

Goal-oriented Teaching Method – The Way of Maintaining the Quality of Education for Both Online and F2F

Tongpil Min

*PonderEd Education, University Canada West
Canada*

Abstract

With COVID-19, many classes have been forced to move online or to a hybrid environment. This movement brings quality of education under question. Theoretically, this change should not affect the quality of education since all the teaching materials are the same. However, the differences between online and f2f are significant. In this paper, the questions of 'what makes the differences between online and f2f?' and 'how to overcome this discrepancy?' will be answered.

1. Introduction

In principle, education should not be affected by moving online as long as teaching materials can be delivered to students. However, the gaps between online and face to face (f2f) are significant [1], [2]. This indicates that quality of education depends on more than students, instructors and teaching materials. Considering the three factors stay the same, it must be the teaching methods that determine the quality of education. This might be true when the online teaching tools such as real time online meeting apps for synchronous teaching were not available. But COVID-19 has forced these tools to be developed and applied fast and now most of the classes could be as close as f2f. Even with these online tools, the quality is still an issue. This means that there is another factor(s) preventing gaps to be closed between online and f2f.

Education is for students' learning. So, students must hold the key to the answers. This brings all the issues back to one common factor that is motivation. If students are motivated, the quality of education should not be an issue as students will proactively become engaged.

2. The reason that online is less effective

To understand why students are not motivated, the teaching and learning processes have to be investigated from different angles. Let's consider a course for 'how to fish' as an example. If this course is held in a tackle shop, the motivation would not be an issue because the students are all interested.

However, if this is a course in postsecondary educational institutes, the story is different. Some students might be interested from the beginning and some are not. If this is f2f, instructors might be able to encourage students to engage during the class. In addition to instructors' encouragement, competition among students will motivate some students as well. However, if this is an online course where students' performance is not visible, instructors have to rely on students' own progress. Thus, without self-motivation, the students' performance will drop significantly for online classes.

3. Knowledge and skill-based teaching

Relying the outcomes of education on students' interests and motivation is a passive way of teaching. Students who are already motivated can learn with minimum support. With this passive approach, students might not be able to survive after graduation since they might have to deal with situations that they are not interested at all. This means that education has to provide students with ways to deal with some topics that are outside their interests. Basically, instructors should be able to motivate students regardless of their interests. The problem is that teaching knowledge and skills would not motivate students effectively.

With the example of the fishing course earlier, if teaching is focused on knowledge (where and when to fish, what types of gears to use etc.) and skills (how to fish), only students with interest will learn proactively. Some students would even say 'So, what is this learning good for? I won't be fishing after graduation.'

Knowledge and skills are only effective when they add value to students' futures and it should be the students who realize the value. In other words, not many students would be motivated enough to be proactive by teaching knowledge and skills. Knowledge and skills are commonly accepted teaching materials. The question is whether there is any other teaching approaches that would work to motivate students.

4. Background of goal-oriented teaching method

Knowledge and skills are something already known. Students could learn the knowledge and skills to fish and they could make a living with them. If the knowledge and skills are relatively new and not many people have them, then students have a better chance to win the race. However, considering the number of graduates each year around the world, there will be numerous students with similar knowledge and skills and this will make the competition severe. In order to survive in heavy competition, students have to develop new knowledge or skills. In this way, students don't simply share markets but create new markets.

For students to build skills to create new knowledge and skills, the teaching materials have to be changed and 'goal-oriented teaching method' developed to teach students to develop creative thinking. The development is based on 'thought process-based learning and teaching' [2], [3], [4].

The goal-oriented teaching is composed of three main steps: a. observation and description to build and connect concepts; b. reflection; c. setting a goal with reasoning. But unlike delivering knowledge and skills, it has to be the students who have to carry out each step. The instructors' role is to provide students resources (knowledge and skills for students to use) and guidance. In other words, knowledge and skills are used but they are not the main focus. The main focus is the process to set a goal with knowledge and skills.

This shouldn't be confused with 'project-based teaching'. Instructors could provide projects for students to carry out. For example, with evolution, instructors could ask students 'Research evolution cases' or other cases, 'Find out how you can trouble shoot certain issues.' Such cases, goals are already set by an instructor and students' activities are limited to finding answers. And many will do by searching for answers from references rather than thinking by themselves. The goal-oriented teaching method is for students to develop the skills to set a goal by themselves which is prior to research. Basically, thinking processes to generate research questions are the main target.

5. The overview of goal-oriented teaching method

The goal-oriented teaching method, as mentioned earlier, composed of three steps: a. observation and description to build and connect concepts; b. reflection; c. setting a goal. Depending on subjects, this can be extended by adding additional steps or by repeating the steps. For example, the observation can be divided further by adding self-observation and observation of teaching materials. The self-

observation is pre-study that can be done before classes so that students get familiarized with the topic. This will enhance students' learning further when they can compare their own study materials with teaching materials provided in classes.

Building and connecting concepts can also be extended by cycling the building and connecting processes. Building concept is process of conceptualization of knowledge or what was observed. Once conceptualized, the concepts can be connected together to make bigger concepts. In the beginning, students might start with one or two knowledge to conceptualize and connect. But instructors can expand the conceptualization and concept connection by adding new knowledge from teaching materials. If students were asked to deal with large amount of knowledge from the beginning, they would be overwhelmed and puzzled. Thus, the most effective way is start small and increase one by one like threading beads to make a necklace. By repeating building and connecting concepts, instructors can guide students to utilize more knowledge. In this process, having students to describe the concepts built and connected is also essential. Description is to visualize the concepts so that the logics can be seen. This is for instructors to see how logically the concepts were built and connected.

Students could build and connect concepts from observation with minimum support because they are somewhat similar to solving mathematical formula. However, reflection will be very challenging for students to carry out by themselves because reflection means that connecting the connected concepts with something that are not directly related. For example, making connection among batteries, wires and light bulbs is straight forward. But connecting the electricity with magnetic field to create a phone requires depth of thought processes. Thus, instructors' capability of reflection is essential. If an instructor is not accustomed to reflect concepts to other topics or real-life cases, he or she would not be able to guide students to build reflection skills even if the instructor has extensive knowledge and skills in the field.

Among the goal-oriented teaching process, the most challenging step would be generating questions to set a goal. This is because majority of students have gone through knowledge and skill-based education and this suppresses students from asking questions. Knowledge and skill-focused education evaluates students based on the accuracy of knowledge or skills. When the assessment is concentrated on 'correct answers', students would not be able to ask questions especially when they have doubt whether the question is the 'right question'. In order to set a goal, questions have to be open questions because a 'goal' means 'undefined' or not yet 'resulted in'.

6. An example of goal-oriented teaching method with COVID-19 as an example

Since the goal-oriented teaching method is newly developed method and COVID-19 has brought education sector challenges, COVID-19 case is taken as an example to provide clear differences from other known educational methods such as experience-based learning [6], inquiry-based teaching [7], direct instruction [8], personalized-learning model [9], project-based learning [10] etc.

Class topic: Guide students to set goals about COVID-19 (virus) in relation with evolution

Step 1. Prepare teaching materials (Knowledge and skills)

Example: Prepare knowledge related to evolution and COVID-19 (virus)

Step 2. Have students observe

Example) Ask students to read, watch videos or any other teaching materials provided.

Step 3. Ask students to describe their observation (This is process of conceptualization of knowledge [2])

Example #1 (Students' description about evolution):
Lifeforms evolve to survive and continue the species.

Evolution is survival of the fittest.

Environment factor forces lifeforms to evolve.

The evolution is based on mutation of genes, etc.

Example #2 (Students' description about COVID-19)
COVID-19 is virus.

Virus is half-lifeform that requires hosts to spread.

Reproduction of virus can only be possible in the host cells.

Genetic materials of virus could be either DNA or RNA.

Virus adapts to hosts by mutation, etc.

Step 4. Ask students to connect concepts from step 3 and describe [3]

Example of connection:

Lifeform mutates to adapt to survive and virus adapts to hosts by mutation. Thus, adaptation of virus by mutation is evolution process.

Step 5. Ask students to generate questions by reflecting the description from step 4

Example of questions #1:

If mutation is for survival, would virus mutate to survive? Will COVID-19 also evolve to maximize their survival by reducing toxicity? As COVID-19 continues to mutate, will it eventually evolve similar to common cold like virus by reducing toxicity but highly infectious?

Example of questions #2:

Evolution is based on randomized mutation and the fittest survives. Will COVID-19 evolve to be more fatal depending on density of population?

Example of questions #3 (This example questions is based on combination of example questions 1 and 2):

If the spread of virus is dependent to human population density, could the toxicity of COVID-19 due to mutation be population dependent?

Step 6. Ask students to set goals and design their research to find answers to the questions from step 5.

7. Two different types of goal-oriented thinking processes

The goal-oriented teaching method in this paper is based on active thinking process. This method can be confused with passive goal-oriented thinking process. Active means that the students have to force their brain to think starting from conceptualization, concept connections, and reflection to generate questions to set a goal. The passive goal-oriented thinking process, on the other hand, does not require such a brain work because the goals can be set by other means such as experiences. It is well known that experiences are effective ways of learning. This is because experiences make students realize why they need to learn by themselves. For example, if a person moved to a new location and experienced cold winter, he or she will prepare next winter to stay warm. Experiences motivate brain to think to find solutions to the facing problems or challenges. This means that motivation is embedded in the experiences. Also, experiences include realization. In the example above, the person could have had knowledge ahead that the new location is extremely cold and temperature could be below minus ten degree Celsius. However, if he or she did not have concept of 'extremely cold' or 'minus ten degree Celsius', the person might not be aware how cold it could be. This lack of conceptualization of knowledge results in lack of preparation. However, experiences change knowledge to concept. Once experienced, he or she realizes the meaning of 'extreme cold' and 'minus ten degree Celsius'. Thus, experiences could be one of the most effective way of learning because motivation, realization and awareness are included. Only problem is that no one can experience everything.

Problem solving is also a passive goal-oriented thinking process. Problem can only arise when something is in progress or started. For example, as COVID-19 restricts social gathering and forcing people to keep distances, education sectors found alternative ways to provide education. Whenever there is a barrier, there will be an effort to solve the problem.

Passive goal-oriented thinking does not require a series of thinking process to set a goal because the goals were given by an experience or a circumstance. Hence, no external stimulation means no goals.

8. Building hypothesis vs. building theory

Once a goal is set, teaching can move to 'project-based (research) teaching'. With the projects, students can collect and analyze data. Continuing from goal-oriented teaching method with COVID-19 as an example, instructors can guide students to collect and analyze data in relation to age, population and density, death/infection, location etc. Once conclusions are drawn, it becomes a theory. In other words, the conclusions of a research lead to the creation of a theory. The process of theorization should be relatively straight forward because students know what to do. However, this thinking process is not as simple as it sounds either. Without the building hypothesis using goal-oriented teaching method, the project-based teaching method alone might not enough for students to build thinking process. The reason is not because of teaching method. It is once again the students' interests or motivation. As stated previously, if students have experienced or faced problems similar to the projects in the past, motivation might not be necessary. Students will engage proactively and be excited for the project. However, if students are not interested in the topic, many students will look for 'answers' to get 'answers' to finish the project. In this way, they can minimize their effort and time investment. This implies that students are hoping for best grade with minimum effort and investment.

The students' strategy of maximizing outcomes with minimum investment works against their study. Looking for answers from other resources is the same as learning knowledge and skills. When students adopt these knowledge and skills for their projects, the results will show high similarities to the references. If the knowledge and skills are relatively new, they might have chance to avoid similarity issues. For example, if students learned from an instructor who provided them knowledge from the most recent research papers, their projects might not fall in similarity issues. However, considering the number of students learning similar knowledge all around the world, similarity issues will increase further and further. And these issues are not only affecting students' life in school. As seen conflicts over patents and copyrights among the companies in the same market, it will affect students' future life.

In order for students to develop active thinking process, step by step training based on goal-oriented teaching method is essential. By training students to generate research questions to set a goal, instructors can also promote students to design their research based on the goal. However, the most critical step is setting a goal with research questions because it

requires reasoning and logics. And a goal with research question is the same as hypothesis. Thus, the goal-oriented teaching method is a series of training method for students to build skills of creating hypothesis.

The hypothesis is not knowledge because questions are not answered yet. All questions are open and there is no right or wrong answer. A hypothesis is possibility of future predicted by logical thinking. To theorize a hypothesis, students have to think by themselves because there is no answer to find from references. This means that students will also learn how to use references as references rather than answer books. Basically, it will be the students who will carry out the research to find answers. When a hypothesis is confirmed by research, it will become a theory which will be new knowledge or skill.

Creating new knowledge and skills and leading society based on them are the basic goals of human beings. Students also have the desire to lead a society and many will proactively engage in learning to be leaders. Even if they are not interested, this method will force students to use their brain because there is no answer to set hypothesis as well as the process of theorization simply because they are not known.

9. Conclusion

Leaders and decision makers are the people who explore unknown and creating new knowledge. Students would not be able to build skills to be leaders or decision makers by learning knowledge and skills. Because knowledge and skills are the known past. In addition to this, students will suffer to survive in the competition because there are people who already have the similar knowledge and skills. Sharing knowledge and skills is the same as market sharing. In order to be a leader or a decision maker, students need to learn how to create new markets, knowledge and skills. It will be challenging for students to build such skills to be a leader or a decision maker with education focused on accepted knowledge and skills. Beside building skills, students' future could be doomed as discussed with similarity issues. Thus, it is time to change the teaching methods and the target from knowledge and skill-based to thinking process to set hypothesis. With the new method: 1. The gaps between f2f and online will be closed; 2. Students can build skills to be leaders; 3. Students can build their own future.

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