A Case Study of Pedagogical Content Knowledge (PCK) of Chinese Senior High School English Teachers

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Abstract

Pedagogical content knowledge (PCK), a core component of teachers' knowledge, is crucial for professional development. While existing studies on senior high school English teachers' PCK mainly focus on science subjects, few consider age factors. This study investigates PCK levels and differences among novice, proficient, and expert English teachers across six dimensions: Knowledge of Teaching Purpose (KTP), Students (KS), Content (KTC), Organization (KCO), Effect Feedback (KEF), and Teaching Strategy (KTS).

Fifty-one senior high school English teachers from two Chinese schools were recruited, with mixed quantitative and qualitative methods employed. A questionnaire was used to analyze PCK levels, and data were processed via SPSS 26.0 for reliability and descriptive statistics. Three participants from each group were interviewed to explore stage-specific differences.

Findings show senior high school teachers demonstrate qualified PCK overall. Teachers excel in KTP, KTC, KCO, and KEF, but lag in KTS and KS. Expert teachers achieve good performance in all dimensions, while proficient teachers meet qualified standards. Novice teachers show qualified PCK except in KS and KEF.

Implications suggest novice teachers should communicate with veterans, deepen textbook study, and engage with new curricula. Proficient teachers need to enrich teaching methods and theoretical knowledge, while expert teachers should update strategies and theories proactively.

Key Words: Pedagogical Content Knowledge (PCK) · novice teacher ·

proficient teacher · expert teacher

Introduction

Pedagogical content knowledge is regarded as the most attractive part of teachers' knowledge by Shulman (1987), which is crucial to teachers' professional development. Therefore, it is necessary to investigate the features of the senior high school teacher in different stages.

All authors converge on PCK as the integrative knowledge framework that bridges subject-matter expertise with pedagogical practice, emphasizing its role in transforming disciplinary knowledge into effective teaching tailored to student needs, though they differ in highlighting its components (curriculum, student understanding, instructional strategies) and operational definitions (Grossman,1989; Shulman, 1986; Shing, Saat & Loke, 2018).

There are also many empirical studies abroad and at home, most of them are distributed in the field of university (Han, et al, 2021; Sarkar, et al,2024; Schiering, et al, 2023), primary school and secondary school(Liu, et al, 2018; Sothayapetch, Lavonen & Juuti; 2013; Aydin& Mihladiz Turhan, 2023).

Most empirical studies in secondary schools are about science subjects (Nilsson & Vikström, 2015; Tufail, 2021), despite many studies in studying different levels of English teachers' PCK (Han, et al, 2021; Kultsum, 2017), the rare studies focused on novice teacher or the comparison of novice teacher and expert teacher. Such studies only take novice teachers and expert teachers into account and neglect the differences of teachers at the proficient stage. Therefore, it is necessary to make English teachers at three stages understand their advantages and disadvantages to improve their teaching competence.

This study fills critical gaps in PCK research by investigating senior high school English teachers' PCK across novice, proficient, and expert stages. Theoretically, it enriches the field by focusing on English—a typically neglected arts subject—and comparing career stages, as prior studies often centered on science disciplines and overlooked proficient teachers. Practically, the research helps teachers identify PCK strengths and weaknesses: novices can accelerate adaptation, proficient teachers can bridge to expertise, and experts can refine strategies. The findings will also inform curriculum development and teacher training to enhance real-world English teaching practices.

Theoretical Framework

Since this study intend to explore the characteristics of PCK of senior high school teachers at different levels, it is essential to construct a theoretical framework of the components of English teachers' PCK to adapt and design the questionnaire. In order to to compensate for the static nature of Shulman's idea of PCK, this study combines Grossman's (1989) thinks of the component of PCK and some studies of the components of English teachers' PCK at home, the study finally generates a theoretical framework of six components of English teachers' PCK.

PCK, as one of the most important parts in teacher professional development, has been used widely in other subjects, however, in the field of English teachers' component of PCK, Grossman (1989) is the most outstanding representative. He made an investigation of a novice English teacher and found that these teachers were in a similar level, but the presentation of teaching status and students' evaluations were different, he summed up the problem as they had different PCK. And based on the definition of PCK of Schulman (1986; 1987), he thinks there are four components of PCK: subject matter knowledge, general pedagogical knowledge, knowledge of context, and pedagogical content knowledge.

According to the studies of the characteristic of senior high school English teachers, this study divides the component of English teachers' PCK into six components, which are knowledge of teaching purpose, knowledge of students, knowledge of teaching content, knowledge of content organization, knowledge of effect feedback and knowledge of teaching strategy.

Table 1 the Framework of English Teachers' PCK Components

PCK components	Specific elements
Knowledge of Teaching Purpose	Knowledge of the beliefs, objectives, content, and sources of the National English curriculum.
Knowledge of Students	Knowledge of English learners' learning abilities and learning strategies, ages and developmental levels, attitudes, motivations and prior conceptions of the subject they are learning.
Knowledge of Teaching Content	Knowledge of the structure, arrangement and content etc. of English textbooks
Knowledge of Content Organization	Teachers' understandings of the English discipline and instructional representations of teaching specific English knowledge
Knowledge of Effect Feedback	Teacher can give emotional or posture feedback to students' reaction and behavior.
Knowledge of Teaching Strategy	Teachers' understandings of general principles and strategies of classroom organization and management and English-specific instructional strategies

Methodology

Since the studies of PCK of English teachers in senior high schools are limited and PCK is regarded as the most attractive part of teachers' knowledge. This study aims to investigate the level of a novice teacher, proficient teacher and expert teacher and whether the level of them will be similar or different. Therefore, the research questions of this study are as follows:

1）What are the levels of English teachers' PCK in senior high schools?

2) What are the differences between novice, proficient and expert teachers' PCK?

The participants of this study consist of 51 English teachers from two provincial key high schools in Baotou, which include three stages of English teachers mentioned above. 51 teacher questionnaires were sent out, 51 were recovered, and the recovery rate was 100%, of which 48 were valid and the effective rate was 94.1%. The table below is the detailed information of the participants.

Table 2 Description of the Participants

Category		Number	Percentage
gender	Male	18	37.5%
	female	30	62.5%
Academic qualifications	College	0	0%
	Bachelor	36	75%
	Master degree	12	25%
Teachers' stage	Novice stage	8	16.7%
	Proficient stage	16	33.3%
	Expert stage	24	50%

This study adopts both quantitative and qualitative methods, and these two different instruments are used for this study. The first instrument is the questionnaire which will be used to

collect data that present the level of PCK of these three stages of teachers and the differences in PCK level of these three stages of teachers; the second is an interview through which this study hopes to know more about the differences in English teachers' PCK level in different stages.

The questionnaire of this paper is from Zhu Chunhua (2016) who designs the questionnaire on the basis of reading Questionnaire in Foreign Language Teaching by QinXiaoqing and refers to Zhai Ruihui (2014) “Investigation on the Teaching knowledge of Junior Middle School English Teachers”. And combines the theory of Grossman, P.L., Schoenfeld, A., &Lee, C (2005: 201-231). The questionnaire is composed of altogether 24 items of 6 scales which are designed based on six PCK elements which are knowledge of teaching purpose (KTP), knowledge of teaching content (KTC), knowledge of students (KS), knowledge of teaching strategy (KTS), knowledge of effect feedback (KEF) and knowledge of content organization (KCO). The questionnaire of this study employs a five-point Likert type scale and each question involves a 5-point response scale which ranges from “very big” to “no” (1=No, 2=minor, 3=modest, 4=big, 5=very big); participants only need to choose the scale which is most appropriate to their reality. Below is the description of the 24-item questionnaire.

Table 3 Description of the 24-item Questionnaires

Scale	Description of scale	Sample item	Item numbers
Knowledge of Teaching Purpose (KTP)	Knowledge of the beliefs, objectives, content, and sources of the National English curriculum.	You can design the teaching task according to the specific course objectives.	1, 2, 3
Knowledge of Students (KS)	Knowledge of English learners’ learning abilities and learning strategies, ages and developmental levels, attitudes, motivations and prior conceptions of the subject they are learning.	You have a clear understanding of the level of knowledge and skills that students already have before you teach the new class.	4,5,6,7, 8, 9
Knowledge of Teaching Content (KTC)	Knowledge of the structure, arrangement and content etc. of English textbooks	You can understand and grasp the relevant knowledge points for the content of the English teaching materials.	10,11,12
Knowledge of Content Organization (KCO)	Teachers’ understandings of the English discipline and instructional representations of teaching specific English knowledge	When you teach new knowledge, you can guide students to relate to the knowledge they already learned.	13,14,15,16
Knowledge of Effect Feedback (KEF)	Teacher can give emotional or posture feedback to students’ reaction and behavior.	You can give answers and explanations when students ask questions.	17,18,19

Knowledge of Teaching Strategy (KTS)	Teachers' understandings of general principles and strategies of classroom organization and management and English-specific instructional strategies	You can use appropriate examples to explain the main knowledge points.	20,21,22,23, 24

Based on the results of the questionnaires, a semi-structured interview is carried out among three participants, all of whom is interviewed one by one, which can verify and supplement the results of the questionnaire, and then help the researcher to further understand the situation of PCK in senior high school English teachers. In this study, the researcher will interview three English teachers in three different stages from these two schools to get a more specific and detailed description of senior high school English teachers' PCK to make the data of the study fuller.

The internal consistency reliability of a questionnaire, regarded as a relatively accurate indicator, plays a big part in deciding whether a questionnaire is reliable or not. Cronbach alpha has been widely accepted to test the internal consistency reliability of a questionnaire. To make the research instrument reliable for this study, the researcher attempted to test the total internal consistency reliability of the questionnaire and the internal consistency reliability of each scale of questionnaire as have been presented respectively in Table 4. Wu Minglong (2010) states that the total internal consistency reliability is high when Cronbach's alpha is above 0.8, and the reliability of each scale is acceptable when Cronbach's alpha is between 0.6 and 0.7. Altogether 48 participants are involved in this reliability test. From Table 4, it can be seen that Cronbach's alpha of the whole questionnaire is 0.963, which proves that the questionnaire of this study has comparatively high internal consistency reliability.

In addition, according to Table 4, the Cronbach's alpha of each scale ranges from 0.678 to 0.888, with 0.793 for KTP, 0.888 for KS, 0.678 for KTC, 0.858 for KCO, 0.885 for KEF, and 0.856 for KTS. The Cronbach's alpha of most scales is above 0.6. Therefore, the whole questionnaire is a reliable instrument for this study.

Table 4 Internal Consistency Reliability (Cronbach's alpha) of Each Scale

Scale	No. of Items	Alpha Reliability (n=48)
Pedagogical content knowledge (PCK)	24	0.963
Knowledge of Teaching Purpose (KTP)	3	0.792
Knowledge of Students (KS)	6	0.888
Knowledge of Teaching Content (KTC)	3	0.678
Knowledge of Content Organization (KCO)	4	0.858
Knowledge of Effect Feedback (KEF)	3	0.885
Knowledge of Teaching Strategy (KTS)	5	0.856

During a school-wide English teaching and research activity, the questionnaire was distributed to 51 senior high school English teachers from two provincial key high schools in Baotou. The

researcher first introduced the purpose and structure of the questionnaire, then asked participants to complete it based on their real experiences. After a 20-minute completion period, the researcher collected the questionnaires and asked participants to check for any omitted items. A total of 48 valid questionnaires were obtained. All data were immediately input into an Excel file and analyzed using SPSS 26.0. Based on the questionnaire results, three English teachers (one novice, one proficient, one expert) were randomly selected for semi-structured interviews. The interviews were conducted in Chinese during a 30-minute break in their office, lasting about 15 minutes each. With the interviewees' permission, the researcher recorded the interviews both by taking notes and using voice recordings for subsequent analysis.

Results and Discussion

Levels of Senior High School English Teachers' PCK

To expound on the levels of English teachers' PCK in senior high school the maximum, minimum, mean and standard deviation have been shown in Table 5. In this study, the full score of each problem is 5 points, that is, the "qualified" line is 3 points, the "good" line is 4 points, and the answer score is higher than 4 points that can prove that the master situation is relatively satisfactory. In terms of the scoring mechanism of the statistical software SPSS 26.0, the higher the mean is, the better the English teachers can master PCK.

Table 5 Maximum, Minimum, Mean and Standard Deviation of Senior High School English Teachers' PCK

	Minimum	Maximum	Mean	SD
PCK	2	5	3.75	0.814

In Table 5, it can be found the levels of senior high school English teachers' PCK are in a qualified level (M=3.75), which means senior high school teachers master PCK quite well.

To expound on the levels of English teachers' PCK in senior high school the maximum, minimum, mean and standard deviation have been shown in Table 6. In terms of the scoring mechanism of the statistical software SPSS 26.0, the higher the mean is, the better the English teachers can master PCK.

Table 6 Maximum, Minimum, Mean and Standard Deviation of all Scales of Senior High School English Teachers' PCK

PCK	Minimum	Maximum	Mean	SD
Knowledge of Teaching Purpose (KTP)	2	5	4.09	0.730
Knowledge of Students (KS)	2	5	3.81	0.808
Knowledge of Teaching Content (KTC)	2	5	4.03	0.799
Knowledge of Content Organization (KCO)	2	5	4.02	0.763

Knowledge of Effect Feedback (KEF)	2	5	4.06	0.911
Knowledge of Teaching Strategy (KTS)	2	5	3.82	0.816

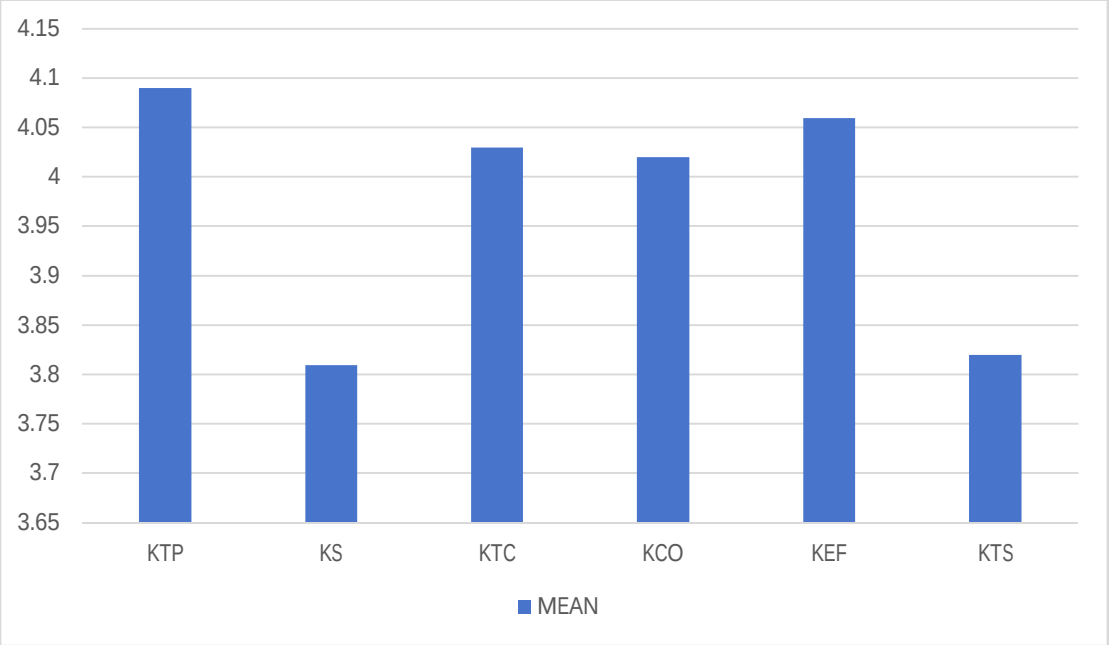

Figure 1 Descriptive Statistics for All Scales of Senior High School English Teachers' PCK

Notes: KTP= Knowledge of teaching purpose; KS= Knowledge of students; KTC=Knowledge of teaching content; KCO=knowledge of content knowledge; KEF= Knowledge of effect feedback; KTS=knowledge of teaching strategy.

In Table 6 and Figure 1, it can be found the levels of senior high school English teachers' PCK: knowledge of teaching purpose (M=4.09), knowledge of effect feedback (M=4.06), knowledge of teaching content (M=4.03), knowledge of content organization (M=4.02), knowledge of teaching strategy (M=3.82) and knowledge of students (M=3.81). With respect to the levels of senior high school English teachers' PCK, the conclusion can be carefully drawn that the senior high school English teachers can master the knowledge of teaching purpose, knowledge of effect feedback, knowledge of teaching content and knowledge of content organization in a good level, but the knowledge of teaching strategy and knowledge of students in a qualified level, which are not as good as the other knowledge.

The results reveal senior high school English teachers show good PCK in teaching purpose, content, organization, and feedback. This indicates they well understand national curriculum goals, textbook structures, disciplinary knowledge representation, and can provide timely emotional and postural feedback. However, their knowledge of students' learning abilities, motivations, and specialized teaching strategies remains at qualified levels, needing improvement.

Differences Among Novice, Proficient and Expert English Teachers' PCK

To expound on the differences among novice, proficient and expert English teachers' PCK in senior high school, the mean has been shown in Table 7. In terms of the scoring mechanism of the statistical software SPSS 26.0, the higher the mean is, the better the English teachers can master the knowledge.

Table 7 Mean of all Scales of Novice, Proficient and Expert English Teachers' PCK

The stage of teacher	Minimum	Maximum	Mean	SD
Novice teacher	2	5	3.07	0.644
Proficient teacher	2	5	3.79	0.741
Expert teacher	2	5	4.40	0.591

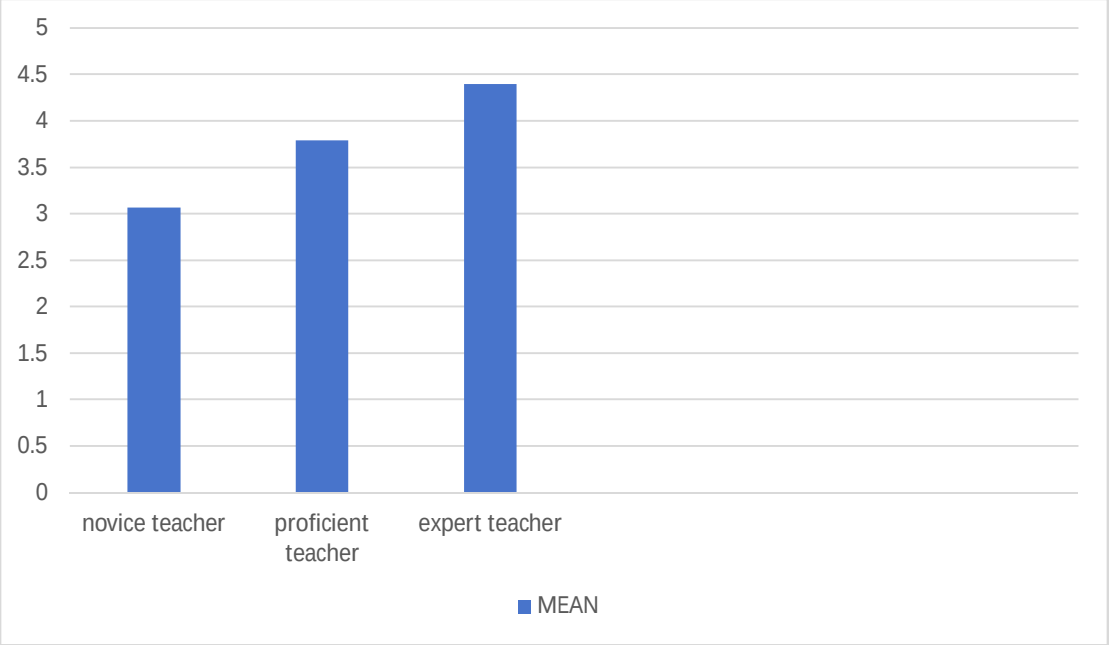

Figure 2 Descriptive Statistics for All Scales of Novice, Proficient and Expert English Teachers' PCK

In Table 7 and figure 2, the levels of senior high school English teachers in three stages are listed as follows in terms of the degree of master PCK well or badly: expert teacher (M=4.40), proficient teacher (M=3.79), novice teacher (M=3.07). With respect to the levels of senior high school English teachers' PCK, the conclusion can be carefully drawn that in senior high school, expert English teachers master PCK in a good level, proficient English teachers and novice English teachers have qualified PCK level, and proficient English teachers did better. The results of comparison of the mean values of novice, proficient and expert teachers' PCK reveal that novice, proficient and expert teachers have significant differences in all scales.

Analysis of the Results of Knowledge of Teaching Objective (KTP)

Knowledge of teaching purpose in this study refers to knowledge of the beliefs, objectives, content, and sources of the National English curriculum.

To make clear the differences of senior high school English teachers' KTP, the maximum, minimum, mean and standard deviation of KTP have been presented as follows in Table 8, and the mean is indicated in Figure 3 respectively.

Table 8 Maximum, Minimum, Mean and Standard Deviation of KTP

The stage of teacher	Minimum	Maximum	Mean	SD
Novice teacher	2	4	3.25	0.595
Proficient teacher	2	5	3.96	0.611
Expert teacher	2	5	4.72	0.552

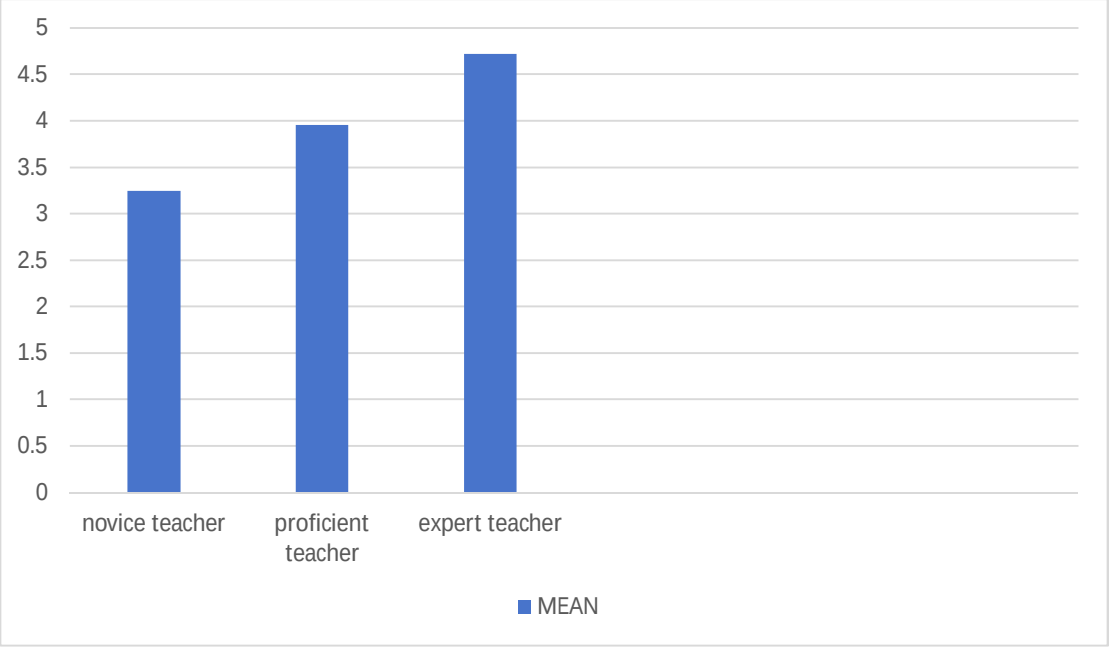

Figure 3 Descriptive Statistics of KTP

Table 8 and Figure 3, the levels of novice, proficient and expert teachers' KTP are listed as follows in terms of the degree of master KTP well or badly: expert teacher (M=4.72), proficient teacher (M=3.96), novice teacher (M=3.25). With respect to the levels of novice, proficient and expert teachers' KTP, the conclusion can be carefully drawn that in senior high school, expert English teachers master KTP in a good level, proficient English teachers and novice English teachers have qualified level, and proficient English teachers did better.

To further explore stage-specific PCK differences beyond quantitative analysis, three teachers (novice/proficient/expert) were randomly selected from two schools for in-depth comparison. Interview questions, informed by prior quantitative findings, focused on exploring PCK disparities among the three teacher groups. The interview reveals novice teachers design teaching objectives based on the curriculum but lack student analysis and need to diversify reference methods. Proficient teachers set objectives according to student needs, yet their preparation and setting approaches are limited. Expert teachers excel in effective objective-setting, providing valuable insights for study.

Analysis of the Results of Knowledge of Students

Knowledge of students in this study refers to knowledge of English learners' learning abilities and learning strategies, ages and developmental levels, attitudes, motivations and prior conceptions of the subject they are learning.

To make clear the differences of senior high school English teachers' KS, the maximum, minimum, mean and standard deviation of KS have been presented as follows in Table 9, and the mean is indicated in Figure 4 respectively.

Table 9 Maximum, Minimum, Mean and Standard Deviation of KS

The stage of teacher	Minimum	Maximum	Mean	SD
Novice teacher	2	4	2.79	0.510
Proficient teacher	3	5	3.63	0.633
Expert teacher	2	5	4.28	0.606

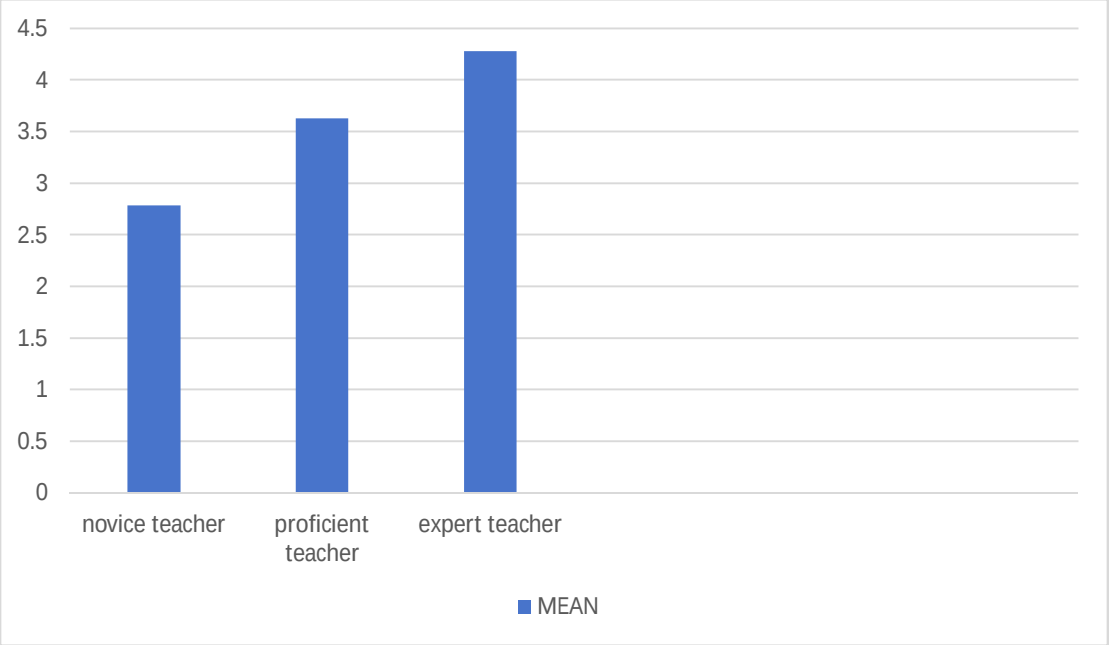

Figure 4 Descriptive Statistics of KS

Table 9 and Figure 4, the levels of novice, proficient and expert teachers' KS are listed as follows in terms of the degree of master KS well or badly: expert teacher (M=4.28), proficient teacher (M=3.63), novice teacher (M=2.79). With respect to the levels of novice, proficient and expert teachers' KS, the conclusion can be carefully drawn that in senior high school, expert English teachers master KS in a good level, proficient English teachers have qualified level, but novice English teachers are not qualified, novice teachers are too weak for knowledge of students.

In addition to quantitative analysis, interviews explored KS differences. Findings show novice teachers lag in student knowledge, failing to adjust content or provide feedback based on students, unlike proficient and expert teachers who demonstrate strong KS due to rich experience.

Analysis of the Results of Knowledge of Teaching Content (KTC)

Knowledge of teaching content in this study refers to knowledge of the structure, arrangement and content etc. of English textbooks.

To make clear the differences of senior high school English teachers' KTC, the maximum, minimum, mean and standard deviation of KTC have been presented as follows in Table 10, and the mean is indicated in Figure 5 respectively.

Table 10 Maximum, Minimum, Mean and Standard Deviation of KTC

The stage of teacher	Minimum	Maximum	Mean	SD
Novice teacher	2	4	3.25	0.722
Proficient teacher	2	5	3.88	0.780
Expert teacher	3	5	4.39	0.546

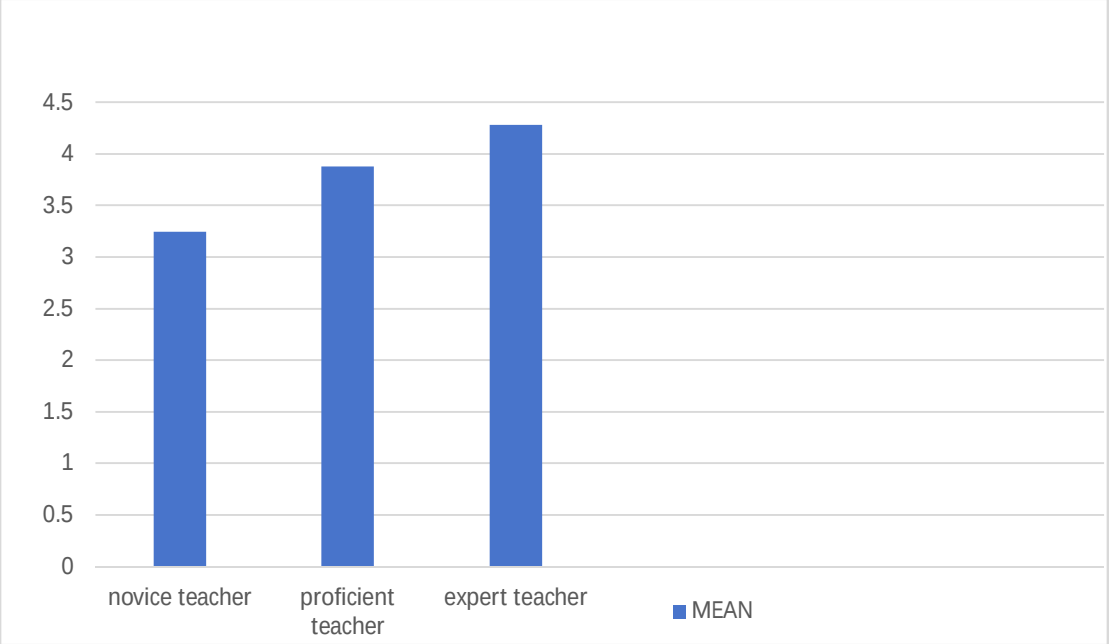

Figure 5 Descriptive Statistics of KTC

Table 10 and Figure 5, the levels of novice, proficient and expert teachers' KTC are listed as follows in terms of the degree of master KTC well or badly: expert teacher (M=4.39), proficient teacher (M=3.88), novice teacher (M=3.25). With respect to the levels of novice, proficient and expert teachers' KTC, the conclusion can be carefully drawn that in senior high school, expert English teachers master KTC in a good level, proficient and novice English teachers have qualified level, and proficient English teachers can master better.

Beyond quantitative analysis, interviews delved into KTC differences among teacher groups. Notably, while novice teachers had read the new curriculum, they struggled to identify its guiding significance for English education and missed developmental directions. Proficient teachers, having studied the curriculum carefully, derived teaching applications and recognized its guiding role but

still needed to grasp the discipline's developmental implications. Expert teachers, by contrast, effectively translated curricular guidance into pedagogical strategies, demonstrating a comprehensive understanding of how the new curriculum shapes English teaching trends.

Analysis of the Results of Knowledge of Content Organization (KCO)

Knowledge of content organization in this study refers to teachers' understandings of the English discipline and instructional representations of teaching specific English knowledge

To make clear the differences of senior high school English teachers' KCO, the maximum, minimum, mean and standard deviation of KCO have been presented as follows in Table 11, and the mean is indicated in Figure 6 respectively.

Table 11 Maximum, Minimum, Mean and Standard Deviation of KCO

The stage of teacher	Minimum	Maximum	Mean	SD
Novice teacher	2	4	3.19	0.527
Proficient teacher	3	5	3.78	0.780
Expert teacher	3	5	4.39	0.695

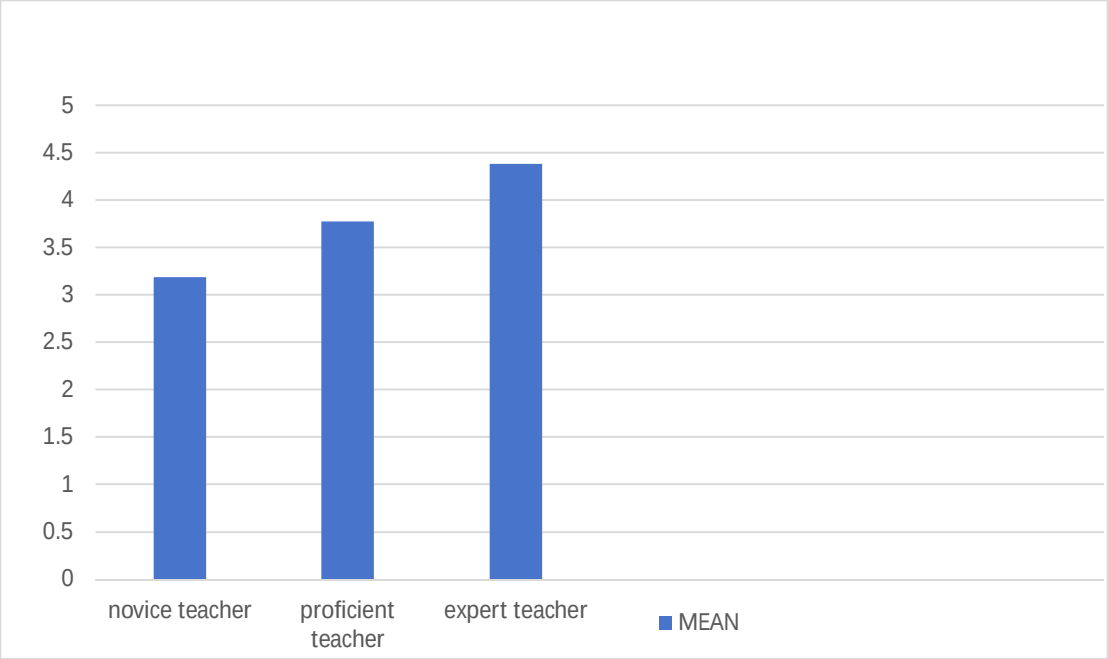

Figure 6 Descriptive Statistics of KCO

Table 11 and Figure 6, the levels of novice, proficient and expert teachers' KCO are listed as follows in terms of the degree of master KCO well or badly: expert teacher (M=4.39), proficient teacher (M=3.88), novice teacher (M=3.25). With respect to the levels of novice, proficient and expert teachers' KCO, the conclusion can be carefully drawn that in senior high school, expert English teachers master KCO in a good level, proficient and novice English teachers have qualified level, and proficient English teachers can master better.

Besides the data analysis, some interview questions are asked to further study the differences of novice, proficient and expert English teachers in KCO.The interview revealed that compared to expert teacher, novice teacher and proficient teacher both paid attention to the important part of English book and the theme of a unit, but they need to find the linkage of the English knowledge in each unit, book, and even the subject.

Analysis of the Results of Knowledge of Effect Feedback (KEF)

Knowledge of effect feedback in this study refers to teacher can give emotional or posture feedback to students' reaction and behavior.

To make clear the differences of senior high school English teachers' KEF, the maximum, minimum, mean and standard deviation of KEF have been presented as follows in Table 12, and the mean is indicated in Figure 7 respectively.

Table 12 Maximum, Minimum, Mean and Standard Deviation of KET

The stage of teacher	Minimum	Maximum	Mean	SD
Novice teacher	2	4	2.83	0.552
Proficient teacher	2	5	3.83	0.850
Expert teacher	4	5	4.61	0.487

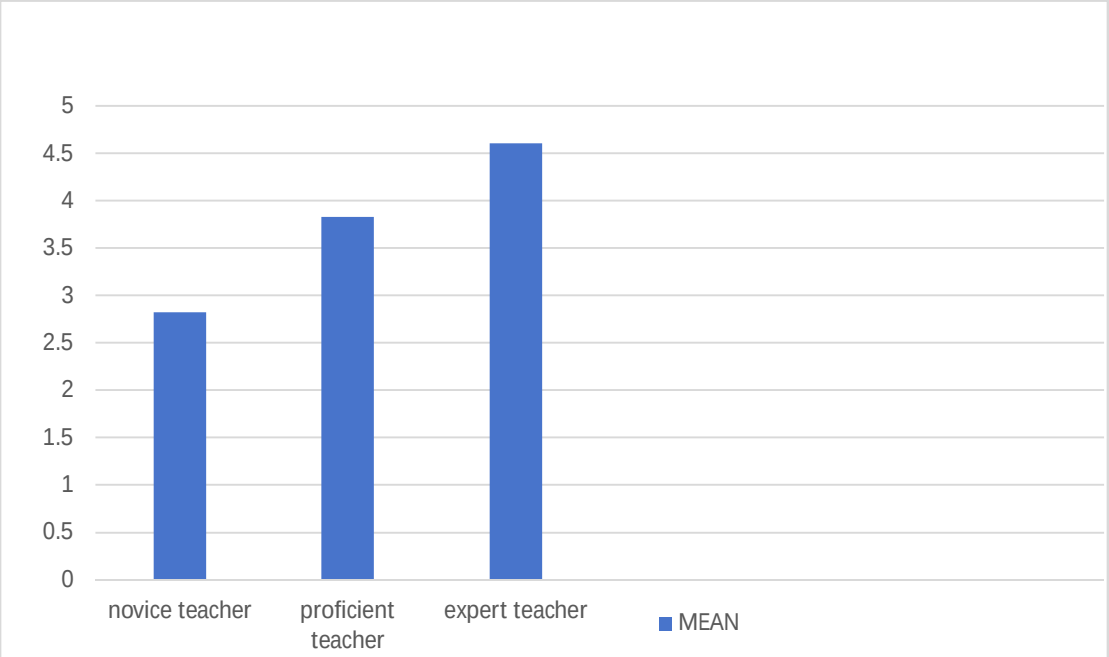

Figure 7 Descriptive Statistics of KEF

Table 12 and Figure 7, the levels of novice, proficient and expert teachers' KEF are listed as follows in terms of the degree of master KEF well or badly: expert teacher (M=4.61), proficient teacher (M=3.83), novice teacher (M=2.82). With respect to the levels of novice, proficient and expert teachers' KEF, the conclusion can be carefully drawn that in senior high school, expert

English teachers master KEF in a good level, proficient English teachers have a qualified level, but novice English teachers are not qualified to grasp KEF.

Besides the data analysis, some interview questions are asked to further study the differences of novice, proficient and expert English teachers in KEF. The result found that expert teachers had concrete ways to deal with different types of mistakes. Compared to expert teachers, novice teachers and proficient teachers both did not classify the type of mistakes in order to use different ways to deal with mistakes.

4.2.7 Analysis of the Results of Knowledge of Teaching Strategy (KTS)

Knowledge of teaching strategy in this study refers to Teachers' understandings of general principles and strategies of classroom organization and management and English-specific instructional strategies.

To make clear the differences of senior high school English teachers' KTS, the maximum, minimum, mean and standard deviation of KTS have been presented as follows in Table 13, and the mean is indicated in Figure 8 respectively.

Table 13 Maximum, Minimum, Mean and Standard Deviation of KTS

The stage of teacher	Minimum	Maximum	Mean	SD
Novice teacher	2	5	3.10	0.768
Proficient teacher	2	5	3.65	0.823
Expert teacher	3	5	4.17	0.610

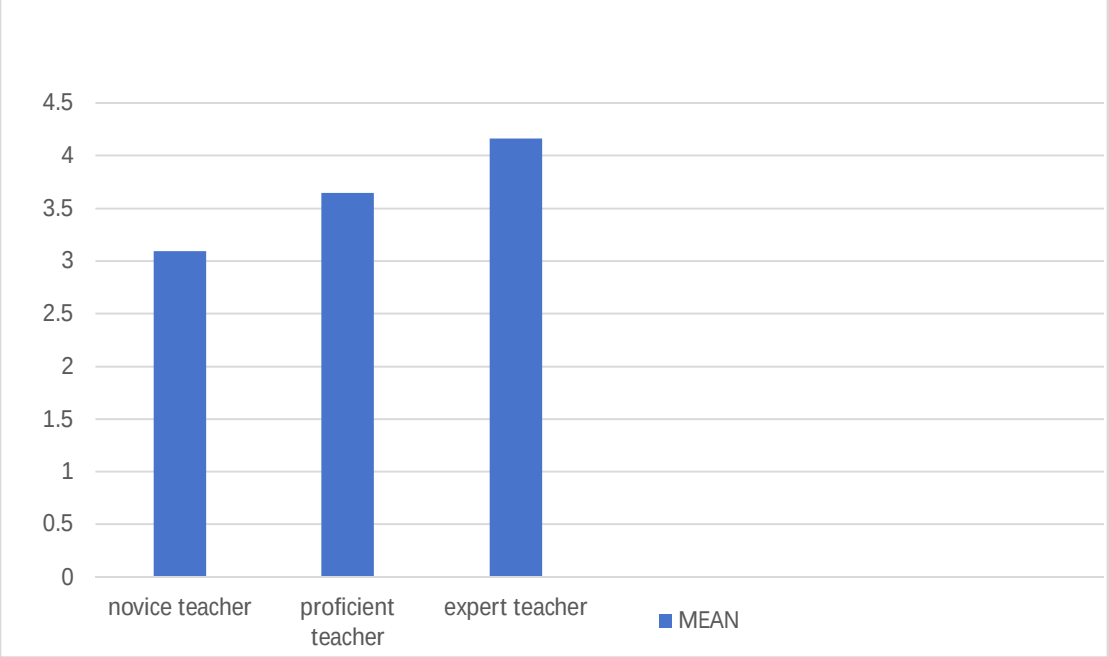

Figure 8 Descriptive Statistics of KTS

Table 13 and Figure 8, the levels of novice, proficient and expert teachers' KTS are listed as follows in terms of the degree of master KTS well or badly: expert teacher (M=4.17), proficient teacher (M=3.65), novice teacher (M=3.10). With respect to the levels of novice, proficient and expert teachers' KTS, the conclusion can be carefully drawn that in senior high school, expert English teachers master KTS in a good level, proficient and novice English teachers have qualified level, and proficient English teachers master KTS better.

Beyond quantitative analysis, interviews explored KTS differences among teachers. Novice teachers demonstrated diverse teaching strategies and adept use of multimedia technology, outperforming others in theoretical methods. However, they struggled to adjust strategies to meet student needs. Proficient teachers could tailor strategies to student levels but needed to enrich their approaches with theoretical knowledge and incorporate more multimedia. Expert teachers relied mainly on traditional teaching methods. They should both theoretically and practically diversify their teaching strategies and make an effort to utilize multimedia technology in instruction. This integration of quantitative and qualitative findings provides a comprehensive understanding of KTS disparities across different teaching stages.

Conclusions

Levels of senior high school teachers' PCK

In general, the overall level of senior high school teachers' PCK is quite good, especially in knowledge of teaching purpose, knowledge of teaching content, knowledge of content organization, knowledge of effect feedback, while knowledge of teaching strategy and knowledge of students is in a qualified level.

Differences among Senior High School Novice, Proficient and Expert English Teachers

A pivotal discovery highlights significant PCK variations among novice, proficient, and expert senior high school English teachers, with mastery hierarchies consistently showing expert > proficient > novice across six core dimensions:

Knowledge of Teaching Purpose (KTP): Expert teachers demonstrated robust KTP mastery, formulating objectives by integrating student needs with diverse references (curriculum standards, teacher manuals). Proficient teachers achieved qualified KTP by balancing curricular requirements and student needs, whereas novices primarily anchored objectives in curricular guidelines.

Knowledge of Students (KS): Experts excelled in KS, dynamically adjusting instructional content through accumulated experience. Proficient teachers reached qualified KS levels, but novices lagged due to limited student-teacher interaction, hindering their ability to gauge learner needs.

Knowledge of Teaching Content (KTC): Experts recognized the new curriculum ' s comprehensive guidance for lesson design, pedagogical methods, and college entrance exam strategies. Proficient teachers applied curricular insights to design and methods, while novices focused on extracting cultural value orientations for instructional planning.

Knowledge of Content Organization (KCO): All teacher groups prioritized vocabulary, grammar, and unit themes in textbook utilization. Experts uniquely emphasized knowledge integration and categorization to facilitate student comprehension.

Knowledge of Effect Feedback (KEF): Experts systematically classified student errors to deliver targeted feedback, while proficient teachers provided basic error correction. Novices lacked adaptive feedback skills, failing to tailor responses to error types.

Knowledge of Teaching Strategy (KTS): Experts employed diverse strategies and multimedia tools but struggled to customize approaches for different learners. Proficient teachers adapted strategies to student proficiency levels but underutilized multimedia resources. Novices over-relied on theoretical methods without integrating student-centered adjustments.

Suggestions for Senior High School English Teachers

Novice Teachers

1. Enhance Student Knowledge through Collaboration

Novice teachers should actively engage with proficient and expert colleagues to gain deeper insights into student needs and learning profiles. Regular communication with mentors or homeroom teachers can provide valuable perspectives on student proficiency levels, while administering student questionnaires can systematically gather data on learning preferences. This collaboration will address novices' challenges in tailoring teaching objectives and content to student needs, bridging the gap between theoretical strategies learned in university and practical classroom application.

2. Establish a Holistic Knowledge System

To transcend unit-focused instruction, novices should reconstruct English textbooks from a macroscopic perspective, categorizing knowledge (e.g., grammar, vocabulary) into integrated systems. For example, organizing grammar concepts into a hierarchical framework can help students grasp disciplinary connections, addressing the novice tendency to overlook cross-curricular knowledge linkages.

3. Deepen Curriculum Understanding

Novices should expand their interpretation of the new curriculum beyond cultural value-focused class design. Engaging with curriculum-explaining literature, attending relevant seminars, and consulting expert teachers will help unearth the curriculum's guidance for college entrance exam strategies and disciplinary development, aligning instruction with broader educational objectives.

Proficient Teachers

1. Foster Curriculum-Instruction Integration

Proficient teachers should advance beyond applying the curriculum to class design and teaching methods. By connecting curricular principles with daily teaching practices, analyzing exam syllabi, and exploring interdisciplinary links, they can unlock the curriculum's full potential for instructional innovation, moving toward expert-level curricular interpretation.

2. Systematize Pedagogical Theories and Innovate Methods

To address gaps in theoretical knowledge and limited multimedia use, proficient teachers should commit to weekly readings of authoritative educational journals, observe model classes online, and exchange ideas with novice teachers on emerging strategies. Integrating technologies like PPT and educational videos will diversify instructional approaches, balancing practical experience with theoretical grounding.

Expert Teachers

Modernize Strategies and Theories

Expert teachers should refresh traditional teaching models by incorporating contemporary methodologies. Regular engagement with cutting-edge educational research, participation in professional development workshops, and collaboration with younger teachers on new strategies will help update their pedagogical toolkit. Embracing multimedia technologies—such as interactive

software and video resources—will enhance classroom dynamics and ensure alignment with evolving educational trends.

Limitations and Recommendations for Future Research

This study, despite rigorous execution, has notable limitations. First, the sample size was relatively small, involving only 51 senior high school English teachers. Such a limited sample may compromise the representativeness of questionnaire results and interview findings, as insights from just three interviewees cannot fully reflect broader teacher perspectives. Second, the research focused solely on PCK differences among novice, proficient, and expert teachers, overlooking variables like gender and teaching grade level, which may influence PCK development.

To address these gaps, future studies should: 1) Expand the sample size by including teachers from diverse geographical areas (urban/rural schools, multiple provinces) to enhance result generalizability; 2) Incorporate additional variables such as gender and grade level to conduct more comprehensive PCK analyses; 3) Explore longitudinal PCK development trajectories across career stages, integrating mixed-method approaches for deeper insights. These directions will advance the field by fostering more nuanced and inclusive understandings of English teachers' PCK.

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