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Effect and Scientific Verification of Innovative English Teaching and Learning through an International Networking Instructional System

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Abstract: International networking offers a teacher/learner an additional platform for promoting self-learning, as well as another way of generating social benefits by attracting more people for discussion and sharing. In this study, Taiwan is used as the instructional center to study international networking for innovative teaching efficiency, and Mongolia is the research object. A strategy inventory for language learning (SILL) questionnaire was used to estimate how often Mongolian students employ specific strategies for language learning. This assessment allows teachers to determine their students' profiles and strategies, thereby enabling them to design suitable approaches for teaching English. The SILL answers were analyzed in SPSS, and a descriptive statistics procedure was applied. In the SILL results, standard deviations were calculated using the SPSS statistical package. The SPSS general linear model was used to conduct an analysis of variance with gender and strategic ability as the independent variables. The results provided the Cronbach's alpha, which indicates the correlation of a set of items that measure the same constructs, providing an average correlation of all items. The result of the Cronbach's alpha was 0.741, which was acceptable. The analysis also provided the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy, with a value of 0.667, which meant that the degree of common variance was minimal. Innovative teaching and learning via international networking in English were verified through a reliability analysis. This produced values of 5% for α and a 95% confidence index, with the learner's effectiveness greater than 81%. Among the six indicators—Memory, Cognitive, Compensation, Metacognitive, Affective, and Social. Memory and Cognitive levels were the highest, but remained behind the confidence level. The results showed that essential features can provide enhanced opportunities for teachers and students to teach and learn English. Therefore, this research suggests using IT in English classes motivates students to learn in class and to make the learning process more interesting and productive.

Keywords: information technology; learning and teaching English in Mongolia; learning weakness; learning motivation strategy

1. Introduction

Under the domestic background of increasingly frequent exchanges, and an even faster pace of reform, Mongolia has implemented a Western development strategy. In response to increasing demands for foreign language talent, English teaching has also been given increasingly more attention [1] (p. 28). It is widely acknowledged that the development of information technology has changed the nature of instructional systems worldwide, and research concerning the integration of information technology into teaching has been conducted around Mongolia [2] (p. 108). Using a networking strategy, via an evaluation platform, helps a teacher/learner measure how well the learning effect satisfies the goals and

objectives of the learning. The internet and networking provide critical support for partnerships and the engagement of individual learners anywhere and anytime, so that informal institutions can provide exactly the same learning opportunities as schools [3] (pp. 6, 13). A small group of English teachers from the English Language Teachers' Association of Mongolia (ELTAM), which unites all ELT teachers in the country, were consulted for this study. This study suggests methods for analyzing classroom interactions and educator performances for teachers/learners. Technology plays an important role in the development of English learning and teaching in Mongolia [4] (p. 6).

In the 2000s, the Mongolian government launched a program to improve English instruction. In particular, the government collaborated with international stakeholders to diversify available English resources (e.g., textbooks and curricula), implement reforms in the English curriculum to align it with international standards, and elevate the level of English to address Mongolia's increasing demand for this language [5].

In previous years, Mongolians had limited opportunities to study English. However, the number of Mongolian students who learn English has increased steadily since 2000, making English the most widely learned language in the country [6]. Therefore, the current study intends to determine why Mongolians learn English and how we can contribute to effective teaching practices, thereby encouraging the development of a relevant curriculum. The learning abilities of Mongolian students should be determined to enable the development of standard strategies for learning and teaching English.

Many factors have influenced students' historically poor performance in learning English, including a lack of curricula, the poor quality of English teachers, and students' learning motivation. A few of these factors are also related to the school environment, class size, and a number of students. Accordingly, we should determine the practices that will be effective in Mongolia, as well as the factors that will enhance learning opportunities, and implement these elements correctly. Furthermore, when teachers learn these practices, they should be prepared to exert their best efforts to implement such techniques and follow through with the required steps.

Technology is rapidly improving and becoming part of daily life, thereby increasing our dependence on such innovations. Hence, using and combining technology with learning English may be one way to improve the process of learning and teaching this language. In traditional approaches, students have their own space in a classroom, where they learn English from teachers and textbooks within a set timeframe. Students can only receive information from their teachers and cannot access any additional information they require [7] (p. 2111). We refer to the research of Tan and Hsu [7] (p. 2112), which discusses whether increased exposure to information technology (IT) and multimedia in learning and teaching English is more advantageous than traditional methods. As shown in Table 1, the authors noted that when using an e-learning system, students can be properly grouped according to their level of academic performance and enrolled in courses suitable to their needs. Overall, such a system can enhance student learning.

Table 1. Basic characteristics [7].

Characteristics	Traditional Classroom Learning	E-Learning
Location and time limits	Place- and time-dependent; physical evidence is limited	Can take place anywhere and at any time; free
Teaching and learning content	Teacher-centered	Learner-centered
Personalization	Push method: One learning path (lowest common denominator)	Pull method: Learning pace and path determined by the learner
Learning methods	Inflexible	Flexible

The use of IT has an impact on learning, and extensive resources and tools can be used for instructional purposes. In general, the use of IT provides new dimensions to students who are learning

English, making them excited and curious about learning this language. The use of technology can also enhance students' motivation during the learning process.

2. Related Studies

2.1. English in Mongolia

Mongolia is a landlocked country between China and Russia and was, at one time, unknown to the world. Mongolia is the world's 18th largest sovereign country by area (1,564,116 square kilometers), and the most sparsely populated (approximately 3 million people) [8]. Mongolia is a land of nomadic herders who tend sheep, goats, cows, horses, camels, and yaks. The country's extreme temperatures and short growing season have resulted in the prevalence of intensive agriculture. However, the country intends to develop educated and skilled people who will lead the country's development into the future. Hence, the country requires instruction in English, which can provide a window to the world [9].

The growth of English in Mongolia since the collapse of communism in the 1990s has been phenomenal. At present, the majority of the younger generation either knows a minimum level of English or understands that the ability to speak this language is necessary to succeed, particularly in the market economy. The attitude and interest of Mongolian English users will increase rapidly in the coming years, as English enters all sectors of society. Although the number of English learners and students in Mongolia continues to increase, the country should continue to improve its quality of English teaching and the relevant developmental processes. If Mongolia truly desires to participate economically and politically in the international scene, the country should carefully study the different facets of instruction as the government enacts decisions and estimates the resources needed for the teaching and learning of English ([10] (p. 87), [11] (p. 80)).

Various reasons have been cited for studying English in Mongolia. First, Mongolia is a leading tourist destination, and the number of people visiting the country is increasing annually. The country's western and southwestern regions are characterized by a series of high mountains, while the north has forests and lakes, the east comprises steppe plains, and the south is the location of an expansive desert, where the country's rare plants and animals are found. In 2017, 469,309 tourists traveled through Mongolia. In the past five years, the number of tourists has increased by 10%, underscoring the tourist and travel interest in the country. Second, Mongolia has abundant natural resources (e.g., coal, gold, copper concentrate, iron ore, and zinc concentrate) and agricultural products for export [12]. Numerous international organizations and companies are interested in collaborating with Mongolian companies, particularly mining companies. Such collaborations are also a reason that companies require their employees to have English language skills.

In 2004, Cohen [13] (p. 22) conducted a survey among Mongolian universities to determine the reasons for the spread of English in Mongolia. The survey's results indicated that the majority of the participants want to understand international business communications and that English is recognized for its critical role in conducting business in other Asian countries. The respondents agreed that Mongolians who study English have a higher probability of finding a job in Mongolia or studying overseas.

Altangerel [14] explained that in Mongolia's capital of Ulaanbaatar, English is the most widely used language in all international offices. This situation illustrates the current influence of English on professionals and how the essential working dynamics in office settings have been rearranged in recent years. For young people, English is a requirement to get a job. Moreover, the prevalence of English television programs, advertisements, and movies demonstrate that the use of English is expanding considerably in Mongolia. Indeed, English is highly esteemed among the young population and is associated with modernism and internationalism. The impact of English-language music is evident in the creative use of this language, specifically the desire of certain population segments, particularly urban youth, to change their speaking styles [15]. Therefore, the Mongolian government has taken on various tasks related to the process of learning and teaching English to prepare Mongolia's children for

the future. Accordingly, we need additional research, studies, and practice in teaching English because of Mongolia's insufficient experience in teaching and learning this language.

2.2. Weaknesses in Learning and Teaching in Mongolia

Teaching English is a general issue among teachers and researchers in Mongolia, with problems evident in all aspects of teaching this language. The Mongolian government prioritizes the improvement of English learning and teaching in the country. Although numerous programs, projects, and curricula have been used, we have yet to develop a program to enhance the efficiency of teaching and learning English. Primary, secondary, and higher instruction curricula are the most important documents for English teachers. Hence, educators are constantly exploring ideas that can be applied to improve the learning process.

The factors that influence language learning include the learning process itself, teaching style, learning motivation and attitudes toward learning a language, students' needs and goals, classmates' interactions during the study, levels of self-confidence and performance, test-oriented learning, practical use of the language, and external support.

In secondary schools, students' weaknesses are often associated with their family background; teachers' pedagogies (when the curriculum plan is not taught effectively); the teachers' focus on grammar and textbooks, which exerts immense pressure on the students; crowded classrooms in which the number of learners is unmanageable; and students' low motivation, due to a lack of support from their family and classmates. Figure 1 shows the weaknesses in teaching and learning English in Mongolia.

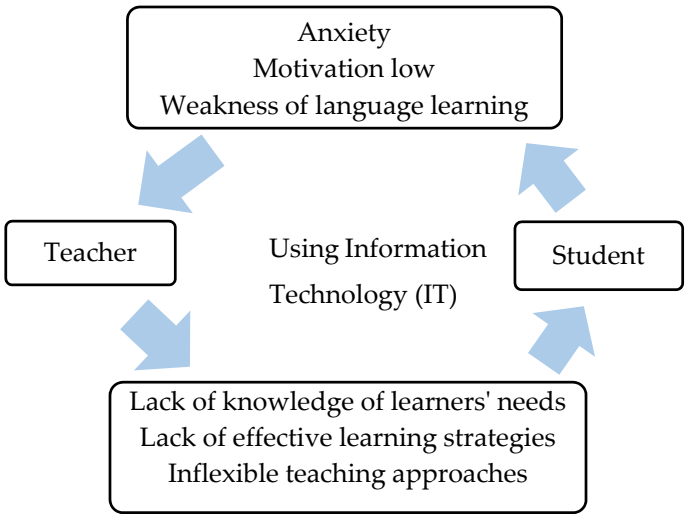

Figure 1. Weaknesses in teaching and learning English.

The teachers' role is of particular importance in motivating students, especially in encouraging them to succeed in learning English. Moreover, teachers' personalities influence how their students learn. For example, if a teacher is not friendly, sociable, and encouraging, students may refrain from participating in learning activities or initiating the creation of knowledge.

In addition, communicative language teaching is insufficient, and students seldom actually use English in or out of the classroom. The reason for this situation is that teachers consciously or unconsciously focus on testing students' vocabulary or grammar, instead of using English to communicate effectively.

2.3. Strategies in Promoting English Teaching

Naratsetseg et al. [16] reported that the teaching and learning process depends on the activities of teachers and students. In the Mongolian instructional context, many types of exercises are positively

correlated with students' proficiency and activities. Hence, teachers study the teaching context and focus on their students, resources and materials, and teaching methods. However, these teaching methods depend on the students' intellectual potential, learning effort, and personal qualities, including their strategic competence, motivation, activities, communicative potential, and shyness. The aforementioned researchers suggested the use of IT-related activities in class, such as teaching a few English songs at school, teaching songs by filling in the missing lyrics, and watching movies.

Jargaltuya [17] (p. 35) noted that teachers' teaching strategies often lack elements pertaining to the actual teaching and learning of English. To succeed in learning English, students should use effective strategies beyond depending on their teachers. Accordingly, vocabulary-learning strategies are the most widely studied. However, only a few studies have been conducted on English-language listening and reading strategies used outside the classroom. A moderate correlation was determined between children's attitudes toward listening and reading and their reading strategies. Age and maternal instruction negatively affected these learning strategies, while students' listening and reading attitudes positively affected their learning strategies.

Souvannasy et al. [18] emphasized the limited textbooks, unprofessional English teachers, and the lack of a standardized curriculum for English learning in Mongolia. Jdetawy [19] identified several weaknesses in the process of learning English, such as shortages and weaknesses in the teaching context, and a lack of motivation and exposure to the target language as spoken by native speakers. Hutchinson and Waters and Susanna recognized that a potential cause of weak English learning is the mismatch between students' capabilities and approaches to teaching that do not relate to students' needs and interests [20] (p. 8), [21] (p. 23). Table 2 presents a summary of the weaknesses and strategies for the teaching of English.

Table 2. Summary of the weaknesses and strategies for English learning.

Authors	Causes of Weakness in English Learning	Solutions through IT
Souvannasy et al. [18]	Shortage of textbooks	• Knowledge and skills are enhanced through the use of the internet and computer networks, thereby enhancing the nature of knowledge acquisition from teaching to learning. • Students like to use English outside the class by listening to popular songs, watching movies in English, and playing video games. • Digital stories are embraced by children because such stories combine interactivity, visual aids, and repetition. • Technology-based pedagogy is consistent with the learner-centered approach that teachers strive for, thereby resulting in the emergence of interactive classrooms. • Songs can be taught to any number of students, and even teachers with limited resources can use this music-related technique effectively. • Songs can help young learners improve their listening skills and pronunciation. • Video appears poised to become a major contributor to a shift in the instructional landscape, thereby acting as a powerful agent that adds value and enhances the quality of the learning experience.
	Lack of qualified English teachers	
	Unstandardized curriculum	
Hutchinson and Waters; Susanna [20,21]	Students' learning style and teachers' teaching approach do not match	
	English courses do not relate to the students' needs and interests	
Jdetawy [19]	Lack of personal motivation	
	Shortage and weakness of student contributions in the language teaching context	
	Lack of exposure to the target language as spoken by native speakers	
Normazidah, Koo, and Hazita [22] (p. 42); Trawiński [23]	English is considered a difficult subject to learn	
	Learning depends on the English teachers as authorities	
	Lack of support in using English at home and in the community	
	Learners have insufficient exposure to the language due to limited opportunities to use English outside the classroom	
	Students have limited vocabulary proficiency; English reading materials are often unavailable	
	Learners are unwilling and lack the motivation to learn English; they do not see the immediate need to use the language	
	Lack of motivation to learn or negative attitudes toward the target language	
Chang [24] (p. 2007)	Learners' laziness	
	Inefficiency of schools	
	Insufficient encouragement from parents	
Alderman [25]	Lack of effort	
	Lack of effective learning strategies	
Trawiński [23]	Teachers' academic achievements	
Scovel [26]	Anxiety	

2.4. Information Technology in Teaching and Learning English

Information technology helps students and teachers absorb course materials easily, due to to fast access [27] (p. 272). Because many students have anxiety about the learning process, they miss their chance to learn English. On the other hand, motivation is the foundation of study, without which a good methodology or good teacher cannot help. How can we solve these kinds of problems? Using IT in English learning could offer a solution to some problems with teaching English. The application of technology has considerably changed English teaching methods [28] (p. 118). Ahmadi stated that one of the most important elements of learning is the methods that instructors use in their classes to facilitate the language-learning process. Computer technology is regarded by many teachers as a significant part of providing a high-quality education [29] (p. 116). Information technology (IT) is necessary during classes, and students aspire to combine technology and English learning. Such combinations can improve students' learning motivation. The use of technology provides a new dimension and atmosphere for the students, making them excited and curious about the subject. The use of technology can also promote students' motivation to learn. There are several features of technology that can be used in learning, e.g., audio, video, computer-assisted learning, projectors, and word processing programs. These features attract students and can be used to teach all four language skills: listening, reading, speaking, and writing [30] (p. 402).

Researchers have also suggested the use of digital games for encouraging learners to learn English beyond the classroom because of their characteristics of portability, social interactivity, context sensitivity, connectivity, and individuality. Such games can also be used to create learning opportunities that are distributed, collaborative, situated, networked, and autonomous [31].

2.5. Technology Integrated into English Learning

The teachers' role is to provide guidance and develop a learning strategy for students. Modern students are no longer those that the traditional instructional system was designed to teach. As described by Zimmerman and Milligan [32] (p. 122), present-day students are the "net generation," who speak the digital language of computers, video games, and the internet as their native language. It is not an exaggeration to say that such students are "digital natives" [32] (p. 1). However, as teachers, we are mostly "digital immigrants" [33] (p. 2) who came to the internet later in adolescence or adulthood. Communication technologies like the internet are creating abundant opportunities to facilitate learning [34]. One drawback is that learners must be more responsible for themselves in e-learning environments. However, this factor also provides more opportunities for learners to choose their own direction and set their own pace. E-learning systems can also provide materials that are fine-tuned to users' needs [35] (p. 2).

Good teachers are able to motivate students to learn outside the classroom using technology. The use of technology has positive performance effects when learning foreign languages and also improves students' motivation [35] (p. 2). English instruction is also emphasized in Taiwan. When Tan worked in the Department of Applied Foreign Languages, National Penghu University of Science and Technology as an assistant professor, he used the technology acceptance model (TAM) model in his research and empirical study on the integration of technology into English learning and teaching [36–38]. The TAM suggests that the perceived usefulness and ease of use of new technology are beliefs that influence an individual's attitudes toward that technology, and their use of it [39] (p. 999). Thus, an individual's intention to accept technology is very important for both teachers and students [40] (p. 130). Utilizing the technology acceptance model as a fundamental theory to design the use of a learning system is a necessity for English e-learners [7]. It is thus necessary to build an English e-learning system for students. The empirical results of research examples using IT support with the TAM model for learning English are shown in Figure 2.

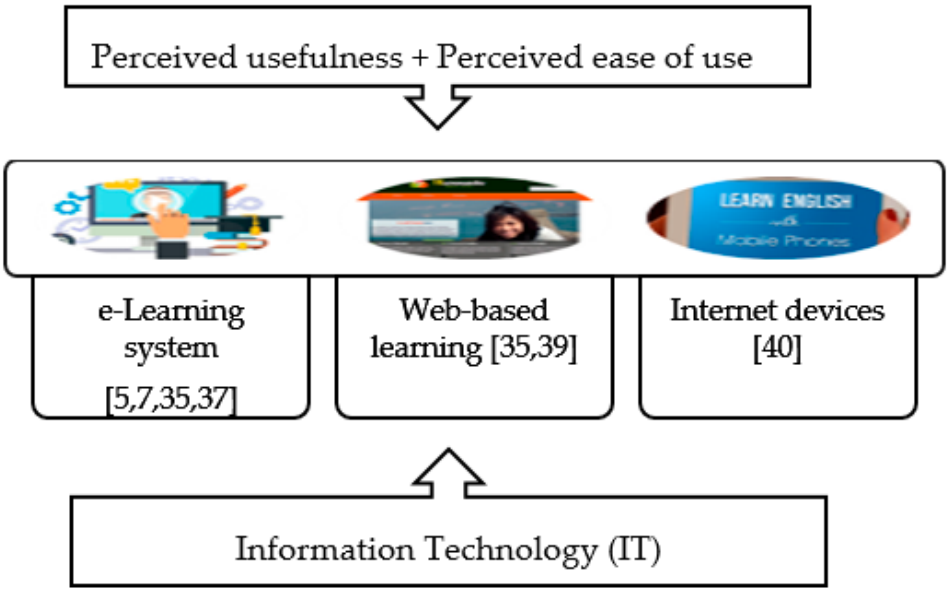

Figure 2. How IT supports English learning.

3. Methodology

Scientific verification is provided in Sections 3 and 4 in the form of empirical data, observations, and experiments conducted to confirm the assumptions of this research.

3.1. Qualitative Interview

Qualitative interviews aim to (a) comprehend the research problems, (b) predefine a process set to answer the proposed problems, (c) collect evidence, (d) determine what has not been studied, and (e) recognize the limitations of the study. The advantage of qualitative research is its ability to provide descriptions of people's experiences when addressing a research problem. In particular, it provides a rich, detailed image of why people act in certain ways, as well as their feelings about these actions. This study involved qualitative interviews with Mongolian English teachers who have worked in schools for at least five years, as well as Mongolian students who studied in universities or are in junior high school. The purpose of the interviews was to determine the problems encountered in teaching and learning English, as well as the advantages and disadvantages of using information technology in studying English.

3.2. SILL Survey in Mongolia

SILL version 7.0, designed by Oxford, was utilized in this study. The SILL survey consists of 50 questions categorized into six aspects of language-learning strategies [40]. Students' responses to the SILL items reveal how often students use these strategies. The responses are measured on a five-point Likert scale. The SILL is divided into six aspects of language-learning strategies; each part groups strategies with similar functions. Globally, more than 10,000 students have been evaluated using the SILL, which has also been translated into many languages, such as Arabic, Chinese, French, German, Japanese, Korean, Portuguese, Russian, Serbo-Croatian, Spanish, Swedish, Thai, Ukrainian, and Greek.

The SILL is a structured questionnaire that aims to identify how often learners apply particular language-learning strategies. It also helps teachers determine the profiles of their students' learning strategies when learning English [29].

3.3. SPSS

SPSS is used widely for statistical analyses in research. Survey companies, Mongolian governmental institutions, researchers, marketing organizations, and other individuals utilize SPSS [29].

3.4. Six Learning Strategies

Six major aspects of L2 (second or foreign language)-learning strategies were identified by Oxford in the SILL [29]. Language-learning styles and strategies are among the main factors that help determine how—and how well—students learn a second or foreign language. These six major aspects are Memory, Cognition, Compensation, Metacognition, Affection, and Socialization. We asked students to fill in the questionnaire so we could determine their viewpoints and needs in learning English [41] (p. 1). This study aimed to ultimately provide a better English-learning strategy for Mongolian teachers and students according to the results of the statistical analysis.

Memory strategies can help learners link one L2 item or concept with another, but do not necessarily involve deep understanding. Cognitive strategies enable the learner to manipulate the language material in direct ways, e.g., through reasoning, analysis, note-taking, summarizing, synthesizing, outlining, reorganizing information to develop stronger schemas (knowledge structures), practicing in naturalistic settings, and formally practicing the language's structures and sounds. Compensation strategies help the learner compensate for missing knowledge. Metacognitive strategies are employed to manage the overall learning process. Affective strategies involve talking about feelings, rewarding oneself for good performance, and using deep breathing or positive self-talk; these strategies have been shown to be significantly related to L2 proficiency. Social strategies help the learner work with others and understand the target culture, as well as the language [41]. Thus, we used these six aspects to understand the situation and needs of Mongolian teachers and students at the present time and to clarify how to provide relevant technology to improve the English-learning environment.

4. Results

This section explains the methods applied in this study and their results. Questionnaire design, data collection, and response analysis are mentioned on this section.

4.1. Qualitative Interviews

This research used a qualitative interview method that aimed to (1) identify the problems encountered by English teachers and students in Mongolia during classes, (2) establish a means to solve the problems mentioned in the interviews and literature review, and (3) determine the influence of using information technology in teaching and learning English.

4.2. Interviews

The teacher interviewees were selected with no regard for representativeness. As a result, no generalizations can be made. The interviewees were selected based on the requirement that they had experience in teaching English at a school for at least five years.

The interviews were conducted over the internet to enable all teachers to speak freely with no language barriers. We sent out invitations to a number of teachers who teach English in school, but several apologized and indicated that they did not have time for an interview. After selecting the teachers, we conducted the interviews over the internet. We set the times and met the interviewees individually at their appointed times.

The teachers mentioned that songs can be used to improve motivation and pronunciation. However, too much singing may demotivate students. They also mentioned that playing videos/movies in class is a good approach to improve students' English. However, school environments may not provide all the facilities that teachers need for these purposes (projector, computer, speaker, and video player), due to stretched budgets. Table 3 shows a comparison of the responses of teachers and students. Qualitative interview notes are presented in Tables A1 and A2 in the Appendices A and B.

Table 3. Summary of the responses of teachers and students.

(1) What are Your Feelings about Your Class?	
Teachers' Responses	**Students' Responses**
• Students' abilities and tenacity levels differ. • Several students are shy and afraid to speak English. • The motivation of several students is poor. This affects other students' motivation.	• We experience difficulty completing assignments or homework on time. • The subjects are boring, and we are frustrated by this. • Teachers teach too much grammar, and there is no opportunity to improve our speaking or converse with others.
(2) How Can these Situations be Resolved?	
• Teachers should select appropriate materials that cover all students' abilities. • Teachers should motivate students in interesting ways during class. • Teachers should encourage their students to work in groups. • Teachers should give rewards to their students to motivate English learning.	• Students should express their interests to their teachers. • Students should be active in learning English and be hardworking. • If students encounter any difficulties in learning English, they should share those difficulties with their teachers and find ways to resolve them.

The teachers said that some students experience anxiety or are afraid to speak in class. However, the students did not mention this factor. Rather, they said that their teachers do not give them an opportunity to communicate with others. The teachers also mentioned that student motivation is poor during class. However, the students said that teachers' teaching methods are boring and that they feel frustrated by this. In conclusion, teachers and students need to collaborate with each other and share their ideas, interests, difficulties, and problems. In this way, both parties can succeed.

4.3. Data Analysis

4.3.1. Participants

The participants included 50 Mongolian junior high school and university students (23 males and 27 females) engaged in learning English as a foreign language. The students were studying English as a required subject, and their ages ranged from 15 to 21 years. We asked the interviewed teachers to help us identify students who could complete the SILL survey for us. The willing students were contacted over the internet and asked to fill out the survey form. We used Google Drive to collect the responses from the students who were learning English in Mongolia. All of the students filled out the survey form completely. The collected data were analyzed in SPSS.

4.3.2. Data Collection Procedure

Data were collected over the internet. The previously interviewed English teachers helped us recruit students to participate in the survey. We then connected with the students through Facebook. After our request was accepted, we distributed the questionnaire via the internet. The subjects were told that the questionnaire contained questions about their use of English-learning strategies. Directions were given, and the subjects were told to ask for clarification should they have difficulty filling out the questionnaire. They were told that their names would not be used in reporting the results. Most had no difficulty understanding the questionnaire because it was in Mongolian. All students answered the questionnaire successfully.

4.3.3. Data Analysis in SPSS

The SILL answers were analyzed in SPSS via a descriptive statistics procedure. In the SILL results, standard deviations were calculated using the SPSS statistical package. The SPSS general linear model was used to conduct an analysis of variance with gender and strategic ability as the independent variables. The SILL scores were used as the dependent variable to determine whether sex and ability affected the use of specific learning strategies.

The mean scores of the six categories of learning strategies used by Mongolian students were between 2.7 and 3.4 on a scale of 1 to 5, a range that Oxford defines as medium use [42]. The mean scores of the strategies are shown in Table 4.

Table 4. Mean scores of strategies.

Strategies	Mean	SD
Memory	2.79	0.37
Cognition	2.91	0.24
Compensation	3.13	0.54
Metacognition	3.44	0.48
Affection	3.27	0.31
Socialization	2.97	0.43

Metacognitive strategies, which include guessing and the use of gestures, were used the most frequently (M = 3.44), followed by Affective (M = 3.27), Compensation (M = 3.13), Social and Cognitive (M = 2.97 and M = 2.91, respectively), and Memory (M = 2.79) strategies. The preference for Metacognitive strategies indicated that the students truly cared about English and had an interest in learning the language. Obstacles need to be overcome through communication and cooperation in the English-language subject. The results also showed that the Mongolian students used Memory strategies to compensate for mislaid knowledge. Social and Memory strategies were the least frequently used. A comparison of the mean scores and SD values between males and females is shown in Table 5.

Table 5. Comparison of the mean scores and SD values between males and females.

Categories	Male	Female
Memory	2.67	2.89
Cognition	2.94	2.88
Compensation	3.05	3.2
Metacognition	3.17	3.67
Affection	2.44	2.96
Socialization	2.67	3.22
Mean score	2.82	3.13
SD	0.27	0.29

Table 5 shows that in all of the categories of strategies, the female students (M = 3.13) had a higher use frequency than the male students (M = 2.82). The girls mostly used Metacognitive, Compensation, and Social strategies, but rarely adopted Affective, Memory, or Cognitive strategies. The boys mostly used Metacognitive, Compensation, and Cognitive strategies and rarely adopted Memory, Affective, and Social strategies. The boys used cognitive strategies more often than the girls did.

The correlation analysis, shown in Table 6, indicated that the categories were related to one another at a moderate to strong level. The strongest significant relationships were found between Metacognitive and Affective strategies (r = 0.999), Social and Affective strategies (r = 0.997), Compensation and Affective strategies (r = 0.996), and Affective and Compensation strategies (r = 0.996). The relationship between Metacognitive and Social strategies (r = 0.995) was also strong. Cognitive strategies were related to Affective strategies (r = 0.986), and the relationship between Social and Cognitive strategies (r = 0.985)

was stronger than that between Metacognitive and Cognitive strategies (r = 0.985). A weak relationship was observed between Cognitive and Memory strategies and between Affective and Memory strategies. This result indicates that the more frequently the students used Affective, Social, and Metacognitive strategies, the less frequently they reportedly used Memory and Compensation strategies. The weakest relationship was found between Metacognitive and Memory strategies (r = 0.547). Affective strategies had the strongest correlation with the other strategies—i.e., Metacognitive (0.999), Social (0.997), Compensation (0.996), and Cognitive (0.986) strategies. This result means that the students who used Affective strategies were also often responded well to other strategies.

Table 6. Analysis of the correlations among the categories.

Categories	Memory	Cognition	Compensation	Metacognition	Affection	Social
Memory	1	0.602 **	0.560 **	0.547 **	0.566 **	0.591 **
Cognition	0.602 **	1	0.986 **	0.980 **	0.986 **	0.985 **
Compensation	0.560 **	0.986 **	1	0.994 **	0.996 **	0.996 **
Metacognition	0.547 **	0.980 **	0.994 **	1	0.999 **	0.995 **
Affection	0.566 **	0.986 **	0.996 **	0.999 **	1	0.997 **
Socialization	0.591 **	0.985 **	0.996 **	0.995 **	0.997 **	1

Note: Coefficients are standardized; ** $p < 0.1$.

Table 7 shows the Cronbach's alpha, which indicates the correlation of a set of items that measure the same constructs and provides the average correlation of all items. The result of Cronbach's alpha was 0.741, which was acceptable. Table 8 shows the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy, which has a value of 0.667. This result means the degree of common variance here is minimum.

Table 7. Reliability statistics.

Cronbach's Alpha	*N* of Items
0.741	51

Table 8. Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test.

KMO Measure of Sampling Adequacy		0.667
Bartlett's Test of Sphericity	Approx. Chi-Square	7392.233
	Df	1225
	Sig.	0.000

Tables 9 and 10 present the analysis of variance (ANOVA) and statistics for each variable used in the regression equation. The regression variable had five degrees of freedom (DF), but the residual had 46 DF. For the distribution, the F value was 13.176 (p-value was less than 0.001). Strong evidence suggests that the F value was not equal to zero.

Table 9. ANOVA [a].

Model		Sum of Squares	DF	Mean Square	F	Sig.
1	Regression	9.181	5	1.836	13.176	0.000 [b]
	Residual	6.410	46	0.139		
	Total	15.591	51			

[a] Dependent variable: memory; [b] Predictors: (Constant), Social, Cognitive, Metacognitive, Compensation, and Affective strategies.

Table 10. Coefficients [a].

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.874	0.673		5.752	0.000
	Cognition	0.223	0.191	0.767	1.163	0.251
	Compensation	−0.481	0.202	−2.830	−2.376	0.022
	Metacognition	−0.686	0.262	−5.271	−2.620	0.012
	Affection	0.312	0.285	3.039	1.096	0.279
	Socialization	0.434	0.115	4.868	3.784	0.000

[a] Dependent variable: memory.

4.4. Scientific Verification of Innovative Teaching and Learning with a Reliability Analysis

Innovative teaching and learning via international networking in English were verified with a reliability analysis. When relevant to the efficiency of subsequent innovative teaching and learning via international networking in English, reliability is defined as the probability that an element (that is, a component, subsystem, or full system) will accomplish its assigned task within a specified time, which is designated as the interval t = [0, tM] [42]. Reliability is closely related to the following four factors: (1) The probability value, (2) the predetermined function, (3) the predetermined life, and (4) the prescribed environment. The probability function of reliability allocation and exponential distribution is explained in the following sections [43].

4.5. Exponential Distribution

The hazard rate is calculated as follows:

$$\mathbf{h(x) = (f(x))/(R(x)).} \tag{1}$$

If $f\ (x)$ as the probability density function of exponential distribution, then

$$f\ (x) = \lambda\ e^{-\lambda x}, x \geq 0 \tag{2}$$

where λ is the failure rate.

To find the mean time between failures (MTTF), let X be a random variable indicating the expiration time; then, the probability of the product failing at a specific time x is

$$P(X \leq x) = F(x), x \geq 0 \tag{3}$$

where $F(x)$ is the failure distribution function.

If the product still reaches the intended function at time x, then

$$R(x) = P(X > x) = 1 - f(x). \tag{4}$$

4.6. Weibull Distribution Probability Density Function

$$f(x) = \frac{\beta}{\lambda}\left(\frac{x}{\lambda}\right)^{\beta-1} \exp\left[-\left(\frac{x}{\lambda}\right)^{\beta}\right],\ x \geq 0 \tag{5}$$

The cumulatively assigned function is

$$F(x) = 1 - \exp\left[-\left(\frac{x}{\lambda}\right)^{\beta}\right],\ x \geq 0. \tag{6}$$

The reliability is

$$R(x) = 1 - F(x) = \exp\left[-\left(\frac{x}{\lambda}\right)^{\beta}\right],\ x \geq 0. \tag{7}$$

The average time to failure is

$$\text{MTTF} = \lambda\Gamma\left(1 + \frac{1}{\beta}\right). \tag{8}$$

The failure rate function is

$$h(x) = \frac{\beta}{\lambda}\left(\frac{x}{\lambda}\right)^{\beta-1},\ x \geq 0. \tag{9}$$

When $\beta < 1$, the failure rate decreases with time (early stage); when $\beta = 1$, the failure rate constant (opportunity period); when $\beta > 1$, the failure rate increases with time (loss period).

Reliability was assessed via an internal series calculation and an Internet of Things (IoT) system.

$$R_S = (R_A)(R_B)(R_C)(R_D) \tag{10}$$

Internal parallel calculation: The internal components of the system and the IoT system are connected in series. The parallel equation is as follows:

$$R_P = 1 - (1 - R_A)(1 - R_B)(1 - R_C)(1 - R_D). \tag{11}$$

From the Mongolian students' samples, we conducted non-probability sampling using quota sampling with respect to the age of samples. Reliability analysis was used in the follow-up to discriminate the effect of innovative teaching and learning via international networking in English. The results showed that the learners' effectiveness was greater than 81%. Among the six indicators of Memory, Cognition, Compensation, Metacognition, Affection, and Socialization, the Memory and Cognition levels were the highest, but remained behind the confidence level. The results are shown in Table 11.

Table 11. Statistical analysis of the reliability of scientific verification of innovative English teaching and learning.

Group	Memory	Cognitive	Compensation	Metacognitive	Affective	Social	Reliability of Innovative English Teaching and Learning via International Networking. ($R = R_A{*}R_B{*}R_C{*}R_D$)
Male (23 samples)	0.95	0.97	0.92	0.88	0.93	0.86	0.6
Female (27 samples)	0.95	0.95	0.87	0.84	0.91	0.89	0.53
Reliability on the Effect of Innovative English Teaching and Learning by International Networking R = 1 − (1 − R1)*(1 − R2)						0.81	

5. Conclusions

Many students who are learning English encounter difficulties in the classroom. However, little research has been conducted in Mongolia regarding teaching and learning English and how these difficulties can be resolved for teachers and students.

This study used interviews with teachers and students in Mongolia. The interviewed teachers were interested in the topic. Many students struggle for several years to learn English and encounter difficulties and anxiety when they realize that they lag behind their classmates. This situation is difficult for students, but is also difficult for teachers because they have to consider all the students in a class. Thus, teachers must evaluate each student, determine the cause of the difficulty, and provide appropriate support.

Mongolia has many primary schools, and English is initially taught in the first grade. However, parents are not aware of this issue because they trust the teachers. The interviewees indicated that one's first language must be well established before studying a foreign language. Motivation is the most important factor in improving language skills and achieving success in learning English.

The SILL data analysis revealed which strategies were used the most and least frequently by students. The data showed that memory strategies were the least frequently used. We suggest that teachers resolve this problem by using IT in teaching English, as mentioned in the literature review. To achieve successful learning results, teachers need to implement strategies for improving the motivation of students. Scientific verification should be expanded to further investigate organizations' abilities to develop successful teaching and learning platforms online. These scientific data would provide managers with practical suggestions for developing strategic platforms and assessing the necessary capabilities for discovering learning effects.

6. Implications and Suggestions

The internet is now familiar to many students in developed countries. Our proposed strategic framework was designed to focus on the application for a country far off the beaten path regarding its goals and objectives—not for the internet, as most of the studies have done. While learning English is necessary for some people and specialists, it is not an easy language to learn. IT may provide an easier way of learning or serve as an educational element—it can make English easier to study and help teachers in the classroom setting. Most survey studies adopted only user-based evaluation for investigating user's perceptions regarding the selected cases, and few studies evaluated the selected cases from both the user's and specialist's perspectives. Indeed, we consider user-based surveys a good method for external evaluation to examine whether the students are meeting teachers' expectations. Besides qualitative and quantification methods, we conducted a simultaneous reliability analysis to make the conclusions more accurate and careful.

IT has become an inevitable element of education in the twenty-first century. It makes classrooms happier and learning more fun. Appropriate use of IT provides an avenue for interaction between teachers and students, and IT makes English teaching and learning available to a wider range of learners. Regarding actual language use, symmetry and asymmetrical structure can be presented in a different way during the learning process. Future research should examine the individual strategies to seek insight into other educational factors in the presence of learning.

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Appendix A

Table A1. Qualitative Interview Note 1.

Interview Title	**Using IT in English Teaching and Learning**
Interview date	10 June 2018
Attendees	Six English teachers in Mongolia
Moderator	Erdenetuya Batbileg
Reason	(1) To find the problems that teachers and students have in English classes in Mongolia. (2) To discuss how to solve the problems mentioned in the interviews and the literature review. (3) What is the effect of using information technology in teaching and learning English?
Questions and answers: 1. What are you feeling in your class? (1) Teachers faced some problems in their classes. Some of their students had different abilities and tenacity levels. Teachers had problems in choosing appropriate topics for their students. Some students had a low ability in English, while others had a high ability. (2) Teachers faced problems in their students being shy and afraid to speak English. (3) Students had low motivation to speak English. 2. How can these problems be solved? (1) Teachers selected appropriate materials to cover all students' abilities. (2) Teachers created games and role-playing exercises to make their students more interested in learning English, especially in speaking. (3) Teachers divided students into groups. In these group activities, every student had the opportunity to speak out, the students were expected to help each other. (4) Teachers motivated the students and gave out rewards. 3. Have you ever used Information Technology in your class? (1) All teachers had used IT in their classrooms to motivate their students. For example, one or two times a semester, teachers sang English songs to their students. (2) Teachers mentioned that songs can improve their students' motivation and pronunciation. (3) They mentioned that using videos/movies in class could also be a good approach for improving students' English. However, the schools did not provide the facilities that teachers needed (a projector, computer, speaker, and video player) because of stretched budgets.	

Appendix B

Table A2. Qualitative Interview Note 2.

Interview Title	**Using IT in English Teaching and Learning**
Interview date	11 June 2018
Attendees	Six students in Mongolia
Moderator	Erdenetuya Batbileg
Reason	(1) To find the problems teachers and students have in English classes in Mongolia. (2) To discuss how to solve the problems mentioned in the interviews and the literature review. (3) What is the effect of using information technology in teaching and learning English?
Questions and answers: 1. What are you feeling about learning English? (1) Some students struggle with completing English assignments, submitting their homework on time, and staying focused in class. However, these struggles may be a part of a larger problem that is not clearly seen by parents, guardians, and educators. (2) Some students improve significantly, while others always have difficulty in learning. 2. How can these problems be solved? (1) Most students need to be encouraged to pursue their own interests and practice their skills in a variety of ways. (2) Students are worrying about their grades as they are concerned about not being prepared for upcoming tests and college admissions.	

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