

## Teaching Science and Technology

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### Abstract

### Review Article

In recent years, with the evolution in technology, telecommunication with high-speed Internet transmission, and the new era of smartphone. This evolution changes everything, our work environment to the way we do thing. It also makes changes and enhances in education, how we learn and teach. To be effective use of this new technology, we need to adjust our teaching skills especially in the field of science and technology.

**Keywords:** Learning, teaching, science, technology, education, telecommunication, Internet, distance learning, research.

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## INTRODUCTION

Education is defined as the process of facilitating of learning, or to obtain knowledge, understanding of values, beliefs, habits and skills. Educational methods mean everything from storytelling, discussion, teaching, training to conduct research. Frequently, education takes place under the teaching, guidance of a teacher but there are learners who can learn, educated themselves. The methodology of teaching is called pedagogy [1].

Teaching has been regarded as a noble profession in our society and education is an admirable thing from the old time. Teachers need to understand the subject being taught well enough in order to transmit the understanding of his knowledge to the next generation of students. Because of the important of education, many educators, researchers have tried to find the meaning of education and to find a better way for teaching and learning.

### Teaching and learning

#### Teaching

Depending on the subject of teaching, we can select an appropriate, most suitable teaching technique. Post-secondary teaching requires teachers to engage, creative and to understand students' needs (Fogg, 2007). According to Biggs and Tang in 2007, there are three theories or levels of teaching that could be used as roadmaps for effective teaching.

- Level 1. This level focus on what the student is that means his or her performance in class. Teachers in

this level see the learning process as their students' responsibility, knowing the lessons well and answering the question clearly. It is up to individual to attend lectures, to take notes and to do homework.

Level 1 is viewed as classic or traditional university teaching and is worldwide accepted. It is a one-way delivery, the teacher is the knowledgeable who transmit his knowledge, his expertise and students are the one who absorbs, receives the information from the teacher.

- Level 2. It focuses on what teachers do. The responsibility is rested on teacher ability to transmit information, his knowledge to students. Learning is now considered a function of what the teacher does rather than what type of students who sit in the classroom. Teachers in this level are usually have experiences, teaching skills. The teaching in this level is regarded as teacher centered and delivering materials required more than just a blackboard and speaking.
- Level 3. This level focuses on students' performance and its relationship with teaching. It is a model of student centered and teaching supports learning to achieve the desired outcomes. This brings a broader view of teaching, not limited with facts, concepts but also included the answer to question "What kind of teaching, learning activities required to accomplish the intended outcomes?".

#### Learning

According to Biggs, learning could be classified into two different approaches:

### Surface approach

The surface approach is a situation when a learner tries to get a task done with less effort. One just tries to get “it” out of the way because it is one of the course requirements, example in this approach is rote learning, study only selected materials and memorize them instead of understanding the materials.

### Deep approach

Learners select this approach will try to accomplish a task seriously and appropriately. In academic, students who choose the deep approach feel the need to work hard on homework, to master the subject in order to get a good grade. This group of students has positive feeling, interest in learning [2].

Oscar Wilde once stated “Education is an admirable thing, but it is well to remember from time to time that nothing that is worth learning can be taught.”

Traditional education focuses on teaching not learning. This is a misconception to assume that students learn everything from the teacher. In reality, most of what is taught in classroom is forgotten and most of what is remembered is irrelevant [3].

### Teaching scientific fields

Following Piggs three levels of teaching, level 2 would be the best fit for teaching scientific disciplines such as mathematics, physics, engineering or computer science. Teaching these fields requires the classroom to be designed for one-way delivery of instructions and the teacher is the knowledgeable expert, the one at the center of the stage who transmit information, concepts and understandings to students [4].

In mathematics, engineering, and physics, students learn theorems then use them to solve problems that require a high degree of precision and a logical algorithm. Computer programming languages such as Java, C# (pronounce C-Sharp) also require the correct syntactic that a computer can understand. A computer program is also required program’s statements to be written in a logical, reasonable manner.

These special characteristics in mathematics, engineering, physics and computer science above require attending lectures, taking notes, and do homework and these requirements make the students different. The teacher in this case is the central resource, as one teacher said “Every lecture, I show students how to work on problems, solve the whole problems with predefined steps in logical sequence”.

If this teaching routine is classified as level 1 teaching which focuses on the different between students and it could create a boring classroom as many new teachers encountered. We are living in a fast-changing world with the advancing of technology. Computer-base technology changes the way we live, the

way we work, entertaining, and ofcause it has a strong effect in teaching and learning.

To move from level 1 (student focused) to level 2 teaching (teacher focused), we need to integrate multimedia technology into classroom. “A picture worth a thousand words”, presentation software such as power-point slides make teaching becomes more interesting. Internet is also a valuable resource for both teaching and learning environment. A teacher can search for additional information on a specific topic so he can provide adequate answer to his students, on the other hand, the students also can find information to supplement their learning. However, computer technology alone is not enough; teaching is an art that requires a broad knowledge in the teaching field, interpersonal communication so a teacher can transmit his knowledge, experiences and information to students.

### Multimedia in the classroom



Multimedia is defined as using more than one medium of expression or communication. It is a combination of various types of digital media such as text, images, sound and video, into an integrated application (presentation software) to transmit information to the audience (students). Multimedia can stimulate more than one sense at a time that can cause students “more attention-getting and attention-holding”.

Using multimedia in the classroom, teacher can provide students with valuable learning opportunities. It’s obvious, a picture is easier to remember than reading a paragraph, an animated video is more interesting, entertaining than a lecture, and a video demonstration by a scientist gives more real time knowledge than a simple theoretical explanation. No question, educators consider multimedia is a great tool for students to learn or to improve learning. The following is a list of benefits from using multimedia:

- Personalized learning using multimedia resources. Different learners have different learning styles. Educators use YouTube to provide visual learners with online videos, podcasts for auditory learners, and video games for interactive learners. Multimedia resources make learning easier and comfortable for different leaning styles. Unlike

traditional teaching and learning, the teacher is at the center of the classroom and he delivers long lecture at the same space that could make some students feel boring, even tortured.

- Group learning. Blogs, social networks and wikis enable students working together. They can share their works, give feedbacks on other's works, and discuss about their projects.
- Improving presentation skills. Giving students a various choice of software and tools to present their work in an effective approach. This is also another way for students to improve their creative, critical thinking, and reflective thoughts [5].

### Enhance teaching effectiveness

In teaching, teachers have time to develop a formal teaching plan that makes the job easier. In some situations, teaching becomes interesting when students are ready to learn but in some other cases, a teacher might sit alone in office asking him/herself "to teach or not to teach". The following are some principles that will enhance teaching skills.

- Seize the moment. Make every effort to answer question when students ask. The students are ready to learn, the answer satisfies their immediate need.
- Let students involved in planning. Get students involved in identifying their needs and outcomes. Giving students the chance to test his/her ideas, to be creative will promote learning attitude.
- Begin with what the students know. It proves that learning is faster when subject is built on what students already know.
- Start with simple. Start with simple concepts make students feel more comfortable, easier to absorb the subject then move to more complex ones.
- Accommodate student's learning style. How well, how quick a student can learn depends on his/her intelligence, education background, and also on the student's learning style.
- Make teaching material meaningful. Using general knowledge and real-world experience would benefit students, easier for them to learn and make the lectures become more interesting.
- Tell students how they progress. Students are aware of their learning progress. Positive feedback can motivate them to a greater effort; it makes their goals achievable [6].

## CONCLUSION

Teaching profession is very important in molding young minds into useful, capable and responsible citizens of the future. The teacher's role may vary between cultures, academic subjects but in general, the objective of teaching is to facilitate student learning. No matter level of teaching selected, a good teacher must be able to deliver information, good judgment and wisdom to students. Studies in the United States suggest that the quality of teachers is the most important factor affecting student learning and the countries which score highly on international tests have policies to ensure teachers qualification. Many young people want to become successful teachers, but teaching is not a well-suited job for everyone. In fact, many new teachers leave within the first 3 – 5 years of teaching.

Besides classroom teaching, teachers also have "community expectations". Everyone has opinion of what a teacher should be doing. A modern teacher wears many hats; he acts as educator, coach, activity sponsor, nurse, career advisor, parent, and friend to everyone in the community [7].

As a profession, teaching has a very high level of stress (work related stress), especially for newly teachers. On the other hand, teaching is enjoyable and rewarded. I enjoy teaching, and I feel good to see my student success.

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