Original Research Article

~~Research on the~~ Cognitive Level of Preservice Mathematics Teachers Towards the "Pseudo-Understanding Phenomenon"

Abstract: The phenomenon of students "pseudo-understanding" has attracted widespread attention, and many scholars have conducted research in this area. However, there is no research on the cognitive level of preservice mathematics teachers towards the "pseudo-understanding phenomenon."This study employed the method of questionnaire surveys to investigate the cognitive understanding of 31 preservice mathematics teachers (including both master's students in education and undergraduate mathematics majors) at a university.Data analysis reveals that most participants attribute the phenomenon to students' superficial understanding, failure to apply knowledge, and lack of practice. To address this, they suggest increasing practice, summarizing problem-solving methods, and encouraging more frequent review.This indicates that the current preservice mathematics teachers have a relatively limited understanding of the causes and solutions to the "pseudo-understanding phenomenon," only recognizing some of the reasons and solutions from the students' perspective, with an incomplete understanding, and neglecting the impact of teachers on students, showing a cognitive bias. The findings underscore the need for improved training in university and graduate courses to equip future educators with effective teaching strategies.

***Keywords*:** Preservice Mathematics Teachers, Pseudo-Understanding, Cognitive Level

1. INTRODUCTION

In the process of mathematics teaching, students commonly exhibit a phenomenon: they can understand the teacher's explanation in class, but they are unable to solve problems without any ideas, also known as the "pseudo-understanding phenomenon." Studying this common educational phenomenon is of great significance and value for improving students' learning outcomes and the quality of teaching. Although many scholars have conducted research in this area, there is no research on the cognitive level of preservice mathematics teachers towards this phenomenon. Preservice mathematics teachers have a dual identities as future educators and students.Their understanding of the "pseudo-understanding phenomenon" in current mathematics teaching affects both their academic

development and the cultivation of students' abilities after they engage in education.Understanding the cognitive level of preservice mathematics teachers towards the "pseudo-understanding phenomenon" helps to promote the development of future education; thus, further research from a new perspective is necessary for this phenomenon.

2. REVIEW OF LITERATURE

In the process of mathematics teaching and learning, the "pseudo-understanding" of students is a common phenomenon that has long received attention, involvingdifferent stages from primary school to high school and even adult education for teachers. Existing researchers are mostly primary and secondary school teachers, with research mainly focused on the analysis of the causes of students' "pseudo-understanding" and suggestions for countermeasures. A few researchers have discussed the relationship between listening to lectures and problem-solving from the students' viewpoint, some have approached the issue from a psychological angle, and others have analyzed the performance of students at different levels within this phenomenon.

Chen Qingqing, Nie Yongqi, and others have analyzed the reasons for the occurrence of "pseudo-understanding" in primary schools and proposed solutions**Error! Reference source not found.**1. Song Meili, Wang Ronghui, Wu Yujin, and others have investigated and analyzed the reasons for the widespread "pseudo-understanding phenomenon" among middle school students in mathematics learning and proposed specific countermeasures for improvement**Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.**. Yu Jianxi has sought solutions from both "teaching methods" and "learning methods" for the widespread "pseudo-understandingphenomenon" among vocational college students in mathematics learning**Error! Reference source not found.**. Qin Maogu analyzed the reasons for the existence of the "pseudo-understanding phenomenon" among vocational students in mathematics learning and proposed countermeasures**Error! Reference source not found.**. Yang Yunping analyzed the reasons for the "pseudo-understanding phenomenon" in the "Mathematical Analysis" course for adult mathematics education majors in normal universities and proposed countermeasures**Error! Reference source not found.**.Zhang Yongchang, Liu Yongxia, and others have analyzed the reasons for the "pseudo-understanding phenomenon"**Error! Reference source not found.Error! Reference source not found.**, Chen Lili, Cao Mei, Shao Chunyan, and others have proposed suggestions for changing the "pseudo-understanding phenomenon"111213, and Jiang Fengchun, Wu Yang, Dai Chengfang, and others have analyzed the "pseudo-understanding phenomenon" and proposed specific countermeasures for improving teaching methods and guiding students' learning of mathematics141516.

Chen Qingqing and Zhu Qian have divided the thinking of students who understand but cannot do when they listen to courses into levels: pretending to

understand; understanding the theoretical knowledge but not being able to do variant problems; understanding the theoretical knowledge but not being able to do application problems; understanding the theoretical knowledge but not being able to solve real-life problems. They further point out the need to carry out teaching in layers, improve the pertinence of classroom teaching, make teaching practice more targeted, and facilitate teaching students according to their aptitude**Error! Reference source not found.**17. Liu Yongwan and Zhang Qi have approached the research from a psychological perspective, provided specific cases, and then conducted surveys and analyses to conclude that students' inner thoughts include "I don't know what method the teacher taught just now,""I don't know which method to use,""I don't know where my method is wrong,""I forgot," and finally, based on the students' problems, they proposed solutions to make them realize that when students encounter difficulties in learning, teachers should not only think about the students' problems but also consider that this may be a problem with the teachers' methods and learning materials, and then improve18. Liu Na started with a practice problem, conducted a mini-questionnaire survey, and found that students' understanding and problem-solving exactly fall into four different types: "can understand and solve problems, can understand but cannot solve problems, cannot understand but can solve problems, cannot understand and cannot solve problems," and compared and analyzed each type of student19.

From the above research, it can be seen that there have been many studies on the "pseudo-understanding phenomenon," but it is also evident that few people have started from the perspective of preservice mathematics teachers to study this group's cognitive level of this phenomenon. Preservice teachers will play a leading role in students' learning path in the future, and their understanding of the "pseudo-understanding phenomenon," including how to recognize the reasons for the occurrence of the "pseudo-understanding phenomenon" and solutions, will have a great impact on students' learning development. It is not difficult to see that the cognitive level of preservice teachers towards the "pseudo-understanding phenomenon" is an important factor affecting students' mathematics learning. Based on this, the purpose of this paper is to understand the current cognitive level of preservice mathematics teachers towards the "pseudo-understanding phenomenon" through surveys.

3. THEORETICAL FOUNDATION

Pre-service mathematics teachers refer to individuals who have not yet officially become mathematics teachers but are undergoing relevant education and training in preparation for entering the teaching profession. This group typically includes students majoring in mathematics at normal universities, education master's degree holders, and those who are preparing to engage in mathematics teaching through other pathways (such as non-education majors obtaining teaching qualifications).

Regarding the so-called "understanding" in "pseudo-understanding," it refers to "knowing" and "understanding," which is a basic realm of student learning20. It

means that students in the classroom can understand the knowledge and methods taught by the teacher without cognitive obstacles21, but they understand the places they did not think of under the teacher's guidance, not as a result of independent thinking22, and such "understanding" depends on the teacher. "Pseudo-understanding" refers to "not understanding" and "not comprehending," which is manifested in only being able to understand the content taught by the teacher but not being able to speak (knowing not only what but also why), recognize (seeing through the phenomenon to the essence), and do (being able to draw inferences and learn by analogy), which is a higher realm that students' learning should pursue. "Understanding" is just the beginning and foundation of being able to do, which is relatively easy to achieve, while "true understanding" requires students to construct "their own understanding" in the process of skilled operation and continuous reflection, and need to internalize it into their own ability on the basis of mastering the essence of knowledge. "Pseudo-understanding" refers to understanding under the teacher's guidance or prompts, along the route designed by the teacher, and when faced with slightly more complex problems in an unfamiliar situation, without the teacher's inspiration, they will feel at a loss and struggle to proceed20.

Regarding the reasons for the occurrence of the "pseudo-understanding phenomenon" and how to change this phenomenon, there have been many studies by predecessors. Wu Yang believes that teaching is a bilateral activity process between teachers and students, with teachers being external factors and students being internal factors15. Dai Hongxiang analyzes the reasons from the perspectives of students and teachers, and finds ways from the "teaching methods" and seeks solutions from the "learning methods." Zhao Yuzheng, Li Chunlan, and others point out that since students can "understand," it indicates that there is no problem with the teacher's grasp of knowledge, so the key to this external condition is the classroom, pointing out that teachers should ake students' original knowledge as the basis in the classroom and guide them to a higher level of "understanding" - learning mathematical thinking methods, knowing how to think, analyze, and operate, so that students "can speak,""can recognize," and "can use" will naturally follow23.

Summarizing theabove research, it is generally believed that the main reasons for students' "pseudo-understanding phenomenon" are students and teachers, from the viewpoint of students, there are several aspects: (1) lack of initiative and planning in learning (2) lack of interest and motivation in learning (3) lack of concentration during lectures, lack of thinking (4) lack of timely consolidation, forgetting what has been learned (5) weak awareness of homework, perfunctory. From the perspective of teachers, it is reflected in the following aspects: (1) teaching methods are not appropriate, teaching concepts are outdated, and "infusion teaching"(teachers unilaterally impart knowledge to students, who passively receive it, lacking independent thinking and interaction) is adopted, leaving no space for students' independent thinking (2) teachers do not take students' original

knowledge as the basis in the classroom and guide them to learn mathematical thinking methods, knowing how to think, analyze, and operate. Regarding how to change the situation of students' "pseudo-understanding phenomenon," it should also be viewed from the perspectives of students and teachers. From the perspective of students: (1) strengthen the initiative of learning and develop the good habit of previewing (2) be diligent in learning, and focus on cultivating interest in learning mathematics (3) firmly grasp the important link of lectures and truly understand the course (4) actively participate in mathematics learning activities before and after class, independently complete learning tasks, and develop the good habit of conscious review (5) focus on basic skills training and expand knowledge. From the approach of teachers, it is mainly reflected in the following aspects: (1) change educational concepts, improve teaching methods and models (2) strengthen guidance on students' learning methods, stimulate students' interest in learning mathematics (3) teach students to learn, correctly guide students in problem-solving, and focus on cultivating students' self-learning ability and innovative ability (4) let students be the masters of the classroom, guide students to use their brains, mouths and hands.

4. RESEARCH METHOD

4.1 Sample

In order to truly reflect the cognitive level of preservice mathematics teachers regarding the "pseudo-understanding phenomenon," this study conducted detailed planning during the research design phase. The target population of the study was preservice mathematics teachers, specifically including students from the Master of Science Teaching (Mathematics) program and undergraduate students in the School of Mathematics and Statistics at Shandong Normal University. These students are all in the training phase of teacher education, and after investigation, it was found that these students clearly stated their future career intention as becoming teachers, and thus could effectively represent the cognitive level of future mathematics teachers.

In terms of sampling design, this study employed purposeful sampling techniques, selecting a total of 31 students from the Mathematics Teaching Master's program and undergraduate students in the School of Mathematics and Statistics at Shandong Normal University for the 2024 academic year as the research subjects. This sampling method ensures that the sample is targeted and representative.

The reasons why this research design and sampling method are suitable for this study are as follows: First, Shandong Normal University, as a comprehensive normal university, has a well-established pre-service teacher training system in its School of Mathematics and Statistics, and studentsare representative. Second, purposeful sampling can precisely target the target population, ensuring that the sample is highly relevant to the research question. Finally, by including students at both the master's and undergraduate levels, the study can more comprehensively

reveal the cognitive characteristics of pre-service mathematics teachers at different educational stages.

4.2 Tools

This study employed a questionnaire survey method, using an unstructured questionnaire. The questionnaire contained three questions: "1. Have you ever encountered a situation where you can understand in class but cannot solve problems without any ideas, that is, 'understand upon listening, fail upon doing'? If so, how often does this happen? 2. What do you think is the cause of this problem? 3. How do you think this problem should be solved?"The first question provided an explanation of the "pseudo-understanding phenomenon," making the question clearer. The three questions were designed around the core issue, serving the research objective and ensuring the rationality and relevance of the questionnaire content. The questions could guide the respondents to think and express themselves deeply, understanding the true level of preservice mathematics teachers' cognitive understanding of the "pseudo-understanding phenomenon."The questionnaire was self-developed. The questionnaire survey method is used because it is convenient and fast, and the use of open-ended questions allows the surveyed to freely express their ideas, feelings, and opinions without being limited by preset answers, which can deeply explore their cognition of the "pseudo-understanding phenomenon" and ensure the objectivity and independence of the answers.

4.3 Data Collection

To ensure the reliability of the research, electronic questionnaires were distributed online to the 31 research subjects.

4.4 Data Processing

First, conduct data cleaning by checking for irrelevant responses and removing them.Next, encode the responses. Categorize the responses into two aspects based on the content: students and teachers. The reasons for the emergence of the "pseudo-understanding phenomenon" according to the surveyed were indicated by capital letters, and the solutions to the phenomenon were indicated by lowercase letters. Then, perform thematic analysis by carefully reading all responses, marking recurring words, and classifying them into several core themes to better understand the survey results.Finally, quantify the findings by recording the frequency of different content and making a statistical table.

5. RESULTS

5.1 Cognitive Analysis of the Causes of "Pseudo-Understanding Phenomenon"

Through Question 1 of the questionnaire survey, it was found that 100% of the surveyed had encountered the "pseudo-understanding phenomenon," with 61% of the surveyed indicating that they encountered this situation quite often, indicating

that most preservice mathematics teachers often encounter the "pseudo-understanding phenomenon."

Most people believe that the "pseudo-understanding phenomenon" is mainly due to students' reasons, specifically: superficial understanding of knowledge, not applying knowledge to solve problems, and lack of practice. Among them, 55% of the surveyed believed that the "pseudo-understanding phenomenon" is due to students' superficial understanding of knowledge, 35% believed it is due to students' not applying knowledge to solve problems, and 32% believed it is due to students' lack of practice. Details are shown in Table 1.

Table 1 Summary of the Causes of "Pseudo-Understanding Phenomenon" Survey

Classification	Reason	Percentage
	Not deeply understanding	55
	Not applying knowledge to solve problems	35
	Lack of practice	32
	Insufficient mastery of knowledge itself	16
Students	Limited problem-solving ideas	10
	Not thinking actively	10
	Questions are flexible	10
	Not paying attention in class	6
	Not reviewing in time	6
	Lack of experience in problem-solving	6
	Knowledge confusion	3
Students		
	Not knowing their own problems	3
	Questions involve knowledge they don't know	3

Classification	Reason	Percentage
	Having doubts about the format or steps of problem-solving	3
	Course difficulty is high	3
	Not establishing a network between knowledge points	3
	Mathematical comprehension ability is not strong	3
	Not truly internalizing knowledge into their own knowledge system	3
	Mathematical thinking is not flexible	3
	Teachers' explanations are too theoretical, no problem-solving assistance	6
Teachers	Teachers' examples in class are too singular	6
	There is a gap between the content taught by teachers and the problems solved	6

5.2 Cognitive Analysis of Solutions to the "Pseudo-Understanding Phenomenon"

From the survey results, it can be seen that most people believe that to change the "pseudo-understanding" phenomenon, solutions should also be proposed from the students' viewpoint: increasing the amount of practice, summarizing problem-solving methods, and reviewing more frequently. Among them, 55% of the surveyed believed that increasing the amount of practice can change the current situation of the "pseudo-understanding phenomenon," 26% believed that summarizing problem-solving methods can change the current situation of the "pseudo-understanding phenomenon," and 26% believed that reviewing more frequently can change the current situation of the "pseudo-understanding phenomenon." Details are shown in Table 2.

Table 2 Summary of Solutions to the "Pseudo-Understanding Phenomenon" Survey

Classification	Reason	Percentage

Classification	Reason	Percentage
Students	Increasing the amount of practice	55
	Summarizing problem-solving methods	26
	Reviewing more frequently	26
	Previewing	16
	Thinking actively	16
	Understanding derivation proofs, concept analysis, precautions, etc., more profoundly	13
	Communicating actively with classmates and teachers when encountering problems, seeking help	13
	Doing it independently	6
	Checking and making up for omissions in a timely manner	3
	Paying attention to details	3
	Organizing classroom content in a timely manner, organizing notes	3
	Remembering knowledge firmly	3
	Strengthening post-class practice and consolidation	3
	Clarifying the principles of problem-solving methods	3
Students	Reading more proof answers	3
	Deriving the difficult points in class again	3

Classification	Reason	Percentage
	Accumulating knowledge not learned	3
	Doing some basic exercises, trying to do more comprehensive problems	3
	Clarifying the basic definitions and principles of related problems	3
	Listening attentively in class	3
	Learning problem-solving thinking	3
	Familiarizing with textbooks	3
	Establishing a knowledge network	3
	Doing high-difficulty problems	3
	Learning to read questions, understanding the meaning of questions	3
	Teachers explaining typical examples	19
	Teachers using heuristic teaching, providing appropriate thinking space for students	13
	Teachers paying more attention to summarizing	6
Teachers	Teachers using various teaching methods	3
	Teachers explaining similar types of problems	3
	Teachers focusing on cultivating students' problem-solving ideas, skills, methods, and mathematical thinking	3
Teachers	Teachers first explaining simple problems,	3

Classification	Reason	Percentage
	then conducting variation exercises	

6. DISCUSSION

6.1 Cognitive Analysis of the Causes of "Pseudo-Understanding Phenomenon"

From the above data analysis, it can be seen that the current preservice mathematics teachers believe that the reasons for the occurrence of the "pseudo-understanding phenomenon" mainly include: superficial understanding of knowledge, not applying knowledge to solve problems, and lack of practice, all of which look for reasons from the students' perspective, and few can find reasons from the teachers' viewpoint.

Understanding is the premise of applying knowledge. When the understanding of knowledge is not profound and the level of mastery is not enough, it is impossible to use knowledge to answer questions. However, the cognition of preservice mathematics teachers is not comprehensive enough. The underlying reason for students' superficial understanding of knowledge is also tied to the teaching methods of teachers.Teachers' teaching concepts are outdated, and the adoption of "infusion teaching" does not inspire students' thinking well24, which also fails to achieve a profound understanding of knowledge. Most preservice mathematics teachers believe that students' "not applying knowledge to solve problems" is one of the reasons for the occurrence of the "pseudo-understanding phenomenon," but this cognition is not comprehensive. This reason seems to be limited to students' own mathematical thinking level, but it is actually closely related to the teachers' explanation methods. Teachers do not pay attention to teaching method thinking when explaining related problems, but only inscribe knowledge, making students unable to understand how to think, analyze, and operate23. When students encounter new problems, it is inevitable that they cannot solve them. The reason for "lack of practice" has some irrationality. If students only increase the amount of practice without reflection, then the problems they do are meaningless and they still cannot reach the level of "being able to do."Solving mathematical problems is only part of the process; reviewing and reflecting afterward is equally important.At the same time, preservice mathematics teachers do not have a comprehensive understanding of the aspects mentioned earlier, such as students' low initiative, lack of interest, lack of thinking, and not consolidating in time. Current preservice mathematics teachers are more accustomed to looking for reasons from students and cannot view it well from the teachers' perspective. This way of thinking will affect preservice mathematics teachers' teaching of class students after they become teachers, and they may not be able to improve and enhance students' performance from their own perspective.

This shows that the current cognition of preservice mathematics teachers regarding the causes of the 'pseudo-understanding phenomenon' is shallow, and they fail to explore the root causes.Most of them look for reasons from the students' perspective, with an incomplete understanding, neglecting the impact of teachers on students, showing a cognitive bias.

6.2 Cognitive Analysis of Solutions to the "Pseudo-Understanding Phenomenon"

From the above data analysis, it can be seen that the current preservice mathematics teachers believe that the measures to solve the "pseudo-understanding phenomenon" mainly include: increasing the amount of practice, summarizing problem-solving methods, and reviewing more frequently, all of which look for solutions from the students' viewpoint, and few propose solutions from the perspective of teaching.

Remembering and mastering knowledge is the prerequisite and foundation for students to be able to do problems. Only by mastering and remembering the knowledge points can they further learn to apply them. Current preservice mathematics teachers believe that "summarizing problem-solving methods" is an effective measure to change students' "pseudo-understanding phenomenon." This cognition is not comprehensive. Summarizing problem-solving methods can help students sort out their problem-solving ideas and draw inferences, but it is indispensable for teachers to guide the problem-solving methods and skills, and to carry out targeted explanations25, to avoid students from blindly summarizing, increasing their learning burden, and causing confusion in their thinking. Preservice mathematics teachers believe that "increasing the amount of practice" can change students' "pseudo-understanding phenomenon."This belief is largely flawed.Simply increasing the amount of practice without summarizing and reflecting, just practicing without connecting it with knowledge points, still cannot solve new problems when encountered, and blind problem-solving will make the problem-solving thinking more confused. Preservice mathematics teachers do not have a comprehensive understanding of aspects such as strengthening students' initiative in learning, cultivating students' interest in learning mathematics, changing educational concepts, improving teaching methods and models, and strengthening guidance on students' learning methods.

From this, we can see that the current preservice mathematics teachers' cognition of the solutions to the "pseudo-understanding phenomenon" is relatively limited.

7. CONCLUSION

Through a questionnaire survey of 31 education masters and undergraduate students, this study investigated the current cognitive level of preservice mathematics teachers towards the "pseudo-understanding phenomenon." It was found that most people believe that to change this phenomenon, changes should be made from the students' perspective. It can be seen that the current preservice mathematics teachers' cognitive level of the causes and solutions to the

"pseudo-understanding phenomenon" is relatively limited, only recognizing some of the reasons and solutions from the students' viewpoint, with an incomplete understanding, and neglecting the impact of teachers on students, showing a cognitive bias.

From the above conclusion, it is recommended that training be enhancedin university and graduate courses to make preservice mathematics teachers realize that there are methods to change the "pseudo-understanding" phenomenon and to learn the related methods, such as when teachers explain a certain problem or method, they should first demonstrate it to the students, then explain and describe the related steps in writing, tell the students how to do each step, and then let the students practice a simpler problem than the demonstrated one according to the above steps, and finally gradually increase the difficulty and speed to make students learn to learn.

The research subjects of this survey are 31 education masters and undergraduate students, with a small sample size, and are concentrated in the same university, with a narrow sample selection range.In addition, the self-reported data used in the study may be subject to potential biases. Therefore, it is necessary to broaden the research sample in future studies, conduct more comprehensive surveys and analyses, and use a variety of research methods to gain a more comprehensive and detailed understanding of the cognitive level of preservice mathematics teachers towards the "pseudo-understanding phenomenon."

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

REFERENCES

1. Chen Qingqing. (2021). Analysis of the thinking levels of the "understanding but inability to perform"phenomenon in primary school mathematics teaching. In Proceedings of the 2021 Education Innovation Network Conference (Vol. 3, pp. 703-705). Gaqiao Primary School, Xiaoshan District, Hangzhou, Zhejiang Province; doi:10.26914/c.cnkihy.2021.007441. https://link_cnki_net.libwg.sdnu.edu.cn/doi/10.26914/c.cnkihy.2021.007441
2. Nie Yongqi. (2022). Analysis and reflections on the phenomenon of "understanding but inability to perform" in primary school mathematics learning. Mathematics World (Late Edition) (05), 74-76. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=x0sJsLzXXbg1Canuqf6uD1PELTO4hzYg6ylQUzqgRlEjIVP9GL5wMdPquyUBlB3K7XW_DArn6Mi7Rgc6Ld9ycXRCu-4uhM-y0Efxe8aQ0snhcNSQB9EhDn6A5phUv

PSDR1cqKYOjlBnaOSrbo5SN4UHrl9pr83XR9JArC7F8ToySgF9C-2toy4sa1G44KNwrOxah88sPJDk=&uniplatform=NZKPT&language=CHS

3. Song Meili. (2024). Exploration and research on the "understanding but inability to perform"phenomenon in the context of core literacy—taking variant teaching in senior high school review as an example. Mathematics Teaching Communication (36), 84-86. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=x0sJsLzXXbgKej2qCOwgAmmPXHLj4_-eoCvLBKrhJ1DNpdYBgzg48KFWG3MzuoTUmHT4GSmRnjRW_Yf4V049qQ23SL-F632I-FBwN_z3a8WePSJruUYlvYsg_ZqfDqZJVvemkAkIIlrrVr88L_KDKm15H4M6rvhl4gtT1SVS2RA9csRpfGdBUr0dAAssOAyk&uniplatform=NZKPT&language=CHS
4. Wang Ronghui. (2023). Causes and countermeasures of the "understanding but inability to perform"phenomenon. Middle School Teaching Reference (02), 22-24. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=x0sJsLzXXbhjGaKX7eOxLRYJOQtedHLar_iFuyTq4Axdgte348vALSB5yVXnTWypPpGSQlvlWHHaXNMoF-7IpG3VRvyD57xmrnN-SyTP0VE98nFxwkXWO2qszHXJbOf1htHDfBrthek0AhqzM1hygDP9aGbPMnyi4etu6Ek746LqyU6hbD4qbzGYJJEzVvw5dwDXRL6iuKw=&uniplatform=NZKPT&language=CHS
5. Wu Yujin. (2021). Causes and countermeasures of the "understanding but inability to perform"phenomenon in mathematics learning. Seeking Learning (47), 43-44. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=x0sJsLzXXbj27XqlaEvj7KV2K_8Mu5FPRapjF4cukBQttLAdl4UM7cxvKRjvtZtXyYylJmj9c3OYZC6ORjCkpk6cFbgAXjx6rbcOzGgsyZihSKeeAabeTnuVGP_7O7mrUayK3EfRs1V9GzqWqBSVPnXBGZ7wrBcgWlPahpDfVDbCVOBp1UgC0RDAv4tZQVoNiFDXyZ4p46c=&uniplatform=NZKPT&language=CHS.
6. Yu Jianxi. (2008). How to improve the mathematics problem-solving ability of vocational college students. Henan Education (Higher Education Edition) (09), 60-61. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyCxsd9gqrBW8tWVsdce2oO0m3sC3YPh68c-qFPxD5g8PhFETyKHXeuY5GDAXMLi9FKgjesnDVFJUQMaLMyxiZKHPZatUdm40MuSm4UBVHeLhLq3H_DyE4I14SHF3eFdAwSh1gSc-OHIj8I2f5VDTXlPqXPnBq0pt8VcrqDFK0WA6YfSN9HuQG1e&uniplatform=NZKPT&language=CHS
7. Qin Maogui. (2008). Investigation and analysis of the reasons why vocational high school students "understand the class but cannot solve problems" in mathematics. Examination Weekly (14), 41-42. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyB-nIQ2qtRRqqGxQzDfhk_pvw8cW_kfSVRAiJrGPiR74UXIWg_eZorLInGZuj3ql_pv0yAL1djZdRNfZViGwbXvpozA0bsmM-iQzjdHD4Qc-uRk0uzoLNaSCFFyjFFKjmO5tNrft5eYCiY9LR0Qec30fHke5hKnWQz7BREuVgKUIGisuMgDJQjX&uniplatform=NZKPT&language=CHS

8. Yang Yunping. (2003). Reasons and countermeasures for "understanding the class but being unable to solve problems" – on the cultivation of problem-solving abilities in mathematics teaching for adult students in normal universities. Adult Education (Z2), 78-79. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyDNemI_bWgMsX8HfP6bjyWhZ3fwMFG0Nhfix8H4w3ComgoFxHy4kDdF-HLwZtwB8zHQ2Vw90lauY9jn7wccr13PprvMSByw6ftxUP-ybGR2_wSCUEjL2FK4i2Wlp2MFT3wykpslIBbFpp0HO-O7K8AJRoHa5xTUHtrKZnj91MKu1UzOEiv_dtKc&uniplatform=NZKPT&language=CHS
9. Zhang Yongchang. (2024). Analysis of the "understanding but inability to perform"phenomenon from the perspectives of teachers and students. Mathematics Teaching Communication (24), 71-73. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=x0sJsLzXXbjCmmLVoSoMs-AfikTW1X7EIjpQDBAiFyALE6Li5TZHGdwKjO-POBOgkFaXpySLO1faOIeQQdgRVuvILUZ2trBNhPwylAalmPk3n4HtD1OHpY88I_mavgbiMLmFbrUrf9OVx-d5IL48E8VCIhOx5p41DsO8lzDPmO2sn0aWZSvi5oRRgeQ7KxxXQPf_kra5miA=&uniplatform=NZKPT&language=CHS
10. Liu Yongxia. (2022). Enhancing the understanding of "learning to comprehend" to avoid the risk of "inability to perform". Mathematics Teaching Communication (36), 64-65. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=x0sJsLzXXbg0mJreY5SDdlsKoTa-F8_5tOURdB-mO-XqVECWyCvw4iyxh1Eh3ELMqNhjlaY1E9SFvagT0paebYiZrBvxp80JlyA-Ot54zXqmOGno-oScZC5B87_44QaDD2FkpzLi6br2w253Kt97jFB5wGnmgiE31gW0nomz8vX4EV_HVjNgaeX-Teuwk4sGRGbLHysEwqU=&uniplatform=NZKPT&language=CHS
11. Chen Lili & Li Haijun. (2023). A discussion on how to eliminate the "understanding but inability to perform"phenomenon in mathematics learning. Mathematics Communication (24), 28-30+45. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=x0sJsLzXXbh1jtyQT21l2NyOH7TutZQEtQu2q1g7UFPPWKcinTtCDGiEZfmu4Xrn9Ag-3xTKtJf7EnqjQlYuF7CSIbbjW6c6lfRzRpvS9-p81kUPyz55qocyj7NaEU_MTpixozJLbJGUv85qFqo8xXLqhfpZeZhOtpLMxrhPNE7TL9ntZFJ6V-7ppVYH5wJ7z1vXtWXyP9A=&uniplatform=NZKPT&language=CHS
12. Cao Mei. (2023). On the "understanding but inability to perform"phenomenon in mathematics education—taking the teaching of "properties of logarithmic operations" as an example. Mathematics Teaching Communication (36), 36-38. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=x0sJsLzXXbiR3Fs-5JOnInnW2SVWVAoE4BpZ1V29i5qsDsTb8JFmOd8kBcD2tlS4MwwUVkdTnbeeLqXzUY3QfpXu5Rtq3ybCSFLemIuVcXMxh320HDAO8y0pSb_4tP9cWi55HYvm_k-drbqSOFVtOvK00z4C2zsQA1q1W09S6nHENAsW9Y4ltdgBn2yEUVoJVHEYGHuL6oo=&uniplatform=NZKPT&language=CHS
13. Shao Chunyan. (2023). Breaking through the "understanding but inability to perform" to improve problem-solving efficiency. Middle School Mathematics (05), 60-61.

https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=x0sJsLzXXbhdboPLoV6qIzwhqcZ5QsoXyVJFTL02MrgExfeNyFJuTLGKsXfX3AVwy_Qt6__LbfT9DDAKx_uv3md7YspxkNB-6zoz7mGqjH6cxJ4nVKsev2KO4ivlJygTnf-hSue2Rvsyootjl0mf3Sp87PMyZWmylgBbo1TCGPqFx7TXy6PLiLGooE9kZi0AyD5tcTsXHSk=&uniplatform=NZKPT&language=CHS

14. Jiang Fengchun. (2017). A brief analysis of how to improve students' problem-solving autonomy. Popular Science and Technology (12), 106-107. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyBTVW0H8DRXOYcZ-IhkvJJiASqSfRRMQvaLzd_r-G2soB0C5R5fdR6hkcX2xTBYjs8DWKXl8qRitNUHqDjUguuBi5t41dGf6MoQ3-cgBMnfZ9Quz0YkB0OR7CI-rlHECE2dT_Nc3bVl32XRjssyZcT2LL6NFs0WQnifuhQdLsn8S7TVAyrdo7oyRL2oNePiR-Q=&uniplatform=NZKPT&language=CHS
15. Wu Yang. (2016). Recognizing surface phenomena and solidifying mathematics teaching—Abrief analysis of the reasons and countermeasures for students' common complaint of "understanding the class but being unable to solve mathematics problems". College Entrance Examination (18), 109. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyBj6tD6kA5IXiHQcvxARMnXPUXFxztUGurfccu_uU0AkDNEJzgBl_KvJE2OVMWnBecfF9O22w-fIfetSjGPxvdCc0zLzB3x9JupRsmSMUEyiBrWeZGQzkvXQVluonbJh5IYzqM7XDOUqx8Eztx-vzYf_gcTy_djL7fru7Uy5XPhrFW4GpNOnbOHtSPt3NPCd4I=&uniplatform=NZKPT&language=CHS
16. Dai Chengfang. (2023). Analysis of the causes and research on countermeasures of the "understanding but inability to perform"phenomenon in mathematics teaching. Friends of Mathematics (16), 53-55. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=x0sJsLzXXbhSdBBsUooHi4l6jKUBCSnbCns96Sy7lpb0UFEr8RneTfGot1iyU59_KO7Z-Xu_d08cQzEsDdoAUDhHU9v37vGZZ0HaPfGNeoxLi6XZ7JUcMbiqD7-wJY_Er9uPiM2wLHkVxH-e3dLAk4u6DCefQooBnAnJkye5tKFqOL9XW2gF_uR_3nAg2qOVBzR4bAPxB0E=&uniplatform=NZKPT&language=CHS
17. Zhu Qian. (2017). Analysis of the cognitive levels of the "understand but cannot do" phenomenon in primary school mathematics teaching. Examination Weekly (02), 68-69. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyAm_HDz6ufFzc4llXQLy3asgxJIk8tTOpxkEHThQ40ePhNLmOKbJzWUWREemEWqRZvqhbkgaK_u4ZsgNz3q5b1OyNeCONr0ue_EliiGuWAnceHAcN-cgGC91f5vg2T7xZw33j_sJmfAWSavBNNDr5nQZKZGa9EjB6heA4JRpsznd7f0zyqjqgSiAWz3AvbsElE=&uniplatform=NZKPT&language=CHS
18. Liu Yongwan & Zhang Qi. (2008). Understood, but why can't it be done? - Research from the psychological perspective of students. Mathematics for Middle and Primary School (Primary School Edition) (06), 2-5. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyD75QhuXaumGBZSUHEsUYRZtZB0n2IKBwl2Z9_cybLGpsxoeLQ6g5Wd_QUfTMGPpfl31659Y9f9ydi3C0JKfdB2L6LAj-ktcIaIjAsRjtVa0k-zYFSzuuIQc

RvbHphXTsKgKDPmz2-DJgC8IpY_iXx88hb8HUZalFS3B4xcznoD4WzQbPdaIkoM&uniplatform=NZKPT&language=CHS
19. Liu Na. (2012). Investigation and analysis of "understand but cannot solve problems". Art of Education (08), 76-77. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyBKv6MoDY-1Iax-DS96VjZ_Ns_qp3PQQxdcmKkL9Maq6mRwhyIzco0jaZoyH-ks6X4pvFsX44znluKzh9ZR4o4dNK8gs4vjtT8nYPVnc-Eb9rFBuwqXISFNVn1V05sMML0ndB036zy4en-xess1H1qjf_6el7tAxY6wkMrry-SYIOaIq-s3jbe0&uniplatform=NZKPT&language=CHS
20. Mao Xirong. (2022). Analysis and strategies for the "understand but cannot do" phenomenon in mathematics teaching. Mathematics Bulletin (02), 31-34. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyBTgnAFqaJtJGHgBVl2oZ15tCm8ZP2iT2xj4W7ujhdBiaeDnFAHNSM0Txe81tSxYc2jMZlad8E7N8fdh5B0Df5LcjHsB1Yz8Zm-lNwZj9TDJsZWbAc-u0-pw2xy-_KplbY7OK59JZbiMny9pzdhU5rXgSJGVp5JRSK3kXW5s66agai8xV5jPOoNcvh2SbDzu2k=&uniplatform=NZKPT&language=CHS
21. Sun Zhen. (2013). Analysis and research on the reasons for students "understanding lectures but not being able to solve problems". Modern Women (End of the Month) (10), 111-112. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyAAU2VfuDEfhT3xTwsrLuFI40DWBT0dxTW6zfm4wyr5JGyajhecHVHjp5X_VOqaxgZfk4WTei-7ILjvXtd70XskajCVOLg379w2WNb3R7P2LoIkoMCHOGzGMjx064OKDZ3izvNAebGDDxcmP7w_Qo0FHVdG1W7KnAMv-vcv1b7piOtBuCj04gxS&uniplatform=NZKPT&language=CHS
22. Ma Jun. (2013). Causes and strategies for the phenomenon of students "able to understand lectures, but not being able to solve problems". Science and Technology Innovation Herald (09), 183. doi:10.16660/j.cnki.1674-098x.2013.09.137. https://link_cnki_net.libwg.sdnu.edu.cn/doi/10.16660/j.cnki.1674-098x.2013.09.137
23. Zhao Yuzheng, Li Chunlan & Dai Qin. (2013). Teaching strategies for solving the "understand but cannot do" phenomenon in mathematics learning. Teaching and Management (34), 73-75. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyCWJWP6OE56GIXWVudKz8OWuqDesYPppRNIP0cFQ1c79r9pCXQZSQHLZXLZzBazUEC72MHQZJp518EdUY9GiLZ3rbcr6h3ZgJ7FrCX14V13SHHvsrp89T29G-n3p6DpegZZHIQu4mk4yN8kzUJPqLILjxiYi0hgZYZ_rQ2vF8fcOZYvWAFYUqV9&uniplatform=NZKPT&language=CHS
24. Wen Chao. (2018). Thoughts and explorations on junior high school mathematics teaching. Middle School Students Mathematics and Physics (Teaching and Learning) (06), 88. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyB01bwsTAQpNyG7K5Harvnv-qoDX-jjn_npFBZy_w_y4Otc_wwel8XRZ-RJhhgscchPZnQ6WeCQNzrv_B6W_L5jP2LFD9tAbFte6WczLFd90Vb1TLkVZcV

D5rs0DNVh342y0Cx3DjCJU362hhxetV14f5wZIUcLpGuIL9mcIv1CJat8VvBN2OHzgqZhpHsh44M=&uniplatform=NZKPT&language=CHS

25. Dong Yongyong. (2024). Summary and analysis of high school mathematics problem-solving methods and techniques. Mathematics, Physics, and Chemistry Learning (Teaching Research Edition) (05), 6-8. https://kns_cnki_net.libwg.sdnu.edu.cn/kcms2/article/abstract?v=7fc2yiS_nyAI4tIXu6LdmtPN_YZn17BNS0wiURXqQe8vte_LxHYvIG0_C4mGufINYQP3jZiyVZicsDhgpSK_KxV00Za8p0tTnamGNACgheDo3NwiNNjORkhncYM31d9URfxJk7-Rz4ZyRt_4ecBZ_j2E4FjEwRgnNvUtkkmbP2cEBHGi1ziNfxIUeet98MUxtUUqIr0_IpU=&uniplatform=NZKPT&language=CHS