cell tissue' as illustrated below:

Seed-germination teaching and learning theory

We first focus on updated teaching theories:

Transfer theory

This posits that the process of teaching is just transferring knowledge from one container to another, from the teacher to the learner.

Shaping theory

This argues that the process of teaching is just shaping the learner to a predetermined pattern. It sees the learner as a product made in the production line of a factory.

Growing theory

This suggests that the process of teaching is just the development of intelligence and emotion in a learner. So we can see this theory is justified, but it is simplistic.

Also we know that current teaching strategies around the world include: case study; problem-based teaching; student-centred teaching; teacher-centred teaching; and so on.

These teaching strategies are not suitable for teaching individually. There is a demand for a new suitable teaching theory. Based on the above learning theory, seed-germinatism, this paper proposes a new facet to the relationship between teacher and learner, and then proposes a new teaching theory.

A new facet to the relationship between teacher and learner: ‘No-centred teaching’

We say a teaching process is student-centred or teacher-centred based on two considerations. The first is a theoretical consideration. We usually think if a teacher is active, then we name the teaching as teacher-centred. The second is from the number of activities in a classroom, if a learner is given more activities, then the teaching is labeled as student-centred. Actually it is difficult to distinguish

whether the teacher or the student is more active. Therefore, the author suggests that a teaching process can be ‘No-centred’. In the author’s point of view, a learner is just like a seed, and the teacher is just like a laboratory technician who is responsible for germinating the seed. The seed has its tissue and it can germinate through activation or by itself. The teacher should go back to grass roots, go between the learners, establish a friendly relationship with the learners, and create a good climate in the classroom. So, the teacher’s role is to guide, help, monitor and push. That is, guide the learner to go on the right lines, help the learner to learn deeply, monitor the learner to know how good he is learning and push the learner to adopt deep learning approaches.

A Cycle of SGTL can be illustrated as follows:

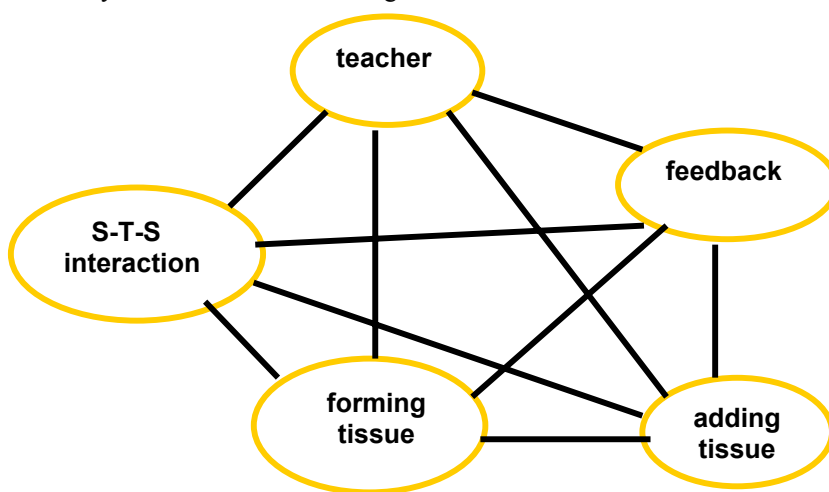


Figure 2. Cycle of seed-germination teaching and learning theory

A teacher needs to structure his teaching to make his teaching clear. And then through the interaction between students and students or students and teacher, the learner can grasp the new information, forming a new tissue which will exist in his memory. By linking this to old tissues, a tissue net is formed. During these processes, the teacher needs to pay much attention to feedback from the learner so as to know how deeply the learners have been learning.

Current teaching and learning approach in lectures around the world

We first focus on current learning approaches. There are two kinds of learning approaches.

The first is surface approach

The learners view the learning as remembering facts and definitions. They treat the course as bits of knowledge. What are they doing in learning? They copy down, but do not understand, and go through worked examples and try them again to see where the answers come from. They aim to reproduce in tests. Hence, the effectiveness is very weak. The learners can not see the wood for the trees, they are used to being spoon-fed, they feel awful because they have a great deal to cover.

The surface approach will lead to low retention, and the misconceptions are very widely shared.

The second learning approaches is deep approaches

The learners view the learning as finding what exists behind the problem, and they treat the course as related knowledge. What are they doing in learning? They ask questions all the time, they try to find different methods to get to the same point, and they relate evidence to conclusion, they also try to go beyond the knowledge to a deeper understanding. Therefore, the deep approach is related to higher quality learning outcomes, the content is more likely to be remembered for in the long term, and the satisfaction from learning is very widely shared.

How about the current teaching approaches?

Teachers view teaching as covering the syllabus and covering the knowledge base that students need to learn. Students’ success is defined as accurately remembering this knowledge base and reproducing it in assessment. What do they do in teaching? They try to structure the knowledge, make it clear, lead students to practice, help students to review and guide students to pass the final examination. This traditional model of teaching is no longer as effective in providing students with deep understanding and in meeting students’ needs of ongoing learning or lifelong

learning. The standard of a good teacher must be changed thus: a good teacher must not only make himself clear but also make his students clear, not only increase students' knowledge but also develop students' emotions to push them into a good personal approach, maintain their ongoing interest in science, and to acquire lifelong learning skills.

Net-distribution tissue methods

Based on the new learning and teaching theory proposed in this paper, how these theories need to be applied to the classroom will now be discussed. As we have seen, the process of teaching and learning should include five factors (Figure 1).

Aim

The process of teaching and learning must focus on students' original aims, their ambitions, their hopes for meeting friends, their hopes for success, their demand for learning, and so on. Also the process of teaching and learning must consider the course aim. The course not only needs to develop students' knowledge bases but also their deep level approach to the course. It should also develop their self-study skills, reasoning skills, logic skills, ordered thinking skills, critical thinking skills, and so on. Hence, the teacher's aim lies in creating a good atmosphere, paying attention to individual students, ensuring a 'fair go' to every student, encouraging student's disagreement and independent thinking, highlighting the main concepts, helping students to see the big picture of the course and to push students to form their own new tissue.

Activating factors

The process of teaching and learning must focus on activating students' interest because we all know that lack of interest is a real problem for a learner. A teacher can use a storyline, use a surprising or unusual fact, a significant contribution of a scientist in this course, and so on, to keep students' ongoing interest. Also the process of teaching and learning must encourage students to face failure with confidence. What's more, we must admit that no one wants to do something if he thinks it is worthless or he thinks he cannot succeed in doing this thing. So the process of teaching and learning should let students see the value of their learning and their chance of success.

Interaction

The first thing a teacher needs to do maybe is an entry survey. The process of teaching and learning needs to know students' backgrounds, their knowledge, their interest, their ability, in a word, their tissue.

Teachers must determine effective teaching strategies based on their tissue. Also the process of teaching and learning should focus on course interaction and out of course interaction, we must attend to students' feedback so as to know how well students are learning and what are their weaknesses. Again, by end-of-semester assessment, the teacher is able to know further the advantages and disadvantages and effectiveness of his teaching.

Organisation

Teachers must first organise their teaching materials, structure their lectures, make themselves very clear in order to push their students to an in-depth understanding. They can group students into small working groups in order to provide opportunities for discussion. They can select some students, let them preview, and present in the next class.

Practice

Without practice, students' learning cannot be deep. In the process of teaching and learning, we can use real world questions or virtual questions to give students a realistic background. Also we can give students' ability training such as changing conditions, research inverse questions, links between numbers and graphs and simplify the questions. Furthermore, the students can be introduced to the recent developments in this field and related questions in other disciplines. Through practice, students can go further and maintain ongoing interest in this field.

Conclusion

Although the author has proposed some new theories, it is clear that we have a long way to go. This is because these theories themselves need deep consideration. But we need to try. We must try because we all hope to help students to the maximum. We know what works. What we now need to do is to move from analysis to action.

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