

Exploration of Motivational Measures in University Classrooms and their Impact on Classroom Atmosphere and Effectiveness - Taking the “Advanced Mathematics” Class as an Example

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Abstract:

The phenomenon of silence in university classrooms is widespread. Ways to improve the situation are a problem that university teachers must pay attention to and consider. A good classroom atmosphere can arouse students' interest in learning the course, inspire teachers to actively teach, and have a mutually reinforcing effect on both teachers and students. This article explores how to take effective motivational measures to promote good interaction between students and teachers in the classroom.

Keywords:

University classroom
Learning atmosphere
Reward measures
Positive interaction
Advanced Mathematics

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1. Introduction

Classroom teaching, an important part of university education, is a key component where teachers impart knowledge and students absorb it. At the forefront of undergraduate education, the university classroom is naturally of utmost importance, serving as a crucial space for talent cultivation^[1]. However, it seems that classroom teaching is gradually being undermined in terms of its significance from both the perspectives of teachers and students. Teachers have become less concerned with whether students are paying attention and engaging in

interaction, while students are increasingly silent, showing low participation and reluctance to interact with teachers. Moreover, some students have become absorbed in their smartphones during class, unable to focus on the lesson and choosing to watch online videos instead of paying attention. Poor classroom effectiveness has become a common phenomenon in university education. As the primary managers of the classroom, teachers should recognize that a positive classroom atmosphere not only influences their teaching enthusiasm but also profoundly impacts students' learning outcomes. A good learning

atmosphere and a positive classroom environment are closely intertwined. Therefore, improving these “silent” classrooms is a pressing issue that university teachers must address.

2. Problems in university classrooms and analysis of causes

From a subjective perspective, traditional lecture-style teaching is commonly adopted in university classrooms, where teachers unilaterally impart knowledge from the podium and students passively receive information. Many students show little interest in the content and instead focus on their activities. The only response by the students was when the teacher showed videos, told jokes, or brought up topics unrelated to the course. When the teacher returns to the course content, these students revert to their activities and remain silent ^[2-5].

On the one hand, due to the complexity and limited interest in university courses, students find it difficult to engage in pre-class preparation, attentive listening during class, and post-class review. Students feel the content taught is challenging, leading to a lack of interest and reluctance to engage in the classroom, inhibiting their creative thinking abilities. On the other hand, when teachers pose questions for interaction, many students display passive avoidance behaviors. Few students are willing to answer questions or even take an evasive approach actively.

Interaction between teachers and students is particularly important ^[6-9]. In the absence of interaction, teachers often find themselves answering their questions, leading to a lack of achievement and negatively impacting the teachers’ enthusiasm for teaching ^[10]. Even when teachers ask for collective responses to questions, some students remain silent and cannot answer when prompted to repeat the question ^[11].

From an objective perspective, although learning should be the top priority for students, the diverse and colorful activities available in university life, such as student clubs and society events, are highly enticing and allow students to earn credits. Additionally, counselors actively encourage students to participate in these activities. Consequently, a phenomenon arises where learning becomes less important than extracurriculars.

Although comprehensive development is emphasized in university education, it does not imply that learning should be ranked as the least important. Thus, the position of learning in students’ minds determines their attitude toward it.

Moreover, in teaching practice, a small percentage of students may have others attend classes or even take exams on their behalf. These acts demonstrate a lack of concern regarding their studies, classes, and exams, reinforcing an indifference toward attending classes. It becomes very important to stimulate students’ desire to speak in the classroom ^[12,13].

3. Silence in Advanced Mathematics classrooms

The course “Advanced Mathematics” is usually introduced in the first year of college and is a widely taken course by freshmen. The disciplinary status of advanced mathematics determines the depth and breadth of cultivating students ^[14]. As a compulsory course for science, technology, and management disciplines, advanced mathematics is challenging and requires a strong mathematical foundation. For students in science and technology fields, most universities offer advanced mathematics courses tailored to engineering, which are notably more demanding. For management students, the difficulty is slightly lower, but those with weaker mathematical foundations may struggle with this course.

From the teacher’s perspective, traditional mathematics teaching largely emphasizes reasoning and calculation, less interaction, and less feedback. Teachers often prioritize theorem derivation and demonstration of example problems ^[15]. As theorem proofs are often difficult and theoretical and require a solid foundation in previous knowledge, students with weaker mathematical backgrounds find it challenging to comprehend and engage with the content.

Teaching is often considered secondary or even overlooked in various aspects, such as promotion and evaluation. For instance, most universities prioritize project funds and research papers as measurement standards in promotion evaluations, with minimal teaching requirements. Given the demanding nature of research work, many teachers may be reluctant to invest

significant time in teaching.

Moreover, the continuous compression of advanced mathematics class hours further diminishes the time available for teacher-student interaction. Suppose students are given too much time for thinking and interaction. In that case, teaching schedules can be disrupted, leading to difficulties in completing teaching tasks and affecting students' learning progress and mid-term and final examinations. Furthermore, most students rarely or never engage in pre-class preparation or review, exacerbating the difficulty of learning advanced mathematics and leading to a situation where students have nothing to say during class, resulting in a silent classroom^[6]. Additionally, the temptation of mobile phones in the classroom has become increasingly common. Even with schools promoting "phone-free classrooms" or hanging phone pouches in classrooms, the effectiveness remains low. Enforcing a strict phone ban is impractical, and for large classes of one or two hundred students, those sitting in the back may use their phones for taking pictures when they cannot see the board or PowerPoint slides, affecting their motivation to learn if all phones are collected.

For many students, advanced mathematics is highly theoretical and challenging and is perceived as dry and uninteresting. In contrast to advanced mathematics, other courses in liberal arts or those with unique themes (such as courses on relationships or taught by celebrities) are more engaging and enjoyable. Due to the lack of confidence, students find it difficult to experience a sense of achievement or pleasure from learning advanced mathematics, making it challenging to establish positive interactions with teachers in the classroom. This causes students to frequently feel overwhelmed and worried, particularly regarding their performance in this challenging course.

4. Analysis of incentive measures and classroom atmosphere and effect of Advanced Mathematics classes

Classroom interaction is a dynamic process of mutual influence and interaction between teachers and students in the classroom teaching process. Students can only better grasp knowledge related to the course, improve their comprehensive abilities and gain an advantageous

position in different levels of competition by actively interacting with teachers in class^[1].

4.1. Impact of incentive measures already implemented on classroom atmosphere

During the January 2022–January 2023 academic year, the incentive measures already implemented in advanced mathematics classes and their effects are as follows:

(1) In large classrooms, due to the number of students not filling up the entire classroom in the first week of school, students were very enthusiastic as freshmen, and everyone sat in the front rows, with the first four rows fully occupied. However, starting from the second week, student enthusiasm decreased. The number of students in the first row noticeably diminished, and the rear rows gradually filled up. A reward measure of adding bonus points for sitting in the front four rows was implemented to incentivize students to sit in the front rows. After this reward measure was implemented, students noticeably began to sit in the front rows in the subsequent weeks of classes, indicating that the bonus point strategy was effective. (Although not all students sitting in the front row will necessarily pay full attention, most students sitting in the front will create a good learning atmosphere, which is a prerequisite for a good classroom atmosphere and the establishment of a good learning environment for the majority of students is needed.)

(2) Encouraging students to take good notes in class and randomly inspecting students' notebooks afterward, rewarding students with good notes by adding bonus points or providing material rewards. This method combines supervision and encouragement, and the enthusiasm of students to take notes in class has been somewhat improved. There are two types of notebook inspections:

(a) Students voluntarily submitting their notebooks for inspection by the teacher;

(b) The teacher designates students to submit their notebooks for inspection.

(3) Rewarding students with bonus points for actively raising their hands to answer questions in class. The teacher can try asking questions students raise their hands to answer, and the teacher guides students to answer questions during class exercises. In order to

encourage students to actively raise their hands to answer questions and create a good learning atmosphere, a bonus point strategy was adopted for students who actively raised their hands to answer questions, with additional bonus points given for correct answers. This incentive measure led to more and more students participating in class, and the classroom atmosphere improved.

During the 2023.10-2024.1 academic year, in addition to the above incentive measures, the following additional incentive measures and effects were implemented:

(1) Students who actively answer questions raised by teachers in class or who can promptly identify and communicate with the teacher about any issues with the lesson are not only verbally praised and awarded bonus points but also provided with material rewards. Material rewards include stationery, snacks, and daily necessities. Although the current students may not lack these items, receiving rewards in class still brings joy to many students, greatly increasing their enthusiasm for communicating with the teacher actively.

(2) Material rewards are given to students who achieve outstanding results in mid-term and final exams, which encourages diligent students and incentivizes students who did not receive rewards. (Although this incentive measure is often used for primary and secondary school students, it also significantly motivates university students).

(3) Students who frequently communicate with the teacher about learning issues outside of class and have unique insights into advanced mathematics are given spiritual encouragement and additional bonus points. This encourages students to communicate with the teacher and increases their interest in the subject.

In short, regardless of spiritual commendation, verbal praise, or material rewards, they all represent the teacher's affirmation of the students' serious study in and out of class. The feeling of being "acknowledged" is what many students hope to receive during the learning process, especially when studying difficult subjects like advanced mathematics. This acknowledgment can enhance students' confidence in learning advanced mathematics, increase their enthusiasm for learning the subject, and give them a greater sense of achievement.

4.2. Insufficient classroom incentive measures already adopted and areas needing improvement

After implementing incentive measures in the classroom for three to four semesters, I found that these measures have greatly improved the classroom atmosphere and students' enthusiasm for answering questions. However, there are still some insufficiencies and areas that need improvement.

(1) Too few students actively answer questions in the classroom, and the level of student participation is not enough. For a large class of more than 100 students, approximately only 50 students participate in classroom interactions (including answering teachers' questions collectively) in each class, and fewer than 20 students actively answer questions. Due to the limited class time, it is challenging to give every student who raises their hand an opportunity to answer the question. Therefore, this area needs improvement: how to ensure every student who raises their hand can speak out their answer? (Choosing who to call on to answer questions can somewhat discourage students from participating in classroom interactions).

(2) There are not enough interactive questions in class. In today's classroom, students should be the main body, so teachers need to prepare more simple and easily answerable questions to encourage more students to participate.

(3) The teacher's available reward measures in the classroom are too limited. Reward measures must be meaningful and attractive to students. Among the few reward measures tried so far, the bonus point addition appeals to most students. Still, a deeper understanding of students is required for material rewards to be more attractive to students. Therefore, teachers need to further explore more reward measures suitable for students.

(4) It is difficult for teachers to get to know each student. Many universities offering advanced mathematics classes have around 60 students in small classes and between 100 to 200 students in medium to large classes. If a teacher can remember the names of every student, it will greatly enhance students' interactions with the teacher in class. However, this is a great challenge for teachers, especially for a large class of two hundred students. The premise of teaching according to student's abilities is that

teachers should be able to recognize and understand each student. Therefore, to improve the classroom atmosphere, teachers need to try to understand every student in their class, which is challenging for teachers.

(5) Improving the situation where some students cannot control themselves and use their phones in class. The good learning atmosphere of a class is driven by most students who study diligently. Conversely, using phones to watch videos and play games in class will also affect each other. Teachers need to think about how to take “non-violent” measures, devise incentive measures, and resolve the situation where students cannot control themselves and actively “put down” their phones in class.

5. Conclusion

The establishment of a good classroom atmosphere

requires the formation of good learning habits for students. It is difficult for the efforts of a teacher in a course to maintain a good learning environment for students. Therefore, to establish a good teacher-student interaction in university classrooms, the joint efforts of every teacher are required.

Reward measures can increase students’ enthusiasm for learning, and punitive measures must also be in place. Combining rewards and punishments encourages students to maintain a respectful and interesting attitude toward the classroom.

Therefore, teachers must not only complete the teaching tasks specified in the teaching plan but also ensure a good classroom atmosphere and maintain good interactions with students. They need to continuously explore and improve this in their daily teaching.

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