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Planned Behavior and Student Engagement of Chinese Engineering Majors toward Learning English using Translation Software and Generative AI

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ABSTRACT

This study aims to investigate the planned behavior and non-language major students' engagement in China when using generative AI and translation software to learn English. This study examines the engagement of 327 undergraduate engineering students in China with educational technology tools in their English language learning, using a convenience sampling method and an online survey to measure factors such as personal norm, attitude, subjective norm, perceived behavioral control, and intention, along with engagement across behavioral, cognitive, emotional, and educational technology dimensions. The results of the survey show that Chinese non-language students agree that using generative AI and translation software can help them learn English, and they are more accustomed to using translation software to learn English than using generative AI out of concern that the use of AI could lead to academic misconduct. Additionally, students' classroom engagement and use of language technologies vary across disciplines, with more positive attitudes and higher engagement observed in fields where English is more relevant, such as computer science and mechanical engineering. The study also highlights the need for personalized approaches to technology integration and emphasizes the importance of addressing concerns around academic integrity when incorporating generative AI into educational settings.

Keywords: Generative AI; ChatGPT; Deepseek; Translation Software; Engineering Education; Language Learning; Planned Behavior

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1. Introduction

For Chinese university students, especially non-language majors, English proficiency is essential for academic and career success in an increasingly globalized world. English continues to dominate globally, even though native speakers remain in the minority [1]. The percentage of social sciences and humanities essays written in English is over 75 percent, and more than 90% of natural science articles are in English [2], demonstrating the accessibility of English. Meanwhile, the results of a written survey of young people in Algeria showed that more than 92 percent consider English to be the world language [3]. This is also a reflection of the universality of the English language. Not only that, but English is also a window to the modern world. In government organizations, mathematical research, engineering companies, etc., practitioners are often required to be proficient in English [4]. At the same time, learning English in China has always been an important part of the exam, so many non-language majors in China may study English for interest or functional purposes in order to gain a broader global perspective and more options for global employment [5]. Given the important role of English in global and academic settings, understanding how non-language majors can leverage emerging technologies such as generative AI and translation software is critical to tailoring educational strategies. Therefore, the planned behavior of non-English majors in China to learn English is a question worth studying. This study aims to evaluate how program behavior affects the engagement of non-language majors in Chinese when using generative AI and translation software in English learning, as well as the purpose, approach, associations, and differences in their use of generative AI and translation software to learn English.

The popularity of English has facilitated global communication and technical exchange, and technological advancements have also brought new opportunities for generative AI. Generative AI has great potential for a wide range of applications across a wide range of industries [6]. Generative AI plays an important role in learning English. Some native English majors find it quite helpful to use generative AI to aid their writing [7]. This shows that generative AI can do English writing tasks well. A survey has shown that the use of AI chatbots to interact with students in oral conversations can effectively alleviate students' oral anxiety, improve the fun of learning, and can effectively help English oral learning [8]. Obviously, generative AI plays an important role in helping students learn English, both in speaking and writing.

Different countries and regions always have different languages, and in the past, there were certain difficulties in communication between people due to language barriers. In particular, the translation of some technical terms can lead to misunderstandings [9]. However, with the development of translation software and applications, the functions of translation software have become more perfect, and the communication between people in different regions has become more convenient. Some translation software has been shown to be beneficial for conversations between teachers and students, increasing students' understanding of the content of the class and increasing students' participation in the class [10]. This is a good example of the use of translation software in education. Not only that, but translation software also plays an important role in learning English. Students can effectively improve their English skills if they are able to use translation software correctly and make full use of it for learning [11].

Planned behavior theory can accurately predict the intention to perform different types of behaviors through three aspects: behavioral attitudes, subjective norms, and behavioral perception control [12]. Therefore, it is possible to understand the purpose, degree, and willingness of students to use generative AI and translation software by surveying and statistically stating students' behavior habits and attitudes towards behavior.

The results of a study show that college students can make full use of generative AI to improve computational thinking and mobility in class [13]. It can be observed that students who are interested in using generative AI are first interested in its practicality. Because of the benefits of generative AI, some students have developed behaviors and habits of using generative AI. Due to the convenience of generative AI, students' attitudes towards generative AI may be more positive. Some students use generative AI to complete assignments quickly and get high scores at the same time, which also makes some students rely on generative AI [14]. Students using translation software exhibit similar behaviors, often using it to avoid translation mis-

takes. Students may be prone to grammatical errors, spelling mistakes, and incorrect expressions of meaning due to their lack of proficiency in English. Spelling and grammatical errors can be corrected with translation software, and you can express what you want more clearly [15]. Students' use of generative AI and translation software reflects a variety of purposes, including improving accuracy and efficiency in language learning.

The widespread availability and ease of use of generative artificial intelligence (GAI) have significantly influenced various aspects of modern life, particularly in the realm of education. As technological advancements continue to reshape academic practices, students increasingly turn to AI-powered tools for academic support. Recent surveys highlight this trend, revealing that approximately 89% of university students in the United States utilize ChatGPT to assist with their coursework, while 53% rely on it to complete their essays [16]. These statistics underscore the rapid adoption of AI-driven platforms in academic settings, raising important discussions about their impact on learning, critical thinking, and academic integrity. Since its introduction, ChatGPT has amassed a vast user base within a remarkably short period, reflecting its accessibility and growing reliance among students and professionals alike [17]. Beyond its increasing role in education, studies suggest that ChatGPT and similar AI models have seamlessly integrated into daily life, influencing not only academic activities but also communication, content creation, and information retrieval [14]. Students frequently engage with generative AI through search engines, automated writing assistants, and digital marketing tools, illustrating the multifaceted nature of AI applications. Unlike traditional educational resources, generative AI enables instant responses, personalized learning experiences, and adaptive feedback mechanisms, further solidifying its role in contemporary academic practices.

In contrast to generative AI, translation software has a much longer history in technological development. The earliest forms of machine translation (MT) date back to the mid-20th century, with early computational models designed to facilitate cross-linguistic communication. Over time, advances in natural language processing (NLP) and artificial intelligence have significantly enhanced the accuracy and efficiency of translation software, making it a widely used tool among students and professionals [18,19]. Today, modern machine translation systems can process and translate English texts with increasing accuracy, allowing students to access multilingual content and improve their language proficiency. The convenience of mobile applications and web-based translation services further simplifies the process, enabling users to translate texts instantly using smartphones, tablets, or computers. Given the accessibility and efficiency of both generative AI and translation software, it is evident that students have unprecedented opportunities to engage with technology in their academic pursuits. Whether through AI-powered content generation or real-time language translation, these tools offer valuable assistance in navigating complex coursework. However, their widespread use also raises important considerations regarding ethical implications, cognitive engagement, and the potential over-reliance on automated solutions. As such, further exploration is needed to assess the role of these technologies in fostering independent learning while ensuring academic integrity.

Several studies mention the behavior and purpose of students using generative AI in the United States [16]. There are also studies that mention that some people use generative AI to get the information they want, and some people use generative AI to replace themselves to achieve higher academic results [20]. Obviously, the two have different levels of engagement and different impacts. While there are still some academics who use generative AI to generate academic dishonesty, the characteristics of generative AI are more pronounced, so this behavior is still easy to avoid. So far, there has been a lack of empirical research on the specific use of generative AI and translation software by non-language students in China. Chinese non-language students are a group that deserves attention, so this study focuses on the planning behavior and participation of Chinese non-language students in the use of generative AI and translation software, as well as the correlation between the two, and whether there are differences between different disciplines. This will further deepen people's awareness and understanding of the use of generative AI and translation software by students in different countries and regions.

2. Literature Review

English education has undeniably become an integral component of China's foreign language policy framework, playing a crucial role in academic advancement and professional development. In recent years, as English has gained widespread prominence across various sectors, it has increasingly been recognized as a valuable asset for accessing higher-quality education and enhancing social mobility [21,22]. To examine the impact of English learning on students from diverse academic backgrounds, Abdelrahim [23] conducted an empirical study utilizing a structured questionnaire survey. This study involved a sample of 128 students from multiple disciplines, all of whom were enrolled in English courses on a regular basis. The findings provided valuable insights into how disciplinary differences influence English language engagement and proficiency levels among university students. The results show that the practical application of English in various daily communication situations inside and outside the classroom is very unsatisfactory. Learning environment plays an important role in language acquisition. In view of the current educational environment, there are few ways for students to practice English. Classroom dynamics, the acquisition of language resources, and the overall atmosphere will significantly affect students' willingness and ability to use non-native languages meaningfully. In addition, Li and Fang [24] also mentioned this point. As non-language majors, the classroom teaching they receive can't provide an environment to simulate daily life, so the chances of using English become very few, which may indirectly lead to a lack of confidence in using English. Without the combination of theory and practice, it is difficult for students to apply what they have learned in class to practice. It is not difficult to find that this problem is not an isolated phenomenon, but a systematic challenge in English education. In other words, non-language majors do not realize the direct or indirect connection between their major subjects and their major fields when learning English, which leads to the lack or even loss of intrinsic motivation [25]. According to Dörnyei [26], most non-language majors regard English learning as a utilitarian periodic assessment, rather than a practical life skill, which will have an unnecessary negative impact on their investment and perseverance. Therefore, educators should consider designing more targeted teaching strategies to stimulate the interest and motivation of non-language majors in English learning. As a non-language major, regular participation in group work or study meetings can significantly improve English learning. Let students practice listening, speaking, reading and writing in an atmosphere, that can not only increase the fun of learning, but also cultivate "community consciousness" imperceptibly [27]. If you immerse yourself in an English environment shaped by literature or activities, such as watching movies, participating in language exchange activities or attending an English corner, you can improve your oral English. Students use English to complete tasks in real life, thus improving their language skills. These opinions emphasize the importance of further exploring how translation tools affect non-language majors' English learning, which is the blank this study aims to fill.

2.1. GAI in Learning English

The continuous advancement of science and technology has led to a growing intersection between artificial intelligence (AI) and language learning. In recent years, the integration of AI-driven tools into English education has become an inevitable trend, driven by rapid developments in machine learning, natural language processing (NLP), and autonomous decision-making systems. These innovations have opened new pathways for enhancing both the accessibility and efficiency of English language instruction. According to Dwivedi et al. [28], the accelerating pace of AI-driven technological change has introduced unprecedented opportunities for educational development, with algorithmic learning and intelligent automation reshaping traditional pedagogical approaches.

Given these advancements, Generative Artificial Intelligence (GAI) tools have gained widespread recognition across various domains, including English language education. These tools provide learners with interactive and adaptive learning environments that can cater to individual needs and facilitate more personalized instruction. As the application of GAI in education continues to expand, it becomes increasingly important to examine the perspectives of both students and educators regarding its effectiveness and potential challenges. Research by Hınız [29] suggests that an in-depth exploration of students' and teachers'

views can yield valuable insights into the optimal integration of GAI in English learning. By analyzing their experiences and recommendations, educators can refine teaching strategies to maximize the benefits of AI while mitigating its drawbacks.

A study conducted by Yeh [30] investigated the impact of GAI on English language acquisition by tracking its use among 14 English teachers and 13 college students over the course of a year. The findings revealed that GAI not only enhanced students' motivation for language learning but also led to substantial improvements in their listening, speaking, reading, and writing skills. These results align with the conclusions drawn by Zheng et al. [31], who emphasized the transformative role of AI in fostering more dynamic and immersive language learning experiences. The adaptive capabilities of AI-driven systems allow learners to engage with language content in real time, receive instant feedback, and tailor their learning pace according to their proficiency levels.

Despite its numerous advantages, the integration of GAI in English education also presents certain challenges. One of the primary concerns is the risk of over-reliance on AI-based tools, which can potentially hinder the development of independent problem-solving and critical thinking skills. While GAI offers immediate solutions and language assistance, excessive dependence on these technologies may reduce students' ability to analyze linguistic structures autonomously. To address this issue, teachers play a crucial role in guiding students toward a balanced approach to AI usage—one that leverages the benefits of AI without compromising cognitive engagement and self-directed learning. Educators should emphasize the importance of using AI as a supplement rather than a replacement for traditional language learning methods.

Moreover, the ethical implications of AI-driven learning tools must also be considered. As AI applications in education continue to evolve, questions regarding academic integrity, data privacy, and algorithmic bias become increasingly relevant. The automatic generation of text, real-time translation, and AI-assisted writing tools raise concerns about the authenticity of student output and the potential dilution of original thought. Therefore, future research should explore strategies to establish clear guidelines for AI integration, ensuring that students develop genuine language proficiency while maintaining academic integrity.

At the same time, the research results advocate the strategic integration of artificial intelligence into English teaching, which shows that this technology can bring novel teaching methods to the individualized needs of English learners, and also confirms the hidden potential behind English and other language learning [32]. At the same time, Liu [32] assessed the attitude of Chinese college students towards ChatGPT, the main force of English learning, and found that it was really effective. However, the related security risks brought by information security cannot be ignored. GAI is a double-edged sword affecting English learning. Overreliance on GAI may interfere with students' critical thinking and problem-solving ability [33]. In addition, due to the characteristics of artificial intelligence itself, the content generated by it can be inaccurate or inappropriate, which may lead to misunderstandings from the mixed information students get. For example, some factors lead to students' mistakes in translation, including a lack of understanding of ellipsis, difficulty in identifying idioms and lexical meanings, and lack of effective translation strategies. Many students rely on word-for-word translation and lack understanding of the text content and background [34]. In addition, artificial intelligence will bring risks to society. Algorithms may be biased due to measurement problems and their training data, reinforce unpopular practices, or lead to unexpected results due to hidden complexity [35]. This warns us that when using GAI tools for English learning, students should learn to comprehensively evaluate the generated content and generate a more mature information literacy evaluation system. These findings highlight the necessity of studying the role of GAI in English learning of non-language majors. This study will explore how GAI affects students' participation and learning outcomes. Combining the new GAI tools with the traditional learning methods can enhance the depth and breadth of learning.

2.2. Translation in Learning English

Translation has long been recognized as a valuable pedagogical tool in foreign language acquisition. Similar to generative artificial intelligence (GAI), it serves as an essential aid for learners navigating the complexities of a new language. Research by Dagilienė [11] highlights the

importance of integrating translation into English language instruction, as it fosters deeper comprehension and enhances overall language proficiency. In particular, translation provides learners with a means to bridge the gap between their native language and English, allowing them to decode meaning more effectively and internalize linguistic structures.

One of the primary advantages of translation in English learning is its role in facilitating the understanding of complex concepts and unfamiliar vocabulary. When students encounter difficult or abstract terms in English, translation enables them to associate these words with familiar concepts in their native language, thereby reinforcing retention and comprehension. Lin et al. [36] assert that this process is especially beneficial for non-language majors, as translating foreign language texts into their first language allows them to grasp intricate subject matter with greater ease. Without the assistance of translation, many learners may struggle to understand content fully, which can hinder their overall language development.

Moreover, translation is particularly advantageous during the early stages of language learning. According to Jubran [37], translation provides learners with an initial scaffold that connects the known and the unknown, easing the transition into full immersion in the target language. This claim is further supported by the findings of Duong et al. [38] that Vietnamese beginners use mother tongue translation to map English grammar into structure. In immersion activities, Vietnamese students' dependence on translation drops faster, which indicates that cultural attitudes towards using L1 in class may affect the transition to L2 autonomy. While exposure to English through direct interaction is crucial for fluency, translation serves as a supplementary strategy that enhances comprehension and supports the gradual internalization of linguistic rules.

An additional benefit of translation is its role in fostering cross-cultural understanding. Since language is deeply intertwined with culture, many English words and expressions carry implicit meanings that may not be immediately evident to non-native speakers. Farooq et al. [39] emphasize that translation enables learners to decode cultural references and contextual nuances, which are essential for effective communication. By engaging in translation, students become more aware of linguistic subtleties and can navigate cross-cultural interactions with greater confidence. This cultural competence is particularly significant in a globalized world, where English is often used as a medium for international communication.

Vocabulary acquisition, a fundamental component of language learning, is another area where translation proves to be highly beneficial. Many students find memorizing new words challenging, particularly when faced with extensive vocabulary lists that lack contextual relevance. As English as a Foreign Language (EFL) learners, students often struggle with retaining unfamiliar terms, which can impede their language progression. A study conducted by Hassan Ja'ashan et al. [40] investigated the effectiveness of translation tools in vocabulary learning among 109 English learners. The findings revealed that students who utilized translation software not only scored higher on vocabulary assessments but also demonstrated greater retention of newly learned terms after three weeks. This suggests that translation can serve as a powerful reinforcement tool, helping students internalize vocabulary more efficiently. Despite its advantages, translation is not without its limitations. While it aids comprehension, it does not always capture the full depth of meaning inherent in native speech. Drucker and Krapfenbauer [41] caution that translation tools often struggle with idiomatic expressions, cultural allusions, and context-specific meanings, leading to potential misunderstandings. Moreover, excessive reliance on translation software can inhibit the development of independent language skills. If students become overly dependent on automated translation, they may struggle to think critically in English and develop the linguistic flexibility required for fluent communication. To mitigate this issue, language educators should encourage a balanced approach that incorporates translation as a support mechanism rather than a primary mode of learning.

A promising strategy for optimizing English language learning involves combining translation with generative artificial intelligence (GAI). The integration of these two tools can enhance students' ability to comprehend and produce English while fostering critical thinking skills. By leveraging GAI alongside translation, non-language majors can develop a more structured and analytical approach to language acquisition. This dual approach enables learners to cross-check meanings, refine their sentence structures,

and improve accuracy in language production. Additionally, it helps students transition from passive reliance on translation tools to active engagement with the language, thereby fostering greater autonomy in their learning process.

It is also important to consider students' attitudes toward GAI and translation in language learning. While non-language majors generally recognize the practicality and convenience of GAI, their willingness to integrate it into daily learning routines remains limited. Yang et al. [42] suggest that this hesitancy may stem from a lack of familiarity with GAI applications or concerns regarding its reliability. Given these considerations, further research is needed to explore effective strategies for incorporating GAI into language instruction in ways that maximize its benefits while addressing students' reservations.

In conclusion, translation plays a significant role in English language learning by facilitating comprehension, aiding vocabulary retention, and fostering cultural awareness. However, it should be used judiciously to avoid over-reliance, which may hinder the development of independent language skills. When combined with GAI, translation can serve as a powerful tool for improving both comprehension and critical thinking, ultimately leading to a more effective and well-rounded approach to English language acquisition. Future research should focus on optimizing the integration of translation and GAI within language learning curricula, ensuring that students can harness their full potential while developing the autonomy necessary for linguistic mastery.

2.3. Planned Behavior Theory

There appears to be general agreement among social psychologists that most human behavior is goal-directed. The Theory of Planned Behavior (TPB) is a widely recognized model for forecasting and understanding behavior across multiple fields [43]. It was first proposed in the chapter "From Intentions to Actions: A Theory of Planned Behavior" by Ajzen [12], and it is one of the most widely used models for understanding human behavior in various contexts, including education and language learning. TPB postulates that an individual's behavior is directly influenced by their intention to perform the behavior, which is determined by three main constructs: Attitude, Subjective Norm, and Perceived Behavioral Control. In other words, behavioral intentions can be reliably predicted by attitudes, subjective norms, and perceived control, which together explain much of the variation in actual behavior [12]. These constructs offer a comprehensive lens to assess and predict how individuals make decisions and engage in certain behaviors, such as using translation software and generative AI for language learning. In this study, we utilized a questionnaire to inquire about students' use of translation tools in their daily English learning, focusing on frequency of use, level of dependence, degree of approval, moral alignment, and objective conditions such as internet access and subscription costs. This allowed us to evaluate their personal norm, attitude and the extent to which these behaviors are influenced by subjective norms, thereby assessing students' planned behavior in using translation software and generative AI for language learning. It is worth noting that students generally rely on translation software to aid foreign language learning, acknowledging its convenience but expressing reservations about its long-term learning effects, which suggests that software needs to be optimized in the future to better support deep learning [44,45]. These opinions emphasize the importance of further exploring how translation tools affect non-language majors' English learning, which is the blank that this study aims to fill.

On the basis of considering subjective factors, planned behavior theory introduces some limitations that are not completely controlled by will, and takes other irrational factors' perception of Perceived Behavioral Control into account to try to explain the reasons and rationality of behavior more reasonably. Perceived behavioral control reflects an individual's belief about the ease or difficulty of performing the behavior, which is based on previous experiences and anticipated obstacles. Ajzen [46] points out that perceived behavioral control is a broad, overarching concept made up of two key components: self-efficacy and controllability. Similarly, according to Bandura [47], perceived behavioral is closely related to the concept of self-efficacy.

Although personal norms were not originally part of Ajzen's TPB model, researchers have incorporated them to deepen the understanding of individual behaviors, especially in moral and ethical contexts. Some psychologists suggest that personal norms are internalized, motivating

individuals to follow them to avoid self-directed feelings like guilt or regret, rather than fear of social sanctions [48]. Personal norms and personal behavior are often weakly differentiated. When examining the planned behavior of Chinese non-language majors toward learning English using translation software, it is important to clearly distinguish between the two. Research shows that personal norms are linked to behavior, but not causally. In view of these studies, the necessity of studying the role of GAI in non-language professional English learning is highlighted. This study will explore how GAI affects student engagement and learning outcomes. Therefore, it is necessary to introduce the influence of moral sense when studying students' personal behavior of using translation software and GAI to learn English.

2.4. Student Engagement

Student engagement has become a crucial focus in educational research, as it is closely linked to academic success and overall student satisfaction. Despite its vital role in promoting positive educational outcomes, researchers in educational psychology have acknowledged the conceptual ambiguity surrounding student engagement as a multidimensional construct [49]. The prevailing view is that engagement encompasses three primary dimensions: behavioral, cognitive, and emotional [50]. Understanding these dimensions is vital, especially in the context of learning English through translation software and generative AI among Chinese non-language majors. This study aims to assess students' engagement in English classes and the key factors that influence it, using translation software and generative AI as focal points. It explores the potential positive impacts of these tools on enhancing student participation and efficiency over extended periods and across various settings. By doing so, it offers constructive insights into strengthening the reliability and effectiveness of future digital education.

Behavioral engagement refers to the observable actions of students as they participate in learning activities. It includes attendance, participation in class discussions, completion of assignments, and interaction with peers and instructors. Behavioral engagement is often seen as the most visible aspect of student engagement and serves as an indicator of students' commitment to their education [51,52]. Emotional engagement encompasses the feelings and attitudes that students develop toward their learning experiences. Research has shown that emotional engagement significantly influences overall student engagement and can lead to better learning outcomes [53].

2.5. Language Technology Engagement

Recent studies suggest that Web 2.0 applications help promote a social constructivist approach to language learning [54]. The integration of technology in language learning has transformed traditional educational practices, particularly with the emergence of tools like translation software and generative AI. Language technology offers teachers adaptive and personalized tools to support students in their language learning process, making the experience more engaging and effective [55,56]. Language technology engagement refers to how actively and effectively students utilize these digital tools to enhance their language learning experience. For Chinese non-language majors learning English, language technology engagement is a critical aspect of both motivation and learning outcomes, as it shapes how students interact with language technologies such as translation software and AI-based applications. Studies on language learning suggest that positive attitudes toward technology use tend to increase student engagement and motivation to adopt new learning strategies [57]. Similarly, some research suggested that by using student-centered teaching to integrate technology in the language classroom, students becom more motivated and engaged in their learning [8].

Building on this, the successful integration of Web 2.0 applications and language technology in the classroom depends on how effectively students engage with these tools. Research indicates that the social constructivist approach promoted by technology-enhanced learning encourages students to become more autonomous and collaborative learners [54]. For Chinese non-language majors, engagement with translation software and generative AI plays a pivotal role in shaping both motivation and academic performance, as these technologies provide real-time feedback and adaptive learning experiences tailored to individual needs. Studies suggest that language technology engagement fosters greater learner motivation, allowing students to explore context-based language acquisition and interactive learning strategies [57]. Similarly, student-cen-

tered teaching methodologies that incorporate AI-driven tools have been shown to enhance engagement and overall language proficiency by creating dynamic, personalized learning environments [8]. Moreover, as educators integrate AI-based applications into language instruction, they must strike a balance between technological support and cognitive skill development, ensuring that students critically analyze AI-generated content rather than passively relying on it [55]. Without such guidance, excessive dependence on AI tools may limit independent language processing skills, underscoring the need for structured, pedagogically sound technology integration strategies.

2.6. Cross-Cultural Perspectives on Technology Use in Language Learning

The application of generative AI, alongside translation software, in English learning is gaining traction across different educational contexts; however, the extent of adoption takes a distinct form from various cultural and institutional perspectives. In the United States and Europe, for example, ChatGPT has rapidly evolved into a learning tool, with surveys showing that approximately 89% of American university students have used the platform to provide coursework support [16]. Students appreciate the immediacy and flexibility of AI-generated replies to support their learning. However, many scholars have warned that too much reliance on such technology erodes students' critical thinking and writing independence [17,58]. Holland and Ciachir [20] found that UK students noted ChatGPT may promote equity in supporting disadvantaged learners, but also noted risks related to academic integrity and originality. These findings illustrate a developing tension between convenience and conserving academic integrity.

In higher education contexts in Asia, the adoption of technology by learners and educators is significantly shaped by institutional and culturally limited norms. In Hong Kong, Shepard and Rose [59] studied English-medium instruction and concluded that translation software was a key form of support for students (both local and non-local) who struggled to decode course content, and it frequently created barriers to comprehension and overall academic performance. In a similar vein, Yeh [30] investigated the use of generative AI with Taiwanese learners and educators, and found that while learning to integrate generative AI shaped students' writing and communication, students had serious concerns related to reliability and authenticity. These studies reveal that students in collectivist cultural contexts generally adopt AI cautiously, and that both institutional policies and collective norms are important when using data for student work with technology.

In the African context, the impact of digital capabilities is especially important for narrowing resource gaps. Abraham et al. [60] demonstrated that ICT-supported teacher education in Ethiopia not only enhanced teachers' instruction practices but also the students' English proficiency. This indicates that digital advancements can supplement knowledge, skills, and learning even in under-resourced contexts. The usefulness of the translation software to support cross-linguistic communication is particularly significant in African classrooms where learners encounter English as a second or even third language. Farooq et al. [39] highlighted that developments in machine translation are enabling learners to engage with content in a more equitable manner, but warned that inadequate infrastructure may hinder sustainable use.

European perspectives emphasize ethical and regulatory dimensions of generative AI in education; Fuchs [61] analysed the implications of ChatGPT in German higher education, and described it as both a student learning tool and an educational risk element, with a particular emphasis on the possibility of plagiarism. Not surprisingly, Kasneci et al. [55] discussed the importance of applying pedagogical guidance. The inclusion of technological affordances must balance independent, cognitive development with technology; pedagogically, it must be implemented to inhibit the chance of student dependency. In the context of Turkey, Yilmaz and Yilmaz [13] indicated that affect and mobility were positive contributors to generative AI in regard to computational thinking in mainly language classrooms. The authors also indicated that students may lose the concept of responsible use; providing engagement through technological affordances may render students largely dependent. These findings suggest that European educators may want to balance opportunity for autonomous creative use and integration of AI, whilst having the risk of academic integrity in mind.

When conceptualized in a global context, these studies show that while generative AI and translation software

are endorsed in many countries as valuable educational tools, the acceptance and use of this technology are largely influenced by local cultural, institutional, and infrastructural contexts. For example, debates in Western countries are focused on whether the use of such technology is academically honest and promotes independence in student learning, whereas in Asian and some African contexts, the discourses are more about accessibility, emotional engagement, and support for teaching and learning in the classroom. Framing this study within the broader global context points to the unique way Chinese engineering students use generative AI and translation software in and beyond classrooms, and provides impetus for more culturally and policy-bound integration of technology. It also highlights the potential for what we can term "best practices", developed in global contexts, which can support localized educational practices and policies.

3. Methodology

3.1. Respondents

This study employed a random sampling approach to select participants from a pool of undergraduate students enrolled in various engineering disciplines at the International Engineering College in Xi'an, China. A total of 327 students took part in the survey, all of whom were actively enrolled in English courses as part of their academic curriculum. To ensure anonymity and unbiased responses, the survey was administered without requiring any personally identifiable information. Participants were first briefed on the purpose and scope of the study before providing informed consent, after which they proceeded to complete the online questionnaire.

The respondents represented a diverse range of engineering specializations, including Electronic Engineering (n = 66), Computer Engineering (n = 88), Civil Engineering (n = 99), and Mechanical Engineering (n = 74). A notable demographic characteristic of the sample was its gender distribution, with a significantly larger proportion of male respondents (n = 248, 74.7%) compared to female respondents (n = 79, 23.8%). The participants were exclusively drawn from two academic levels, comprising freshmen (n = 216, 66.06%) and sophomores (n = 111, 33.94%). Upperclassmen, specifically juniors and seniors, were excluded from the study since they are no longer required to enroll in English courses, as their focus shifts toward discipline-specific coursework and research activities.

3.2. Data Collection and Analysis

Data collection was conducted online using *Wenjuanxing (wjx.cn)*, an anonymous survey platform commonly used in China. The survey link was disseminated within WeChat groups to solicit voluntary participation from students. Informed consent was obtained electronically before participants could access the survey, and they were informed about the voluntary nature of participation, with an option to withdraw at any stage. Participants were instructed to complete the survey independently and were given a two-week period to ensure flexibility. The completion of the survey tasks typically required participants to allocate approximately 5–10 minutes so that the respondents may answer at their most convenient time. Upon collection, the data were processed and analyzed using IBM SPSS Statistics, a statistical software package commonly used in quantitative research. The analysis was structured to directly address the study's research questions. Descriptive statistics were generated to provide an overview of participant engagement and language technology use patterns. To examine relationships among key variables, Pearson correlation coefficients were computed, assessing the strength and direction of associations between self-determination, learning engagement, and technology use. Furthermore, multiple regression analysis was conducted to determine the predictive influence of self-determination on both learning engagement and technology integration in language learning. Additionally, ANOVA (Analysis of Variance) was employed to identify any significant differences in language technology engagement across various engineering disciplines.

3.3. Research Instrument

The research included a number of established instruments, which were broadly validated in behavioral and educational research, to ensure conceptual and psychometric rigor. The Theory of Planned Behavior (TPB) constructs were applied using validated measures. Personal norm was measured with Ibtissem's [62] six-item person-

al norm scale, which had been used widely in behavioral intention research. Attitude toward the behavior was measured using seven semantic differential items, as Ajzen [12] suggested that attitude should be applied as a multi-item attitude measure. Subjective norm (SN) was measured with three items, and perceived behavioral control was measured with two items, which were adapted from Kim and Han [63], who demonstrated predictive validity with their instruments in technology-adoption studies. Intention was measured using three items from Verbeke and Vackier [64], who developed a scale for planned behavioral outcome measures in applied educational settings. The instruments selected for the study have consistently demonstrated very good reliability in cross-cultural studies of TPB and were well-suited for achieving the aim of this study, which was to examine students' planned behaviors. All TPB items were rated on 7-point Likert scales ranging from "strongly disagree" to "strongly agree."

Classroom engagement was evaluated with instruments based on established multidimensional frameworks of engagement. Specifically, the scale was adapted from Teng and Wang [65], who compiled items from a number of validated scales, including "Factor Loadings for Core Survey Items and Technology Items" [66], the Higher Education Student Engagement Scale (HESES; 28 items), and the Seven-Factor Model by Moreira et al. [67]. The core reason for selecting these scales was that they comprehensively captured the behavioral, cognitive, emotional, and technological scopes of engagement and assessed engagement levels relevant to higher education contexts. The adapted engagement scale in this study included 22 items using a 5-point Likert-type scale (1 = strongly disagree to 5 = strongly agree).

Language technology engagement was assessed with 24 items adapted from Teng and Wang [65] specifically on engagement with translation tools and generative AI. The items were assessed and refined with content experts to ensure contextual relevance with Chinese engineering students. The rationale for using this scale is based on its focus on technology-mediated engagement, which addresses the ways emerging tools such as translation software and GAI are likely to impact student behavior. Response options were recorded using a 5-point Likert-type scale (1 = Never to 5 = Always).

Internal consistency analyses undertaken to determine reliability showed that the scales demonstrated high levels of Cronbach's alpha across all scales: Planned Behavior Theory ($\alpha = 0.973$), Classroom Engagement ($\alpha = 0.969$) and Language Technology Engagement ($\alpha = 0.975$), which are all above the or > 0.70; Nunnally & Bernstein [68] support this reliability scale in their study on assessment of reliability, showing an excellent reliability. For validity assessment, we used confirmatory factor analysis (CFA), which indicated that all of the factor loadings exceeded 0.70, meaning that the observed variables were strong indicators of the constructs of interest. The results also provide evidence of both convergent and construct validity of the adapted instruments amongst the participants for the present study. In summary, the adapted instruments were theoretically justified, empirically reliable and contextually relevant for examining the planned behaviors of Chinese engineering students and their engagement with language technologies.

4. Results and Discussions

4.1. Planned Behavior Theory in Language Technologies

In order to investigate the planned behavior among Chinese non-language majors in China, survey data were systematically collected and analyzed. The arithmetic mean and standard deviation for three key behavioral constructs—personal norm, attitude, and subjective norm—were calculated separately for both translation software and generative AI applications. This statistical breakdown provides a comprehensive view of how participants perceive and engage with these technologies in their English language learning process.

Table 1 summarizes the computed mean values and standard deviations, indicating the general tendency of participants' responses based on a 7-point Likert scale ranging from Strongly Disagree (1.00) to Strongly Agree (7.00).

According to the survey data, the participants' translation mean was lower than each mean of the generative AI. The results indicate that the mean scores for translation software were consistently higher than those for generative AI across all three constructs (5.11 > 4.75, 5.20 > 4.88, 4.78 > 4.45). This suggests that participants exhibit a stronger

inclination toward translation tools in comparison to GAI-based applications. Additionally, the standard deviation values for GAI-related responses were generally higher than those for translation software (1.01 > 0.91, 1.39 > 1.27, 1.38 > 1.24), implying greater variability in participants' opinions and a less consistent level of acceptance toward GAI tools.

The relatively lower acceptance of generative AI tools among non-language majors can be attributed to several factors. One possible explanation is the long-standing familiarity with translation software, which has been widely accessible for decades, as opposed to generative AI, which has only recently gained prominence in language learning contexts. The longer history and established reliability of translation tools may contribute to students' greater confidence in their usefulness and accuracy, leading to higher preference and perceived effectiveness. In contrast, generative AI tools, despite their potential for enhancing English proficiency, may still be perceived as relatively new, experimental, or less trustworthy by some students, thus hindering widespread adoption.

According to the statistics of **Figure 1**, the mean score is 4. Anything higher than a 4 indicates that participants exhibit planned behavior that corresponds to that score, whereas anything lower than 4 indicates denial of that behavior (or that the behavior does not take place). The mean scores for guilt regarding the use of GAI (M=3.13) and translation software (referring to web-based and mobile-free GAI) (M=3.52) were lower than 4. This illustrates that non-language major Chinese students surveyed did not feel guilty generally when it came to GAI and translation software. The mean scores for academic integrity regarding GAI (M=6.07) and translation software (M=6.11) were much higher than the midpoint of 4.0. These findings show that Chinese non-language students strongly value academic integrity when they engage with GAI and translation software. This concurs with Yu [14] that generative AI use should be framed as a practice of integrity.

Table 1. Planned behavior theory.

Variable		Mean	SD	Interpretation
Translation	Personal Norm	5.11	0.91	Partially Agree
	Attitude	5.20	1.27	Partially Agree
	Subjective Norm	4.78	1.24	Partially Agree
Generative AI	Personal Norm	4.75	1.01	Partially Agree
	Attitude	4.88	1.39	Partially Agree
	Subjective Norm	4.45	1.38	Partially Agree

Note: Scale: 1.00–1.85 = Strongly Disagree, 1.86–2.71 = Disagree, 2.72–3.56 = Partially Disagree, 3.57–4.42 = Neutral, 4.43–5.28 = Partially Agree, 5.29–6.13 = Agree, 6.14–7.00 = Strongly Agree (N = 327).

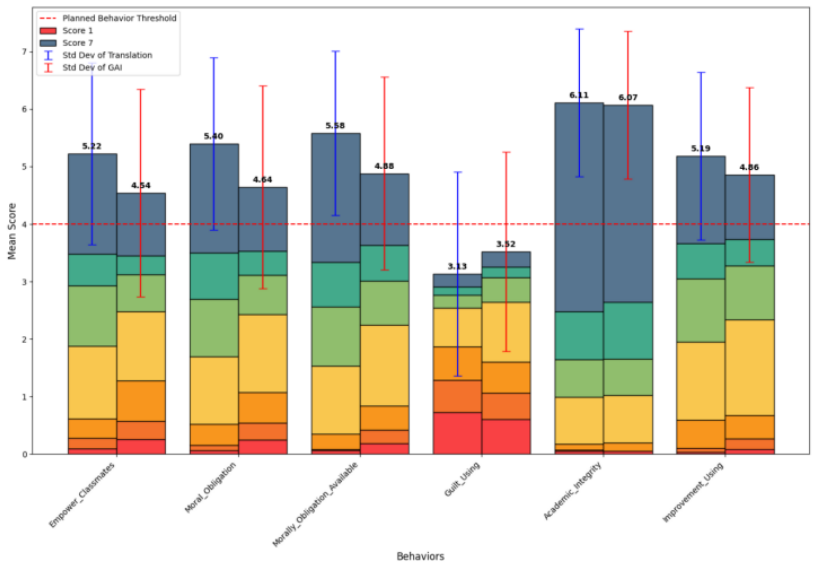

Figure 1. Planned behaviors mean scores std dev.

The consistently high levels of academic integrity may be, in part, due to institutional policies of Chinese universities that typically set strict guidelines and penalties for academic integrity. The policies reinforce adherence to academic integrity with a structured code of conduct, honour pledges, and established consequences for academic dishonesty, leading to an environment in which academic behavior is regulated and encouraged. Cultural contexts may also matter. In the Chinese educational setting, for example, collective responsibility, respect for power, and social reputation may strongly influence students' behaviors and adherence to expectations that are grounded in integrity. The structural and cultural conditions that shape participants' attitudes to academic integrity help explain why participants in this study held a strong commitment to academic integrity. Future studies could further explore how policies, such as those relating to GAI and translation tools, reflect cultural attitudes embedded in their organization/institution and how they affect students' ethical decision-making processes.

Figure 2 presents data on the subjective norm associated with the use of translation software and generative AI (GAI) among Chinese non-language majors. The findings indicate that participants generally demonstrated significant agreement in their planned behaviors related to willingness to use these technologies. However, when considering the willingness to pay for subscription-based services, the results revealed a stark contrast.

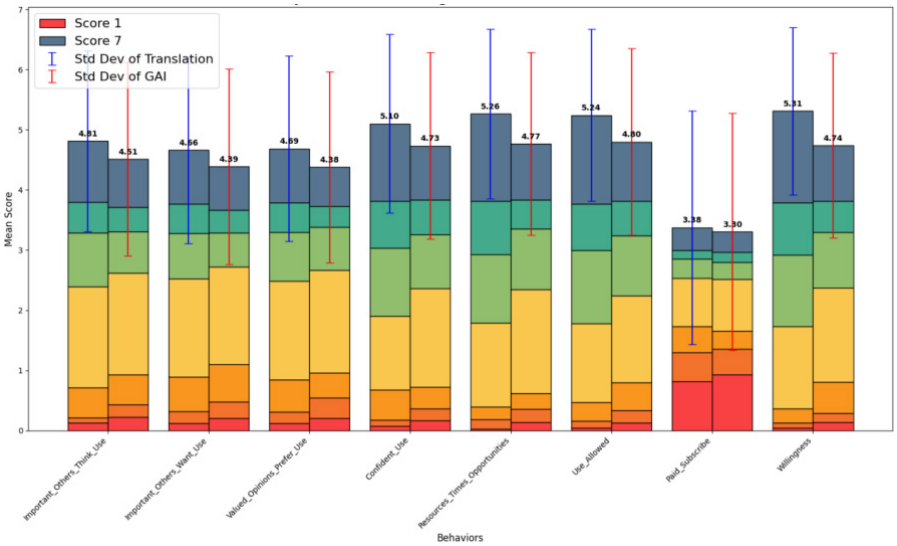

Figure 2. Subjective Norm of using translation software and GAI.

Specifically, the mean values for paid subscription willingness were 3.30 for GAI and 3.38 for translation software, both of which are below the neutral threshold of 4.00. These values are also notably lower than those observed for other measured behavioral constructs, suggesting a clear reluctance among students to invest financially in these tools. This reluctance may stem from several factors, including the availability of free alternatives, perceptions of cost-effectiveness, and general attitudes toward paying for digital services in educational contexts.

The data suggest that while Chinese non-language majors recognize the utility of translation software and GAI in their language learning process, they strongly prefer free access to these tools. This preference may be influenced by a variety of reasons, including the wide availability of free online translation tools, the perception that AI-based tools should be openly accessible, and potential budget constraints faced by students. Additionally, cultural and educational norms may also play a role, as students may be accustomed to government-supported or institutionally provided learning resources, reducing their willingness to independently invest in paid language technologies.

4.2. Students' Engagement in English Classroom

The survey results assessing Chinese non-language

students' engagement in English classrooms are categorized into three dimensions: behavioral engagement, cognitive engagement, and emotional engagement. The mean and standard deviation values for each category were computed and are presented in **Table 2**.

The data indicate that Chinese non-language students exhibit moderate to high engagement levels in English classrooms across all three dimensions. The behavioral engagement mean score of 3.78, cognitive engagement score of 3.85, and emotional engagement score of 3.87 suggest that students actively participate in classroom activities, process information meaningfully, and maintain a generally positive emotional response toward English learning.

Additionally, the similarity in standard deviation values (0.88, 0.93, and 0.95, respectively) suggests consistency in engagement patterns among the participants. This uniformity implies that non-language students, regardless of individual differences, tend to have comparable levels of classroom participation and motivation when learning English. These findings align with previous research indicating that students' attitudes toward language learning influence both their willingness to participate and their overall learning outcomes [57].

A deeper analysis of **Figure 3** reveals notable differences in engagement levels among students from various academic disciplines. The median engagement score of mechanical engineering students is higher than that of other majors, indicating that students from this field are more actively involved in English language learning. Furthermore, the interquartile range (IQR), defined by the 25th and 75th percentiles, is also wider for mechanical engineering students, suggesting greater variability in engagement levels within this group compared to students from other majors.

Table 2. English Classroom of Engagement.

Variable	Mean	SD	Interpretation
Behavioral	3.78	0.88	Agree
Cognitive	3.85	0.93	Agree
Emotional	3.87	0.95	Agree

Note: Scale: 1.00–1.49 = Strongly Disagree (1), 1.50–2.49 = Disagree (2), 2.50–3.49 = Uncertain (3), 3.50–4.49 = Agree (4), 4.50–5.00 = Strongly Agree (5) (N = 327).

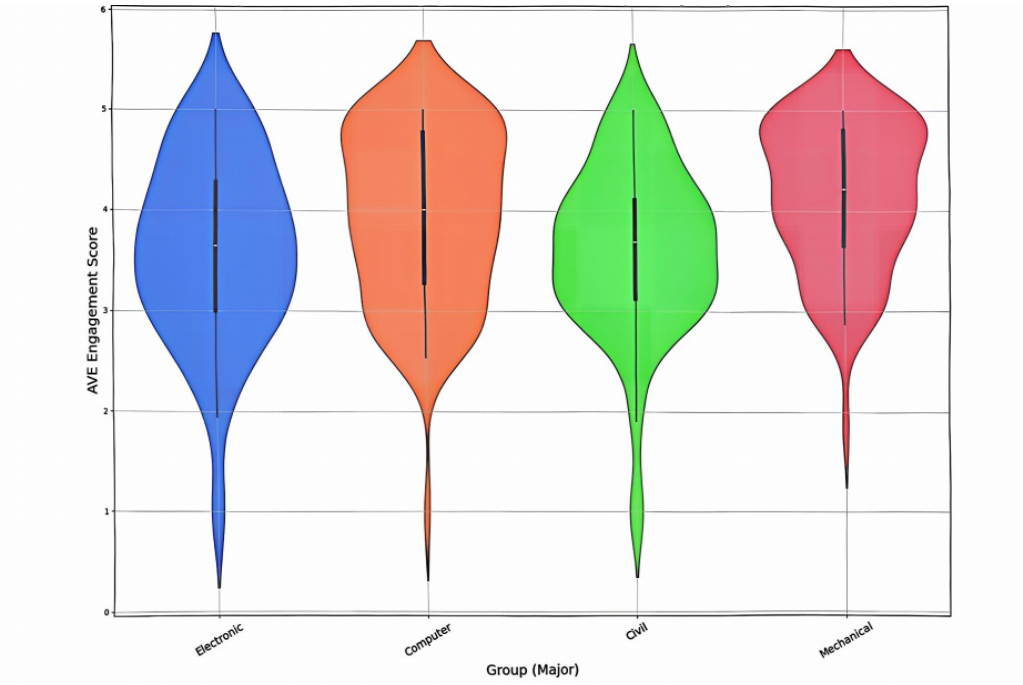

Figure 3. English classroom of engagement distribution by major.

This finding suggests that certain disciplines may place greater emphasis on English proficiency, possibly due to the necessity of technical documentation, research papers, or international collaborations. In contrast, students in disciplines with less frequent exposure to English-based materials may exhibit lower engagement scores due to reduced relevance to their academic and professional needs.

4.3. Students' Language Technology Engagement

Table 3 is a survey of the engagement of non-language students in learning English in China, and the data are also processed using mean and standard deviation methods. Among them, the technologies used by the students were mainly translation software and generative AI.

According to the Language Technology Engagement statistics, the mean value of participants using generative AI was 2.82, which was lower than the mean of 3.28 for translation software. The standard deviation of participants using generative AI was 1.10, which was significantly greater than the 0.91 of using translation software, and the interpretation of both was sometimes. This shows that the frequency of use of generative AI and translation software by non-language students in China is moderate. Not only that, but Chinese non-language majors have planned behaviors that are more likely to use translation software than to use generative AI.

Figure 4 shows that the median language technology engagement of non-language majors in China is around 3, regardless of the major, but the median and 75% quantile of computer science and mechanical engineering are higher, which shows that computer and mechanical engineering students are more willing to use GAI and translation software in English learning. This also shows that generative AI and translation software can help with learning, which is related to the fact that generative AI, as mentioned by Fuchs [61], can support student learning and promote educational development.

Table 3. Language technology engagement.

Variable	Mean	SD	Interpretation
Translation	3.28	0.91	Sometimes
Generative AI	2.82	1.10	Sometimes

Note: Scale: 1.00–1.49 = Never (1), 1.50–2.49 = Rarely (2), 2.50–3.49 = Sometimes (3), 3.50–4.49 = Often (4), 4.50–5.00 = Always (5) (N = 327).

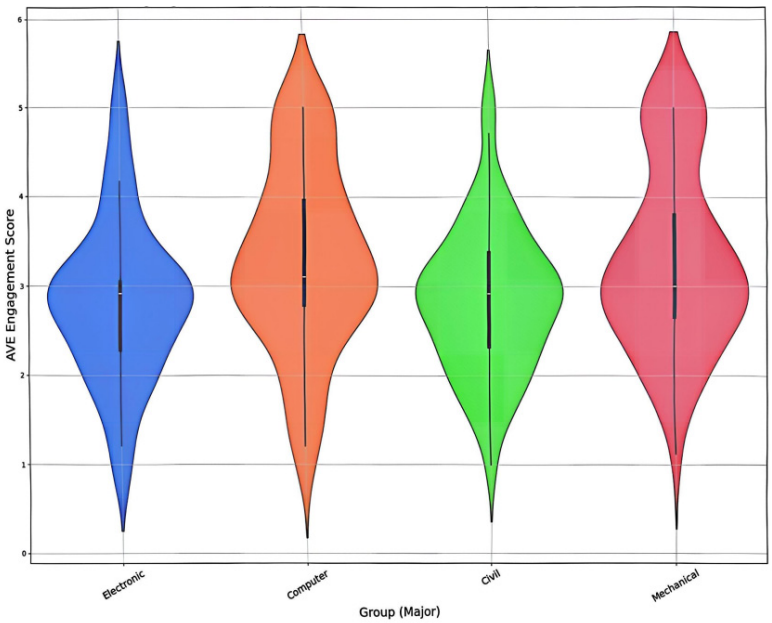

Figure 4. Language technology engagement distribution by major.

4.4. Planned Behavior, Classroom Engagement, and Language Technology

To explore the interplay between planning behavior, classroom participation, and language technology in different disciplines, the study randomly selected 327 students from four different disciplines: electronics, computing, civil engineering, and mechanics in **Table 4**.

Table 4. Planned behavior, classroom engagement, and language technology across disciplines.

Variables			Mean	SD	Description	*p*-value		
Dependent		Independent (Disciplines)						
Planned-Behavior	Personal Norm	Electronic	4.83	0.88	Partially Agree	0.38	Not Significant	Not Significant
		Computer	5.00	0.92	Partially Agree			
		Civil	4.83	0.82	Partially Agree			
		Mechanical	5.00	0.93	Partially Agree			
	Attitude	Electronic	4.79	1.19	Partially Agree	0.00	Significant	
		Computer	5.33	1.37	Partially Agree			
		Civil	4.76	1.12	Partially Agree			
		Mechanical	5.17	1.26	Partially Agree			
	Subject Norm	Electronic	4.38	1.21	Neutral	0.01	Significant	
		Computer	4.90	1.33	Partially Agree			
		Civil	4.39	1.11	Neutral			
		Mechanical	4.74	1.30	Partially Agree			
Classroom Engagement	Behavioral	Electronic	3.57	0.95	Agree	0.00	Significant	Significant
		Computer	3.90	0.88	Agree			
		Civil	3.63	0.87	Agree			
		Mechanical	4.05	0.71	Agree			
	Cognitive	Electronic	3.69	1.01	Agree	0.00	Significant	
		Computer	4.01	0.92	Agree			
		Civil	3.60	0.89	Agree			
		Mechanical	4.13	0.80	Agree			
	Emotional	Electronic	3.72	1.03	Agree	0.00	Significant	
		Computer	3.98	0.92	Agree			
		Civil	3.60	0.91	Agree			
		Mechanical	4.21	0.83	Agree			
Language Technology	Translation	Electronic	3.07	0.85	Sometimes	0.01	Significant	Significant
		Computer	3.45	0.96	Sometimes			
		Civil	3.12	0.80	Sometimes			
		Mechanical	3.46	0.98	Sometimes			
	Generative AI	Electronic	2.56	0.99	Sometimes	0.01	Significant	
		Computer	3.13	1.20	Sometimes			
		Civil	2.54	0.96	Sometimes			
		Mechanical	3.05	1.11	Sometimes			

Note: (*p*-value [2-tailed] = 0.000 < a = 0.01), N = 327.

On the performance of planned behavior, the average scores of individual standards, attitudes, and subject norms for each subject range from 4.66 in civil engineering to 5.08 in computer science, and the responses show partial agreement. However, the KDE distribution of planned behavior scores by major (**Figure 5**) shows that the average peak value of scores in planned behavior of the four disciplines obviously does not have the same trend, and even the mechanical discipline has a double peak value, and no statistical significance is reached in any discipline (*p*-value = 0.0224 > 0.01). It shows that there is no significant correlation between planned behaviors in different disciplines. Consistent with what Cheon et al. [69] mentioned, planned behavior can well explain college students' acceptance degree, attitude, subjective norms and behavioral control towards mobile learning, which positively affect their intention to adopt mobile learning and have little connection with the difference of disciplines.

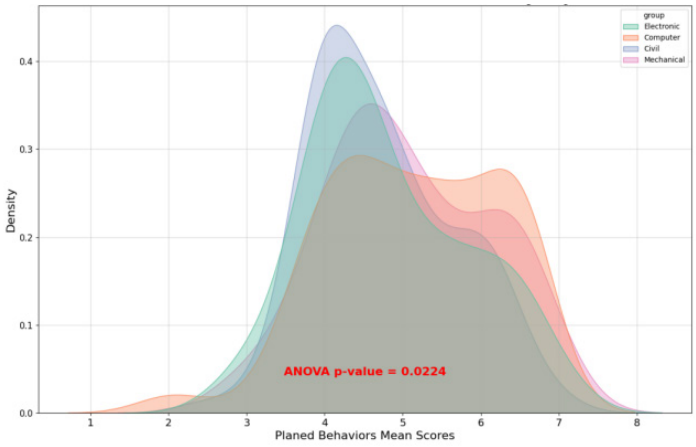

Figure 5. KDE Distribution of Planned Behaviors Scores by Major.

In the assessment of classroom participation, students of all disciplines perform well. From the perspective of the average score, mechanical subjects lead with 4.05 points, and electronics subjects have the lowest score of 3.57 points. In terms of cognitive engagement, mechanical subjects lead with 4.13 points, electronics subjects are 3.69 points, and emotional engagement, mechanical subjects lead with 4.21 points. The score of electronics is 3.72, and the three aspects mentioned above all show significant correlation (p-value = 0.00 < 0.01), which respectively demonstrate the consistency of students' participation, the consistent high level of cognitive engagement, and the students' emotional connection to their respective disciplines. According to the distribution of the "violin" graph (**Figure 3**), the concentration of civil engineering is the best, and the concentration of the average score is significantly higher than that of the other three disciplines, while the concentration of electronic engineering is the worst, the distribution is more dispersed and uneven, and the upper and lower limits are prominent. Different subjects correspond to different subject characteristics and teachers' teaching styles, which are positively correlated with students' classroom participation [59].

In the field of Language Technology, the distribution of engagement scores across four distinct academic disciplines provides valuable insights into how students from different fields interact with translation software and generative AI. The Kernel Density Estimation (KDE) distribution plot in **Figure 6** illustrates the variations in language technology engagement scores across these disciplines, offering a deeper understanding of the extent to which students from diverse academic backgrounds incorporate these tools into their learning processes.

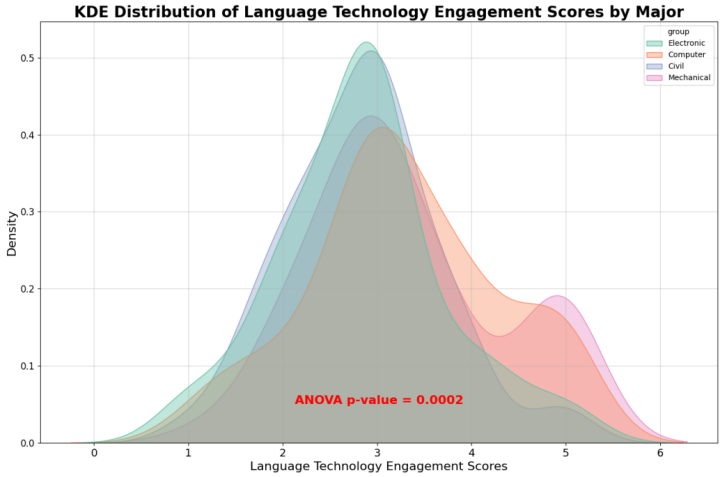

Figure 6. KDE Distribution of Language Technology Engagement Scores by Major.

The KDE distribution reveals that the average peak values of engagement scores for the four disciplines demonstrate a high degree of uniformity, indicating that students across various fields exhibit relatively similar patterns of technology usage. However, despite this general consistency, statistical analysis confirms that the observed differences are statistically significant (p-value = 0.0002 < 0.01). This finding suggests that while engagement with language technology is widespread, the extent and manner in which students integrate these tools into their academic activities vary based on their field of study.

A closer analysis of the KDE distribution suggests that some disciplines may demonstrate higher peaks in engagement, potentially reflecting greater reliance on translation software and generative AI tools. For instance, students in language-related disciplines might show higher engagement levels due to the direct application of these technologies in language acquisition and translation tasks. In contrast, students in STEM fields or non-language majors may exhibit a more varied distribution, possibly indicating sporadic or selective use of language technology for specific academic purposes, such as reading comprehension or report writing.

4.5. Correlation: Planned Behavior, Classroom Engagement, Technology Engagement

To resolve whether there is a significant relationship between the respondents' planned behavior, classroom engagement, and language technology in learning language, the product coefficient (also known as Pearson r) were used to treat the data. The analysis is shown in **Table 5** and supported by **Figure 7** for presentation.

Table 5. Correlation: planned behavior, classroom engagement, technology engagement.

Variables	Planned Behavior	Classroom Engagement	Language Technology Engagement
Planned Behavior	1	0.007 0.146	0.52 0.000**
Classroom Engagement	0.007 0.146	1	0.34 0.000**
Language Technology Engagement	0.52 0.000**	0.34 0.000**	1

Note: **Correlation is significant at the 0.01 level (2-tailed).

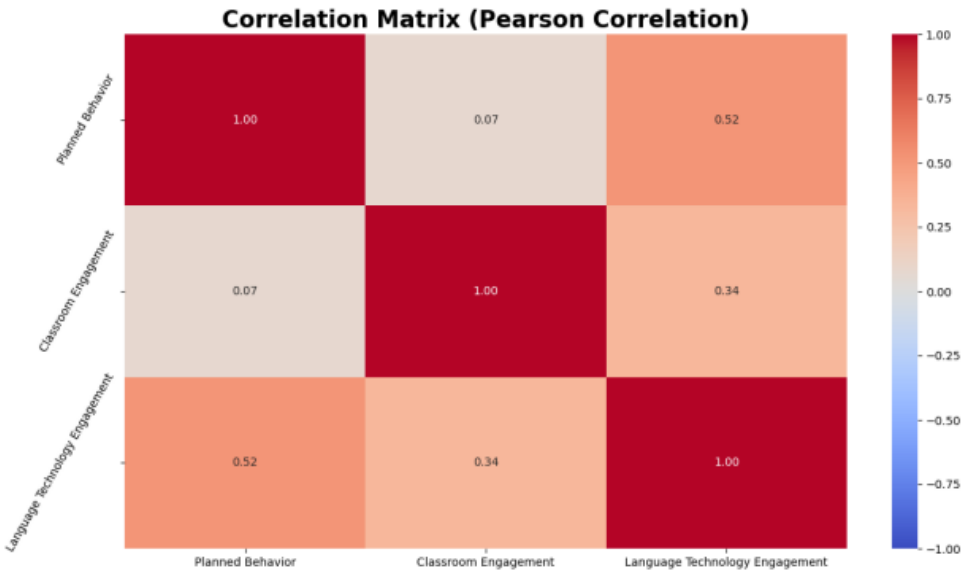

Figure 7. Correlation between Planned Behavior, Classroom Engagement, and Technology Engagement.

The information presented above reveals the correlation between planned behavior, classroom participation, and technology participation. R stands for the correlation coefficient, p stands for the p-value, and the established significance level is 0.05 or 0.01. The correlation between planned behavior theory and English classroom participation ($R = 0.52$, $p < 0.01$) indicates a moderate positive relationship between the planned behavior theory and English classroom participation. To the contrary, through correlation analysis, we found a weak and insignificant correlation between planned behavior and class participation ($R = 0.07$, $p > 0.05$) that planned behavior might not be the most suitable framework for explaining classroom participation, This just contrary to the view of Dmello et al. [70]: the intentional behavior of Internet learners plays a significant mediating role in influencing the engagement of Internet learners. In addition, there was a weak positive correlation between English classroom participation and language technology participation ($R = 0.34$, $p < 0.01$). As Abraham et al. [60] mentioned, the impact of technology-assisted English teaching training on middle school English teachers' teaching knowledge and English language ability.

These results emphasize that while planned behavior offers important insights into the role of intentions in classroom participation, it may not fully capture the complexity of the classroom engagement process. Educators should consider not only fostering students' intentionality but also addressing factors such as classroom dynamics, peer influences, and technological integration to enhance overall engagement. Additionally, leveraging technology as a complementary tool for learning could provide students with more opportunities for active participation and language practice, both inside and outside the classroom.

5. Conclusion and Implications

The primary aim of this study is to explore and assess the planned behavior and engagement of Chinese non-language major university students regarding the use of translation software and generative artificial intelligence (AI). By collecting online survey responses, we analyzed a total of 327 completed questionnaires, focusing on statistical relationships and research variables. The findings indicate that Chinese non-language major students demonstrate a similar level of recognition for both translation software and generative AI in language learning. This suggests that, under the influence of personal norms and ethical guidelines, students are aware of how to leverage these technologies effectively. In the aftermath of the generative AI boom, a significant number of language learning software and websites based on generative AI have emerged in China. These tools have made it easier for Chinese non-English major students to incorporate supportive technologies into their language studies. For instance, some IELTS candidates have utilized AI-powered simulation platforms with virtual examiners to replicate oral examination scenarios, enabling them to rapidly improve their English-speaking skills. However, it is noteworthy that students show significant controversy regarding the use of generative AI compared to traditional translation software, with relatively low levels of normative understanding. The main concern lies in the perceived risk of violating academic integrity through improper use of generative AI and the potential ethical issues associated with AI-generated content. These concerns may cause students to hesitate in fully embracing such technologies. This aligns with their preference for tools that directly support language learning and comprehension, rather than more complex AI systems. The study highlights issues related to academic integrity in the use of AI, prompting some institutions to impose comprehensive bans on the use of generative AI and translation software in academic contexts. This has, to some extent, hindered the adoption of supportive educational technologies and affected the quality of education. As a result, the cost of high-quality education remains high, exacerbating challenges such as regional disparities in the development of modern education in China. Regarding student engagement, the study reveals that some non-language majors, such as Civil Engineering and Electronic Science and Technology students, may withdraw from English classes when confronted with learning difficulties. Non-English major students may withdraw from English classes when faced with learning difficulties, resulting in decreased interest in the course and even class absenteeism. This decline in classroom engagement is closely related to students' academic disciplines. By comparing disciplines with high classroom engagement to those with less active participation, the study finds that students in fields where

English plays a crucial role, such as computer science and technology, tend to place greater emphasis on classroom activities. This heightened engagement is closely linked to their frequent need to work with computer programming languages that are primarily based on English.

Moreover, the level of engagement with technology in the classroom is similarly influenced by students' fields of study. This clear pattern further confirms that students' participation and approach to language learning vary significantly across disciplines, particularly in areas where foreign language learning plays a varying role. However, this study focused solely on four engineering-related disciplines within a single university, resulting in limited coverage of academic fields and a relatively small sample size. Consequently, the initial findings regarding the potential influence of academic disciplines on students' classroom engagement and technology engagement may not be comprehensive. Future research will aim to provide a more thorough analysis by examining the impact of different non-language disciplines across the 14 major categories of undergraduate education in China on student engagement in both classroom and technological contexts.

The study also finds a strong positive correlation between planned behavior theory and classroom engagement, indicating that individuals are inclined to make plans before taking action. This aligns closely with the Theory of Planned Behavior (TPB), suggesting that teachers can enhance students' classroom engagement through appropriate behavioral guidance and predictive planning. Furthermore, a significant positive correlation exists between students' Classroom Engagement and their Language Technology Engagement, demonstrating the positive impact of technology on English learning efficiency and classroom teaching effectiveness.

The implications drawn from these findings suggest that educators should be particularly cautious when integrating generative AI into classroom activities and academic behavior due to its potential for immature use and weak regulation. Positive guidance should be provided to students, especially regarding adherence to academic integrity. Policymakers may consider developing guidelines that promote responsible AI use in educational settings, ensuring that students benefit from these tools while maintaining academic integrity.

Additionally, non-language major students, who are more likely to disengage from learning when faced with challenges, highlight the necessity of targeted interventions to support sustained engagement. The university administration could consider offering specialized English courses tailored to the potential impact of students' academic disciplines on language learning. Examples include discipline-specific classes such as Academic English or English for Cultural Exchange, designed to meet the unique needs of different fields. The significant impact of academic discipline on planned behavior, classroom engagement, and technology engagement further suggests that educators may need to adopt personalized approaches to integrating technology into language learning to optimize student participation and academic outcomes.

Author Contributions

Conceptualization, H.S. and E.E.; methodology, H.S. and B.Z.; software, B.Z.; validation, G.J. and Y.W.; formal analysis, B.Z. and Y.Y.; investigation, G.J., Y.Y. and A.H.; resources, G.J. and E.E.; data curation, G.J. and Y.W.; writing—original draft preparation, H.S., B.Z., Y.Y., J.R. and A.H.; writing—review and editing, H.S., J.R. and E.E.; visualization, Y.W.; supervision, H.S. and E.E.; project administration, H.S. and E.E.; funding acquisition, H.S. and E.E. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

Ethical review and approval were waived for this study due to its method of gathering data, which is only an anonymous survey on a non-sensitive topic, and tools were adapted from previous studies, which poses very low risk to the participants. In addition, the data collected does not

allow for the identification of individual participants. The research is primarily for educational purposes only, a class project turned into research paper that does not involve vulnerable populations.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study. Respondents were informed of the purpose, and voluntary participation were sought, so participants can decide whether or not to be involved.

Data Availability Statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflict of interest.

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