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Article

Application and Effect Evaluation of Flipped Classroom in Management Communication Teaching

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Abstract: Based on the concept of flipped classroom, this study constructed and implemented a teaching mode of "pre class knowledge input - deep classroom interaction - post class reflection and consolidation" in the undergraduate course of "Management Communication" and evaluated its application effect through a quasi-experimental design. Two parallel classes of students from a comprehensive university were selected as the subjects, with the experimental class using flipped classroom and the control class using traditional teaching methods. The study analyzed three dimensions: learning effectiveness, learning attitude and satisfaction, and teaching effectiveness through multiple methods such as questionnaire surveys, classroom observations, and semi-structured interviews. The results showed that flipped classroom significantly improved students' knowledge mastery, communication skills, and classroom participation. Students generally held a positive attitude towards classroom interaction and self-directed learning experience, and teachers' classroom design and management abilities also improved. At the same time, this study points out the problems faced by flipped classroom implementation, such as differences in pre class learning engagement, complexity of classroom management, and insufficient reliability of evaluation criteria, and proposes corresponding improvement suggestions. The research results provide empirical support and reference paths for the teaching reform of management communication courses and other skill-based courses.

Keywords: Flipped classroom; Management communication; Reform in education; Effect evaluation; Higher education

1. Introduction

Management communication, as one of the core courses in business management majors, aims to cultivate students' abilities in effective information transmission, teamwork, and conflict management in organizational environments. With the accelerated development of globalization and informatization, the teaching content of management communication is becoming increasingly complex, involving basic skills such as oral and written expression, nonverbal communication, as well as cross-cultural communication, organizational communication strategies, and new communication methods in the digital context. However, in courses that are teaching practice of most universities, the management communication course is still mainly based on the traditional "teacher lectures students listening and recording homework" model. This one-way transmission model centered on teachers and centered on classroom teaching has certain efficiency in knowledge transmission, but there are obvious shortcomings in cultivating students' abilities for active learning, interactive communication, and practical application. Specifically, low classroom participation, limited opportunities for students to use communication skills in real-life situations, and insufficient attention to individual differences all limit the improvement of teaching effectiveness. In addition, with the diversification of students' learning habits and the multi-channel availability of learning resources, a single classroom teaching is difficult to fully stimulate students' interest and enthusiasm for learning, which makes the need for management communication teaching reform increasingly urgent.

In recent years, with the rapid development of information technology and continuous innovation of educational concepts, the classroom flipped as a student-centered teaching model has gradually emerged and been widely applied in the global higher education field. This model uses the process of "pre class self-directed learning - in-depth classroom exploration - post class extension and consolidation" to advance the knowledge imparting process outside the classroom, and use classroom time for teacher-student interaction, problem solving, and case analysis, effectively improving the participation and depth of learning. In domestic and international educational practices, flipped classrooms have shown significant results in various courses such as science and engineering, medicine, foreign languages, etc., such as enhancing students' self-learning ability, promoting the development of critical thinking, and enhancing learning experience. However, existing research also shows that flipped classrooms still face some challenges in the application process, such as insufficient student engagement in pre class learning, unstable classroom interaction quality, and adaptation difficulties for teachers in teaching design and technology application. Regarding the course of management communication, which combines theory and practice, although some scholars have explored its potential in communication skills training, related research has mostly focused on teaching activity design or student satisfaction surveys. Empirical research on the systematic application and comprehensive evaluation of flipped classroom in this course is still relatively insufficient, and there is a lack of a complete implementation framework and evaluation model that can be referenced.

Based on the above background, this study aims to explore:

a. How to construct a flipped classroom implementation path that adapts to the characteristics of management communication courses.

b. The comprehensive impact of flipped classroom on students' learning outcomes, classroom participation, communication skills, and satisfaction in this course. The study adopted a quasi-experimental design, combined with questionnaires, classroom observations, and interviews, to conduct comparative analysis between the experimental group and the control group. In theory, this study supplements empirical research on flipped classroom in the field of management communication, enriching the theoretical framework of skill-based curriculum teaching reform; In practice, it provides a replicable implementation model and optimization suggestions for the management communication course in universities, which has reference value for enhancing students' communication skills and learning initiative.

2. Materials and Methods

2.1. The conceptual framework and classic research of flipped classroom

The idea of flipped classroom can be traced back to the inverted teaching method of "transmitting information outside of class and high-level interaction inside class". Lage, Platt, and Treglia (2000) first systematically proposed the concept of "inverted classroom" in economics courses, emphasizing the use of technology

to transfer classroom teaching outside of class and allocating limited classroom time for discussion and collaboration, thereby enhancing inclusivity and interactivity. Subsequently, Bergmann and Sams proposed the 'Flipped Mastery Model' in their article Flipping for Mastery (2014), which combines flipped classroom with mastery learning. In this model, teachers design courses according to learning objectives, create learning paths that support students' autonomous step-by-step progress, and require students to master knowledge before entering the next stage. This model provides an operational implementation plan, making classroom teaching more flexible and personalized, and laying the foundation for the large-scale application of different disciplines. In terms of research lineage, Bishop and Verleger's (2013) review pointed out that early studies often focused on student perception, had a bias towards single group designs, and lacked quantitative evidence and rigorous causal identification. This provides direction for subsequent meta-analysis and empirical improvement. These classic studies collectively establish the core proposition of flipped classrooms: putting learners at the center and exchanging classroom "movement" for high-quality interaction and problem-solving.

2.2. Overall effectiveness evidence and recent progress

From an overall perspective, Jang and Kim (2020) found in their meta-analysis of higher education that flipped classrooms have a significant positive impact on students' cognitive, emotional, and interpersonal interaction outcomes (with a moderate or even high overall effect). This conclusion further supports the interdisciplinary potential of flipped classrooms and suggests that different course design and evaluation methods may be important factors affecting differences in effectiveness. The research in the past three years has further deepened the understanding of the implementation mechanism of flipped classroom. The systematic review by Baig et al. (2023) indicates that in higher education, high-quality pre class resources (such as instructional videos, learning management systems, and collaborative platforms) and consistency between collaborative activities and assessments in classroom design are key factors in ensuring the sustained effectiveness of flipped classrooms, while also facing challenges such as insufficient technical preparation and heavy burden on teacher instructional design. The review by Naing et al. (2023) on undergraduate education in health and hygiene points out that high-quality randomized controlled studies are still limited, and non-randomized studies have a high risk of bias. However, the overall results show that flipped classrooms may significantly improve academic performance and improve student satisfaction, indicating the need for more rigorous experimental design and long-term tracking in future research. In addition, Galindo Dom í nguez's (2025) critical systems review emphasizes that the evidence on whether flipped classrooms can significantly promote self-directed learning is inconsistent, and this difference may be related to the choice of measurement tools and endogeneity processing in research design. Overall, international evidence has moved from a preliminary consensus of "feasibility effectiveness" to a comparative stage of mechanisms on "which design is most effective and in which context it is more effective".

2.3. Match with the context of communication and business courses

The communication and management course emphasizes situational simulation, oral expression, team collaboration, and immediate feedback, which is naturally in line with the structure of the flipped classroom of "pre class understanding in class practice immediate commentary". In the practice of teaching business and communication, research has shown that if knowledge sorting and demonstration video resources are prioritized, classroom time can be more effectively used for high-level interactive activities such as role-playing, speeches, and peer evaluations, thereby significantly improving students' classroom participation and task focus (Stein, 2016). In addition, empirical research has shown that the effectiveness of flipped classrooms is not equivalent to the "video driven effect"; Its true effectiveness depends on the appropriate difficulty and structural design of classroom tasks, as well as the optimization of task orientation and student engagement (P é rez et al., 2019). Recent research further suggests that in university level business courses, case discussions, role-playing, and simulation tasks, combined with structured guidance from teachers, can significantly improve the quality of classroom interaction and task focus, thereby enhancing students' learning engagement experience (Wang, 2025). Overall, the advantage of flipped classroom in communication courses lies in freeing up classroom time to develop higher-order interactions, but effective implementation still relies on key factors such as task structure design, classroom guidance, and consistency in evaluation.

2.4. Insufficient research and positioning of this study

Although existing evidence proves the overall effectiveness of flipped classrooms, there are still three shortcomings in the comprehensive skill course of management communication: Firstly, there is a lack of a systematic evaluation framework that integrates the learning process, interactive quality, and outcome output, with most studies focusing on satisfaction or a single performance indicator; Secondly, there is a lack of mechanism identification between design elements such as intervention intensity, quality of pre class tasks, and degree of scriptification of classroom activities and learning outcomes. Research often replaces rigorous causal inference with empirical descriptions; Thirdly, the assessment indicators for the business/management communication field (such as speech/negotiation scoring, team communication behavior coding, peer evaluation reliability) have not been fully integrated with the flipping process, resulting in limited external scalability (Bishop & Verleger, 2013; Baig et al., 2023; Naing et al., 2023). Based on this, this study will construct an implementation and evaluation model aligned with "pre class input quality classroom interaction structure learning effectiveness" in management communication courses. Through a control group design and the linkage collection of process data and outcome data, the comprehensive impact of flipped classroom on academic performance, classroom participation, communication ability, and satisfaction will be examined, and the marginal contribution and mechanism of design elements will be explored.

3. Research Methodology

3.1. Research Design

This study adopts a strategy combining quasi experimental design and mixed methods to evaluate the application effect of flipped classroom in management communication teaching through comparative analysis between the experimental class and the control class. The idea is shown in Figure 1. The experimental class adopts the flipped classroom mode, while the control class uses the traditional "lecture + discussion" teaching mode. The experimental period is one semester (16 weeks), and two groups of students are taught by the same teacher. The course content, total class hours, and assessment methods are consistent to ensure that the differences in results mainly come from different teaching modes. The overall research process includes three stages: the first stage is the design of the flipped classroom implementation plan and pre class training; The second stage is teaching intervention and data collection; The third stage is effect analysis and summary reflection.

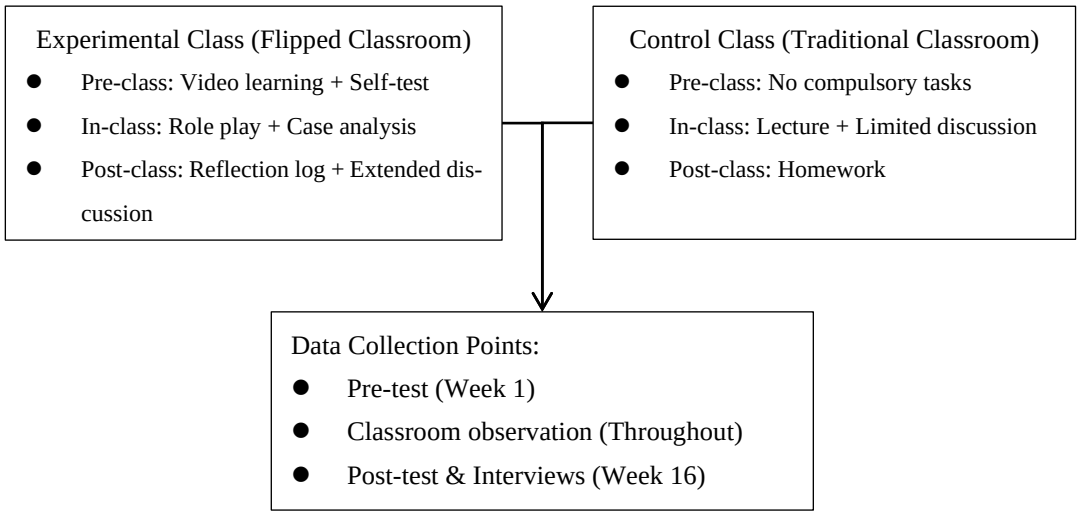

Figure 1. Research Design and Implementation Flowchart

In terms of implementation plan, the flipped classroom is divided into three stages: "pre class, in class, and post class". The pre class stage involves teachers producing video micro lessons on management communication theory and cases, supporting reading materials, and self-testing questions, which are published through the learning management platform. Students are required to learn independently and submit pre class

learning records; In class activities focus on scenario simulation, role-playing, group case analysis, and real-time feedback, emphasizing student participation and knowledge application; After class activities provide extended case studies, reflection logs, and online Q&A sessions to promote knowledge consolidation and skill deepening. The specific types of activities are shown in Table 1.

Table 1. Flipped Classroom Implementation Stages and Activity Types

Stage	Activity Content	Objective	Tools/Resources	Teacher Role	Student Role
Pre-class	Provide video lectures and reading materials; Assign preview questions	Build foundational knowledge; Stimulate curiosity	Rain Classroom, recorded videos, reading packets	Content designer; Resource provider; Question setter	Self-directed learner; Note-taker
In-class	Q&A session; Group discussion on case studies; Role-play activities	Clarify misunderstandings; Promote peer learning; Apply knowledge	Interactive whiteboard, case study handouts, timer	Facilitator; Discussion guide; Feedback provider	Active participant; Collaborator
Post-class	Reflection journal; Online quiz; Peer feedback submission	Consolidate knowledge; Assess learning outcomes; Encourage reflection	Rain Classroom quiz module, online forums	Evaluator; Feedback provider	Reflective learner; Self-assessor

3.2. Research object and sample

The research subjects are 92 undergraduate third year students majoring in Business Administration at a comprehensive university who took the course of "Management Communication" in the spring semester of 2024-2025. The basic information of the sample is shown in Table 2. According to the course schedule, two parallel classes were randomly selected as research samples, with 47 participants in the experimental class and 45 participants in the control class. There was no significant difference ($p>0.05$) between the two classes in terms of gender ratio, GPA, and pre course foundation, ensuring comparability.

Table 2. Sample Characteristics

Variable	Experimental Class	Control Class	p-value
Number of Students	47	45	-
Gender Ratio (Male%)	48.9%	46.7%	-
GPA Mean	3.21	3.19	0.72
Pre-test Knowledge Mean	3.42	3.38	0.68
Pre-test Skills Mean	3.35	3.32	0.74
Pre-test Participation Mean	3.4	3.37	0.7

3.3. Data collection methods and tools

This study used multiple data sources, including quantitative questionnaires, classroom observations, and semi-structured interviews. The learning effectiveness questionnaire was constructed based on Bloom's classification of learning objectives (cognition, emotion, skills) (Bakokonane&Pansiri, 2024), which has been proven to have good theoretical appropriateness and practical feasibility in the development of higher education assessment tools. The scale covers three dimensions: knowledge mastery, self-assessment of communication skills, and learning engagement. A five point Likert scale (1=strongly disagree, 5=strongly agree) was

used to measure before and after the intervention; The Learning Satisfaction Questionnaire is adapted from the Baig et al. (2023) Higher Education Flipped Classroom Satisfaction Scale, which includes three subscales: content appropriateness, classroom participation experience, and learning autonomy. The classroom observation segment refers to the Flanders Interaction Analysis System (FIAS) adapted tool, which encodes behaviors such as teacher lectures, student speeches, group interactions, and class discussions, and calculates their time ratios to quantify the quality of classroom interactions (Santaria et al., 2023). In addition, 10 students from the experimental class and 5 students from the control class were randomly selected for a final semi-structured interview to explore their feelings about the classroom format, difficulties encountered during the learning process, and suggestions for the teaching mode. Reflection on the implementation process of the teaching teacher was also collected.

3.4. Data Analysis

Quantitative data was analyzed using SPSS 26.0 software, including descriptive statistics to analyze the mean and standard deviation of two groups of students on various indicators; Paired sample t-test is used to compare the changes in scores of various dimensions between the experimental group and the control group before and after intervention; Independent sample t-test is used to compare the differences in scores of various dimensions between two groups of students after intervention; Analysis of Variance (ANCOVA), with pre-test scores as covariates, tests the net effect of teaching mode on post test results; Calculate the effect size and use Cohen's d to evaluate the practical significance of intervention effectiveness.

Qualitative data is encoded and classified using thematic analysis, extracting common viewpoints and personalized feedback from students and teachers to supplement and explain quantitative results.

3.5. Research reliability and validity guarantee

To ensure the reliability and validity of the research results, multiple measures were taken in the design and implementation process of this study: firstly, Cronbach's alpha coefficient was used to test the internal consistency of the scale, ensuring that the alpha values of each subscale were greater than 0.70; Secondly, invite three experts with backgrounds in management communication and educational technology to evaluate the content validity of the research tool; Thirdly, the experimental class and the control class are taught by the same teacher, and the teaching progress and assessment standards are kept consistent to reduce teacher interference; Fourthly, data triangulation can be conducted through quantitative questionnaires, classroom observations, and interviews to enhance the interpretability and credibility of research conclusions. In addition, the research objectives and data confidentiality principles should be explained to participants and written informed consent should be obtained before implementation. Strict anonymization should be applied during data processing and result presentations to avoid the leakage of personal information.

4. The Application of Flipped Classroom in Management Communication Teaching

Authors should discuss the results and how they can be interpreted from the perspective of previous studies and of the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be highlighted.

4.1. Overall implementation strategy

The flipped classroom model constructed in the management communication course of this study follows a three-stage structure of "pre class knowledge input - deep classroom interaction - post class reflection and consolidation" to achieve dual improvement of theoretical and practical abilities. During the implementation process, teachers use the "Rain Classroom" learning management platform to distribute multimedia learning resources, and collect students' learning process data through classroom observation, questionnaires, and interviews to ensure that teaching design and effectiveness evaluation match each other. The entire intervention period is 16 weeks, with the introduction and adaptation of flipped classroom in weeks 1-2, the core teaching implementation stage in weeks 3-14, and the review and effectiveness evaluation in weeks 15-16.

4.2. Pre class session

The main objective of the pre class session is to transfer the learning of basic theories and case background knowledge outside of the classroom, so that classroom time can be focused on skill training and situational exercises.

Firstly, design learning resources. The first is video micro lessons, where teachers create 8–12-minute short videos based on the teaching syllabus, covering core knowledge of management communication such as communication models, nonverbal communication, listening skills, conflict management, cross-cultural communication, etc. Each lesson is accompanied by 2-3 videos, accompanied by illustrations, animations, and case studies to help students quickly understand concepts. The second is reading materials, selecting classic cases from both domestic and international sources (such as the cross departmental communication case of Apple Inc. and the cross-cultural negotiation case of a multinational corporation) as pre class reading materials, accompanied by guiding questions to encourage students to think while reading.

Next, conduct a pre class self-assessment. Before each class, publish 5-10 multiple-choice or true/false questions on Rain Classroom. Students are required to complete them before the deadline, and the system will automatically grade and record the learning time and accuracy as one of the bases for classroom grouping.

Finally, supervise and motivate the learning process. Teachers monitor the progress of video viewing and the completion rate of pre class self-testing through the platform backend and announce the list of outstanding groups at the beginning of each class to motivate students to complete pre class tasks through group points. The classroom observation table shows that after the fourth week, the pre class completion rate of the experimental class students remained stable at over 90%, and the average video viewing frequency was 1.4 times, indicating the gradual formation of self-learning habits.

4.3. In class activities

The in-class session is the core of flipped classroom, aimed at transforming theoretical knowledge acquired before class into applicable communication skills.

The class time (90 minutes) for each lesson is divided into four stages. Phase 1: Introduction and Feedback (10 minutes). The teacher quickly reviews the key points of pre class learning, briefly explains the knowledge points with low accuracy in self-testing, and answers the questions submitted by students during pre-class learning. Phase 2: Situational simulation (30 minutes). Students are grouped for role-playing or simulated negotiations. For example, in the theme of "conflict management", students play the roles of both parties in the conflict and third-party mediators, using different communication strategies to negotiate. Teachers and peer observers use classroom observation forms to record the frequency of communication behaviors such as listening, responding, body language, and information clarification. Phase 3: Case Analysis (30 minutes). The group conducts in-depth discussions based on pre class cases, analyzes communication barriers and improvement plans, and presents the analysis results using visual tools such as mind maps and flowcharts. Phase 4: Reporting and Immediate Feedback (20 minutes). Each group sends representatives to report, and teachers provide comments on communication content, expression skills, teamwork, and encourage peer evaluation to strengthen self-reflection.

Record the quality of classroom interaction in class. According to the analysis results of FIAS classroom interaction (as shown in Table 3), the proportion of "student active speech + group interaction" time in the experimental class was significantly higher than that in the control class (54.3% vs 27.8%, $p<0.01$), indicating that flipped classroom effectively improved classroom participation.

Table 3. Classroom Interaction Behavior Analysis (FIAS)

Interaction Type	Experimental Group Time Proportion (%)	Control Group Time Proportion (%)
Teacher lecturing	35.2	68.5
Student individual speaking	20.1	8.7

Group discussion	28.4	12.3
Teacher feedback	10.3	6.5
Silence/Non-interaction	6	4

4.4. After class activities

The after-school session aims to help students consolidate what they have learned in class and deepen their understanding of communication strategies.

After each class, students are required to submit a reflection log of 200-300 words on Rain Classroom, which includes challenges encountered during classroom activities, successful communication strategies, and improvement plans. During the research process, a total of 752 reflection logs were collected from experimental class students. Theme analysis showed that students reflected more on topics such as "application of listening skills," "control of nonverbal signals," and "emotional regulation in conflict situations.

In addition, teachers post international cases or video clips related to the classroom theme on the platform, guiding students to express their opinions and evaluate each other in the discussion area. Platform data shows that experimental class students participate in discussions an average of 3.2 times per week, with a significantly higher level of interaction than the control class's 1.1 times.

4.5. The Implementation Characteristics and Innovation of Flipped Classroom

Based on the characteristics of the management communication course in this study, the implementation of the flipped classroom has innovative ideas and methods. The pre class session combines theoretical explanations with skill demonstration videos, enabling students to not only master conceptual principles but also possess the operational cognition required for situational simulation. In the classroom, teachers rely on platform process data (such as video viewing duration, answer accuracy, and discussion participation) to dynamically adjust grouping and task difficulty and provide targeted guidance to students who lack preparation before class, thereby achieving personalized intervention and resource optimization. In the reporting and communication process, a peer evaluation form covering dimensions such as communication clarity, listening and response, and nonverbal cooperation will be introduced, and the evaluation results will be immediately published to complement the teacher's comments and promote student self-monitoring and continuous improvement. At the same time, teachers use the adapted FIAS classroom observation form to record interactive behaviors, which not only provides data support for subsequent teaching effectiveness evaluation, but also plays a guiding role in real-time classroom adjustments, reflecting the organic integration of teaching and research.

4.6. Challenges and Responses in the Implementation Process

In the implementation process of this study, although flipped classroom has shown strong adaptability in management communication courses, it still faces several challenges. Firstly, there are differences in students' pre class learning engagement, with some students being unprepared, which affects the quality of classroom participation. Secondly, multiple parallel activities significantly increase the complexity of classroom management, placing higher demands on teachers' time allocation and energy investment. In addition, in the peer evaluation process, some students' ratings are influenced by emotional factors, which affect the objectivity and consistency of the evaluation.

Multiple measures have been taken in practice to address the above-mentioned issues. To enhance students' enthusiasm for pre class learning, group points will be linked to pre class test scores, and learning reminders will be pushed through the teaching platform to encourage students to complete preparations in advance. To alleviate classroom management pressure, teaching assistants are introduced during the mid-term of teaching to assist in recording and monitoring activity progress, thereby maintaining classroom order. In response to the bias in peer evaluation, scoring training and example exercises were added after week 5 to unify students' evaluation criteria and improve the objectivity of evaluation.

5. Effect Evaluation

To comprehensively evaluate the application effect of flipped classroom in management communication teaching, this study analyzes three dimensions: student learning effect, learning attitude and satisfaction, and teacher teaching effect. Combined with quantitative data and qualitative interview results, a systematic conclusion is formed.

5.1. Assessment of Student Learning Effectiveness

According to the pre-test and post test results of the "Learning Effectiveness Questionnaire" (Table 4), the experimental group showed significant improvements in cognitive dimension (theoretical knowledge mastery), skill dimension (communication skills application), and emotional dimension (learning engagement and self-efficacy) ($p<0.01$), and the posttest mean was significantly higher than that of the control group. At the cognitive level, the average scores of the experimental class students in items such as "understanding of communication models" and "choice of conflict management strategies" increased from 3.42 to 4.28, while the control class only increased from 3.38 to 3.79; At the skill level, classroom observations showed that the number of times experimental class students used listening, clarification, summarization, and other skills in role-playing increased by about 45% compared to the previous period, significantly higher than the 18% in the control group; On the emotional level, the posttest mean values of "classroom participation willingness" and "interest in course content" of the experimental class students were 4.46 and 4.39, respectively, both higher than the control class's 4.02 and 3.95. The FIAS classroom interaction analysis further showed that the proportion of time spent on "student initiated speech + group discussion" in the experimental class was 54.3%, significantly higher than the control class's 27.8% ($p<0.01$), and the speech content reflected higher-order thinking more, such as proposing solutions, analyzing case backgrounds, etc., while the control class students mostly stayed at retelling and superficial answers.

Table 4. Learning Outcome Survey Results

Dimension	Group	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Gain	t-value (paired)	p-value
Knowledge Mastery	Experimental	3.42 (0.30)	4.28 (0.28)	0.86	8.42	<.001
Knowledge Mastery	Control	3.38 (0.29)	3.79 (0.31)	0.41	5.32	<.001
Communication Skills	Experimental	3.35 (0.32)	4.20 (0.30)	0.85	9.15	<.001
Communication Skills	Control	3.32 (0.30)	3.77 (0.29)	0.45	5.67	<.001
Class Participation	Experimental	3.40 (0.31)	4.25 (0.29)	0.85	7.86	<.001
Class Participation	Control	3.37 (0.33)	3.80 (0.28)	0.43	5.21	<.001

In the final case analysis report, the average score of the experimental class students was 87.6 points, while the control class scored 82.4 points. The scoring details show that the experimental class is significantly better than the control class in the three dimensions of "logical structure", "evidence support", and "rationality of communication strategies", further indicating that flipped classroom can help improve students' performance ability in comprehensive communication tasks.

5.2. Assessment of Students' Learning Attitude and Satisfaction

Firstly, analyze the questionnaire results. Based on the adapted Baig et al. (2023) satisfaction scale, the experimental class students scored significantly higher than the control class in the three subscales of "content appropriateness", "classroom participation experience", and "self-directed learning experience" ($p<0.05$).

Among them, the score difference in "classroom participation experience" was the largest (4.51 in the experimental class and 4.02 in the control class), indicating that flipped classroom significantly improved students' positive feelings towards classroom interaction. The specific results are shown in Table 5.

Table 5. Student Satisfaction Survey

Subscale	Experimental Class Mean	Control Class Mean	p-value
Content Appropriateness	4.35	4.05	0.012
Class Participation Experience	4.51	4.02	0.0
Self-directed Learning Perception	4.4	4.1	0.018

Continuing with the analysis of interview results, the themes are summarized in Table 6. Interviews with 10 students in the experimental class showed that students generally believe that flipped classroom "improves the sense of purpose in pre class learning", "the classroom is no longer one-way indoctrination", and "it is easier to remember knowledge points and apply them to situations". Some students mentioned that the preparation requirements before class are high, and there is some pressure in the early stages of learning. However, through group cooperation and classroom exercises, this pressure gradually transforms into motivation. Among the 5 students in the control class, 3 of them stated that "classroom time is mainly used for listening, and participation opportunities are limited", while 2 of them believed that "there is a lack of simulation training for real situations", which is consistent with the interactive differences in quantitative data.

Table 6. Interview Results: Thematic Analysis

Theme	Representative Quote	Frequency (n)
Enhanced engagement and motivation	I feel more involved because I can express my views in class.	26
Improved understanding through discussion	Group discussions helped me clarify complex concepts.	22
Increased responsibility for learning	I must prepare before class, otherwise I can’t follow the discussion.	18
More diverse perspectives gained	Listening to peers’ ideas opened up new ways of thinking.	15

5.3. Teacher Teaching Effectiveness Evaluation

In the implementation process of the flipped classroom, the teaching staff paid more attention to the scripting of activities and the reasonable allocation of time in the course design and achieved differentiated guidance by monitoring students' pre class learning data. For example, for students with low accuracy in pre class self-testing, teachers will arrange for them to collaborate with high performing peers during classroom grouping to promote mutual assistance and learning. Although multiple parallel activities initially increased the difficulty of classroom management, in practice, teachers gradually formed a management model of "multitask allocation group touring instant recording centralized feedback", which not only improved the controllability of classroom pace, but also significantly improved the quality of activity output.

5.4. Comprehensive statistical analysis

The paired sample t-test results (Table 2) showed that the experimental group showed significant improvements in three dimensions: knowledge mastery ($t=8.42$, $p<0.001$), communication skills ($t=9.15$,

p<0.001), and classroom participation (t=7.86, p<0.001), while the control group showed relatively small improvements. Further independent sample t-test showed that after the intervention, the experimental group had significantly higher average scores in all dimensions than the control group (p<0.01). The ANCOVA analysis conducted after controlling for pre-test scores (Table 7) confirmed the significant net effect of the teaching mode on post test scores (η^2>0.14, indicating a large effect size). In addition, the results of the effect size calculation (Table 8) show that the effect size of flipped classroom on communication skills improvement is 0.87, and the effect size on classroom participation is 0.92, both of which are at a high level, indicating that this model has significant practical effects in skill-based courses.

Table 7. ANCOVA Results

Dimension	F-value	p-value	Partial Eta²
Knowledge Mastery	45.32	<.001	0.18
Communication Skills	52.14	<.001	0.21
Class Participation	48.07	<.001	0.19

Table 8. Comparison of Effect Sizes across Learning Dimensions

Dimension	Cohen's d (Experimental Pre-Post)	Cohen's d (Control Pre-Post)
Knowledge Mastery	1.9	1.22
Communication Skills	1.87	1.28
Class Participation	1.83	1.24

5.5. Integration of qualitative and quantitative results

Comprehensive questionnaire, classroom observation, and interview data indicate that flipped classroom significantly improves students' knowledge mastery, communication skills application ability, and classroom participation in management communication courses. Students generally recognize its interactivity and practicality. Although pre class preparation requires a high level of effort, with the support of group collaboration and immediate feedback, this process can effectively be transformed into learning motivation. At the same time, teachers have also improved in classroom management, activity design, and differentiated guidance, and the teaching process pays more attention to individual differences and participation levels of students. However, in the implementation of this model, attention still needs to be paid to ensure the quality of pre class learning and the objectivity of peer evaluation, as these factors may affect the stability of the final effect.

6. Discussion

6.1. Advantages of Flipped Classroom in Management Communication Teaching

The results of this study indicate that flipped classrooms have shown significant advantages in managing communication courses. Firstly, it effectively enhances students' learning initiative. In the traditional teaching mode, students are usually in a passive position to receive knowledge, and classroom interaction relies more on teacher questioning driven; In the flipped classroom, students need to complete knowledge preparation before class, and the classroom becomes a platform for applying knowledge and solving problems. This structure promotes students' role in the learning process to shift from "passive recipients" to "active participants". Both pre - and post test data and classroom observations show that the participation and speaking quality of students in the experimental class are significantly higher than those in the control class, especially in situational simulation and case analysis, showing stronger initiative and depth of thinking.

Secondly, flipped classrooms help promote the internalization and transfer of communication skills. The core of management communication courses is to cultivate students' ability to choose and execute communication strategies in different contexts, and the acquisition of this ability requires multiple, cross situational practices and reflections. In this study, through the design of a trinity of pre class theoretical learning, classroom role-playing and case analysis, and post class reflection logs, students' frequency and proficiency in skill application were significantly improved, which is consistent with the conclusion emphasized in previous studies that "flipped classroom can enhance the development of higher-order abilities" (Bishop & Verleger, 2013; Baig et al., 2023).

Once again, the flipped classroom has optimized the interaction between teachers and students. Classroom observations show that more than half of the interaction time between students in the experimental class is spent on higher-order cognitive communication. The role of teachers in the classroom tends to be more of a guide and facilitator, rather than simply a knowledge transmitter. This interactive mode not only enhances students' sense of learning participation but also provides teachers with more opportunities to observe students' learning status and adjust teaching strategies in real time.

6.2. Challenges and Shortcomings in the Implementation Process

Although flipped classroom has achieved good results in this study, there are still some challenges and shortcomings in the implementation process.

Firstly, the difference in students' pre class learning engagement is an important factor that constrains the effectiveness of flipped classrooms. Although this study improved students' pre class participation through measures such as learning platform data monitoring, pre class quizzes, and group points, there are still a small number of students who lack investment in video learning and material reading, resulting in unstable performance in classroom activities. This issue has also been reflected in flipped classroom research in other disciplines (Naing et al., 2023), suggesting the need to further optimize the incentive and support mechanisms for pre class learning.

Secondly, the difficulty of classroom management has increased. Multiple parallel scenario simulations and case discussions require teachers to have strong classroom organization and time allocation skills. In the first few weeks of this study, there were fluctuations in activity progress and discussion quality. Although there were improvements in the later stages through the assistance of teaching assistants and activity scripting, this placed higher demands on teachers' experience and energy, especially in large class teaching environments.

Thirdly, the issue of uniformity and reliability of evaluation criteria. This study introduced a peer evaluation mechanism aimed at enhancing students' evaluation ability and reflective awareness. However, during the implementation process, it was found that some students were influenced by personal relationships when grading, resulting in insufficient objectivity in grading. Although there has been an increase in rating training and example drills in the mid-term, which has improved the consistency of ratings, this issue still needs to be addressed in future applications.

6.3. Improvement suggestions

In response to the above challenges and shortcomings, this study proposes the following improvement suggestions:

a. Improve pre class learning support and incentive mechanisms. In addition to group points and quizzes, the approach of "micro task decomposition + immediate feedback" can be further introduced to break down pre class tasks into multiple short-term, low burden learning units, and provide immediate feedback on scores and prompts after students complete them, thereby improving the continuity and positivity of learning. At the same time, a learning partner system can be introduced, allowing students who perform well in pre-class learning to serve as "learning mentors" to assist peers in solving comprehension difficulties.

b. Optimize classroom management and resource allocation. In large classes or classes with high activity levels, roles such as teaching assistants and study group leaders can be added to share organizational tasks, and tools such as classroom timers and activity templates can be used to improve the rhythm control of activities. Teachers can assign groups and tasks based on students' pre class learning data before class, ensuring complementary abilities within the classroom discussion group and reducing resource waste.

c. Improve the objectivity and reliability of evaluation criteria. In peer evaluation, "double-blind evaluation" or "cross group evaluation" can be used to reduce emotional interference, and peer rating can be combined with teacher rating to balance subjective and objective components. In addition, a detailed scale can be designed, and the consistency of students' scoring can be improved through case demonstrations and scoring exercises.

d. Continuously collect and utilize process data. The classroom observation and platform learning records in this study have played a positive role in teaching adjustments, and should be further systematized in the future, such as building a learning analytics dashboard to present real-time data before, during, and after class to teachers and students for learning diagnosis and feedback loops.

e. Strengthen teachers' flipped classroom training and community building. The effective implementation of flipped classroom not only relies on the teaching design ability of teachers but also requires teachers to possess various skills such as technology application, classroom guidance, and data interpretation. Universities can promote the sharing and optimization of flipped classroom experience through organizing teacher training, teaching observation, and experience exchange, forming a continuously improving teaching community.

7. Conclusion

This study focuses on the undergraduate course "Management Communication" at a comprehensive university, and based on the flipped classroom concept, constructs and implements a teaching model of "pre class knowledge input - deep classroom interaction - post class reflection and consolidation". The study systematically evaluates its application effect in management communication teaching. The research results indicate that flipped classroom significantly improves students' knowledge mastery level, communication skills application ability, and classroom participation. Students demonstrate higher initiative and creativity in practical activities such as situational simulation and case analysis. At the same time, students generally hold a positive attitude towards classroom interactivity, practicality, and self-directed learning experience, and teachers have also significantly improved their abilities in teaching design, classroom management, and differentiated guidance.

However, research has also found that flipped classrooms face certain challenges in implementation, including differences in students' pre class learning engagement, increased complexity in classroom management, and insufficient objectivity in peer evaluation. In response to these issues, this study proposes improvement suggestions such as improving the pre class learning support mechanism, optimizing classroom management and resource allocation, enhancing the reliability of evaluation standards, and constructing a data-driven teaching feedback system.

The limitations of this study mainly include: the sample size is concentrated on undergraduate students from a single institution, the research period is one semester, and the long-term impact of flipped classroom on students' communication skills has not been examined; Although multiple methods such as questionnaires, classroom observations, and interviews were used for data collection, self-assessment is still the main quantitative indicator, which may have subjective bias. Future research can conduct cross-situational comparisons in different universities and disciplinary backgrounds and combine long-term tracking and multi-source data analysis to further reveal the mechanism and optimization path of flipped classroom in skill-based courses. At the same time, exploring the integration of emerging technologies such as artificial intelligence and virtual reality with flipped classrooms will also provide new development directions for management communication and related course teaching reforms.

AUTHOR CONTRIBUTIONS

Li Rong: Conceptualization, Methodology, Data Collection, Formal Analysis, Investigation, Validation, Visualization, Writing – Original Draft, Writing – Review & Editing.
Zhang Guoyin: Supervision, Project Administration, Writing – Review & Editing, Funding Acquisition.
All authors have read and approved the final version of the manuscript.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was conducted in accordance with the principles of the Declaration of Helsinki.
All participants provided informed consent prior to data collection.

COMPETING INTERESTS

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

DATA AVAILABILITY STATEMENT

All data supporting the findings of this study are included within the article and its supplementary materials. Additional data may be made available from the corresponding author upon reasonable request.

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