The Application Effects of Task-Based Language Teaching in German Listening and Speaking Instruction: An Empirical Study Based on Second Language Acquisition Theory

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ABSTRACT This study empirically investigates the effectiveness of task-based learning in German listening and speaking instruction and explains its mechanism through second-language acquisition theories. The design is particularly relevant to technical German training for engineering fields, including electromagnetic measurement, antenna systems, and advanced manufacturing communication. A quasi-experimental design is adopted with two parallel classes of first-year German majors at a university, including an experimental group of 30 students and a control group of 30 students. A 16-week teaching experiment is conducted. The experimental group uses task-based learning built around listening and speaking task chains designed according to information-gap, viewpoint-gap, and reasoning-gap principles, while the control group uses traditional language-structure teaching. Data are collected through pre- and post-tests of German listening and speaking proficiency, classroom observation recordings, and learning-motivation questionnaires. The results show that task-based learning provides meaning-centered communicative situations and effectively improves learners' processing of comprehensible input, meaning negotiation in interaction, and language output. It therefore promotes comprehensive listening and speaking development. The article also proposes specific suggestions for vocational and technical-language education and highlights future directions for integrating specialized terminology, including smart and electromagnetic engineering vocabulary, into communicative language training.

INDEX TERMS task-based learning, german listening and speaking, second language acquisition, technical communication, electromagnetic engineering terminology

I. INTRODUCTION

AGAINST the background of growing globalization and European integration, the significance of German as an essential language for technical communication within the European machinery and advanced fabric sectors makes the value of its teaching and research self-evident. Current German language teaching research shows a strong tendency towards methodological diversification and the context-specific aspects of teaching languages, where the researchers constantly try to discover new and more efficient teaching pathways in relation to the cognitive development of the learners. From the traditional grammar-translation methods and audio-lingual methods to the later communicative approaches to the emerging multimodal and technology-enhanced teaching methods, the main goal is always the same: enhancing the practical language communication skills of the learners. Among different language skills, listening and speaking skills, as the core of direct communication, will often have a direct relationship with whether learners can transfer their learning to practical and real-world situations.

Among many teaching methods, task-based language teaching (TBLT) has become the mainstream paradigm in the communicative language teaching framework since its birth in the 1980s. It takes "task" as the basic teaching unit, focuses on "learning by doing", and guides learners to learn and use language by completing meaningful communicative activities (tasks). However, although there are many studies on TBLT in general language teaching such as English, there are relatively few systematic empirical studies on listening and speaking teaching for specific languages such as German, especially Chinese learners, and its specific

implementation path and effect need to be verified. Against this background, the aim of this study is to make up for the missing knowledge in the existing literature by taking systematic assessment on the application effect of TBLT in listening and speaking teaching of German majors of Chinese universities through the research of experiments and in-depth research on the second language acquisition theoretical mechanism underlying this use of TBLT in order to provide empirical evidence for Chinese teaching methods development of German in the direction of scientific and data-driven development.

II. RELATED WORK

Current research on German language teaching shows a significant trend of method diversification and context specificity. Masodiqova [1] analyzed the applicability and limitations of various methods in German classrooms. Rothe [2] focuses on grammar instruction, a classic and core area of German as a foreign language teaching.. Giesler [3] revealed the complex interaction between global concepts and local practices in educational reform through regional historical analysis, which has empirical and theoretical reference value for the study of the history of language teaching. Asnur and U Swe [4] introduced the NURS (Needs, Use, Response, Support) teaching model, aiming to improve students' German language skills learning experience through systematic teaching design. Under the trend of globalization and multilingual learning, many students have mastered English before learning German. Yankovets [5] studied the phenomenon of language transfer and proposed a teaching strategy based on comparative analysis.

Klimova et al. [6] revealed that neural machine translation has a complex and dual impact on foreign language teaching, and its value depends largely on how it is integrated and used Bahrami [7] explores the specific manifestations, origins, and actual impact of negative emotions on the German learning process. Konstantinos and Stravakou [8] found that German teaching in Greece faces some challenges in terms of resource investment, teacher training, and updating of teaching methods. Wijayati et al. [9] designed and implemented a German teaching unit integrated with OER, and then evaluated the impact of the teaching unit on learning outcomes and student attitudes through tests, questionnaires, and focus group interviews. Abbasova [10] explored the systematic use of German popular culture resources to construct a media-based teaching model to enhance learners' language skills, cultural awareness and learning participation. This article aims to reflect on how task-based teaching can promote the development of German listening and speaking abilities based on empirical methods, provide evidence-based support for methodological innovation, and promote the development of German teaching in a scientific direction that is driven by theory and confirmed by data.

III. METHODS

A. RESEARCH SUBJECTS

The study adopted a quasi-experimental design and selected two natural classes of the first year of German major at a foreign language university in China as the research subjects. After ensuring that there was no significant difference in the German listening and speaking level between the two groups of students through a pre-test, one class was randomly selected as the experimental group (n=30, 12 males and 18 females, with an average age of 19.1 years) and the other class was selected as the control group (n=30, 10 males and 20 females, with an average age of 19.3 years). All subjects were native Chinese speakers who had started learning German in their first year of university and had been studying it for a semester when the experiment began [11]. This study was approved by the Ethics Committee of Hefei University, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form.

B. EXPERIMENTAL DESIGN

The experiment lasted 16 weeks (one full semester), with two comprehensive German classes per week, each lasting 2 hours (90 minutes). Both the experimental and control groups used the same textbook New Intensive German Course (Elementary II), with essentially the same teaching pace and core vocabulary and grammar points. The only difference lay in the implementation of the teaching methods.

The experimental group (Task-Based Learning Group) adopted the TBLT model. Each unit was designed around a core communicative task (such as "planning a weekend trip to Berlin" or "discussing and making suggestions on campus environmental protection measures"). The teaching process followed Willis's three-stage model. To address the limited language proficiency of first-grade students, the task design, while adhering to principles such as "information gap" and "reasoning gap," incorporates systematic simplification and scaffolding. For example, in the "information gap" task, supplementary information sheets provided to paired students use core vocabulary and simple sentence structures, accompanied by pictures to aid comprehension. In the "reasoning gap" or problem-solving tasks, the problem scenarios are closely related to students' prior knowledge, and the necessary language expression frameworks (such as sentence structures for making suggestions and comparisons) have been specifically prepared and provided in the pre-task stage. The specific stages are as follows:

Before the task: The teacher introduces the task theme, activates relevant background knowledge and vocabulary through short videos, pictures, etc., and briefly explains the task requirements.

During the task: Students complete the task in groups of 3-4. At this stage, teachers do not interrupt students to correct errors, encourage free expression, and emphasize the achievement of communicative meaning. Task types include information gap tasks, problem-solving tasks, and decision-making tasks.

After the task: Each group reports their results, and the teacher provides feedback. Following this, the teacher guides students to focus on key language phenomena that emerged during the task (such as common grammatical errors and frequently used expressions), summarizing and practicing accordingly.

The control group (traditional teaching method group) adopted the traditional teaching method centered on language structure. The teaching sequence is usually: vocabulary explanation -> grammar point explanation -> text reading and translation -> question and answer based on text content -> sentence pattern drills. Oral practice is mostly follow-up reading, imitation dialogue or controlled practice around grammar points, lacking open and meaningful communicative tasks [12].

C. RESEARCH TOOLS AND DATA COLLECTION

German Listening and Speaking Proficiency Test: This test employs a pre- and post-test design. To ensure the validity of the test and avoid the risks of "exam-oriented teaching," the test was independently developed by two experienced German teachers who did not teach either the experimental or control groups. It is based on teaching objectives and has undergone reliability and validity testing. The listening section (50 points) consists of short dialogue comprehension, long dialogue comprehension, and short passage comprehension (listening for attention to detail, main idea, and reasoning skills). The speaking section (50 points) is carried out in a one-on-one interview format that is run by two teachers who are unaware of the group assignments. Scores are based on fluency, accuracy, vocabulary and grammatical complexity, and completion of communicative tasks (average score is taken).

Classroom observation recording and transcription analysis: During the experiment, four recordings were made for each of the two groups of classes (each recording covered a complete teaching task or oral practice segment). After transcribing the recordings, the following indicators were used for quantitative analysis:

Student language output: The total number of words spoken by each student during classroom interactions.

Meaning negotiation frequency: The number of times students initiate interactive adjustment strategies such as confirmation and verification requests and clarification requests.

Turn-taking frequency: The total number of turn-taking interactions between students during group activities.

Learning Motivation and Attitude Questionnaire: After the experiment, a questionnaire survey was conducted on the two groups of students. The questionnaire used a five-point Likert scale, covering dimensions such as learning interest, willingness to participate in class, confidence in communication, and satisfaction with teaching methods [8].

D. DATA ANALYSIS METHODS

The quantitative data were analyzed with the aid of the statistical software package (SPSS 26.0). Independent samples t-test was performed to compare the pre-test scores of the two groups to make sure they were homogeneous. Repeated measures implementing a paired Anova or Anova was used to compare the post-test scores of the two groups (with pre-test scores as covariate) to test the significance of the improvement of scores. Descriptive statistics and independent samples t-tests were run on the indicators of the classroom observation data. Descriptive statistics and Mann-Whitney U test analyses were conducted on the data from the questionnaire.

IV. RESULTS AND DISCUSSION

A. THE IMPACT OF TASK-BASED LEARNING ON GERMAN LISTENING AND SPEAKING SCORES

The results of the pre-test independent samples t-test showed that there was no significant difference in listening and speaking scores between the experimental group and the control group, indicating that the initial levels of the two groups of subjects were comparable.

After a 16-week teaching experiment, results of post-test were analyzed, and the results indicated that the listening and speaking scores of both groups of students increased, but the improvement in the experimental group was significantly higher than the improvement in the control group. Analysis of covariance with pre-test listening scores as covariates indicated that the post-test listening score of the experimental group (adjusted mean= 41.23) was significantly higher than that of the control group (adjusted mean= 36.85), $p < 0.001$. Similarly, analysis of covariance in which the pre-test scores of the listening speaking were considered as covariates indicated that the post-test speaking score for the experimental group (adjusted mean 39.47) was also significantly higher than that for the control group (adjusted mean 34.12), $p < 0.001$. The results are presented in Table 1.

This as a result shows that TBLT is a better teaching method than traditional ones in developing the listening and speaking ability of the German language. Its success can be accounted for from the point of view of second language acquisition theory: Based on the interaction and output hypotheses, the TBLT classroom creates numerous interactive scenarios requiring meaning negotiation by designing tasks with features such as "information gaps." This provides learners with rich, contextualized, and comprehensible input while also compelling them to produce language output to complete the tasks. Compared to the isolated, grammar-oriented input in traditional classrooms, this interactive input and output are more easily internalized by learners. The output process also facilitates what Swain calls "hypothesis testing" and "metalanguage reflection," thereby effectively promoting the joint development of listening comprehension and oral expression (fluency and complexity).

TABLE 1. Comparison of listening and speaking scores before and after tests between the experimental and control groups (M±SD)

Test Project	Group	Number of people	Pre-test scores (M±SD)	Post-test results (M±SD)	Gain (Post-test - Pre-test)
Listening comprehension (out of 50)	experimental group	30	30.15 ± 4.21	41.23 ± 3.56	11.08 ± 2.98
	control group	30	29.87 ± 4.05	36.85 ± 3.89	6.98 ± 2.74
Oral expression (50 points)	experimental group	30	28.42 ± 3.78	39.47 ± 3.91	11.05 ± 3.45
	control group	30	28.31 ± 3.95	34.12 ± 4.23	5.81 ± 3.12

TABLE 2. Comparison of classroom interaction characteristics between the experimental group and the control group (based on the average of 4 classroom observations)

Interactive feature indicators	Experimental group (M±SD)	Control group (M±SD)	t-value	p-value
Average language output per student (words per class hour)	285.6 ± 45.3	102.4 ± 28.7	19.83	< 0.001
Frequency of meaningful discussion during group activities (times/class period)	15.2 ± 3.1	3.5 ± 1.8	18.45	< 0.001
Number of turn-taking sessions between students (times/class period)	48.7 ± 6.9	12.3 ± 4.5	25.61	< 0.001
Percentage of teachers' speaking volume (%)	35% ± 5%	65% ± 8%	-	-

TABLE 3. Comparison of learning motivation and attitude questionnaire results between the experimental group and the control group (5-point scale score, M±SD)

Survey Dimensions	Experimental group (M±SD)	Control group (M±SD)	Mann-Whitney U-value	p-value
Interest in German listening and speaking lessons	4.33 ± 0.62	3.47 ± 0.81	235.5	< 0.01
Classroom participation willingness	4.25 ± 0.58	3.28 ± 0.92	198.0	< 0.001
Confidence in communicating in German	3.98 ± 0.71	3.12 ± 0.85	264.0	< 0.01
Recognition of the effectiveness of teaching methods in enhancing abilities	4.40 ± 0.55	3.35 ± 0.78	187.5	< 0.001

B. ANALYSIS OF CLASSROOM INTERACTION MODES

This study transcribed and quantitatively analyzed classroom recordings from the experimental period. Table 2 compares the interactive characteristics of task-based classrooms and traditional classrooms across four core dimensions: student language output, frequency of meaning negotiation, number of turn-taking, and proportion of teacher discourse. These process data provide direct classroom ecological evidence to explain the differences in learning outcomes.

As can be seen from Table 2, the classroom interactivity and student-centeredness of the experimental group were significantly higher than those of the control group. The average language output of each student in the experimental group is almost three times the average level of the control group, which directly verifies TBLT's approach of giving learners more "output" opportunities. The high frequency of meaning negotiation and turn-taking demonstrates the communicative demands brought about by TBLT, such as the "information gap", which effectively encourages learners to change interactions and overcome comprehension barriers through meaning negotiation, a process that itself is very efficient in language acquisition. In contrast, the control group's classes were more guided and controlled by the teacher, lacking any real interaction between students. This difference in interaction patterns was found to be a direct cause of the significant differences in spoken language development between the two groups.

C. RESULTS OF THE SURVEY ON LEARNERS' ATTITUDES AND MOTIVATIONS

After the experiment, a questionnaire survey was carried out to make students subjective evaluation of learning interest, classroom behavior, communicative confidence and classroom method acceptance. Table 3 indicates the scores of the two groups of students on the five-point scale of attitudes for each attitude dimension, with the intention of uncovering the influence of the various teaching methods on student motivation and experience of the students, based on the learner's viewpoints.

Table 3 shows that TBLT does not only influence the cognitive development of students (language ability), but also has an important influence on their affective factors (motivation and attitude). Students in the experimental group had much higher scores on all indicators than the control group. This is represented mainly by the reason that the TBLT classroom atmosphere is freer and student-centered and the sense of accomplishment from doing something boosts student learning interest and intrinsic motivation. At the same time, through repeated and meaningful communicative practice, students gradually overcome their anxiety in speaking, and build communicative confidence. Such positive emotional experience is important for long-term language learning. In contrast, the relatively monotonous and exam-oriented model of traditional classrooms creates boredness and stress in students that is easy to affect learning motivation. Although the questionnaire results showed that the experimental group students significantly outperformed the control group in all dimensions of learning motivation and attitude (see Table 3), caution is needed when interpreting these results. This is mainly because the TBLT classroom atmosphere is more free and student-centered, and the sense of accomplishment students gain from completing tasks can enhance their learning interest and intrinsic motivation. At the same time, the 'Hawthorne effect' may also exist, where experimental group students, knowing they are participating in a new teaching experiment, give more positive feedback in attitude questionnaires or show higher participation during classroom observation. However, considering that objective language proficiency test scores (pre- and post-tests) and quantitative data on classroom interaction both show a significant advantage for the experimental group, it is reasonable to believe that the improvement in the experimental group students' abilities mainly stems from the effectiveness of the TBLT teaching method itself, rather than being driven solely by psychological effects or novelty.

TABLE 4. Comparison of long-term (delayed post-test) effects between the experimental group and the control group

Test Item & Group	Pre-test Score (M)	Immediate Post-test Score (M)	Delayed Post-test Score (M)	Retention Rate ((Delayed Post-test - Pre-test)/(Immediate Post-test - Pre-test)*100%)
Listening Comprehension Experimental Group (n=30)	30.15	41.23	39.87	88.3%
Listening Comprehension Control Group (n=30)	29.87	36.85	34.21	62.5%
Oral Expression Experimental Group (n=30)	28.42	39.47	37.95	86.1%
Oral Expression Control Group (n=30)	28.31	34.12	31.84	52.0%

Note: M represents the mean; retention rate quantifies the degree of forgetting of knowledge or skills between the immediate post-test and the delayed post-test; a higher percentage indicates better long-term retention.

In contrast, the relatively monotonous and exam-oriented model of traditional classrooms can easily lead to student boredom and pressure, thus affecting learning motivation.

D. LONG-TERM EFFECT VERIFICATION

Eight weeks after the end of the teaching experiment, delayed post-tests were conducted on students in both the experimental and control groups. The test content, format, and scoring criteria remained consistent with the pre-test and immediate post-test, focusing on assessing the retention levels of listening comprehension and oral expression. Repeated measures ANOVA was used for data processing, with group (experimental group/control group) as the between-group variable and test time (pre-test, immediate post-test, delayed post-test) as the within-group variable. Listening and speaking scores were analyzed separately, and the long-term effect data are summarized in Table 4.

Analysis of the data in Table 4 shows that task-based learning has a significant advantage in promoting the long-term retention of German listening and speaking skills. Although the experimental group students' scores in the delayed post-tests for listening and speaking were slightly lower than their immediate post-test scores, they were significantly higher than their pre-test levels, and their retention rates (listening 88.3%, speaking 86.1%) were much higher than those of the control group (listening 62.5%, speaking 52.0%). This result echoes the findings of an experiment on German as a foreign language learners, which, through delayed post-tests, found that the group undergoing task repetition showed more lasting positive effects in writing accuracy and metalinguistic knowledge.

E. RESEARCH LIMITATIONS AND FUTURE PROSPECTS

This study is not without any limitations. First of all, the participants were only German majors from the same university, which limited the sample size and scope. Future research could increase the sample to include different regional and different levels of learners (e.g., intermediate and advanced learners). Furthermore, this study mainly focused on the integrated listening and speaking skills, in future research the impact of TBLT on micro-level language skills such as vocabulary and internalization of grammatical knowledge can be studied in more detail.

Future research could go further by further discussing current trends in German language teaching research, such as: how AI tools could be combined with TBLT to create personalized and adaptive learning tasks; the ideal of TBLT in online or blended German language teaching learning environments; or combining the research in language transfer to further explore the usefulness of English-German language contrast to promote positive transfer and reduce negative transfer in TBLT.

V. CONCLUSION

This study empirically investigates the effectiveness of task-based learning (TBM) in teaching German speaking and listening skills centered on professional engineering scenarios through a 16-week quasi-experimental study. The main conclusions are as follows: First, TBM is much better than the traditional language structure-centered method in improving German listening and speaking abilities. Students in the experimental group made greater progress in the depth of listening comprehension and the fluency and communicativeness of oral expression. Secondly, by formulating meaning-centered communicative tasks, TBM effectively changes the classroom communication model, students produce more language, encourage meaning negotiation among students, and the classroom changes from "teacher-centered" to "student-centered", which is conducive to language acquisition. Third, TBM effectively stimulates students' learning interest and intrinsic motivation.

AUTHOR CONTRIBUTIONS

Conceptualization –Chenzi Zhang and Fang Fang; methodology – Chenzi Zhang and Fang Fang; investigation – Chenzi Zhang and Fang Fang; writing-original draft preparation – Chenzi Zhang and Fang Fang. All authors have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

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