Critical Thinking Cultivation and Curriculum Modules Construction of Chinese College English Reform: The Case of Beijing Institute of Technology

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Abstract
One main concern of Chinese university education is to vigorously improve the teaching quality, in the midst of it is to enhance the students’ capability of critical thinking. China’s construction plan of world-class university and first-class discipline (The “Double First-Class Initiative”) puts forward specific requirements for the training of critical thinking skills. This paper takes Beijing Institute of Technology (BIT) as an example to explore how to promote a critical-thinking oriented English teaching reforms in the aspects of course design, teaching strategy, evaluation method, textbook writing, teacher training and educational resource integration. It takes some courses, namely English writing, business English and American literature at BIT to explore how to integrate the critical thinking into English teaching curriculum modules design. To be more specific, how to integrate the sub-critical thinking ability, such as logical reasoning, innovative thinking, analysis and problem solving ability, comprehensive and evaluation ability, research and practice ability to language skills, language knowledge, language use, cultural appreciation and practice activities. It holds that the enhancement of critical thinking ability of students will brings about vital energy to the English teaching and research in universities.

Keywords: Beijing Institute of Technology; Critical Thinking; Curriculum Modules; College English Reform

INTRODUCTION
In the next 5 to 10 years, one of key concerns of education reform at Chinese universities is to improve the teaching quality. An important indicator for measuring the teaching quality at college is the cultivation of college students’ critical thinking ability. China’s college English teaching has made considerable progress after several reforms, however, there are still many problems, especially that there is still some room for improvement...
for the cultivation of critical thinking. Chinese Ministry of Education put forward ambitious plan of world-class university and first-class discipline (The “Double First-Class Initiative”) and sets specific requirements for the training of critical thinking skills. This paper, taking Beijing Institute of Technology (BIT) as an example, tries to explore how to promote a critical-thinking oriented English teaching reforms in the aspects of course design, teaching strategy, evaluation method, textbook writing, teacher training and educational resource integration and how to integrate the sub-critical thinking ability, such as logical reasoning, innovative thinking, analysis and problem solving ability, comprehensive and evaluation ability, research and practice ability to the teaching module of language skills, language knowledge, language use, cultural appreciation and practice activities.

CRITICAL THINKING AND CRITICAL THINKING STRATEGY

“Critical thinking ability” comes from English “critical thinking skills” and is also translated into “criticism”, “thinking ability” etc. Critical thinking is actually the unity of human cognitive skills and affective dispositions, of which cognitive skills includes three skills such as analysis, reasoning and evaluation, and affective dispositions includes five personality traits, namely curiosity, openness, self-confidence, integrity and perseverance (Wen Qiufang,2009). Critical Thinking (CT) is an intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief or action (Scriven & Paul, 2004). Critical Thinking Teaching Strategy CITS is defined as an “instructional method or style used for the purpose of promoting CT ability in students, usually associated with teaching that engages the student, facilitates inquiry, encourages analysis, and involves critical judgment and reflection” (Mezirow, 2000).

Critical thinking is crucial for the overall development of college students, since it enables students to take a broad and insightful perspective to explain some phenomena, make multi-dimensional analysis, draw a rational judgment and to propose eligible solutions to the problem. That how to cultivate the critical thinking ability of college students has become one of the core objectives of China’s higher education. The Ministry of Education has issued the National Criteria of Teaching Quality for Undergraduate English Majors. (also referred to as “national criteria”) which proposes the cultivation of students’ ability in explicit and specific manner. Students should acquire the comprehensive capability of English language, appreciation of English literature and cross-cultural communication skills. Students should also have the ability to acquire and update professional knowledge so as to consider, to innovate and to participate in scientific research or project. It can be seen that Chinese national criteria’s requirements set specific standard and highlight the importance of cultivating the critical thinking ability in college English teaching. It should be noted that the cultivation of students’ critical thinking ability is not exclusively confined to foreign language education, but also extends to the overall educational sectors and exerts great influence on the Chinese long-term and sustainable development.
The well-known universities have put the cultivation of critical thinking ability in the priority. Harvard holds that students’ innovative ideas and freedom of expression should be respected and rejoice in discovery and critical thought should be inspired. University of Cambridge put the encouragement of a questioning spirit into its core value. Yale University sets the ultimate goal for English major students is to gain deeper insight into human experience and turn out to be an excellent and powerful analytical thinker. Western education puts the cultivation of analytical and critical thinking ability in the first place, while Chinese education often emphasizes the systematic mastery of basic knowledge. In English teaching, students’ performance in thinking, reasoning, evaluation, synthesis and analysis is unsatisfactory and there is much room for improvement. Huang Yuanshen (2010) pointed out that among a great number of factors contributing to the students’ lack of critical thinking ability, College English teaching, as an important part of China’s higher education, pays less attention to the students’ critical thinking ability. Thus, Huang believes that the cultivation of critical thinking ability should be set as the focus and orientation to the curriculum modules construction. The reform of English teaching should be pushed deeply to cultivate the talents with competent English skills and critical thinking ability.

THEORETICAL FRAMEWORK OF CRITICAL THINKING

The Delphi Project gives an authoritative definition of critical thinking: “We understood the critical thinking as a purposeful, self-regulating judgment which led to the analysis, evaluation, reasoning and interpretation of evidence, concept, method, standard or background information, including the main two categories of “cognitive skills” and “affective dispositions” shown in Table 1.

<table>
<thead>
<tr>
<th>Interpretation</th>
<th>Analysis</th>
<th>Evaluation</th>
<th>Inference</th>
<th>Explanation</th>
<th>Self-regulation</th>
<th>Affective Dispositions</th>
</tr>
</thead>
<tbody>
<tr>
<td>categorize, understand meaning, clarify meaning</td>
<td>analyze opinions, find supporting ideas, analyze the process of argumentation</td>
<td>evaluate the evidence, comment the argument</td>
<td>question the evidence, propose alternative hypothesis, draw a conclusion</td>
<td>state the result, describe the method, find the supporting ideas</td>
<td>Self-assessment, self-correction</td>
<td>Curious, confident, sharp, open, justice, honest</td>
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</tbody>
</table>

Paul & Elder (2006, 2014) proposes a modified ternary structure model of critical thinking, consisting of three interconnected parts, namely thinking elements, standards and intelligence characteristics, which turns out to be helpful to self-assess, regulate and refine the individual’s critical thinking ability. Lin Chongde extends it to the triangular structure model of critical thinking, including the purpose, process, material, self-monitoring, quality, cognitive and non-cognitive factors in thinking. (Wen Qiufang, 2009; Li Liwen, 2011).
In China, Wen Qiufang proposes the multi-level model of critical thinking, which gives rise to much attention. The first level is the meta-critical thinking ability, including planning, inspection, adjustment and evaluation. The second level is critical thinking ability including cognitive skills, affective dispositions, management and monitoring of meta-critical thinking. (see Table 2)

**Table 2. The multi-level mode of critical thinking**

<table>
<thead>
<tr>
<th>Cognition</th>
<th>Skills</th>
<th>Criteria</th>
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</thead>
<tbody>
<tr>
<td>Analysis</td>
<td>(categorization, identification, comparison, clarification, differentiation, interpretation)</td>
<td></td>
</tr>
<tr>
<td>Reasoning</td>
<td>(questioning, hypothesis, inference, elaboration, argumentation)</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td>(judgment presupposition, assumptions, arguments, talking points)</td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>relevance, logic, depth, flexibility</td>
<td></td>
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</tbody>
</table>

<table>
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<tr>
<th>Emotions</th>
<th>Curious (questioning, asking, learning)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Openness (tolerance, respect for different opinions, self-correction)</td>
</tr>
<tr>
<td></td>
<td>Confidence (believe in your own judgment, dare to challenge authority)</td>
</tr>
<tr>
<td></td>
<td>Integrity (pursuing truth, advocating justice)</td>
</tr>
<tr>
<td></td>
<td>Perseverance (determination, perseverance)</td>
</tr>
</tbody>
</table>

In this model, the cognitive and emotional characteristics are distinct, concise, straightforward with explicit evaluation criteria. Critical thinking is closely related to the all-round development of students and the realization of the long-term development strategy of the country. However, for a long time, college English teaching has not paid enough attention to the cultivation of students’ critical thinking ability. Beware the significance of critical thinking capability, BIT adopts the multi-level model of critical thinking to conduct an overall College English reform in aspects of teaching objective, teaching strategy, curriculum arrangement, testing methods, textbook writing and faculty development.

**CULTIVATION SYSTEM CONSTRUCTION OF CRITICAL THINKING**

Under the guidance of multi-level model, BIT promotes a critical-thinking oriented English teaching reforms and constructs schematic system of critical thinking cultivation in the four aspects of teaching strategy, evaluation method, textbook writing, teacher training.
Critical Thinking Cultivation and Curriculum Modules Construction of Chinese ...

For the teaching strategy, firstly, the critical thinking ability should be included in the syllabus as the core teaching goal. Appropriate classroom activities and practice should be designed by the instructor to meet the specific characteristics of the course so as to pertinently cultivate the defined critical thinking skills. Secondly, teachers are encouraged to use heuristic questions, mutual arguments, round-table discussion, timely evaluation and positive feedback to encourage students to fully engage in the class. Teachers are encouraged to use heuristic questions and mutual arguments to carry out teaching. Using a round-table discussion format to create a classroom environment that encourages students to question and ask questions is also encouraged. Students take turns to speak in class and answer questions from other classmates. Teachers should give timely and accurate evaluation and feedback to students’ classroom behaviors, so that students can feel the sense of accomplishment and satisfaction brought by classroom activities. Under these positive emotional factors, students' English language skills and critical thinking can be effectively enhanced.

Thirdly, students' self-learning ability and personalized learning should be encouraged to stimulate their critical thinking, decision-making and independent action. Modern educational technology and self-learning network platform should be implemented to inspire students' enthusiasm for knowledge. Self-learning, essentially as a psychological relationship between learners, learning processes and learning content, is an ability which involves critical thinking, decision-making and independent action (Littlewood 1991). Using the advantage of modern educational technology, we should establish and improve a self-learning network platform to mobilize the enthusiasm of students to learn independently.

Figure 1. Schematic diagram mode of critical thinking ability
For the evaluation methods, the following reforms were made based on the “overall evaluation criteria for critical thinking ability” designed by American scholars P. A. Facione and N. C. Facione. Firstly, evaluation forms should be enriched and subjective testing be focused. In addition to exams, group discussions, debates, presentations and surveys should be adopted. The amount of objective test such as multiple-choice questions should be reduced and the subjective test such as essay writing should be increased. Language frequency and thought output will be taken equal consideration.

Secondly, more critical thinking thoughts should be increased in the evaluation content and the proportion of the summative assessment should be reduced. Instead, a formative assessment mechanism should be adopted. The critical thinking tests should be added in summative assessment, and the proportion of the formative assessment should be increased in the evaluation test. The concept that evaluation test is designed to serve the critical thinking demand us to increase the ratio of weight in critical thinking parts when we pay attention to language skills.

Thirdly, evaluation criteria for critical thinking should be clear. Teachers design tests for different levels of students respectively such as tests relate to analysis ability, reasoning ability and evaluation ability. On the one hand, from a cognitive perspective, students’ thinking ability is evaluated with clarity, relevance, logic, profoundness and flexibility. On the other hand, the affective dispositions of thoughts are included in the evaluation to check whether the students show emotional characteristics such as curiosity, openness and self-confidence. (Sun Youzhong, 2013)

For the compilation of textbooks, the reform of English teaching guided by cultivation of critical thinking will inevitably require corresponding reform of textbook writing. Textbook writers must incorporate the sub-trainings of critical thinking skills organically so that the transfer of knowledge and the training of critical thinking skills can be integrated. The pursuit of integration of knowledge acquisition, language skills training and critical thinking training will undoubtedly pose huge challenge for the writers. English skills courses are transformed from traditional sub-training mode of listening, speaking, reading and writing to the “content-based” comprehensive skills training mode. Chang Junyue (2009) believes that content-based teaching gives full attention to content which is conducive to stimulating students to think through language and learn new knowledge. It is beneficial to students to integrate the critical thinking into the English listening, speaking, reading and writing. Compared to the traditional teaching mode, the content-based teaching method enjoys favorable advantage in the systematic acquisition of knowledge and turns out to be helpful to encourage students to think critically through language and knowledge acquisition. The integration of skill training into knowledge acquisition process contributes to the improvement of students’ interest in learning and acquisition efficiency.

For the teaching training and faculty development, it is necessary to cultivate the teacher’s cognitive skills and affective dispositions. A series of questions could be taken into serious consideration and careful investigation, such as how to integrate critical thinking training in teaching so as to effectively improve students’ cognitive skills and affective dispositions, how to create a learning environment that is conducive to critical
thinking development and how to evaluate students’ critical thinking ability, etc. A series of program, such as lectures, workshop, discussions, WeChat group and online platform should be set up to provide the assistance and guidance for the teacher. We should promote series of training programs about the teachers’ critical thinking teaching strategy, such as inviting relevant experts to hold a series of lectures, popularizing the basic knowledge and operation strategies of the critical thinking teaching, setting up the critical thinking teaching strategy workshop and inviting relevant experts to have in-depth discussions and experience-sharing on the topic of critical thinking teaching strategies and methods, selecting representative courses and teachers to conduct classroom action research and tentatively introduce critical thinking teaching strategies in a planned way to improve current teaching practices and gain experiences for further promotion, Setting up an online sharing platform for critical thinking teaching resources.

**CRITICAL THINKING CULTIVATION AND CURRICULUM MODULES CONSTRUCTION**

After the critical thinking oriented teaching mode established, this table below illustrates BIT how to integrate critical thinking capability (including logical reasoning ability, innovative thinking ability, analytical and problem-solving ability, comprehensive evaluation ability, practical ability) into English curriculum modules (including language skills, language knowledge, language application, cultural literacy). Under the guidance of National Criteria of Teaching Quality for Undergraduate English Majors, BIT integrates critical thinking ability into corresponding modules teaching, so as to cultivate the critical thinking consciousness and ability. This thereby further promotes the reform of English teaching and improve the teaching quality as well.

**Table 3. Critical thinking-oriented English curriculum modules at BIT**

<table>
<thead>
<tr>
<th>Curriculum Modules</th>
<th>English Course</th>
<th>Critical Thinking Ability</th>
<th>Credit Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Skills</td>
<td>College English, International English Communication, Academic English Listening, Academic English Writing, Advanced English Reading, English Writing, Introduction to English-Chinese Translation, Basic Interpretation of English and Chinese, Film Listening and Speaking, English Film Listening and Speaking, Oral English, Culture Differences and Translation</td>
<td>Logical reasoning ability</td>
<td>27%</td>
</tr>
<tr>
<td>Language Application</td>
<td>Engineering Writing, English of Academic Use, Academic English Communication, Business English, English Application Writing, Practical English Writing, English Speech and Debate</td>
<td>Analyzing, problem-solving ability</td>
<td>21%</td>
</tr>
</tbody>
</table>
The language skills module develops basic skills in listening, speaking, reading, writing and translation. Among all the English courses, writing pays more attention to the analytical reasoning ability. Given the peculiar characteristics of writing, Chen Zehang (2016) constructed the “characteristic framework of critical thinking ability in English writing”. In BIT, teachers of English writing lists five first-level cognitive skills such as analysis, reasoning, discussion, assessment and monitoring as well as five cognitive criteria, along with corresponding secondary cognitive skills.

**Table 4. Cultivation of critical thinking ability in English Writing**

<table>
<thead>
<tr>
<th>Initial stage</th>
<th>logical reasoning ability (cognitive skill application)</th>
<th>Cognitive criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conceiving ideas</td>
<td>Analysis, decomposition, comparison, integration, inclusion, etc.</td>
<td>Correctness, deepness, readership</td>
</tr>
<tr>
<td>Layout of discussion</td>
<td>Logic, reasoning, hypothesis, argumentation, elaboration, prediction, judgment, etc.</td>
<td>Logic, profoundness, appropriateness, relevance, sufficiency</td>
</tr>
<tr>
<td>Revision and evaluation</td>
<td>Reflection, analysis, questioning, evaluation, strategy, etc.</td>
<td>Fairness, openness, flexibility</td>
</tr>
</tbody>
</table>

Writing course should implement cognitive skills training along with the logical thinking ability. In the initial stage of conceiving ideas, the analysis skills including decomposition of topics, comparison between ideas, integration of information, acceptance of ideas should be stressed. As long as the idea is proposed reasonably and developed logically, different views and ideas of students should be understood, admitted and even appreciated. In the discussion stage, students are encouraged to conduct logical reasoning and reasonable verification of hypotheses, to analyze the problems, to reason and to prove dialectically and objectively. In doing so, it will improve students’ ability to explain, predict and judge. Students should be able to reasonably organize their opinions and arguments and use a variety of argumentation methods to make their arguments relevant, reasonable and deep in thought. In the stage of revision and evaluation, students
should be good at discovering problems and conduct self-reflection, analysis and evaluation. They should dare to question and infer logical defects and further propose solutions fairly and flexibly. Such repeated training will effectively improve the students' logical thinking ability in analyzing problems and reasoning.

**CURRICULUM MODULES OF LANGUAGE KNOWLEDGE AND INNOVATIVE THINKING AND RESEARCH ABILITY CULTIVATION**

The language knowledge course module values the implementation of three-dimensional teaching of guidance, learning and research. Guidance means introduction, leading and instruction. The micro-topic designs, micro-activity organizations and micro-topic researches should be adopted to guide students to think, question existing conclusions, make assumptions and then collect data for demonstration. In the process of “Study”, students should be encouraged to challenge authority, discover problems, think independently and solve problems. “Research” is an important way of learning and practice. At BIT, a variety of programs, such as internship, professional practice, innovative practice, career planning, Foreign Language Teaching and Research Press Cup, Challenge Cup, university students' innovation projects, academic associations, English debates, social practice projects in vacations, etc., are implemented to enhance students' ability to use professional knowledge to conduct innovation and scientific research. In this way, the research and practice activities of "guiding", "learning" and "research" are integrated organically to cultivate students' ability to apply professional knowledge to conduct innovative and scientific research.

**CURRICULUM MODULES OF LANGUAGE APPLICATION AND ANALYSIS AND PROBLEM-SOLVING ABILITY CULTIVATION**

The language application course module includes English teaching case analysis, foreign trade correspondence, international trade practice and consecutive interpretation. Based on a certain subject or topic, content-based teaching combines language learning with subject knowledge to promote students' knowledge and cognitive ability while promoting their language level (Mohan 1986; Yuan Pinghua, Yu Liming 2008). Take Business English course at BIT as an example to illustrate the course module of language application and cultivation of analysis and problem-solving ability (see Table 6).

![Figure 2. Cultivation of critical thinking ability in Business English at BIT](image-url)
Business English is a college English elective course designed to help students acquire basic business knowledge. In actual teaching, designing interactive classroom activities, hiring experts to hold special lectures on foreign trade practice and related processes, and taking students to visit the company’s workshops, sample rooms and study foreign trade practical experience reports of enterprise experts etc., all of these are important ways to improve the practical ability of analyzing problems and solving problems. Students can enhance their critical thinking ability through statements, analysis, discussion, interpretation, questioning, evaluation and other thinking activities.

**CURRICULUM MODULES OF CULTURAL APPRECIATION AND COMPREHENSIVE AND EVALUATION ABILITY CULTIVATION**

The cultural appreciation course refers to courses in English and American Literature, Introduction to Chinese Classics, General Theory of Chinese Culture, Intercultural Communication, Anglo-American Society and Culture. Non-traditional English major courses such as Public Relations Research, Sociology, Ethnic Culture and Western Politics should be set up. These courses expand the students’ social and cultural vision and improve their cultural literacy and provide guarantees for cultivating high-quality talents with solid professional foundation, good culture literacy and independent spirit. American Literature is both a language knowledge course and a cultural literacy course. Teachers can adopt problem design, group discussion, story continuation, reading notes and other forms to guide students to analyze, to judge and to reason on the theme of the work, the core of the conflict, the character and the inner world of role, and the roots of social contradictions, thereby enhancing their critical ability to analyze, synthesize and evaluate literary works.

![Figure 3. Cultivation of critical thinking ability in American Literature at BI](image)
**CURRICULUM MODULES OF PRACTICE AND INNOVATION, RESEARCH AND PRACTICAL ABILITY CULTIVATION**

Practical teaching includes thesis writing, scientific research projects, academic competitions, academic communities, entrepreneurial projects, social surveys, volunteer services and international exchanges etc. The purpose is to improve students’ innovative thinking ability, practical ability and scientific research ability. Critical thinking ability is actually an ability to innovate and it is a relatively independent ability which enable us to analyze and judge problems objectively (Dai Yidong, Zhang Xuemei 2007). Students are encouraged to participate in English speech contests. Students need to use language skills, language knowledge, cultural literacy, social vision etc. at each stage of the English speech contest, like the topic selection, writing, rehearsal and speech. At the same time, it can exercise and examine students’ cognitive skills such as arguments, deductions, reasoning, questioning, critical thinking, innovation and synthesis, thus effectively improving students’ ability of analysis, judgment and logical argumentation. Thesis writing can test students’ ability to comprehensively apply their learned knowledge and methods to conduct preliminary academic research. In the writing and oral defense of the thesis, the students’ ability of argumentation, reasoning, questioning, analysis, deduction, innovation, critical thinking etc. have been improved to different degrees, laying a solid foundation for students to carry out planning, research and project report writing after graduation.

**CONCLUSION**

This college teaching reform conducted at BIT helps us to identify some most effective teaching strategy as perceived by English faculty. The top five critical thinking teaching strategy used by faculty were Socratic Questioning, Instructor-directed in-Class Exercises, Instructor Critical Thinking Disposition Modeling, Drawing Reasonable Conclusions, and Assuming Alternative Perspectives and Points of View, although their actual use was rather low, by between 38% and 58% of the faculty. The five teaching strategies perceived as most effective were Class presentation, Socratic Questioning, Instructor Critical Thinking Disposition Modeling, Transferring Insights to New Contexts, and Conspicuous Recognition and Reward. The most common forms of assessment were Essay Examination, Peer Assessment, Self-assessment, Project Assignment, Case Study, Group Problem Solving and Instructor/Learner Dialogue. This study serves as a foundation for further research and provides faculty with information for professional development, specifically by involving faculty directly in the development of a cohesive, participant designed and endorsed program-encompassing commitment and structuring of Critical Thinking in evaluation. Workshops for faculty to learn more about Teaching Strategy and assessment would be important to such further study. To enhance the ability to foster Critical Thinking in English course program evaluation, critical thinking knowledge and skills are valuable and should be shared among program faculty. Curriculum should be reviewed to document how Critical Thinking are used across the curriculum; this should also include information on Critical Thinking assessment strategies.
It should be noted that the cultivation of critical thinking is part of improving the overall quality of students and task of higher education and the teaching goal shared by all courses. However, foreign language courses have their own unique teaching objectives, such as developing students' ability to use foreign languages and cross-cultural communication skills. If we neglect the special goals of the foreign language curriculum and only pay attention to the critical thinking ability, it is possible to lose the value of the foreign language curriculum itself, so the cultivation of the critical thinking ability and the language training should be integrated properly. How to implement such an integrated method is urgently needed for the teachers. Although respondents perceived several strategies as effective in promoting critical thinking in students, further research is needed to ascertain levels of critical thinking improvement for the students. Consideration of learner perceptions of instructional strategy effectiveness in promoting critical thinking would be valuable.

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