

## **INNOVATION IN TEACHING AND RESEARCH ON PERSONNEL TRAINING IN GEOMORPHOLOGY**

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**Received: 19 Aug 2023**

**Accepted: 24 Aug 2023**

**Published: 30 Aug 2023**

### **ABSTRACT**

*Building innovative thinking is the cornerstone of encouraging the development of a system for training inventive talent and nurturing students' innovative spirit and practical aptitude. This paper summarizes the issues with cultivating innovative thinking in traditional teaching and suggests a training model for innovative thinking in comparison to the talent training program of the standard curriculum based on an analysis of the psychological process of the formation of innovative thinking. The findings demonstrate that in the teaching mode, educators must foster an environment of emotional communication, be problem-focused, and lay the emotional groundwork for the psychological processes that result in innovative thinking. Secondly, the teacher will gradually give way to the student's learning through the three steps of discovering new knowledge, learning innovative knowledge, and developing a habit of innovative awareness. It promotes the full psychological activity process of innovative thinking from formation-practice-application-habit, to achieve the goal of curriculum talent training, through the process of typical case analysis and expansion, differentiating group theme discussions, and reading and explaining Chinese and foreign literature.*

**KEYWORDS:** Innovative Teaching Method, Exploration of New Knowledge, Innovative Consciousness, Geomorphology

### **1. INTRODUCTION**

According to China's Education Modernization 2035, education must "vigorously promote the modernization of educational concepts, systems, contents, methods, and governance; innovate talent training methods, and cultivate students' innovative spirit and practical ability." Concept innovation, managerial innovation, technology innovation, and institutional innovation all result from changes in how people think. It is challenging to come up with creative acts without an inventive way of thinking and without shattering the constraints of the conventional thinking mode <sup>[1]</sup>. It is important to cultivate students' innovative spirit and practical ability from the outset. The development of innovative thinking is also necessary in the present day to maintain and advance socialism with Chinese characteristics in the new era.

### **2. THE DEVELOPMENT OF INNOVATIVE THINKING AND ITS PSYCHOLOGICAL PROCESS**

Four stages make up the process of inventive thinking: product, process, measurement, and personality <sup>[2]</sup>, with the personality environment that fosters creativity playing a key role at each stage. Thinking creatively and being intelligent go hand in hand quite well. It is typically thought to have ground-breaking theories in the liberal arts and inventive scientific breakthroughs <sup>[3]</sup>. Intellectual ability differs from creative thinking capacity. Although intellect is a necessary component of creative thinking, it might be disregarded during the formation of innovative thinking <sup>[4]</sup>. Therefore, a person's capacity for creative thought can be shaped by their intellect, which is developed by their education, experience, and level of schooling.

Innovative thinking is the movement of the thinking subject that relies on the cortical area of the brain, particularly the right brain and is based on the sophisticated human-specific forms of perception, memory, thinking, association, and understanding. The dialectical and unified thinking process of divergence and convergence, seeking difference and seeking common ground, image and abstraction, logic and non-logic, etc., goes through four stages during interaction with the thought object: preparation, brewing, elucidation, and verification. Create mental exercises that involve novel, ground-breaking, and compound cognitive achievements<sup>[5]</sup>. Innovative thinking is a sophisticated and unique manner of thinking and doing thought processes. It stresses the comprehension, generalization, and mastery of objective things from various viewpoints and ideas using innovative cognitive techniques. Based on objectively and thoroughly integrating prior information and experience, seeking "new" and "truth" at the same time, and identifying genuine issues, genuine solutions, and genuine concepts<sup>[6]</sup>. Its distinctive qualities are mostly seen in disparity, divergence, and comprehensiveness. Specific elements of innovative thinking, such as fluency, coming up with ideas, responses, solutions, or questions, coming up with strategies and taking into account various strategies and their results; Flexibility, which includes coming up with solutions, questions, or ideas to consider a problem from different angles, look for alternatives, or alter strategies or ways of thinking<sup>[7-9]</sup>.

Innovative thinking is a different idea from conventional thinking, as is the psychological process that gives rise to it. The current teaching reform in colleges and universities must specifically stimulate and support the originality, pioneering, and complicated cognitive process of innovative thinking activities<sup>[10]</sup>.

### 3. THE STATE OF INNOVATIVE THINKING TRAINING AND CURRENT ISSUES

There is no opportunity for the establishment and development of inventive thinking or unique thinking when instruction is done in the traditional group style<sup>[11]</sup>. The mechanical indoctrination teaching approach limits students' ability to think independently and to study independently. The teacher is at the center of the classroom and uses the test as the focal point to control the students' behavior, feelings, and way of thinking by explaining the lesson plans and content. Students learning autonomy, thinking independence, living self-reliance, and behavioral self-discipline are undermined in the teacher-controlled classroom as a result of the one-way transmission relationship that develops between teachers and students<sup>[12]</sup>.

High-quality educational resources cannot be used effectively in the classroom with current information technology. The problem of passive acceptance of education in the traditional teaching mode and passive participation in learning is better solved in the contemporary interactive learning environment under the condition of networks and multimedia. Students can choose the learning method and content appropriate for their characteristics according to factors like interest, learning foundation, and learning conditions. According to the research<sup>[13]</sup>, teachers utilize network-assisted interactive media in the teaching process to describe the process of animation using visuals and simulations, which can help students understand the learning materials and subsequently foster the development of inventive thinking.

Teachers have not matched the knowledge they have taught with their students' capacity for practical creativity, and they have not piqued their curiosity about independent study, original thought, or technological conversation. There was not enough time for innovation in certain professors' educational concepts, which prevented students from thinking creatively enough<sup>[14]</sup>. Some teachers are not creative enough to foster a positive learning environment, which causes students to lose interest in the lessons they are being taught.

The connection between classroom practice Teaching is poor because it ignores the phenomenon that exists in the current educational model, which is the relationship between theory and practice. Colleges and universities should develop a platform for students to obtain a dominant learning model and integrate teaching, scientific research, training, and production to improve students' innovative and practical skills through school-enterprise cooperation, industry-university-research cooperation, and other models <sup>[15]</sup>. According to a survey, 53% of teachers frequently encourage their students to present their unique viewpoints in class, but just 20% of teachers do the same and give their pupils less time to reflect. There are few opportunities for students to identify issues and pose queries on their own. In addition, only 27% of teachers request that students explain what they are thinking. A person can stimulate fresh ideas and develop their innovative thinking by sharing the outcomes of their thought <sup>[14]</sup>.

#### **4. INNOVATIVE THINKING TRAINING STRATEGY ORIENTED TOWARD TALENT TRAINING GOALS**

According to the 2023 version of the talent training plan for Geographical Science (Normal), the matrix shows the support relationship between courses and graduation requirements. The third-level indicators in the four second-level indicators of teaching skills, scientific research literacy, innovation literacy, and lifelong learning, which are summarized as 3.3 Innovative teachings, 5.2 Exploring new knowledge, 6.1 Innovative knowledge learning, and 8.2 Innovation Awareness training, are primarily well supported by the Geomorphology. The following specific training strategies are suggested in light of the aforementioned graduation requirements as well as the present issues with innovative thinking training:

##### **4.1 Innovative Teaching Model Emotional Communication and Integration**

Teachers must foster a particular emotional climate for their students to allow them to develop divergent thinking in a particular circumstance and learn to think about particular topics in a variety of ways. This emotional climate is a prerequisite for encouraging inventive thinking and practical competence. Once this situation has been established, teachers must maintain control over the classroom, timely integrate ideological and political aspects, and direct innovative thinking exercises based on ethical principles. According to the teaching material for the geomorphology course, a "student-oriented" classroom teaching method is developed based on the after-class preview and online learning platform.

Over time, the traditional teacher-speaking mode gave way to one in which students speak and learn. Teachers set key points or key issues of the course's teaching material for students to discuss, and they are problem-oriented. Gradually develop diverse thinking in your students by drawing on their discussion of issues and way of thinking. Encourage your kids to "question" things, think critically, and engage in a constant process of affirmation, denial, and affirmation. To encourage students' inquiry and creation during this time, there must be "tolerance" for mistakes <sup>[16]</sup>.

##### **4.2 Explore New Knowledge Typical Case Analysis and Expansion**

Teachers introduce unique engineering situations to help students develop diverse thinking. The teacher may, for instance, use various images and examples to guide students as they analyze and summarize the internal factors and triggering factors of slope landform disasters like collapses and landslides during teaching the formation and evolution of slope landforms. The internal elements and conditions of slope landforms should be addressed in detail when discussing individual engineering scenarios due to the variations in the types of catastrophes and the generated landforms. Through independent thought, students can determine the interaction of internal and external forces, which can then prompt the

slope disasters model.

Then, teachers must broaden and deepen the aforementioned thought exercises by posing the query, "How to prevent and control slope disasters"? Students' ideas about "how to prevent and treat" are stimulated to increase their enthusiasm for learning new information. The instructor kept presenting the fundamental ideas and strategies for preventing and controlling slope disasters based on typical scenarios at this point. Likewise, consider the engineering approaches of prevention and control for certain situations. After class, invite the students to research failures of other engineering management projects and assess the factors that led to them. To meet the goals of case analysis of innovative thinking and discovery of new knowledge, such a step-by-step teaching technique then builds an entire process of thinking activities.

#### **4.3 Innovative Knowledge Learning Group Discussion on Differentiated Themes**

Classroom discussion topics just outline the topic range; each group chooses its specific discussion topics. Through group collaboration, students gather knowledge and analyze sources. Following a lengthy debate, the group members share their perspectives, choose the final issue, delve deeply into the significance and background information of the discussion topic, and at the same time summarize and refine it to progressively build their own opinions. The group will answer questions from the class while present on its research topics. The team members learn the materials and basic knowledge points prepared in the early stage, apply them to explain and answer various questions and complete the three stages of knowledge perception-knowledge formation-knowledge application. After class discussions, students are efficiently educated to learn novel knowledge in addition to improving their mastery of theoretical knowledge.

#### **4.4 Developing Innovation Awareness Reading and Analyzing Chinese and Foreign Literature**

Reading the most recent works of Chinese and international literature is one of the most efficient ways to actively encourage students' capacity for self-learning and to broaden the shift from conventional to innovative thinking. The most recent information or novel theoretical framework made available by the translation of foreign literature is crucial in advancing the subject beyond the students' limited comprehension of textbook knowledge. It can increase students' interest in actively exploring science, produce fresh ideas or points of view, and attempt to put this cutting-edge technology into practice.

Reading and translating the most recent foreign literature in groups helps students develop their ability to reconstruct basic knowledge concepts, improve their literary analysis skills, advance their path toward forming innovative knowledge, and consciously develop innovative thinking awareness. After reading a lot of literature, it successfully stoked students' interest in publishing research papers or competing in numerous competitions.

### **5. CONCLUSION AND SHORTCOMINGS**

This paper presents a training mode for innovative thinking in geomorphology course teaching based on the training plan of talents, summarizes the existing issues with cultivating innovative thinking in traditional teaching, and does so based on an analysis of the psychological process of the formation of innovative thinking. The following are the primary conclusions:

First and foremost, teachers must foster an environment of emotional communication while in teaching mode. They must also be problem-oriented, encourage students to ask questions, dare them to "question," gradually develop

divergent thinking, and lay the groundwork for psychological exercises that will lead to the development of innovative thinking. Secondly, in terms of teaching methods, through the three stages of exploring new knowledge, learning innovative knowledge, and forming the habit of innovative awareness, the teacher will gradually give way to the students to learn. Through the process of typical case analysis and expansion, differentiated theme group discussions, and reading and explanation of Chinese and foreign literature, it promotes the complete psychological process of innovative thinking from formation-practice-application-habit, to achieve the goal of training talents.

Naturally, only a small amount of innovative thinking training can have a significant impact on a person's ability to think creatively. However, there is still an opportunity for the development of innovative thinking as long as the course instruction is continuously awakened and educated, which necessitates the collaborative efforts of course groups or professional teachers to meet the goal of fostering inventive abilities.

## **ACKNOWLEDGMENTS**

This project was funded by the Teaching Reform Project of GDUPT (234611).

## **REFERENCES**

1. Li Q., *On the cultivation of students' innovative thinking*[J]. *Exploration and Contention*, 2008, 12: 88-89
2. Golann S.E., *Psychological study of creativity*[J]. *Psychological Bulletin*, 1963, 60: 548-565
3. Wang C.W., Wu J.J., Horng R.Y., *Creative thinking ability, cognitive type and R&D performance*[J]. *R&D Management*, 1999, 29: 247-254
4. Guilford J.P., Christensen P.R., *The One-Way Relation Between Creative Potential and IQ*[J]. *The Journal of Creative Behavior*, 1973, 7: 247-252.
5. Wang Y.X., *Creative Thinking*[M]. Jilin: Jilin People's Publishing House, China, 2010, 5-14.
6. Zhou Z.X., *Creative Thinking Theory and Methods*. Shenyang: Liaoning University Press, China, 2010, 1-164.
7. Kulsum S.I., Hidayat W., Wijaya T.T., Kumala J., *Analysis On High School Students' Mathematical Creative Thinking Skills on The Topic Of Sets*[J]. *Journal Cendekia: Journal Pendidikan Matematika*, 2019, 3: 431-436.
8. Nuraini D.R., Kusmayadi T.A., Fitriana L., *Mathematics problem solving based on Schoenfeld in senior high school students*[J]. *Journal of Physics: Conference Series*, 2019, 1318: 012093
9. Tan S.W, Zou L.J, Wijaya T.T, Dewi N.S.S., *Improving Student Creative Thinking Ability With Problem Based Learning Approach Using Hawgent Dynamic Mathematics Software*[J]. *Journal On Education*, 2020, 2: 303-312.
10. Chen L.K., Deng S.F., Ji H., Wang J.Y., *Research on creative thinking and practical ability cultivation of "Geomorphology" course* [J]. *IMPACT: International Journal of Research in Humanities, Arts and Literature*, 2022, 57-62.
11. Li H., *The role of modern educational technology in cultivating creative thinking ability of college students*[J]. *Heilongjiang Higher Education Research*, 2014, 6: 127-129.
12. Zhang J.S., Qin J., Li Y., *Cultivation of creative ability for college students based on problem based learning*[J].

- Education and Career*, 2013. 23:175-176.
13. Rachmawati A.D., Baiduri B., Effendi M.M., *Developing Web-Assisted Interactive Media to Improve Mathematical Creative-Thinking Ability*[J]. *Al-Jabar Jurnal Pendidikan Matematika*, 2020.11:211-226.
  14. Yu G., *Exploratory learning and the cultivation of adult innovative thinking ability*[J]. *Chinese adult education*, 2016.18:13-15.
  15. Zhang R., *Research on the Status Quo of Innovative Talents' Innovative Quality and Its Influence on Creativity in HEIs: The Case of National Challenge Cup Winners*[J]. *Fudan Education Forum*, 2019,17:55-62.
  16. Jin W., "Tolerant" teaching and learning: on the cultivation of innovative thinking in college teaching[J]. *Jiangsu Higher Education*,2021,5:72-78.
  17. Elias MJ, Arnold H 2006.*Emotional Intelligence and Academic Achievement. Social emotional Learning in the Classroom. California: Corwin Press, Thousand oaks: Sage Publications.*
  18. Goleman D 1995. *Emotional Intelligence: Why it Matters More Than IQ?* New York: Bantam Books.
  19. Boyatzis RE 2008. *A Twenty Year View of Trying to Develop Emotional, Social and Cognitive Intelligence Competencies in Graduate Management Education. Journal of Management Development*, 27(1): 92-108.
  20. Singh Dalip 2003. *Emotional Intelligence at Work: A Professional Guide. New Delhi: Sage Publications.*

