

The Cultivation of Students' Thinking Capacity through English Classroom Questioning

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Abstract: Thinking capacity, which is one of the core elements of English, plays a crucial role in students' development. However, many teaching activities are superficial and do not really play a role in developing students' thinking quality. Based on Bloom's taxonomy of educational objectives and the English Curriculum Standards of General Senior High School (2017 Edition 2020 Revised) (hereinafter referred to as the English Curriculum Standards), this paper takes a reading class *A Day in the Clouds* as an example, aiming to explore the cultivation of students' thinking quality through English classroom questioning. Some suggestions on English classroom questioning are put forward: Attach importance to students' level and ask questions related to reality; focus on the differences of students and ask different types of questions; pay attention to the hierarchy of questions and ask questions from easy to difficult; balance the proportion of various questions.

Keywords: classroom questioning; thinking capacity; Bloom's taxonomy of educational objectives

1. Introduction

The English Curriculum Standards have generalized the four core competencies of English subjects, which include language ability, cultural awareness, thinking capacity, and learning ability. Among them, thinking capacity represents the cognitive aspect of the English subject core competencies, which refers to students' skills employed in thinking and the quality of their thinking in terms of logicity, criticality, and innovativeness^[1]. A question can be any signal of trying to elicit a verbal response^[2]. In addition to the iconic sentences with question marks, some imperative sentences that give orders and set tasks can also be questions. Classroom questions go through the whole teaching process. It is one of the main forms of interaction between teachers and students in class. The quality of classroom questioning depends on the value of classroom questions, that is how much thought is concerned in the questions^[3]. Taking students' actual situations into account, the teacher designs the questions carefully to activate their interest and lead them to think independently so as to develop their thinking capacity.

2. Theoretical basis

Based on the complexity of cognition, Bloom classified the educational objectives in the cognitive domain into six levels: knowledge, comprehension, application, analysis, synthesis and evaluation^[4]. As is shown in Figure 1, the distribution of the six objectives is pyramid-shaped, and the cognitive hierarchy gradually increases from bottom to top. The knowledge and comprehension level belong to the lower-level cognitive domain because in this level the learner simply repeats the memory of the learned knowledge and does not require processing of knowledge; the other four levels are all higher Cognitive domain levels^[5].

The classification also fits teachers' classroom questions, from simple to complex, namely knowledge questions, comprehension questions, application questions, analytical questions, synthetic questions and evaluation questions. The former two kinds of questions can be answered by adopting some lower-level thinking activities like recalling prior knowledge and the text, while the latter ones need higher-level thinking activities like breaking down and integrating specific textual information, discovering deep internal connections and evaluating things fairly under given rules.

Knowledge questions can be answered by recalling and confirming the knowledge students have mastered in the past learning, which is the basic level of cognition. Comprehension questions can be

solved with a preliminary or a superficial apprehension of things but not a profound one, including translation, interpretation and extrapolation. Application questions can be finished when making use of the newly learned concepts, rules and methods. Analytical questions examine students' ability to find the logical relation between lines, distinguish fact from opinion through the relationship between sentences and appreciate the implied meaning that the author does not directly state. As for synthetic questions, they examine students' ability to combine old and new knowledge to form their own knowledge system, which cultivates students' creativity and imagination. Evaluation questions are the most difficult because it examines students' ability to make a reasonable and objective assessment based on a given rule or criterion.

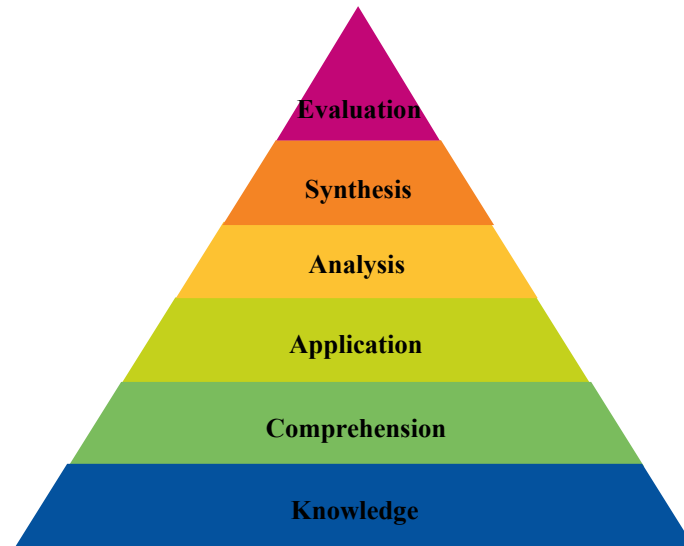


Figure 1: Classification diagram of Bloom Education objectives.

3. Instructional Design that Cultivates Students' thinking capacity with Teachers' Classroom Questioning

After several educational reforms, people have made it clear that what we want to learn from education is not only the growth of knowledge but also the improvement of thinking capacity. Therefore, whether students' thinking capacity can be cultivated has become one of the most important norms to measure the success of classroom teaching. Taking the reading material *A Day in the Cloud* from NSEFC (2019 edition), Book 2, Unit 2 *Wildlife Protection* as an example, this paper mainly explores the instructional design of high-quality classroom questions raised by teachers based on Bloom's cognitive goal classification to promote the development of students' thinking capacity effectively.

3.1. Analysis of the teaching material

The theme context of this passage is human and nature, and the topic is wildlife protection. Students need to read the text and know more about the change of Tibetan antelopes' living condition and try to under the implied meaning beyond the lines.

As for the writing style, this passage is a narration. Narration is the most common and basic but important form of expression in writing. Typically, a narrative essay focuses on people, narrative, scenery and objects, with the experiences of people and the development of things as the main content, which makes it easy for students to understand. Since narration happens everywhere in students' everyday lives from short and simple conversations to long and heated discussions.

The passage describes Tibetan antelopes' living conditions in the past and at present, shares Zhaxi's opinion on protecting them, explains the reason why they were in danger in the past and affirms the measures the government and volunteers have taken to protect them and the effects have got. Through the comparison of the past and current living conditions of Tibetan antelopes, the author called on people to change their daily lifestyles to save wildlife and live in harmony with nature.

3.2. Analysis of the learners

Students in senior 1 are about 16. They have learned English for several years so they have mastered some basic reading skills to get the main ideas and some detailed information of a narration. Students in this grade are active, friendly, and sympathetic. They love animals and are willing to take action to protect them. Sometimes, with great imagination and creativity, the students can cooperate with their partners to finish the task beyond the teacher's expectations.

However, there are still some limitations existing. Most of the students have an interest in English but their foundations are not very solid, so they are afraid to make mistakes, which always makes them fail to express themselves freely in class. Though animal protection is not a strange topic to them, Tibetan antelopes are a little bit far away from their life. They just see some pictures or videos on TV and don't know much about them.

Above all, teachers should be more patient and design questions that are fit for their level to lower their anxiety and strengthen their confidence at the same time. Activities that can arouse students' desire to perform are good choices.

3.3. Teaching objectives

Teaching objectives are the concretization of educational values in teaching, and they should be operative, achievable and detectable. Considering students' ability, the teaching objective of a class should not be too much since greedy chews more than rotten. According to the English Curriculum Standards, the teaching objectives of each class should achieve all of the four components of English subject core competencies. Based on the analysis of the teaching material and the learners, the teaching objectives of this passage are described as follows. By the end of the class, students will be able to know the basic elements and language features of narration, and they can adopt some reading skills like predicting, skimming and scanning to know the main idea and some detailed information (Tibetan antelopes' living condition in the past and at present, the reason why they were in danger and the actions have done to protect them.) of the passage. After analyzing related sentences, students should know the implied meaning of some sentences in the text. Besides, they can perceive the author's writing purpose and form the awareness of wildlife protection from ordinary daily activities and draw a poster to call on people to protect the Tibetan antelope or other endangered wildlife they care about.

3.4. Teaching procedures

This instructional design follows Bloom's taxonomy of educational objectives, and the questions raised in this case are designed as the thinking level needed in problem-solving, from easy to difficult, to encourage students to think actively and improve their thinking ability.

3.4.1. Pre-reading

The teacher asks what students' favorite animals are and whether they know their current living conditions. After listening to their answers carefully, the teacher plays a video and reminds the students that some questions are waiting for them after the video. The video is a public service announcement from Jay Chou and it shows the miserable suffering of some endangered animals. In the pursuit of things made of ivory which can be replaced by other materials, 33,000 elephants are killed every year; rhinos and pangolins are crazily hunted because of their horns and scales for the reason that they are thought to be precious medicine; shark fins are brought to the table as a symbol of wealth so millions of sharks are killed every year. After the introduction of each animal, Joy said the same sentence "When the buying stops, the killing can too." to call on people to refuse to buy wildlife. After the video, students will answer the following two questions:

Q1: What endangered animals can you see in this video?

Q2: Do you know other endangered animals?

Ivory products are not irreplaceable; there is no difference between pangolin scales and human nails—they are both protein keratin; shark fin contains mercury, which is toxic and does great harm to human health. Due to the vanity and ignorance of human beings, those innocent wild animals are on the verge of extinction. Through the strong contrast, students' sympathy for the wild animals will be aroused and they can't help giving hands to them.

The justification of the design: The English Curriculum Standards puts it that texts used in language

teaching usually have multimodal forms, which include spoken and written texts, as well as audio and videos ^[1]. Taking the animals that students like as the starting point, the teacher provides students with some background knowledge of the current situation of endangered wildlife through video so that students can understand the tragic experience of wild animals being hunted to die out by humans. The two questions in this step are knowledge questions so they are relatively simple. The first question can be correctly answered after recalling the video. With the help of the video and their former knowledge, the second one can be answered.

3.4.2. While-reading

Activity 1: Predicting

The teacher will have students make an initial perception and understanding of the text through the pictures and title and then predict the main idea. The teacher will lead students to think about why the title uses the phrase "in the clouds"? who spends a day in the clouds, the author, the animal in the picture or something else? The guiding questions are just hints and are not required to answer. After discussing with their classmates, the students are required to answer the following question: What do you think the text is about?

The justification of the design: Based on the English Curriculum Standards, the content requirements of language receptive skills include predicting the theme and content of the text according to the title ^[1]. In Bloom's taxonomy of educational objectives, "comprehension" belongs to low-level thinking. It refers to a preliminary or a superficial apprehension of things but not a profound one, including transformation, interpretation, inference, etc. So the question here is a comprehension question. The teacher captures students' imagination by asking some guiding questions to stimulate students' curiosity and mobilize their enthusiasm.

Activity 2: Skimming

The teacher has students read the text quickly to find the topic sentence of each paragraph. Before reading, the teacher reminds them to pay more attention to the first and last sentence of each paragraph and the words appear repeatedly. By combining the topic sentence of each paragraph, the students can know the main idea of the text and then check their predictions. Since this is the first time for them to read the text, the teacher lists the topic sentences to make it easier to keep their interest and lower their anxiety. What they need to do is to match the given topic sentences with the right paragraphs not without making up the sentences by themselves.

The justification of the design: According to the English Curriculum Standards, knowledge about topic sentences of a text or a paragraph and knowledge about discourse markers in texts can help readers grasp the essence of a text to improve reading efficiency ^[1]. Therefore, they must know how to find the topic sentences quickly. The teacher teaches students the reading skill of skimming can help students to read efficiently. The questions here are comprehension questions. They are designed from both students' ability levels and their mental factors. Only by understanding and integrating the text, can the students answer the questions correctly. So the questions here belong to the comprehension questions.

Activity 3: Scanning

Before the second reading, the teacher lists the following questions on the PPT and reminds the students not to read word by word. They had better skip the unrelated information and stop at the key information, which can improve their reading speed and their efficiency.

Q1: Why did the author come to Tibet?

Q2: When did the author come to Tibet?

Q3: Why are being haunted illegally?

Q4: What happened to the Tibetan antelopes in the 1980s and 1990s?

Q5: How did people protect the Tibetan antelopes?

Q6: What is the result?

Q7: What's the reflection?

After the analysis of the seven questions, the teacher introduces the great difference of a mind map in clarifying the development of the plot of the text and retelling it. Then, the teacher shows students some types of mind maps and asks students Question 8 "How will you make a mind map with the above

questions?"

The justification of the design: The English Curriculum Standards require students to know how to grasp the key concepts and key details in the text and identify key words and concepts to find target information quickly ^[1]. Read with the questions in their minds, the students can read without blindness and randomness. The teacher teaches students the reading skill of scanning can help them to locate the answer. Q1 to Q7 are comprehension questions, and they include most of the main information of the text, which can help students to form a complete framework of the text. The question to make a mind map with Q1 to Q7 is an application question. Students use the newly learned knowledge in this class and concept to fulfill a mind map and retell the text.

Activity 4: Careful reading

The teacher shows up the whole passage on the PPT and then magnifies "The air is thin", and asks students the meaning of it. What does the author want to say through the description of the air? The students can describe their own ideas freely. Then the teacher explains the definition of the literal meaning and implied meaning to the students -- implied meaning is suggested but not directly expressed and literal meaning is the usual, basic meaning of the words, and then take "When they first saw the antelopes, they were very far away." as a second example to analyze its implied meaning. Next, the teacher has students read the four sentences in Exercise 3 and decide whether their meaning is literal or implied. At last, the teacher encourages students to find out all the sentences with implied meaning in the text and some students will be invited to share their findings and explain the implied meaning in class.

The justification of the design: As it's required in the English Curriculum Standards, students should master the language skill of inferring the implied meaning in the text according to the context ^[1]. The questions here demand students to analyze the meaning of individual sentences based on considering the context, so they are analytical questions. The instruction that asks students to explain the implied meaning of the sentence they find is a synthesis question. Because students need to find out subtle information and organize language to make their explanation more convincing. Analyzing the implied meaning can foster students' holistic awareness. Knowing how to get the implied meaning can help students reduce misgiving and communicate fluently in their daily life. What's more, the above questions can practice students' spoken English and their ability to express themselves.

3.4.3. Post-reading

The teacher divides students into groups of six and has them discuss their understanding of "If we really want to save the planet, we must change our way of life.", then asks them a question "What can we do to change our way of life?" and make a poster to describe their ideas. Each group takes turns sharing their work in class. When the last group finishes their sharing, the second question comes: "Which group is the best? Why?" Each group chooses a member to represent to describe their poster in class. According to the given criteria for evaluation, the teacher and students evaluate each group's performance and decide the winner together. The winner will be praised and the others will be encouraged. The evaluation criteria are made from the scales like the aesthetic quality of the posters, creativity and operability of ideas, fluency and accuracy of language, clarity of explanation.

The justification of the design: The English curriculum advocates adopting an activity-based approach to English learning and some other ways of learning such as autonomous learning, cooperative learning, and inquiry-based learning ^[1]. Group members exchange ideas after independent thinking. Group learning improves students' independent and cooperative learning ability. Moreover, it enhances their creative thinking through the collision of ideas among group members. During communication, their ability to describe their ideas fluently and accurately in a logical way can be practiced. Students not only play an important role in learning but also play an indispensable role in evaluation as their teachers do ^[1]. The knowledge of evaluation makes it clear to students where should be paid attention and evaluation from teachers and peers show their weaknesses. The question of making a poster to describe the ways to save the planet is a synthesis question and the question to evaluate other groups' posters is an evaluation question, both of which are high-level thinking activities.

3.4.4. Assignment

The teacher asks students to finish the following two assignments:

- 1). Polish your poster and description according to the students' scores in class;
- 2). Ask for your parent's evaluation and make a self-evaluation.

The justification of the design: According to the English curriculum, to assess the English subject

core competencies, evaluation should attach great importance to the adoption of multiple subjects of evaluation and those who carry out the evaluation can be teachers, students, or both teachers and students [1]. The teacher should help students to make self-evaluations and develop a habit of self-reflection. Students have more available time and energy at home than at school for them to try their best to polish their posters and description. By combining teacher evaluation and peer evaluation with parent evaluation, students can have clear self-evaluation. Describing the posters to their parents helps them to develop their language skills and improve their expression. On the other hand, it also helps them to convey to their parents their awareness of protecting endangered animals and safeguarding the earth. The first question is a synthesis question and the second one is an evaluation question.

4. Teaching Implications of cultivating Students' Thinking Capacity Through English Classroom Questioning

4.1. Attach importance to students' level and ask questions related to the reality

All the teaching activities are for students' development, so the teachers should have a general understanding of the students' learning situations before designing the teaching. Teachers can learn some teaching methods from good teaching cases, and then make adjustments to match students' level and their needs. The questions for students shouldn't be away from their life. The English Curriculum Standards puts it that the teachers should lead students to actively participate in the activities of exploring the thematic meaning according to their existing life experience, learning interest and language ability [1]. The questions coming from reality have something to do with students' life experience. The familiar topics arouse students' interest, reduce their anxiety, make them dare to say and stimulate their desire to express themselves well. Good questioning promotes students' active participation in classroom activities and helps deepen their understanding of new knowledge, thus transforming or even rebuilding the original knowledge system.

4.2. Focus on the differences between students and ask different types of questions

As an old saying goes, there are not two leaves that look the same. Due to individual differences and family environment, there are some differences between students of the same age. Each student is an independent and unique individual. There is no doubt that a problem can not apply to all students. In such a case, teachers should design different types of questions according to students' interest, needs, cognitive styles and levels to actively mobilize the enthusiasm of students, so that every student has the opportunity to show their ideas. For example, design questions with no fixed answers for outgoing students to make good use of their active minds; for those who are introverted and shy, some simple questions seem to be welcomed to enhance their sense of achievement. Questions whose answers can be found directly in the text seem to be suitable for those who are introverted and shy. Their participation can increase surrounded by a sense of achievement.

4.3. Pay attention to the hierarchy of questions and ask questions from easy to difficult

Bloom's taxonomy of educational objectives in the cognition domain is pyramidal, requiring progressively higher levels of cognition from the base to the top of the tower. As students learn more about the text, their understanding of the text is deeper, and the corresponding classroom questions should also present this hierarchy, leading students' thinking levels to higher ones. Before reading, the teacher should try to evoke students' relevant knowledge and arouse their interest, and the questions in this part should focus on the knowledge and comprehension level. During reading, the students' understanding of the text deepens gradually, and the questions should gradually transition from the comprehension level to the application level. In addition, the teacher should also develop students' ability to thoroughly analyze and understand the implied meaning of the text based on the connection between sentences and their ability to integrate the old and new knowledge systematically into one issue. After reading, the teacher designs a group work to examine and check students' synthesis and evaluation ability. The post-lesson assignment continues the classroom activities and allows each student to express themselves. What the teacher should pay attention to is that the questions are not completely disconnected from each other; they should be echo back and forth. The difficulty of the problem is gradually increased, and if there are more difficult questions, the teacher can provide appropriate scaffolding.

4.4. Balance the proportion of various questions

Analytical questions cultivate students' logical thinking, synthetic questions improve students' creative thinking and evaluative questions conducive to forming students' critical thinking. In order to develop higher-level thinking, teachers need to design higher-level questions. As a result, some people consider lower-level questions to be inferior and bad, and they even suggest reducing their frequency in class, which is overt a misunderstanding of low-order thinking. Without a foundation of lower-level thinking, higher-level thinking is just like a castle in the air. Under the appropriate circumstance can higher-level questions play the role of cultivating students' high-order thinking. This is "the appropriate circumstance" where students are interested in the learning content, have a certain understanding of the information in the text and are able to use their newly acquired knowledge to solve basic problems with the help of lower order questions. So teachers need to balance the proportion of various questions.

5. Conclusion

Thinking capacity cannot be improved overnight, just as Rome was not built in a day. As the chief designer of teaching activities, teachers promote thinking capacity through language ability and make invisible thinking visible. They take the overall picture and grasp the general direction of questioning. They care about students' commonness and personality at the same time, start from real life and design questions that can most resonate with students so that every student has the opportunity to participate in the classroom and truly become the master of the classroom. The order of the questions presented and their distribution in a class are also the keys to a successful class.

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