

A Survey on the Effectiveness of Perceived Teacher Questioning in the English Classroom in Chinese Universities

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Abstract: For a considerable period, educators and mentors have utilized questions as an instructional method to evaluate students' understanding, enhance comprehension, and encourage analytical thinking. This study investigated the current state of effectiveness of student-perceived teacher questioning in Chinese university English classroom from the sociocultural perspective. Based on a questionnaire survey of 1064 Chinese college students, SPSS analysis revealed that EFL learners are generally satisfied with their English teachers' questioning techniques. Analysis indicates public university teachers exhibit greater questioning proficiency than those at private universities. Moreover, there is a significant difference in the perception of teacher questioning across students of different grades, with seniors displaying the lowest appreciation of questioning effectiveness. Additionally, perceptions of questioning effectiveness vary among majors, with engineering students holding a more favorable view compared to their peers in social sciences and humanities, specifically regarding questioning contents, questioning ways, and responding ways. These results enhance our comprehension of the status quo of Chinese English teachers' questioning in the universities and provide valuable implications for pedagogical strategies aimed at improving the effectiveness of teacher questioning, thereby fostering the quality of teaching and learning.

Keywords: Sociocultural perspective; Perceived teacher questioning effectiveness; China

1. Introduction

Colleges and universities are facing the task of implementing teaching strategies that enhance students' agency and autonomy and develop their critical thinking skills and engagement [1]. Asking questions by teachers in the classroom is seen as crucial in achieving this goal, empowering students to become active participants in their learning process rather than passive information receivers [2-4]. Effective classroom questioning by teachers plays a crucial role in enhancing student learning and engagement in classroom interaction [5]. Questions that promote higher-order thinking, rather than mere recall of facts, can lead to substantial improvements in student learning outcomes [6]. Furthermore, effective questioning strategies are linked with increased student participation and motivation, which are vital for effective and thought-provoking learning environments [7].

According to the extent to which the questions foster interaction patterns conducive to language acquisition, prior research on the questioning techniques of language instructors typically categorizes teachers' questions into effective and ineffective ones [5]. However, little is known about whether teachers' questions perceived by EFL learners are effective or not in China. To address this problem, the current study proposes a redirection of research emphasis from determining the effectiveness of specific types of questions regarding learning, to examining the current effectiveness of university instructors' questioning practices in EFL (English as a Foreign Language) classrooms in China. Besides, most studies employ a qualitative study methodology to see the impact of effective teachers' questioning [8-10] and few studies use the quantitative study methodology. Therefore, by collecting and analyzing data on the perceptions of Chinese university students regarding the effectiveness of their English teachers' questioning through a questionnaire, this research offers a new perspective on the quantitative assessment of teachers' questioning. To gain more insights into the effectiveness of teacher questioning in the classroom, this study emphasizes the sociocultural perspective which highlights the importance of social interaction in learning. This study aims to contribute significantly to the understanding of questioning as a pedagogical tool in EFL classrooms. It seeks to elaborate on the status quo of effectiveness of students' perceived teacher questioning in China, thereby providing valuable implications for teaching practices in similar educational contexts.

2. Sociocultural Perspective and Teacher Questioning

Research on classroom communication relates to sociocultural perspectives of student learning, which highlights learning is an active participation in collective practices ^[11]. Internationally, educational standards have stressed the significance of classroom instruction as a social endeavor where students can cultivate skills in asking questions, presenting arguments, and defending their ideas ^[12]. In various settings, studies have shown how teachers can utilize questioning to foster classroom communities that promote meaningful class discussions, conceptual understanding, and shared authority between teachers and students ^[13].

In classrooms, teachers ask various types of questions which range from simple inquiries for information to more complex questions that delve into students' thought processes or encourage them to provide justifications ^[14]. The questions posed by teachers can influence the dynamics of teacher-student interaction. Mehan ^[15] introduced a classroom interaction pattern known as initiation-response-evaluation (IRE), also referred to as initiation-response-feedback (IRF) pattern by Wells and Arauz ^[16]. Other researchers have expanded the IRF pattern to discuss funneling and focusing interaction patterns. When considering classroom activities from a sociocultural perspective, it is important to broaden the conceptualization of teacher questioning which can be seen as part of the wider range of shared practices in a classroom.

3. Literature Review of Teacher Questioning

Questioning is significant in teaching and plays a crucial part in teacher-student interaction ^[17]. Prior research on teachers' questioning tend to focus on five categories: teaching questioning and student engagement, questioning as educational strategy and practice, teacher questioning in online learning, effectiveness of questioning techniques and questioning in specific educational contexts. Firstly, recent research into the dynamics of teacher questioning within English language learning environments reveals its profound impact on student cognitive processing and engagement. Studies like Ribeiro et al. ^[7] and Boyd ^[18] have collectively underscored how these interactions can enhance cognitive, emotional, and motivational aspects of learning. For example, Ribeiro et al. ^[7] specifically highlight the significant role that questioning patterns play in influencing cognitive processing, suggesting that the method and frequency of questions can either stimulate or stifle student thought processes. Boyd ^[18] elaborates on this by discussing the intricate relationship between teacher questions and student participation, which is particularly critical in language learning settings. Secondly, the strategic use of questioning as a pedagogical tool is pivotal in shaping learning outcomes. Heritage and Heritage ^[8] explore how questioning serves as a formative assessment mechanism, supporting essential classroom routines that foster an environment conducive to learning. Their analysis indicates that when teachers skillfully incorporate questioning into their teaching methodology, it not only assesses student understanding but also actively engages them in the learning process, thereby enhancing educational efficacy. This approach is crucial for the development of higher cognitive skills and underscores the need for integrating thoughtful questioning strategies into the curriculum of university English education in China. Thirdly, with the shift towards online learning, the effectiveness of questioning techniques has become even more pertinent. Darius et al. ^[19] address the challenges and opportunities that online education platforms present for teacher questioning. Their discussion points to the necessity for adaptive questioning methods that cater to the digital learning environment, which is inherently different from traditional classroom settings. Fourthly, the effectiveness of questioning techniques in education has been widely debated. Researchers like Smith et al. ^[20], Nystrand et al. ^[21], and Tarasenkova et al. ^[22] provide critical insights into how the structure and nature of questions can drastically affect learning dynamics. Smith et al. ^[20] critique national educational strategies, suggesting that ineffective questioning can undermine classroom interaction. In contrast, Nystrand et al. ^[21] and Tarasenkova et al. ^[22] emphasize the importance of dialogic interactions and tailored questioning, in fostering deeper understanding and student engagement, particularly in subjects like mathematics. Lastly, questioning in specific educational contexts serves as a crucial pedagogical tool, especially in English as a Foreign Language (EFL) classrooms in China. The effectiveness of university English teachers' questioning techniques can significantly impact cognitive processing and student participation ^{[7][18]}. These interactions are not merely about information retrieval but are pivotal in achieving broader educational objectives.

While the existing literature provides extensive coverage of the benefits and applications of questioning, it also presents certain theoretical and methodological limitations. Prior study on teacher

questioning mainly focuses on specific subjects like medical education ^[23], mathematics education ^[22] ^[24], and science education ^[9] or educational settings like primary education ^[20] and preschool children education ^[9] ^[25]. The current landscape of questioning effectiveness in Chinese university EFL classrooms remains underexplored, particularly from the perspective of student-perceived teacher questioning. Yang ^[26] critically reviews the positivistic approaches dominating questioning research, advocating for a context-dependent understanding that acknowledges the nuanced realities of educational settings. This critique highlights a gap in the literature, suggesting a need for research methodologies that can capture the complexities of teacher-student interactions and the contextual variables influencing them. Moreover, the literature often overlooks the variability in the effectiveness of questioning across different subjects and educational stages, calling for a more differentiated approach in the study of questioning techniques ^[23]. The qualitative study methodology was employed in most studies to see the impact of effective teacher questioning ^[7-10] and few studies use the quantitative study methodology. In view of this, the present study aims to employ a questionnaire constructed by Ma ^[27] to investigate the status of students' perceived teacher questioning in EFL classroom in China. Such survey can provide empirical data that reflect the actual conditions and effectiveness of questioning practices, offering a clearer picture of the current state and potential areas for improvement.

Ma ^[27] constructed a scale measuring Chinese English teachers' effectiveness of classroom questioning, which includes four dimensions: questioning contents, questioning ways, responding ways, and questioning effects. This was achieved through a comprehensive review of relevant literature and interviews with expert professors and front-line teachers. This scale provides a comprehensive overview of the connotations of teacher questioning and serves as an effective measurement tool for this study. Definitions and examples of the various dimensions of the scale are shown in Table 1.

Table 1: Dimensions and examples of the effectiveness scale for classroom questioning by English teachers in Chinese universities

dimensions	definition	examples
Effectiveness of questioning contents	The teacher can pose effective questions based on the teaching contents, which facilitates classroom interaction and dialogue, aiming to align the preset and generated questions.	Teachers' questions are closely related to students' real lives.
Effectiveness of questioning ways	The teacher can use diverse language to pose questions clearly to all students and to provide sufficient time for students to respond.	When posing questions, teachers use vocabulary and expressions students are familiar with and can understand.
Effectiveness of responding ways	The teacher can provide timely and targeted feedback to students' answers, using a variety of feedback techniques to guide students toward deeper thinking, and encouraging students to boldly question and innovate.	Teachers' evaluations are targeted.
Effectiveness of questioning effects	Through teachers' classroom questions, the teaching objectives can be met and teacher-student development can be facilitated, reflecting the teachers' instructional characteristics in high-quality classroom teaching.	Students dare to ask questions and express their opinions.

Based on the literature, the following research questions were formulated:

- (1) What is the current state of questioning effectiveness among English teachers in Chinese universities?
- (2) Are there any significant differences in the teacher questioning effectiveness and its various dimensions among English teachers in different types of Chinese universities?
- (3) Do students of different genders, academic years and majors perceive teacher questioning effectiveness and its various dimensions differently?

4. Method

4.1 Participants

This study enlisted 1064 college students hailing from seven diverse universities across various provinces in China. The demographic information of the participants is presented in Table 2. Our sample was deemed to be representative of the higher education landscape in China, since it encompassed a diverse array of students from various types of universities, across different years of study and majors, with a gender distribution that was comparatively balanced. Specifically, the sample consisted of 828 (77.82%) female students and 236 (22.18%) male students. 380 students (35.71%) students were from public universities, while 684 (64.29%) from private universities. The sample included 398 (37.41%) freshmen, 189 (17.76%) sophomores, 245 (23.03%) juniors, and 232 (21.80%) seniors. 892 (83.83%) students were majoring in social sciences and humanities, 143 (13.44%) students in science and engineering programs, and 29 (2.73%) students in medicine. It is noteworthy that all participants shared a common linguistic background, with Mandarin Chinese being their native language.

Convenience sampling methodology was employed for participant selection. In June 2023, the survey questionnaire was administered via Wenjuanxing, an extensively utilized online crowdsourcing platform in China. A weblink to the survey was provided to participants, who were instructed to thoroughly read the guidelines before proceeding with the questionnaire completion. Prior to survey commencement, participants were duly informed of the confidentiality measures in place to safeguard their personal information and responses, and their consent was obtained accordingly.

Table 2: Participants' background information (N=1064)

Category	Group	Number	Percentage
Gender	Male	236	0.2218
	Female	828	0.7782
Type of institution	Public university	380	0.3571
	Private university	684	0.6429
Grade	Freshman	398	0.3741
	Sophomore	189	0.1776
	Junior	245	0.2303
	Senior	232	0.2180
Major	Social sciences and humanities	892	0.8383
	Engineering	89	0.0836
	Science	54	0.0508
	Medicine	29	0.0273

4.2 Instruments

The online survey was structured into two primary segments. The first segment was designed to collect demographic data from the respondents, including variables such as gender, academic major, and year of study. The second segment focused on assessing the perceptions of EFL learners regarding the effectiveness of their teachers' questioning techniques. For this purpose, the present study utilized a questionnaire based on the scale developed by Ma^[27], which is divided into four subscales: questioning contents, questioning ways, responding ways, and questioning effects. This instrument comprises 25 items. Specifically, items 1-5 aim to explore the questioning contents posed by EFL teachers. Items 6-14 are intended to evaluate the effectiveness of the questioning ways. Items 15-21 are designed to assess the responding strategies of EFL teachers. Finally, items 23-25 seek to determine the effect of the teacher questioning on learners. To ensure clarity and user-friendliness, the survey was conducted in Chinese, and items that caused confusion among respondents were revised based on their feedback. Responses were measured on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

4.3 Data Analysis

For data analysis in the present study, SPSS 23.0 software was utilized, employing a methodical three-phase procedure. Firstly, reliability and validity were computed. Secondly, the investigation into EFL learners' perspectives on their instructors' questioning effectiveness was conducted using SPSS

23.0, entailing the computation of means and standard deviations. Thirdly, to explore whether public university teachers' questioning is different from private university teachers' questioning, independent T-test was constructed. Lastly, ANOVA analysis was conducted to examine whether students of different gender, academic years and majors perceives teacher questioning effectiveness and its various dimensions differently or not.

5. Results and Discussion

5.1 Reliability and Validity of the Questionnaire

The Cronbach's Alpha coefficient of the scale was 0.97, which revealed that this scale had good internal consistency. The findings suggest that each of the subscales exhibited favorable internal reliability, as evidenced by Cronbach's Alpha coefficients of 0.90, 0.91, 0.92, and 0.83, respectively.

The author tested the validity of the questionnaire, which was satisfactory ($KMO = .975 > .8$, Bartlett's test of sphericity = 19729.923, $df = 300$, $p = .000 < .05$), with the cumulative variance contribution rate reaching 61.225%.

5.2 The current State of Chinese EFL Teachers' Questioning

Table 3 presents the descriptive results, which can indicate the current state of Chinese EFL teachers' questioning. The students' scores were the highest regarding their perceptions of responding ways ($M = 4.18$, $SD = 0.65$). Their scores were lowest as for the questioning effects ($M = 3.95$, $SD = 0.74$). Furthermore, the EFL learners' scores regarding the overall effectiveness of their teachers' questioning were high ($M = 4.11$, $SD = 0.83$).

Table 3: The current state of Chinese EFL teachers' questioning

Factors	Mean	Standard deviation
Questioning contents	4.12	0.66
Questioning ways	4.12	0.62
Responding ways	4.18	0.65
Questioning effects	3.95	0.74
Total	4.11	0.83

According to Table 3, EFL learners' scores were the highest in terms of their perceptions of their English teachers' responding ways indicating that English teachers can provide timely, targeted, and diverse feedback to students' answering. According to Ma [27], the effective responding ways are reflected in these seven aspects. Firstly, teachers can provide feedback promptly. Secondly, teachers frequently identify students' strengths and give positive feedbacks. Thirdly, teachers' evaluations are targeted. Fourthly, teachers encourage students to query. Fifthly, teachers can adopt various feedback ways. Sixthly, teachers can employ flexible and multiple feedback techniques. Lastly, teachers are skilled in using non-verbal strategies. The provision of feedback by teachers to students is essential to advance their learning [28] since it guides students' deeper thinking, stimulates their motivation and increases their engagement. Additionally, teachers' positive feedback may make students feel supported and understood, thus enhancing positive evaluations of the responding ways.

Despite this, Chinese students perceive the lowest scores for the effects of teachers' questioning, suggesting that the teachers' questioning strategies might not fully achieve the intended educational goals or effectively engage all students. The questioning effects are reflected in the subsequent four aspects [27]. First, students actively engage in thinking about and answering questions. Second, students experience a moderate level of tension and pleasure. Third, students dare to raise questions and express their views. Fourth, students understand and master knowledge more deeply. Tan [29] revealed that in Chinese universities, a significant proportion of the questions posed were of lower cognitive questions, and responses were predominantly delivered either in chorus or through teacher nomination. Besides, Chinese English teachers utilized questioning as a strategy to verify students' understanding of texts, sustain attention towards the material, support and preserve the social standing of both teachers and students, uphold classroom order, assert their authority, and secure students' respect and approval [29]. The questioning quality directly impacts classroom dynamics and student learning outcomes. If the content and form of questions are not diverse enough or disconnected from students' real lives and cognitive levels, it can lead to lower student engagement and, consequently, lower perceived questioning effects. There may be insufficient mechanisms to ensure that all students achieve the

expected learning outcomes in thinking and innovation.

5.3 A Comparative Analysis of the Current State of Teacher Questioning in Different Types of Universities

Independent T-test was constructed using SPSS 23.0 to explore whether students from different types of universities perceived the effectiveness of their teachers' questioning differently. Table 4 shows that the overall mean score for the effectiveness of teacher questioning in public universities is higher than that of teachers in private universities, and the difference is statistically significant ($t = 3.462, p = 0.001$). Furthermore, there are significant differences between teachers in public and private universities in the dimensions of questioning contents, questioning ways, responding ways and questioning effects ($t = 2.647, p = 0.008; t = 3.259, p = 0.001; t = 4.108, p = 0.000; t = 2.661, p = 0.008$), answering the second question of this research.

Table 4: Independent T-test results for effectiveness of teachers' questioning in different types of university

Factors university type		Questing contents	Questioning ways	Responding ways	Questioning effects	total
public	mean	4.18884	4.207	4.2891	4.0283	4.1782
	SD	0.64687	0.62794	0.62191	0.7269	0.59706
private	mean	4.0769	4.0785	4.1197	3.9028	4.0445
	SD	0.66486	0.61006	0.65675	0.74299	0.60759
mean difference		0.11152	0.12856	0.16942	0.12551	0.13375
T value		2.647	3.259	4.108	2.661	3.462
P value		0.008	0.001	0.000	0.008	0.001

According to Table 4, students in public universities score significantly higher than those in private ones in terms of the effectiveness of questioning contents, questioning ways, responding ways, and questioning effects. This may be elucidated by the subsequent factors. Firstly, public universities typically have more stable financial support and richer educational resources, such as experienced teachers and advanced teaching facilities, which might lead to higher expectations and better experiences among students regarding various aspects of teacher questioning. Secondly, teachers in public universities may have undergone more systematic professional training, mastering the questioning contents, questioning ways, and responding ways more precisely, thus better stimulating students' thinking and engagement. Lastly, public school classrooms may be more inclined to encourage open dialogue and critical thinking, enhancing students' response abilities and innovative thinking. In contrast, private institutions may lack stability in their teaching staff, experience, and educational investment, potentially affecting students' perceptions and evaluations of the effectiveness of teachers' questioning.

5.4 A Comparative Analysis of the Current State of Teacher Questioning Perceived by Students of Different Grades

Table 5: Descriptive statistics and analysis of variance results for teacher questioning perceived by students of different grades

Factors		Questioning Contents	Questioning Ways	Responding Ways	Questioning Effects	Total
Freshman	Mean	4.2095	4.1912	4.2674	4.0163	4.1711
	SD	0.635532	0.61083	0.62144	0.72668	0.58794
Sophomore	Mean	4.1439	4.214	4.2184	4.0106	4.1467
	SD	0.71847	0.64803	0.66249	0.74859	0.63578
Junior	Mean	4.1184	4.0862	4.1633	3.9061	4.0685
	SD	0.62923	0.58668	0.62832	0.73612	0.58559
Senior	Mean	3.9336	3.977	4.0172	3.8222	3.9375
	SD	0.65233	0.61696	0.67901	0.74214	0.61013
F Value		8.867	7.698	7.680	4.121	8.057
P Value		0.000	0.000	0.000	0.000	0.000

To investigate whether there are differences in the perceived effectiveness of teacher questioning

among students of different grades, the present research conducted a one-way ANOVA and Post-hoc multiple comparison tests on the overall level and various dimensions of teacher questioning as perceived by freshmen (398), sophomores (189), juniors (245), and seniors (232). The specific results can be seen in Tables 5 and 6.

Table 6: Post Hoc Multiple comparison results of teacher questioning perceived by students of different grades

Grades \ Factors		QC	QW	RW	QE	Total
Freshman and Sophomore	MD	0.06563	-0.02276	0.04897	0.00575	0.0244
	P value	1	1	1	1	1
Freshman and Junior	MD	0.09118	0.10507	0.10414	0.11021	0.10265
	P value	0.515	0.211	0.279	0.393	0.214
Freshman and Senior	MD	0.27593*	0.21422*	0.25017*	0.19413*	0.23361*
	P value	0	0	0	0.009	0
Sophomore and Junior	MD	0.02555	0.12782	0.05518	0.10446	0.07825
	P value	1	0.19	1	0.858	1
Sophomore and Senior	MD	0.21029*	0.23698*	0.20120*	0.18838	0.20922*
	P value	0.006	0.001	0.009	0.055	0.002
Junior and Senior	MD	0.18475*	0.10916	0.14602	0.08392	0.13096
	P value	0.012	0.314	0.08	1	0.105

Note: MD: Mean Difference; QC: Questioning Contents; QW: Questioning Ways; RW: Responding Ways; QE: Questioning Effects

Table 5 shows that freshmen perceived the highest score of teacher questioning ($M = 4.1711$), followed by sophomores ($M = 4.1467$) and juniors ($M = 4.0685$), and seniors' scores were the lowest ($M = 3.9375$). The one-way ANOVA test results indicate that there are significant differences among the four groups of students in their perception of teacher questioning ($F = 8.057$, $p = 0.000$), as well as in the questioning contents ($F = 8.867$, $P = 0.000$), questioning ways ($F = 7.698$, $P = 0.000$), responding ways ($F = 7.680$, $P = 0.000$), and questioning effects ($F = 4.121$, $P = 0.000$). The post-hoc multiple comparison test results (see Table 6) further show that in the dimension of questioning contents, seniors' perception is significantly different from that of freshmen, sophomores, and juniors ($p = 0.000$, 0.006 , and 0.012 respectively). As for questioning ways, seniors' perception is significantly different from that of freshmen and sophomores ($p = 0.000$ and 0.001 , respectively). Seniors' perception is significantly different from freshmen's and sophomores' ($p = 0.000$ and 0.009 , respectively) regarding responding ways. In terms of questioning effectiveness, seniors' perception is significantly different from freshmen's ($p = 0.009$). In the overall teacher questioning, the differences between seniors' perception is significantly different from freshmen's and sophomores' ($p = 0.000$ and 0.002 , respectively). This suggests that in terms of the overall level and four dimensions of teacher questioning, seniors perceive them to be significantly lower than those of other grades.

Seniors' perception of questioning contents appears notably lower than that of freshmen, sophomores, and juniors. This discrepancy might stem from the seniors' advanced knowledge and critical thinking skills, which may lead them to perceive the questions as less challenging or stimulating. Besides, it may be attributed to the evolving complexity and specificity of the subject matter as students progress in their studies. When studying the more complex subjects, seniors expect more specialized and deeper engagement, so they hope their teachers to pose more challenging and targeted questions.

In terms of questioning methods, freshmen and sophomores reported higher scores than juniors and seniors. This reflects teaching strategies that focus on engaging newer students with clearer, more structured questions with the purpose of ensuring them to have a good understanding. Conversely, seniors might perceive these strategies as less engaging or too simplistic as they seek more challenging and dynamic interactions, which aligns with their advanced knowledge and critical thinking skills.

Regarding responding ways, there is a noticeable preference among freshmen and sophomores for the feedback and interaction styles used by their instructors. This might indicate that younger students benefit significantly from immediate and diverse feedback techniques which help them feel supported and encourage active learning. This may be attributed to the fact that freshmen and sophomores are less experienced in academic discourse, making them more receptive to and satisfied with the feedback and interaction dynamics. In contrast, seniors may require more sophisticated feedback that challenges their developed competencies and promotes independent thinking, thus the lower scores in their perceptions.

Concerning the questioning effectiveness, freshmen’s perception is significantly higher than that of seniors, indicating that questioning might be more effective in fostering learning at the introductory level. Seniors might have higher expectations for questioning or rely less on it, leaning more towards independent studies or a more tailored educational approach. Therefore, it is necessary for teachers to adopt tailored questioning in fostering deeper understanding and student engagement [21-22].

Overall, the scores of freshmen’s and sophomores’ perception of teacher questioning are significantly higher than those of seniors, which might reflect an increasing familiarity with the educational system and possibly a growing expectation for a more customized and challenging questioning approach as students advance. As students advance, there appears to be a gap between teaching methods and the evolving educational demands of the students. This insight aligns with educational theories that suggest the need for pedagogical adaptation to meet the evolving needs of learners at different stages of their academic journey.

5.5 A Comparative Analysis of the Current State of Teacher Questioning Perceived by Students of Different Majors

A one-way ANOVA and Post-hoc multiple comparison tests on the overall level and various dimensions of teacher questioning as perceived by students majoring in social sciences and humanities (892), engineering (89), science (54), and medicine (29) was conducted with the purpose of exploring whether there are differences in the perceived effectiveness of teacher questioning among students of different majors. The specific results can be seen in Tables 7 and 8.

Table 7: Descriptive statistics and analysis of variance results for teacher questioning perceived by students of different majors

Factors		questioning contents	questioning ways	responding ways	questioning effects	total
social sciences & humanities	mean	4.0917	4.1009	4.1571	3.9266	4.0691
	SD	0.65674	0.61495	0.64887	0.72315	0.60169
engineering	mean	4.2854	4.3046	4.3612	4.0843	4.2589
	SD	0.67547	0.64735	0.60152	0.88464	0.63971
science	mean	4.1407	4.1584	4.2169	4.0231	4.1348
	SD	0.70216	0.61868	0.70136	0.72728	0.62619
medicine	mean	4.3241	4.2299	4.266	4.0345	4.2136
	SD	0.55398	0.59163	0.6397	0.74918	0.55995
F value		3.362	3.297	2.922	1.578	3.163
P value		0.018	0.02	0.033	0.193	0.024

Table 8: Post Hoc Multiple comparison results of teacher questioning perceived by students of different majors

Factors		QC	QW	RW	QE	Total
SSH and Engineering	MD	-1.9369*	-0.20372*	-0.20404*	-0.15770	-0.18979*
	P value	0.041	0.016	0.024	0.220	0.025
SSH and Science	MD	-0.04904	-0.05754	-0.05982	-0.09658	-0.06574
	P value	0.951	0.910	0.912	0.787	0.866
SSH and Medicine	MD	-0.23243	-0.12899	-0.10890	-0.10791	-0.14456
	P value	0.241	0.685	0.809	0.866	0.585
Engineering and Science	MD	0.14465	-0.14618	0.14422	0.06112	0.12405
	P value	0.580	0.517	0.569	0.964	0.634
Engineering and Medicine	MD	-0.03874	0.07473	0.09515	0.04979	0.04523
	P value	0.993	0.942	0.902	0.989	0.985
Science and Medicine	MD	-0.18340	-0.07145	-0.04908	-0.01133	-0.07881
	P value	0.620	0.958	0.988	1	0.942

Note: SSH: Social Sciences and Humanities; MD: Mean Difference; QC: Questioning Contents; QW: Questioning Ways; RW: Responding Ways; QE: Questioning Effects.

Table 7 shows that students majoring in engineering perceived the highest score of teacher questioning (M = 4.2589), followed by students majoring in medicine (M = 4.2136) and students majoring in science (M = 4.1348), and the scores of students majoring in social sciences and

humanities were the lowest ($M = 4.0691$). The one-way ANOVA test results indicate that there are significant differences among the four groups of students in their perception of teacher questioning ($F = 3.163$, $p = 0.024$), as well as in the questioning contents ($F = 3.362$, $P = 0.018$), questioning ways ($F = 3.297$, $P = 0.02$), and responding ways ($F = 2.922$, $P = 0.033$). There is no significant difference in their perception of questioning effects ($F = 1.578$, $P = 0.193$).

The post-hoc multiple comparison test results (see Table 8) further show that the perception of students majoring in engineering is significantly different from that of students majoring in social sciences and humanities in the dimensions of questioning contents ($P = 0.041$), questioning ways ($P = 0.016$), responding ways ($P = 0.024$) and even the overall teacher questioning ($P = 0.025$). The mean difference in Table 6 suggests that in terms of the overall level and three dimensions of teacher questioning, students majoring in engineering perceive them to be significantly higher than those of students majoring in social sciences and humanities.

Regarding the dimension of questioning contents, the finding indicates that the scores given by engineering students are significantly higher than those of students majoring in social sciences and humanities. Effective questioning contents include questions which can reflect the teaching objectives, questions which are appropriate for students' cognitive development and relevant to students' actual lives, and challenging, thought-provoking, and diverse questions [27]. The finding may imply that engineering students believe that English teachers focus more on the relevance and depth of questions, which is related to their problem-solving abilities and understanding. Engineering students usually need to solve concrete and logically demanding problems, which may prompt teachers to pose more challenging and targeted questions. In contrast, students majoring in social sciences and humanities may be more accustomed to open and exploratory questions, which may not be as specific and in-depth as expected by engineering students in some cases. Therefore, it is necessary for teachers to consider the needs and preferences of students [18] with different academic backgrounds when posing questions to ensure the effectiveness of the questioning contents.

In the dimension of questioning ways, the results shows that scores given by engineering students are significantly higher than those of students majoring in social sciences and humanities. Effective questioning ways include the use of vocabulary and expressions that students are familiar with and understand, creating situational contexts for students, grasping questioning practicality, diversifying the ways in which questions are unfolded, appropriate frequency of questioning, providing sufficient time for students to respond, asking questions before nominating students, addressing all students, and listening attentively and engaging with students directly [27]. The finding may reflect that engineering students prefer a structured and clear questioning approach, which is consistent with their emphasis on logic and steps when solving problems. Liberal arts students may be more accustomed to exploratory and interpretive questions, which may require teachers to adopt a more diverse and open questioning approach. Open-ended questions can be considered as higher cognitive questions. Tan [29] found that Chinese English teachers asked many lower cognitive questions, which cannot meet the demands of students majoring in social sciences and humanities. Therefore, teachers need to balance students' needs and adopt adaptive questioning strategies [18] when asking questions to ensure effectiveness of questioning ways.

In terms of responding ways, the result indicates that the scores given by engineering students are significantly higher than those of students majoring in social sciences and humanities. Effective responding ways means teachers can provide timely and targeted feedback to students' answers, using a variety of feedback techniques to guide students toward deeper thinking, and encouraging students to boldly question and innovate. The finding may imply that engineering students value the guidance and constructiveness in the teacher's feedback, which assists them to clarify the direction and steps of problem-solving. On the other hand, students majoring in social sciences and humanities may expect more open-ended and encouraging feedback from teachers. Thus, teachers need to take into consideration the characteristics and unique needs of students from different disciplines when responding to students.

Regarding the overall teacher questioning, the result indicates that the scores given by engineering students are significantly higher than those of students majoring in social sciences and humanities. This disparity may suggest that engineering students better recognize the strategies and effectiveness of teachers in questioning contents, ways, and feedback. This may be related to the emphasis on problem-solving by engineering students and their attendant expectations for teacher questioning. Conversely, students majoring in social sciences and humanities may have higher expectations for teacher questioning, particularly in terms of the degree of openness and exploratory nature of questions. Teachers need to consider the needs of students from different disciplines comprehensively to improve

the overall effectiveness of questioning.

The study presents certain limitations that highlight areas for further inquiry. Initially, the reliance on self-reported data in this research could potentially overestimate the actual effectiveness of teacher questioning, suggesting a need for more robust methodologies. Subsequent investigations might benefit from a mixed-method framework to offer deeper, more nuanced perspectives on the topic. Additionally, the use of questionnaires implies that results reflect an averaged profile that may not capture individual participant nuances. Future research should consider employing person-centered statistical techniques, like latent profile analysis, to uncover more detailed characteristics of distinct subgroups within the sample. Lastly, the current exploratory study's sole dependence on survey data limits a thorough and profound understanding of the research subject. It is advisable for forthcoming studies to integrate multiple data sources to corroborate and enrich the research findings.

6. Conclusion and Implications for Pedagogical Practice

This paper made a survey of the current state of teacher questioning effectiveness in Chinese EFL classroom through the perspective of students' perception. It was found that EFL learners perceived their English teachers' questioning to be satisfactory. Teachers' responding ways were recognized by students most while teachers' questioning effects were least recognized. Our analysis also revealed that there was a significant difference in questioning proficiency between teachers in public and private universities, with public universities teachers showing a noticeably higher level of questioning proficiency than those in private universities. Furthermore, it was found that there was significant difference in the perception of teacher questioning among students of different grades. Seniors tend to have a notably lower perception compared with students of other academic years in teaching questioning effectiveness and all the four dimensions. In addition, there exists a disparity in how students of different majors perceived the effectiveness of teacher questioning. Engineering students have a significantly more favorable view than students majoring in social sciences and humanities, particularly in terms of the questioning contents, questioning ways, responding ways, as well as the overall effectiveness of teacher questioning.

This approach contributes to a more robust understanding of the current state of the effectiveness of teacher questioning in Chinese EFL classrooms and it also offers some implications for pedagogical practice which can be listed as follows. First, Chinese private colleges and universities should attach great importance to teacher training, enhancing teachers' teaching skills and improving teacher questioning effectiveness. Second, students from various grades perceive teacher questioning differently, so to facilitate students' understanding and engagement, it is of necessity for teachers to adopt tailored questioning in accordance with students' age, characteristics and requirements. Third, students majoring in social sciences and humanities perceive teacher questioning effectiveness significantly lower than their peers majoring in engineering, therefore, it is essential for teachers to adopt adaptive questioning strategies to pose questions welcomed by students majoring in social sciences and humanities. English teachers must consider needs of students from different majors.

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