Towards a Better Education Process

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Abstract

"Much of our educational system is an elaborate game of guess what the teacher is thinking," lamented Roger von Oech in his book on creativity. Our style of teaching often kills creativity. It focuses on the mere transfer of knowledge. This is highly unacceptable, especially in the face of the rapid technological race. Data and technology can become obsolete in just a few years, and our students will be left with nothing more than empty graduation certificates. How then should we teach? In this paper, the author argues that instead of teaching mere data/knowledge, a lecturer should coach the students to master the most essential skills for life, i.e., the art of learning, and the art of thinking.

1. Introduction

Who discovered America? Can you write down the formula of the earth’s gravitation force? When did the war of Diponegoro take place in Java? Which one is correct, the sun moves around the earth, or the other way around? Observing the education process in Indonesia, it is sometimes hard to tell the difference between the education system and a television quiz show. In such a quiz, you memorize a huge amount of data in order to win a prize. In schools, students memorize a lot of data to win good grades. We cram a lot of facts into students’ head and reward them if they can throw back the exact same words in

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1 Parts of this paper are taken from the author’s paper [Mar 2005].
exams, regardless of whether they understand it or not. What is then the goal of education? Could it be, that we unintentionally just produce some sort of quiz winners with our education system?

This problem with our education system seems to encompass all levels of education. In the elementary schools (Sekolah Dasar) we hear about parents complaining that teachers sometimes would not acknowledge a right answer from children because they used another method to come to the answer as the one written in the teacher’s solution book. In the secondary education (Sekolah Menengah Pertama and Sekolah Menengah Atas), students learn the same way, only harder. They memorize more facts; take in more data almost without thinking. Even in the best few elite schools, things are not very different. Students are drilled with difficult calculus calculations, or more complex problems in physic or chemistry. However, very little time is given for in depth discussions of the conceptual and theoretical basis. As a result, even in the university, we end up with students, who are quick to do any calculation, but seldom understand the underlying principal in science and lack the creativity to be involved in a real scientific pursuit.

Reforming our education system is a monstrous job, especially at the university level. Years of education process, which only concentrates on transferring data/knowledge, have produced students (and even educators) who lack the basic skills of independent learning. The goal of this paper is to arouse the awareness of this issue and point the direction for a better education process, especially in the context of the academic activities in Universitas Pelita Harapan (UPH). The following section draws a picture of our general educational system. Section 3 proposes an overview of the ideal education process and discusses some practical considerations. Section 4 provides some conclusions.

2. Our Present Education Process

How else can we teach, except through lectures and didactic instructions? If this statement reflects our view towards education process, check out the following example of school children's activity in Finland:

The intermediate school’s children (comparable to the first class in Sekolah Menengah Pertama in Indonesia) sit in groups and discuss their task. The topic “space” is on the schedule. The children search for aspects of the topic, which they should work on independently.

A team set up a travel agency, which offers a “Honeymoon on Venus” trip. Distances, trip possibilities, rocket systems and life conditions on other planets are debated. Another group puzzles around
extraterrestrial life, UFOs, possible communication alternatives with aliens.

The teachers in Finland call this lesson-model a “Comprehensive Lesson”, in which school children largely work independently and combine the content of classical subjects such as geography, chemistry, mathematics, and languages. In German schools, this would be called a project-lesson. Here (in Germany), it is only an exception, however in the north (Finland) it is the usual thing. [Ert 2002]

This excerpt from the Spiegel Special edition shows a fresh alternative in designing the lessons in school. Triggered by the result of the OECD-PISA studies (Programme for International Student Assessment), which indicated that German school children show considerable poorer performance in reading, mathematics and natural sciences, Manfred Ertel analyzed the school-life in Finland, attempting to put some sense into the high performance displayed by the Finnish children. Another writer in the same magazine argued, “Nicht wer die Welt am besten erklärt, verändert die Welt, sondern nur, wer neue Fragen stellt” [Not the one who can best explain the world, changes the world, but only the one who asks new questions] [Dar 2002]. So what should we really teach our children in schools? Is education only a process of transferring some scientific facts, or is there something more to it?

2.1 Learning Instead of Googling

If the main goal of our education system is just to transfer some facts into the children’s head, than Google\(^3\) can do it better than any school. And the most logical and efficient way to transfer data into children’s head is to provide an access to Google under the fingertips of all our children. However, the author is convinced, that education is not about turning our children into a bunch of googling kids, but about teaching them how to think and for the children to learn how to learn.

What does it mean? How can we teach the art of thinking and learning? Let us take one simple example. There is one simple scientific fact, which is widely known by any elementary school boy, that the earth moves around the sun. Some children even know that Copernicus and Galileo were the main scientists who made us realize this fact. However, it is difficult to find a schoolteacher who can really explain how Copernicus arrived at the conclusion that the earth really moves around the sun and not the other way around.

\(^3\) Google is the most popular search engine in Internet at this time.
Copernicus developed the heliocentric theory out of his observations on the motion of the celestial bodies. His theory can better explain the movement and positions of the sun throughout the year than the older geocentric theory. However, it turned out that Copernicus was never really convinced to publish his work. Only because of the pressure of his disciple Joachim Rethicus (a mathematician at Wittenberg, Germany) Copernicus finally delivered the book to Rheticus to be printed in Nuremberg [Wiki Cope].

Teaching the fact and the name of the scientist is one thing. But explaining and engaging children in a discussion to really understand the scientific principal is something that shows the difference between Google and an education process. By teaching the process of thinking through a problem and not just memorizing facts, we prepare our children to face challenges in life and a journey of life-long-learning. The facts can be looked up anytime in Google. But the ability to learn and think should be taught in schools.

The same teaching/learning process can also be done in a social-science subject. We can look at another example. Most of the school children in Indonesia have to memorize the year in which the war of Diponegoro took place in Java. Again, this kind of data can be looked up quickly in Google. However, a fruitful teaching session will include a discussion of what really triggered Diponegoro to go out and fight the Dutch colonials. Furthermore, children can be invited to discuss what really makes up a hero. Is the motive for a war important? How could a hero look like in our contemporary life?

It turned out that the immediate cause of the Diponegoro’s revolt in 1825 was the Dutch decision to build a road across a piece of his property that contained a sacred tomb. Diponegoro and his followers probably did not want to restore an idealized, pre-colonial past. Nor did they envision an independent, modern nation. Rather they sought a Javanese heartland free of Dutch rule [Http Coun].

By engaging in such a learning process, children will experience the reality of learning from historical or scientific facts, which goes beyond just memorizing data. This learning process can be extended to any thinkable subject. Instead of only stating the relativity theory and do some calculations in relativity physics, children can be asked to do an essay on: How Einstein came up with the relativity theory. Why Einstein thought differently? The concept of energy, mass and the speed of light were already widely known in Einstein’s time. Why did people not see the relation $E=mc^2$ directly. Or children can learn about types of governments of a nation. Instead of just memorizing a
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number of existing governmental types in the world, children can be challenged
to describe the best system. They can be triggered to think, whether the
democracy in Indonesia is a real
democracy. They can be invited to discuss
the conditions to keep a real democracy running.

The difference between an education and
a mere googling activity lies in the
emphasis on things that children should
learn. If we demand that children just
know a lot of facts, than there is no way
a child can beat Google. However if we
insist that children do not only know the
data, but can think critically through it,
then we are teaching the very thing that
Google can not do. This way, we prepare
children for life, and that should be the
emphasis of an education system.

Ng Aik Kwang pointed out the weakness
of an education system, which focuses on
just knowing facts [Kwa 2005]. In his book
he said, that Asian students are diligent
and hardworking, and excel at
international mathematics and science
competitions. We would expect, he
argued, to find many Asians making
waves in different fields in their years of
maturity, for example winning the Nobel
Prize. However, when we check the list of
Nobel laureates, we find that most of
them hail from the West rather than the
East. Of the handful of Asians who have
won the Nobel Prize, six of them are
ethnic Chinese. These Chinese laureates
share a common experience: they have
lived, worked and studied in the West
before they won the Nobel Prize.

In his book, Kwang argued that there is
something inherent in the Asian culture
that hinders the cultivation of creativity
in students. However, the point to be
noted here is, that the emphasis on
knowing facts may cause our children to
win some international science
competitions, but not necessarily produce
brilliant scientists to cope with real
scientific research challenges. Quoting an
educator who has been teaching in the
East and West, Kwang wrote, “In the
West, most university students have
strong opinions, and these opinions may
or may not be based on knowledge. In
Asia, the students are mostly very
knowledgeable, but few have opinions on
issues.”

By treating schools and universities as a
place of thinking and learning instead of
a mere data transmission, we create an
environment, which accommodates the
generation of knowledge. Imagine what
could happen, if our students are skillful
learners, thinkers and creators. Our
universities could be the real place in
which new science and new knowledge are
being produced.

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2.2 Inspiring Thinking, Learning and Creativity

If the goal of education is in fact to teach the art of thinking and learning, then the whole way we look at the education process should be changed. A lesson in class is then not a process of data transmission, it is rather a process of learning how to think and analyze the data. Sadly enough, most parts of our present education system are still geared only to achieve the data transmission.

Students who ask a lot of critical questions often irritate teachers. If this happens, teachers often do not have the answers themselves. Textbooks and teaching materials are optimized to teach as many facts as possible, instead of supporting the critical thinking process. Even the exams are designed to test the knowledge of facts rather than the ability to analyze facts. Students are rewarded for knowing the data, but can get away easily if they do not understand them.

It is apparent, after realizing the goals of education that teachers need to embrace new paradigms in teaching. Teachers should see themselves not as mere data sources (It is needles to say, that even teachers can not beat Google in collecting data). They should not act like they know everything there is to know about a topic or a subject. Instead, they can see themselves as learning companions, guiding students on the road towards enlightenment and understanding, realizing in every turns of the road that it is not their goal to choke students with facts, but to enable them to learn and think independently.

Ng Aik Kwang proposed several roles that can be adopted in teaching [Kwa 2005]. A teacher can adopt the role of an involved coach who is concerned with developing the talents and abilities of the players. Or she can adopt the role of an experienced travel guide who seeks to instill the love of learning in her students. Or he can adopt the role of an enlightened sage who does not rely on a hard and punitive approach to accomplish his objectives. Or she can adopt the role of a mind-mesmerizer who mesmerizes the students with creative puzzles, inviting them to enter into the flow of learning. None of these roles assumes an infallible and all knowing teacher. In fact, an all knowing and authoritarian teacher would only stifle the learning spirit and creativity of students.

A class full of learning and thinking students could be rather chaotic. Students asking penetrating questions, refusing to swallow old clichés easily, in order to make the piece of knowledge becomes their own knowledge. Debates, discussions, lack of rigid rules, could quickly overwhelm a traditional teacher, who cannot appreciate the learning dynamic. A new breed of
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A teacher is needed, who can skillfully handle this learning dynamic and even enjoy learning from their students throughout the education process. Preparing teachers for this change of paradigm in education might be an important key element in transforming the education system in Indonesia.

Beside the teaching attitude, there is also a need to rethink the way we punish and reward the performance of students. Reward and punishment should be gauged to support the thinking and learning ability instead of a mere knowledge of data. Furthermore, the grading system should leave enough room for students to learn to appreciate failure. If students learn in school to avoid every possible failure, this could hinder them to become a good scientist. A scientist faces tremendous possibility of failure, if he is researching the state-of-the-art problems in his field. If he is standing out front in his research, if nobody has done or investigated the same thing before, then there is a huge possibility that the next thing he tries will fail. But like it or not, that is the only way to develop new frontiers of knowledge. How can students appreciate failure as a necessary ingredient of progress, if they are always punished for every failure they did. It is interesting to note, that the school system in Finland does not take a grading system as compulsory until the seventh class (comparable to the first class in SMP) [Ert 2002]. Thus no one has to repeat classes.

The challenge of reforming our education system thus includes not only the redefinition of the education’s goal, but also the training of teachers and the modification of the grading system and teaching materials accordingly.

3. The Better Way

The previous section emphasized the skill of learning as the most essential element that should be taught through the education process. This is clearly stated by the philosopher Mortimer Adler. In [Adl 1982] he wrote:

“Schooling, basic or advanced, that does not prepare the individual for further learning has failed, no matter what else it succeeds in doing....It must prepare young people for the continuation of learning in adult life, during their working years and beyond. How? By imparting to them the skills of learning and giving them the stimulation that will motivate them to keep their minds actively engaged in learning. Schooling should open the doors to the world of learning and provide the guidelines for exploring it.”

But how does this look like in real life? Adler identified three teaching/learning modes, which reflects increasing level of teaching/learning activities [Adl 1982].
The first teaching mode is our regular method through didactic instruction, lectures and responses. These activities should deliver the basic facts of the subject being taught. The second mode does not teach the subjects per se, instead it aims to deliver the skills of: reading, writing, speaking, listening, calculating, problem-solving, observing, measuring, estimating, and exercising critical judgment. The third teaching mode, which is the highest and the most difficult to achieve, should enable students to be involved in the creation of new knowledge or new works of art.

The lack of the second and the third mode of teaching/learning activities in our educational system are easy to spot. Students lack the skill of reading and writing. Note that the ability to read properly should not be confused with the ability to recognize the alphabets. The highest art of reading is expressed in the ability to do the so called syntopical reading, which is the act of learning, comparing and evaluating ideas through the reading of several books on a particular topic. Among our students, it is even hard enough to motivate them to read only one textbook to master a subject. Furthermore, the lack of writing skill is apparent not only among students, but also among the educators who write reluctantly themselves. Not having the basic ability to read and to write (not to mention the critical thinking ability), it is impossible to expect the students to reach maturity to do real research and to create (the third mode of teaching/learning).

In short, the ideal education process should include the above three teaching/learning modes. However, our present educational system is stuck only at the first mode. Our goal is to move towards a more comprehensive educational system.

3.1 Practical Considerations

Teaching in the second mode requires a different approach as the first mode. The second mode, which is a process of imparting skills, cannot be taught only through instructions or lectures. It would be like to teach someone to dance by lecturing him. Teaching in the second mode is analog to coaching. Adler expressed this as follows:

“Since what is learned here is skill in performance, not knowledge of facts and formulas, the mode of teaching cannot be didactic. It cannot consist in the teacher telling, demonstrating, or lecturing. Instead it must be akin to the coaching that is done to impart athletic skills. A coach does not teach simply by telling or giving the learner a rulebook to follow. A coach trains by helping the learner to do, to go through the right motions, and to organize a sequence of
acts in a correct fashion. He corrects faulty performance again and again and insists on repetition of the performance until it achieves a measure of perfection. Only in this way can skill in reading, writing, speaking, and listening be acquired. Only in this way can a similar measure of skill be acquired in mathematical and scientific operations. Only in this way can the ability to think critically - to judge and to discriminate - be developed. When coaching is not adequately undertaken, little can be expected in the development of the basic skills.

Coaching involves a different teacher-pupil relationship and a different pupil-teacher ratio than does instruction by telling and by the use of textbooks [Adl 1982].

The third mode of teaching requires yet another approach. It must be the Socratic mode of teaching, a mode of teaching called “maieutic” because it helps the student bring ideas to birth. It is teaching by asking questions, by leading discussions, by helping students to raise their minds up from a state of understanding or appreciating less to a state of understanding or appreciating more.

Without coaching, learners will lack the skills needed for the study of the basic subject matters. Without discussion, they may be memorizing machines, able to pass quizzes or examinations. But probe their minds and you will find that what they know by memory, they do not understand [Adl 1982].

Adler himself considers the second teaching mode as the backbone of basic schooling. Because the skills learned by this teaching mode is indispensable to the efficient teaching and learning in the first mode and the third mode. Unfortunately, our basic schooling (SD - SMU) does not equip students with these skills. This forces us to do remedial measures at the university level.

Another dilemma for the design of academic activities is the difference of skills and initial knowledge of students. If the material is designed according to the more skillful students, the other students with less skill or initial knowledge will be frustrated. On the other hand, adapting the material to the students with less skill, the more skillful students will get bored quickly. This dilemma is more apparent if we concentrate only on the first teaching mode (teaching only through lecture). It is the author’s believe, that by performing the whole spectrum of educational process (the three modes of teaching), we will free the more skillful students to soar in their learning journey without limit, and at the same time, help the less skillful students to improve their skill individually.
4. Conclusions

The educational process is the heartbeat of university's life. Unfortunately, our educational process is often only taken as a means to transfer data/knowledge, and not a process where students learn the art of learning and thinking. To move towards a better educational process, we have to embrace the whole spectrum of educational aspects. This is achieved not only through lectures, but also through coaching and Socratic questioning that will ultimately lead to the creation of new knowledge and new works of art.

Such an educational process requires educators who are apt learners themselves. They do not need to be all-knowing teachers. Such an all-knowing authoritarian teachers often stifle the learning process. Instead, they have to be skillful learners themselves, enjoying the life-long learning journey as they teach their students.

One very interesting aspect in the context of educational process is the use of e-learning. It is easy to fall for the hype of e-learning. Electronic gadgets, shimmering screens, can be nothing more than fancy gimmicks, which do not add anything to the quality of education process. However, if used properly, electronic devices and systems, can be powerful tools for quality education.
5. References


