

# How To Motivate Language Learning Environment: CALL Before And After The Pandemic Of Covid-19

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**Abstract** – Integrating information technology into teaching and learning foreign languages holds significant importance for the education system of our country. This serves as a crucial foundation for shaping the core generation of the future, aiding the nation's development, and advancing on the path of international integration. However, the application of information technology in foreign language education is currently prevalent primarily in schools located within major cities. To achieve the good effectiveness of Computer Assisted Language Learning (CALL), suitable solutions tailored to specific localities are necessary, which is the motivation for this study.

I conducted this study focusing on high school students in Nha Trang to understand their attitudes towards the use of information technology in learning English before and after the pandemic Covid 19. This understanding was then used to discuss and propose several appropriate solutions aimed at cultivating a self-directed, creative, and engaging learning environment. This research has the potential to contribute towards generating general solutions for the implementation of information technology in teaching and learning across Vietnam.

**Keywords** – CALL, Learners' attitude, Before and after Covid 19, Nha Trang high school students.

## I. INTRODUCTION

The transformative impact of the COVID-19 pandemic on Vietnam has brought about numerous changes, even extending to the realm of language education, particularly English instruction. One pivotal factor that enabled us to navigate this challenging period effectively is the employment of Computer Assisted Language Learning (CALL). Through CALL, we've been able to seamlessly deliver lessons to students while upholding our academic responsibilities to society.

The pervasive integration of technology into our daily lives is a widely acknowledged reality. People across all walks of life are actively seeking ways to incorporate technology, especially within the domain of education, particularly language learning (Garrett, 2009). Dhaif (2013) posits that the computer has firmly entrenched itself in the realms of business and communication technology, assuming a pivotal role in education, which is steadily amplifying due to the increasing affordability, portability, adaptability, and user-friendliness of computers. Their expanding capabilities make them increasingly appealing to educators.

However, before the onset of COVID-19, CALL's potential was underestimated and its significance was not well-recognized by most students. There was skepticism regarding computers' efficacy in aiding English learning, even with teacher guidance. This skepticism was particularly pronounced in smaller cities like Nha Trang, where students often disregarded CALL. The pandemic's mandate for online learning unveiled CALL's substantial advantages, especially for students. Notably, during the pandemic,

students in Nha Trang adeptly embraced computer-assisted learning. Post-pandemic, it became evident that students had shifted their perspective on CALL and were now open to utilizing it in their learning journey.

This shift is observable in English education as well, prompting an exploration into how high school students' attitudes have evolved. In Nha Trang, a city with fewer technological resources compared to metropolises like HCMC, Hanoi, and Da Nang, high school students had limited exposure to advanced technologies. However, COVID-19 induced a shift, compelling Nha Trang's high school students to align with the demands of the new era. This transformation is particularly evident in their perceptions of CALL's role in English learning. Thus, we propose a case study to delve into how Nha Trang's high school students' perceptions of CALL in English learning have changed. Our investigation involves surveying and examining their views both before and after the pandemic.

To execute our proposal, this article is organized into six sections. The introduction constitutes Section 1. Section 2 comprises a comprehensive review of relevant literature. Methodology details are outlined in Section 3. Section 4 will present our findings using three distinct instruments. The ensuing sections, 5 and 6, will respectively discuss the findings and draw conclusions from this study.

## **II. LITERATURE REVIEW**

### **2.1 Computer-Assisted Language Learning (CALL) in English Instruction**

The term "Computer-Assisted Language Learning" (CALL) was established during the 1983 TESOL convention through a consensus of all involved stakeholders (Chapelle, 2001, p. 3). Although the terminology is periodically reexamined, it remains a widely accepted reference point for technology's integration into second language education. Reflecting the diverse scope of activities within CALL (Beatty, 2003, p. 7), a fluid definition that accommodates its evolving nature is one where learners employ computers to enhance their language skills, thus leading to improvement (Beatty, 2003, pp. 7-8). CALL has expanded to encompass considerations of material design, technological facets, pedagogical theories, and instructional modes. Materials within CALL can be specifically crafted for language learning or adapted from existing digital content, videos, and other resources.

Computer-Assisted Language Learning (CALL), as outlined by Trinder (2006), entails leveraging computer technology to facilitate language acquisition. Its applications encompass a broad spectrum, including exercises, multimedia presentations, and online communication tools. Warschauer and Healey (1998) define CALL as "the exploration and examination of computer applications in language teaching and learning" (p. 1).

CALL has been extensively used in teaching English as a secondary or foreign language. It provides learners with dynamic and engaging opportunities to engage with language, enabling personalized and self-paced learning. Additionally, CALL contributes to the cultivation of digital literacy and 21st-century skills among learners.

Numerous studies have explored the effectiveness of CALL in language acquisition. For instance, Chen and Lin (2019) found that a mobile language learning app enhanced English reading and writing skills in Taiwanese university students. Similarly, Guo and Beatty (2016) highlighted how online discussion platforms facilitated language learning and social interaction among Chinese learners of English.

In summary, CALL demonstrates substantial potential for enriching language education. It is imperative for language educators to remain abreast of technological advancements and explore innovative ways to integrate CALL into their teaching strategies.



Figure 1. Types of CALL Programs Pre-Covid and Post-Covid

Diverse activities fall under Computer-Assisted Language Learning (CALL) (Kessler, 2018) for language instruction. These activities range from basic vocabulary drills to intricate communicative tasks. Notable examples include:

**Drill and Practice:** These tasks involve multiple-choice questions, fill-in-the-blank exercises, and matching tasks to reinforce specific language competencies like grammar, vocabulary, and pronunciation.

**Multimedia Presentations:** Utilizing images, audio, and video, these activities situate language within context, fostering listening, speaking, and reading skills.

**Simulation and Gaming:** These immersive exercises replicate real-life scenarios, granting learners meaningful language practice. Instances encompass role-playing games, virtual environments, and simulations mirroring real-world situations.

**Web-based Research and Communication:** Encouraging exploration of authentic online resources and interaction with native speakers, these tasks encompass email exchanges, online forums, and web-based projects.

**Intelligent Tutoring Systems:** Integrating artificial intelligence, these activities furnish tailored feedback and adaptive instruction to learners.

Incorporating a diverse range of CALL activities enhances language learning's engagement and efficacy. It remains crucial to select activities aligning with learning objectives and catering to learners' individual needs and preferences.

## 2.2 Technological-Driven Teaching Amidst the COVID-19 Pandemic

As of April 20th, 2020, the COVID-19 outbreak prompted over 200 countries to undertake measures, including nationwide closures (as cited in the source). This deeply impacted education, disrupting over 90% of the global student population, amounting to more than a billion students (UNESCO estimate). Despite the challenges, governments, educational institutions, teachers, and students have rallied to sustain optimism about education and embrace ongoing learning. Online learning emerged as the foremost substitute for in-person education during this period of uncertainty. Approximately 91% of students, equivalent to 1.5 billion children and youth worldwide, encountered disruptions due to containment measures in response to the pandemic.

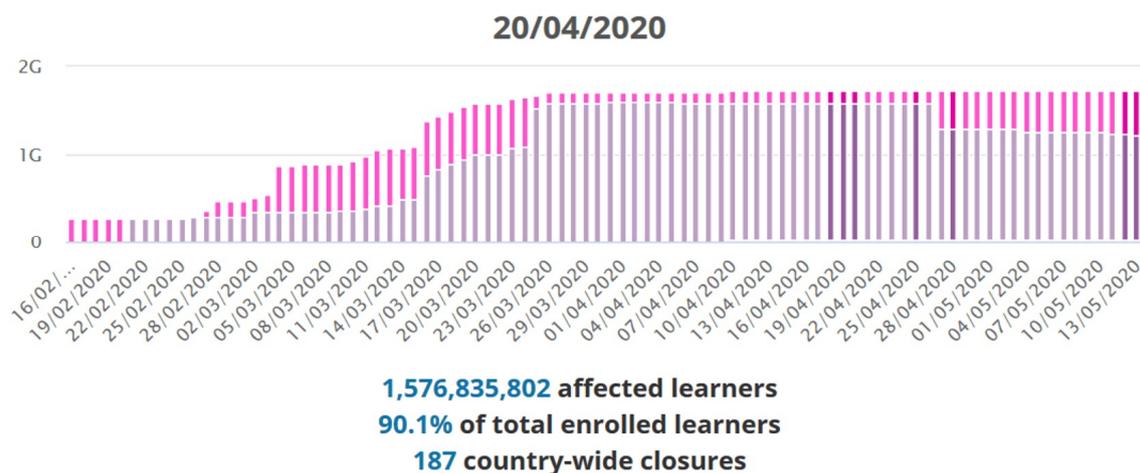


Figure 2. Global School Closures Caused by COVID-19 (Source: UNESCO)

The emergence of the COVID-19 pandemic triggered substantial disturbances within education systems, compelling educators to embrace innovative teaching methods that harness technology. As Picciano (2020) underscores, "never before in the history of education have so many students relied on technology for their learning" (p. 9). Various technological strategies have been employed for teaching during the pandemic, including:

**Online Learning Platforms:** Schools and universities widely adopted online learning platforms, incorporating features like video lectures, interactive forums, and quizzes.

**Video Conferencing:** Platforms like Zoom, Google Meet, and Microsoft Teams were extensively employed for live lectures, discussions, and office hours.

**Social Media:** Social media platforms such as Facebook and Twitter served as channels for updates, announcements, and student support.

**Mobile Apps:** Apps like Duolingo and Quizlet facilitated language learning and other subjects.

**Open Educational Resources (OERs):** Resources like OpenStax and Khan Academy provided free educational materials for teachers and students.

Leveraging technology in education (Al Lily et al., 2020) proved instrumental in alleviating the impact of the COVID-19 pandemic on education. However, this approach faced challenges and constraints, including access to technology and the imperative for effective training and support for educators and learners.



Figure 3. Vietnam's EdTech Landscape in 2019 (Source: nguyentrihien.com)

For many students, their introduction to distance learning stemmed from the repercussions of the COVID-19 pandemic. In the BEAN Survey, an online study conducted in April 2020, 56.4% of 218 participants revealed that their first exposure to online learning occurred due to the pandemic. This percentage was notably higher among high-school students (58.8%) compared to undergraduates (58.4%) and postgraduates (39.1%). Among survey respondents, around one-third had previous experience with e-learning. Of these, 76.5% had engaged in recorded lessons, and 62.4% had participated in video conferencing classes. Foreign languages (67.1%), computer skills (45.9%), and soft skills (35.3%) courses were predominantly taken online. This pertains to students enrolled in official courses, spanning high schools, undergraduate, vocational, and postgraduate programs.

Upon the emergence of the first COVID-19 case in Vietnam in late January 2020, the government mandated the temporary closure of educational institutions. Consequently, schools and universities pivoted to online learning to continue official courses and curricula.

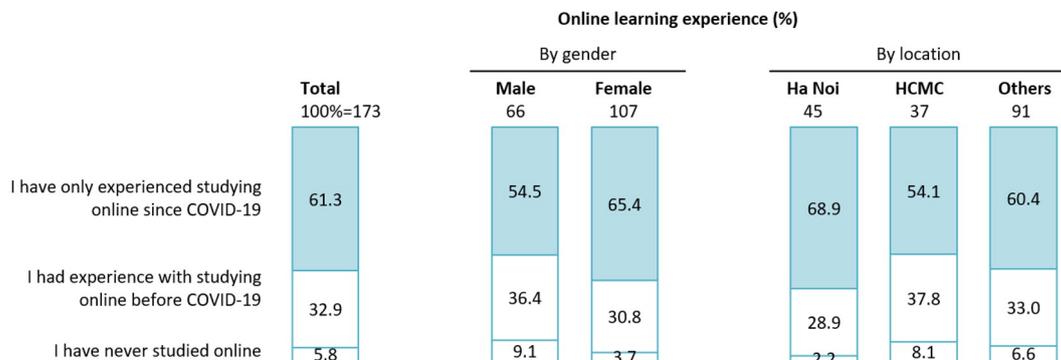


Figure 4. Students' E-Learning Experience (Source: BEAN Survey)

### 2.3 Previous Studies

A study conducted by Afshari et al. (2013) sought to investigate the attitudes of students at the University of Malaya's Faculty of Languages and Linguistics towards computer-assisted language learning (CALL). The study collected data from 100 students via a survey questionnaire, revealing moderate attitudes towards CALL. Noteworthy predictors of computer attitudes encompassed perceived usefulness, perceived ease of use, and subjective norms. Başöz & Çubukçu (2014) delved into the attitudes of pre-service EFL teachers regarding Computer Assisted Language Learning (CALL), finding an overall positive outlook on its application. Siros Izadpanah & Mansooreh Alavi (2016) delved into the attitudes of Iranian high school EFL students towards technology and CALL, demonstrating a positive inclination toward technology in the learning process, unaffected by gender.

In 2018, Alrazeq Saeed's study investigated Jordanian undergraduates' attitudes towards CALL's impact on English learning, unveiling favorable attitudes in facilitating writing assignments, information acquisition, and enjoyable learning experiences.

Mirahmadizadeh et al. (2020) evaluated students' emotions and attitudes towards the abrupt school closures during the COVID-19 pandemic, showcasing satisfactory positive emotions and attitudes towards learning during the closure. Rahimi et al. (2020) probed EFL students' perceptions of CALL programs, indicating high value and positive perceptions among Iranian EFL students. Another study by Ranjbar et al. (2021) examined lockdown impacts on students' leisure and sleep patterns during the pandemic, revealing altered screen time and sleep patterns, necessitating mental health strategies. Berihun et al. (2021) explored Ethiopian students' COVID-19 knowledge, attitudes, and prevention practices, suggesting diverse information dissemination strategies. Sharma & Alvi (2021) analyzed the shift to online learning in India, unveiling a significant preference for pre-pandemic blended learning.

Alves dos Reis et al. (2021) found that Portuguese university students' perceptions of their teachers remained unaffected by the shift to online teaching during the pandemic. Erdogan & Mede's (2021) study advised investments in online pedagogy and quality assurance frameworks for blended learning. Tran The Phi & Nguyen Trinh To Anh (2022) observed positive attitudes toward online education among non-English major undergraduates. Hollister et al. (2022) revealed challenges in online learning's engagement and pace management. Budiana & Djuwari (2023) examined non-native English speakers' attitudes towards CALL, highlighting its efficacy in improving listening skills despite connectivity issues.

Summarizing the literature, students generally exhibit positive attitudes toward CALL, with perceived usefulness, ease of use, and subjective norms influencing attitudes. Positive attitudes toward technology and CALL are prominent, particularly among Iranian EFL students. COVID-19 closures did not greatly impact student emotions, but lifestyle shifts necessitate mental health strategies. Institutions should invest in e-learning infrastructure, quality assurance, and strategic planning for blended learning. A shift towards the entrepreneurial university and disaster management incorporation is anticipated.

## **2.4 High School Students in Nha Trang**

Nha Trang city has approximately ten high schools, collectively enrolling over 10,000 students. One of these institutions is the Le Quy Don High School for the Gifted, led by the 37-year-old Le Quy Don, which accommodates 768 students from grade 8 through 12. Impressively, the school holds a perfect graduation exam passing rate of 100%. Another esteemed establishment, Ly Tu Trong High School, with a history spanning 63 years and a current enrollment of 2,175 students, maintains its prominent status within the province. Equally remarkable, the 46-year-old Nguyen Van Troi High School, with a student body of 1,990, has been awarded the First Class Labor Medal by the President. Nonetheless, when compared to more developed cities like HCMC, Ha Noi, Da Nang, and Can Tho, Nha Trang remains in a developing phase.

### **III. METHODOLOGY**

This study centers on examining the evolving attitudes of high school students in Nha Trang toward Computer-Assisted Language Learning (CALL) in English education, both prior to and following the Covid-19 pandemic. To comprehensively capture student perspectives on CALL post-Covid and pre-Covid, three distinct instruments were employed for measurement and observation. The initial instrument entailed researcher observations of students' attitudes toward CALL in English learning. The second instrument featured questionnaires administered to students, facilitating direct input from the students themselves. Additionally, a deeper understanding of student viewpoints was sought through semi-structured interviews, delving into their perceptions of CALL during the pre-Covid and post-Covid periods.

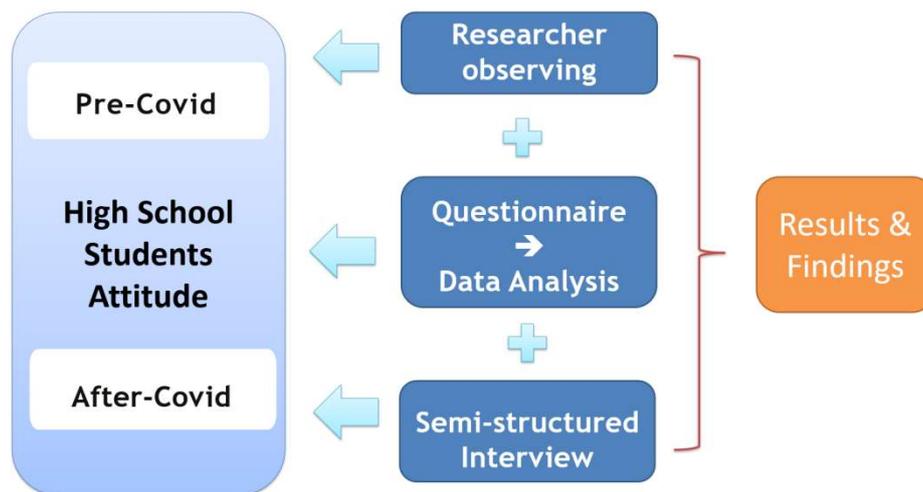


Figure 5. Research Methodology for Exploring Changes in Students' Attitudes Toward Computer-Assisted Language Learning

### 3.1 Researcher Observations

The researcher, who also serves as an English teacher at Ly Tu Trong High School in Nha Trang city, conducted firsthand observations of students' experiences before and after the Covid-19 pandemic. Prior to the outbreak, the researcher engaged with students across two classes, 10A3 to 11A3 and 10A4 to 11A4, over two academic years comprising four semesters. Subsequent to the pandemic, in-person interactions continued for one academic year and two semesters, encompassing two classes: 12A4 and 12A3. This observational approach provided valuable insights into the pandemic's impact on students' learning journeys and their adaptation to novel teaching methods.

### 3.2 Questionnaires and Data Analysis

In pursuit of student feedback, the researcher employed the Google Form application to distribute questionnaires to Nha Trang's high school students. With a focus on approximately 200 students, primarily from Ly Tu Trong High School, the survey spanned four months, from June 2023 to September 2023. Leveraging this technological solution expedited the collection of insights from a sizable student cohort, shedding light on their viewpoints concerning various educational aspects. The questionnaire process comprised several stages: design, participant selection, administration, data collection, analysis, and interpretation.

### 3.3 Semi-Structured Interview

The forthcoming semi-structured interviews will delve into high school students' perceptions of Computer-Assisted Language Learning (CALL) in the context of English education. The interviews are structured to explore students' reflections on the Covid-19 online learning period, their experiences, and their outlooks on utilizing computers for education. The interview will address differences in CALL usage pre- and post-Covid, including its importance, frequency, and impact. The objective is to obtain students' candid insights into their sentiments toward CALL and its role in their language learning journey

## IV. RESULTS

### 4.1. Observations

The observations reveal a significant transformation in the utilization of Computer-Assisted Language Learning (CALL) in the context of English language education, spanning from the period preceding the Covid-19 pandemic to the subsequent era. Prior to the pandemic, students predominantly engaged in rudimentary activities such as quizzes, games, and media consumption. Student involvement was limited to text reconstruction, responding to closed questions, and sporadic computer interactions. Feedback predominantly consisted of marking correct or incorrect answers, while the teacher functioned as a monitor throughout the CALL sessions. The physical placement of computers was confined to a dedicated computer lab.

**Table 1.** Observed Changes in CALL Utilization

Aspect	Pre-Covid	Post-Covid
Task Types	Quizzes, games, video/music consumption	Quizzes, games, web-based, hybrid tasks
Student Activities	Text reconstruction, closed questions, limited interaction	Frequent interaction, student collaboration
Feedback	Correct/incorrect	Interpretive, evaluative, stimulating
Teacher Role	Monitor	Monitor, Facilitator, Manager
Lesson Integration	CALL limited to specific segments	Integrated into entire or partial lessons
Computer Placement	Dedicated lab	In-class, flexible usage

In the post-Covid period, there has been a noticeable shift towards interactive web-based, online, and hybrid tasks that encourage collaborative interaction among students, as well as interaction with computers throughout the lessons. The feedback paradigm has evolved to encompass interpretation, evaluation, commentary, and thought stimulation. The teacher's role has expanded beyond monitoring to encompass facilitation and management of CALL activities. CALL's integration into lessons has become more flexible, spanning the entire lesson or a portion thereof. Physically, computers have migrated from dedicated labs to classroom settings, enabling anytime and anywhere access. Overall, the post-Covid era has fostered a more dynamic and engaging CALL learning environment, emphasizing collaboration and advanced cognitive skills.

**4.2. Questionnaires and Data Analysis Results**

The survey comprises two sections: students' personal information and their perceptions of CALL in the pre-Covid and post-Covid periods. Administered via Google Forms, the survey gathered responses from around 200 high school students in Nha Trang city, mainly from Ly Tu Trong high school. The survey took place from June 2023 to September 2023.

Code	Question
HoTen	
NgaySinh	
GioiTinh	
About Learning English	
ThichHocAV	Do you like to study English (English)?
TuDanhGiaAV	Before you study English, how do you rate your English?
MucDoHoTroCongNghe	In your opinion, do computers and technology devices support your English learning?
GVCanSDThietBiCN	In your opinion, do English teachers (English) need to use computers and technology devices to support the lesson?

Figure 6. Students' Information

Pre-Covid	
Pre_MucDoCanThiet1_MT	In your opinion, in the pre-COVID-19 period, was a computer necessary in the English learning program that you participated in?
Pre_MucDoCanThiet2_MT	In your opinion, in the pre-COVID-19 period, was computers necessary in the English lessons that you learned in class?
Pre_MucDoCanThiet3_MT	In your opinion, in the pre-COVID-19 period, is a computer necessary in your English self-study process at home (not in a classroom where the teacher is teaching)?
Pre_MucDoThuongXuyenMT	In your opinion, in the pre-COVID-19 period, how often did you use computers during your English self-study at home (not in a classroom where the teacher was teaching)?
Post-Covid	
Post_MucDoCanThiet1_MT	In your opinion, in the post-COVID-19 period, is a computer necessary in the English learning program that you have participated in?
Post_MucDoCanThiet2_MT	In your opinion, in the post-COVID-19 period, are computers necessary in the English lessons that you have learned in class?
Post_MucDoCanThiet3_MT	In your opinion, in the post-COVID-19 period, is a computer necessary in my English learning process at home (not in a classroom with teachers teaching)?
Post_MucDoThuongXuyenMT	In your opinion, in the post-COVID-19 period, how often do you use computers during your English self-study at home (not in a classroom where the teacher is teaching)?
Post_MucDoCanThiet4_MT	In your opinion, in the post-COVID-19 period, how will English classes need computers?
Post_MucDoHoTro1_MT	In your opinion, in the post-COVID-19 period, how can computers help you learn English by yourself?
Post_MucDoHoTro2_MT	In your opinion, in the post-COVID-19 period, how does the computer help you self-assess your English proficiency?
Post_MucDoHoTro3_MT	In your opinion, in the post-COVID-19 period, how does the computer support you when participating in English classes of teachers but you do not go directly to the class?

Figure 7. Students' Perceptions of CALL in Pre-Covid and Post-Covid

After acquiring responses, data analysis is conducted using SPSS software.

About Students' General Information:

		Statistics					
		DoB	Gender	Do you like to study English?	Before you study English, how do you rate your English?	In your opinion, do computers and technology devices support your English learning?	In your opinion, do English teachers (English) need to use computers and technology devices to support the lesson?
N	Valid	212	212	212	212	212	212
	Missing	0	0	0	0	0	0
Mean		20-APR-07		3.54	2.92	4.09	4.11
Std. Error of Mean		107 08:56:1...		.076	.062	.066	.069
Median		22-OCT-05		3.00	3.00	4.00	4.00
Mode		26-JUL-05 <sup>a</sup>		3	3	5	5
Std. Deviation		1563 08:45:...		1.112	.909	.959	1.001
Variance		1.825E+16		1.236	.827	.920	1.001
Skewness		3.105		-.409	.245	-.939	-.917
Std. Error of Skewness		.167		.167	.167	.167	.167
Kurtosis		8.440		-.217	.819	.546	.092
Std. Error of Kurtosis		.333		.333	.333	.333	.333
Range		6917 00:00:...		4	4	4	4
Minimum		20-JAN-04		1	1	1	1
Maximum		28-DEC-22		5	5	5	5
Sum		32870839 0...		750	618	868	872
Percentiles	25	21-JUN-05		3.00	2.25	3.00	3.00
	50	22-OCT-05		3.00	3.00	4.00	4.00
	75	03-JUN-07		4.00	3.00	5.00	5.00

a. Multiple modes exist. The smallest value is shown

Figure 8. Students' Survey Information

For the variable "Do you like to study English," the following interpretations are derived from the provided statistics:

Sample size (N): 212 respondents.

Mean: 3.54, indicating a mildly positive attitude towards studying English.

Standard error of the mean: 0.076, implying a reliable estimate of the population mean.

Median: 3.0, suggesting a balanced distribution.

Mode: 3, the most frequent response.

Standard deviation: 1.112, representing moderate dispersion.

Variance: 1.236, indicating response variability.

Skewness: -0.409, signifying slight negative skewness.

Standard error of skewness: 0.167, validating skewness estimate.

Kurtosis: -0.217, indicating mild platykurtosis.

Standard error of kurtosis: 0.333, suggesting limited reliability.

Inference suggests a predominantly positive attitude towards studying English, with a slightly skewed distribution towards positivity.

For the variable "MucDoHoTroCongNghe" (computer and technology support for English learning), results indicate participants' agreement, with a mean score of 4.09 and mode score of 5. Symmetrical distribution is observed, accompanied by limited variation.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nam	111	52.4	52.4	52.4
	Nữ	101	47.6	47.6	100.0
	Total	212	100.0	100.0	

Figure 9. Students' Gender

The SPSS outcome depicts a male-female proportion of approximately 52.4% to 47.6% within the sample, implying a slight male majority. Generalization to the larger population is cautioned.

Students' Perceptions of Pre-Covid CALL:

		In your opinion, in the pre-COVID-19 period, was a computer necessary in the English learning program that you participated in?	In your opinion, in the pre-COVID-19 period, was computers necessary in the English lessons that you learned in class?	In your opinion, in the pre-COVID-19 period, is a computer necessary in your English self-study process at home (not in a classroom where the teacher is teaching)?	In your opinion, in the pre-COVID-19 period, how often did you use computers during your English self-study at home (not in a classroom where the teacher was teaching)?
N	Valid	212	212	212	212
	Missing	0	0	0	0
Mean		4.43	6.45	3.98	6.48
Std. Error of Mean		.146	.079	.057	.074
Median		5.00	6.00	4.00	7.00
Mode		5	5	3	7
Std. Deviation		2.120	1.149	.826	1.082
Variance		4.493	1.320	.682	1.170
Skewness		-.121	.069	.035	-.063
Std. Error of Skewness		.167	.167	.167	.167
Kurtosis		-1.036	-1.424	-1.534	-1.277
Std. Error of Kurtosis		.333	.333	.333	.333
Range		7	3	2	3
Minimum		1	5	3	5
Maximum		8	8	5	8
Sum		940	1368	844	1373
Percentiles	25	3.00	5.00	3.00	5.00
	50	5.00	6.00	4.00	7.00
	75	6.00	8.00	5.00	7.00

Figure 10. Students' Perceptions of CALL in Pre-Covid

For the variable "Pre\_MucDoCanThiet1\_MT" (necessity of computers in English learning program pre-Covid), findings indicate a mean of 4.43, suggesting students found computers somewhat necessary. Substantial response variance is evidenced, with a slightly left-skewed distribution and flatter-than-normal spread.

Students' Perceptions of Post-Covid CALL:

		Statistics							
		In your opinion, in the post-COVID-19 period, is a computer necessary in the English learning program that you have participated in?	In your opinion, in the post-COVID-19 period, are computers necessary in the English lessons that you have learned in class?	In your opinion, in the post-COVID-19 period, is a computer necessary in my English learning process at home (not in a classroom with teachers teaching)?	In your opinion, in the post-COVID-19 period, how often do you use computers during your English self-study at home (not in a classroom where the teacher is teaching)?	In your opinion, in the post-COVID-19 period, how will English classes need computers?	In your opinion, in the post-COVID-19 period, how can computers help you learn English by yourself?	In your opinion, in the post-COVID-19 period, how does the computer help you self-assess your English proficiency?	In your opinion, in the post-COVID-19 period, how does the computer support you when participating in English classes of teachers but you do not go directly to the class?
N	Valid	212	212	212	212	212	212	212	212
	Missing	0	0	0	0	0	0	0	0
Mean		7.67	7.64	4.00	7.34	7.59	4.02	3.70	3.95
Std. Error of Mean		.157	.155	.065	.154	.146	.064	.067	.065
Median		8.00	8.00	4.00	7.00	8.00	4.00	4.00	4.00
Mode		10	10	5	10	10	5	3	5
Std. Deviation		2.286	2.261	.946	2.237	2.130	.934	.979	.950
Variance		5.225	5.113	.896	5.004	4.537	.872	.959	.903
Skewness		-.846	-.896	-.551	-.495	-.638	-.708	-.108	-.498
Std. Error of Skewness		.167	.167	.167	.167	.167	.167	.167	.167
Kurtosis		-.036	.357	-.425	-.472	-.279	.119	-.671	-.449
Std. Error of Kurtosis		.333	.333	.333	.333	.333	.333	.333	.333
Range		9	9	4	9	9	4	4	4
Minimum		1	1	1	1	1	1	1	1
Maximum		10	10	5	10	10	5	5	5
Sum		1627	1620	849	1557	1609	852	785	837
Percentiles	25	6.00	6.00	3.00	6.00	6.00	3.00	3.00	3.00
	50	8.00	8.00	4.00	7.00	8.00	4.00	4.00	4.00
	75	10.00	10.00	5.00	10.00	10.00	5.00	5.00	5.00

Figure 11. Students' Perceptions of CALL in Post-Covid stage

For the "Post\_MucDoCanThiet1\_MT" variable (necessity of computers in English learning program post-Covid), outcomes reveal a mean of 7.76, implying students viewed computers as considerably necessary. Limited left skewness and platykurtic distribution suggest strong agreement among students about computer necessity.

**The change of students' viewpoint to the necessity of computer in English learning program in Pre-Covid and Post-Covid stages:**

**One-Sample Statistics**

		Statistic	Bias	Std. Error	Bootstrap <sup>a</sup>	
					95% Confidence Interval	
					Lower	Upper
In your opinion, in the pre-COVID-19 period, was a computer necessary in the English learning program that you participated in?	N	212				
	Mean	4.43	.00	.15	4.15	4.73
	Std. Deviation	2.120	-.009	.070	1.974	2.251
	Std. Error Mean	.146				
In your opinion, in the post-COVID-19 period, is a computer necessary in the English learning program that you have participated in?	N	212				
	Mean	7.67	.00	.15	7.36	7.97
	Std. Deviation	2.286	-.011	.112	2.049	2.490
	Std. Error Mean	.157				

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Figure 12. One-sample Statistics of Computer Necessity in Pre-Covid and Post-Covid stages

The outcome of the one-sample t-test analysis contrasts the means of two interconnected sets of data. In this instance, it examines participants' viewpoints on the relevance of computers in English learning programs both prior to and following the COVID-19 outbreak. The findings unveil that the mean score for "Pre\_MucDoCanThiet1\_MT" stands at 4.43, accompanied by a 95% confidence interval spanning from 4.15 to 4.73. Conversely, the mean score for "Post\_MucDoCanThiet1\_MT" is 7.67, supported by a 95% confidence interval ranging from 7.36 to 7.97. The standard deviation for "Pre\_MucDoCanThiet1\_MT" is 2.12, whereas for "Post\_MucDoCanThiet1\_MT" it is 2.286. This signifies that there is greater diversity in responses to "Post\_MucDoCanThiet1\_MT." The standard error of the mean for both variables conveys the precision of the mean estimate. Specifically, the standard error for "Pre\_MucDoCanThiet1\_MT" is 0.146, and for "Post\_MucDoCanThiet1\_MT," it is 0.157.

The t-test results affirm a statistically significant distinction in means between "Pre\_MucDoCanThiet1\_MT" and "Post\_MucDoCanThiet1\_MT" ( $t = -28.51, p < 0.001$ ), indicating a substantial transformation in participants' perceptions regarding the necessity of computers in English learning programs post the COVID-19 pandemic. Notably, the mean score for "Post\_MucDoCanThiet1\_MT" surpasses that of "Pre\_MucDoCanThiet1\_MT," underscoring the elevated recognition of computers' significance in English learning after the pandemic.

**One-Sample Test**

Test Value = 0

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
In your opinion, in the pre-COVID-19 period, was a computer necessary in the English learning program that you participated in?	30.456	211	.000	4.434	4.15	4.72
In your opinion, in the post-COVID-19 period, is a computer necessary in the English learning program that you have participated in?	48.884	211	.000	7.675	7.37	7.98

Figure 13. The t-test outcome for the importance of computers in English learning programs before and after the COVID-19 periods.

These visuals depict the outcomes of a one-sample t-test, evaluating the mean score of "Pre\_MucDoCanThiet1\_MT" and "Post\_MucDoCanThiet1\_MT" against a hypothetical value of zero. This hypothetical value of zero implies parity between the variable's mean score and the population mean. For "Pre\_MucDoCanThiet1\_MT," the t-statistic stands at 30.456, with 211 degrees of freedom, and a two-tailed p-value of 0.00, signifying a significant distinction from the hypothetical value of zero. The

mean difference is 4.434, flanked by a 95% confidence interval ranging from 4.15 to 4.72, spotlighting the perception of computers' necessity in English learning during the pre-COVID-19 period. Correspondingly, for "Post\_MucDoCanThiet1\_MT," the t-statistic is 48.884, with 211 degrees of freedom, and a two-tailed p-value of 0.00, accentuating a substantial contrast from the hypothetical value of zero. The mean difference is 7.675, with a 95% confidence interval spanning from 7.37 to 7.98, highlighting an even greater recognition of computers' necessity in English learning during the post-COVID-19 era.

**The transformation in students' perspectives on the importance of computers in English lessons before and after the COVID-19 phases is depicted as belows.**

**One-Sample Statistics**

		Statistic	Bias	Std. Error	Bootstrap <sup>a</sup>	
					Lower	Upper
In your opinion, in the pre-COVID-19 period, was computers necessary in the English lessons that you learned in class?	N	212				
	Mean	6.45	.00	.08	6.28	6.61
	Std. Deviation	1.149	-.004	.030	1.085	1.198
	Std. Error Mean	.079				
In your opinion, in the post-COVID-19 period, are computers necessary in the English lessons that you have learned in class?	N	212				
	Mean	7.64	.00	.15	7.34	7.93
	Std. Deviation	2.261	-.014	.121	2.009	2.481
	Std. Error Mean	.155				

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Figure 14. The one-sample statistics result of the necessity of computer in English classroom in Pre-Covid and Post-Covid stages

The statistics encompass the results of a one-sample t-test comparing two variables, "Pre\_MucDoCanThiet2\_MT" and "Post\_MucDoCanThiet2\_MT." This t-test gauges the existence of a noteworthy variance between the sample mean and a hypothetical population mean. For "Pre\_MucDoCanThiet2\_MT," the mean amounts to 6.45, with a standard deviation of 1.149, and a 95% confidence interval for the mean spanning from 6.28 to 6.61. This indicates a moderate recognition of computers' necessity in English lessons during the pre-COVID-19 period. Conversely, for "Post\_MucDoCanThiet2\_MT," the mean stands at 7.64, with a standard deviation of 2.261, and a 95% confidence interval for the mean ranging from 7.34 to 7.93. This showcases an amplified recognition of computers' necessity in English lessons during the post-COVID-19 phase. The t-values for both variables are significant at the 0.05 level, signifying statistically meaningful differences between the sample means and the hypothetical population means. The mean difference between the two variables is 1.19, accompanied by a 95% confidence interval extending from 0.97 to 1.41, further reinforcing that students' viewpoints on the necessity of computers in English lessons have significantly heightened from the pre-COVID-19 period to the post-COVID-19 period.

**One-Sample Test**

Test Value = 0

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
In your opinion, in the pre-COVID-19 period, was computers necessary in the English lessons that you learned in class?	81.776	211	.000	6.453	6.30	6.61
In your opinion, in the post-COVID-19 period, are computers necessary in the English lessons that you have learned in class?	49.207	211	.000	7.642	7.34	7.95

Figure 15. The t-test result of the necessity of computer in English classroom in Pre-Covid and Post-Covid stages

**Bootstrap for One-Sample Test**

	Mean Difference	Bias	Std. Error	Bootstrap <sup>a</sup>		
				Sig. (2-tailed)	Lower	Upper
In your opinion, in the pre-COVID-19 period, was computers necessary in the English lessons that you learned in class?	6.453	-.001	.080	.001	6.283	6.608
In your opinion, in the post-COVID-19 period, are computers necessary in the English lessons that you have learned in class?	7.642	.002	.155	.001	7.340	7.934

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Figure 16. The Bootstrap result of the necessity of computer in English classroom in Pre-Covid and Post-Covid stages

In Figure 15 and Figure 16, the t-test outcome and the Bootstrap result for the importance of computers in English classroom settings are showcased.

**The evolution in students' perceptions concerning the necessity of computers for English self-study at home, before and after the COVID-19 is encapsulated as follows.**

**One-Sample Statistics**

		Statistic	Bias	Std. Error	Bootstrap <sup>a</sup>	
					95% Confidence Interval	
					Lower	Upper
In your opinion, in the pre-COVID-19 period, is a computer necessary in your English self-study process at home (not in a classroom where the teacher is teaching)?	N	212				
	Mean	3.98	.00	.06	3.86	4.09
	Std. Deviation	.826	-.001	.020	.786	.862
	Std. Error Mean	.057				
In your opinion, in the post-COVID-19 period, is a computer necessary in my English learning process at home (not in a classroom with teachers teaching)?	N	212				
	Mean	4.00	.00	.06	3.88	4.13
	Std. Deviation	.946	-.003	.040	.868	1.020
	Std. Error Mean	.065				

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Figure 17. The one-sample statistics result of the necessity of computer in English self-study at home in Pre-Covid and Post-Covid stages

**One-Sample Test**

Test Value = 0

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
In your opinion, in the pre-COVID-19 period, is a computer necessary in your English self-study process at home (not in a classroom where the teacher is teaching)?	70.186	211	.000	3.981	3.87	4.09
In your opinion, in the post-COVID-19 period, is a computer necessary in my English learning process at home (not in a classroom with teachers teaching)?	61.611	211	.000	4.005	3.88	4.13

Figure 18. The t-test result of the necessity of computer in English self-study at home in Pre-Covid and Post-Covid stages

The exhibited one-sample t-tests compare the means of the same variables—computer necessity in English learning—across the two stages.

For "Pre\_MucDoCanThiet3\_MT," the mean difference amounts to 3.981, flanked by a 95% confidence interval of 3.87 to 4.09, underlining the high degree of participants' belief in the need for computers in their English self-study before the COVID-19 outbreak. Similarly, for "Post\_MucDoCanThiet3\_MT," the mean difference is 4.005, supported by a 95% confidence interval from 3.88 to 4.13, underscoring the consistent belief in the necessity of computers for English learning at home even after the pandemic. Both t-tests yield exceedingly low p-values (0.00), attesting to robust evidence against the null hypothesis of no disparity in computer necessity between the pre- and post-COVID-19 phases. Consequently, it is deduced that participants' perceptions about the importance of computers in English learning have remained notably unaltered from pre-COVID-19 to post-COVID-19 times.

**Bootstrap for One-Sample Test**

	Mean Difference	Bias	Std. Error	Bootstrap <sup>a</sup>		
				Sig. (2-tailed)	95% Confidence Interval Lower	Upper
In your opinion, in the pre-COVID-19 period, is a computer necessary in your English self-study process at home (not in a classroom where the teacher is teaching)?	3.981	-.001	.056	.001	3.863	4.094
In your opinion, in the post-COVID-19 period, is a computer necessary in my English learning process at home (not in a classroom with teachers teaching)?	4.005	.001	.065	.001	3.877	4.132

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Figure 19. The bootstrap result of the necessity of computer in English self-study at home in Pre-Covid and Post-Covid stages

Lastly, Figure 19 displays the Bootstrap result for the necessity of computers in English self-study at home during the pre-COVID-19 and post-COVID-19.

### 4.3 Findings from Semi-Structured Interviews

The semi-structured interviews were conducted with 6 students from grades 10 and 11 at Ly Tu Trong High School, namely Anh Thu, Cao Chau Anh, Duy Luan, Khai Hung, Truc Quynh, and Thuy Anh. These students exhibit strong English skills with diverse backgrounds. During the interviews, students shared their perspectives on integrating technology, particularly computers, into English language learning.

Before the Covid-19 pandemic, Anh Thu and Truc Quynh utilized computers for content delivery, while Cao Chau Anh facilitated classroom discussions, and Duy Luan employed interactive whiteboards. Khai Hung emphasized the role of smart devices in language learning. Post-pandemic, Anh Thu adapted to hybrid teaching, Truc Quynh linked activities to computers and the Internet, Cao Chau Anh incorporated interactive hybrid whiteboards, Duy Luan highlighted computer flexibility, and Thuy Anh mentioned Learning Management Systems. Anh Thu also acknowledged the value of distance learning through various online tools. Overall, students' responses underscored the adaptability of technology in enhancing language learning experiences and proficiency.

The semi-structured interviews investigating "Computers' Role in English Class" yielded compelling insights. Pre-pandemic, Anh Thu, Cao Chau Anh, Duy Luan, and Truc Quynh diversified their computer use, such as content delivery and interactive whiteboard use. Post-pandemic, Anh Thu persisted with hybrid teaching, Truc Quynh integrated computers and discussions, Cao Chau Anh embraced interactive hybrid whiteboards, and Duy Luan valued the versatility of computer utilization. Thuy Anh leveraged Learning Management Systems. Khai Hung mentioned the inclusion of smart devices. These findings demonstrate the growing application of computers and devices to enrich English learning both in and beyond the classroom.

## V. INSIGHTS AND DIALOGUE

This section reflects on the results of the research conducted in Nha Trang, Vietnam, analyzing the shifts in students' attitudes toward Computer-Assisted Language Learning (CALL) before and after the Covid-19 pandemic. The observations from the study are diverse, yet primarily focused on the advantages of CALL. The findings from the study encompass several key aspects:

### 5.1 Shifting Attitudes toward CALL

The investigation carried out in Nha Trang high schools uncovered a significant change in students' acceptance of CALL and online learning due to the pandemic. With the transition to remote education, students had to embrace technology for their studies, fostering a heightened familiarity and comfort with computers and online resources for English learning. This newfound

appreciation for the convenience and adaptability of online learning facilitated an increased acceptance of CALL. The realization of online learning's benefits prompted students to be more receptive to innovative technologies and their incorporation into learning. This evolving mindset offers educators opportunities to leverage technology for more engaging and personalized language instruction, particularly through blended learning, effectively merging traditional teaching with digital tools.

### **5.2 Enhanced Digital Literacy**

The study of Nha Trang high school students underscores the correlation between improved attitudes toward CALL and a boost in digital literacy skills. Students' increased interaction with technology has augmented their awareness of its advantages. They have grown adept at utilizing digital tools for language learning and are more self-assured in their online learning capabilities. This shift can be attributed to the transformative impact of the pandemic, which accelerated students' exposure to digital technologies. This heightened digital literacy not only equips students for future educational and professional pursuits but also empowers educators to incorporate technology more seamlessly into classroom settings.

### **5.3 Necessity for Guidance and Support**

While students' embrace of CALL and online learning surged due to the pandemic, the study also reveals the essential need for comprehensive training and support to maximize the benefits of these technological resources. Many students encountered challenges navigating online platforms and accessing digital resources, highlighting the importance of addressing these obstacles through guidance and support. Equipping students with the tools to effectively engage with online learning is crucial, encompassing proficiency in various online tools and strategies to maintain motivation during virtual learning. Educators must also adapt teaching strategies to accommodate online learners and offer the requisite assistance, nurturing students' skills and confidence in online learning environments.

### **5.4 Emphasis on Engagement and Interaction**

The research conducted with Nha Trang high school students accentuates the pivotal role of engagement and interaction within online learning contexts. Students expressed a preference for interactive, collaborative online learning experiences that facilitate discussions and feedback. This insight emphasizes the necessity of fostering an online learning environment that encourages active participation. Educators must design online activities that stimulate interaction, such as collaborative projects or group work, and foster discussions to promote engagement. The centrality of engagement and interaction underscores their critical role in cultivating dynamic and effective online learning experiences.

### **5.5 Technological Access and Equity**

Access to technology and the internet emerges as a significant determinant shaping students' attitudes toward CALL and online learning. The study reveals that limited access to technology and the internet presents a barrier to embracing online education. Conversely, students with reliable access to technology display greater receptiveness to online learning. This digital divide presents a genuine concern, potentially perpetuating educational inequality. Addressing this challenge entails providing students with equitable access to technology and the internet, thereby ensuring a level playing field for education regardless of socioeconomic backgrounds.

In sum, the findings and discussions gleaned from this research concerning the shifts in students' attitudes toward CALL before and after the Covid-19 pandemic provide valuable insights into the evolving landscape of language learning and teaching, guiding educators toward effective strategies for supporting students in the digital era.

## **VI. APPLICATIONS FOR TEACHING AND LEARNING ENGLISH**

### **6.1 For teachers**

Teachers are the individuals directly guiding and imparting knowledge and skills to students. Therefore, in the process of innovating English language education methods, teachers play a central role.

To support the integration of information and communication technology (ICT) into English language teaching, teachers can flexibly use various software tools to design engaging lessons that ensure quality, including:

Windows Media Maker: This software assists teachers in editing audio, creating videos, and clips for pronunciation instruction.

Audacity: It allows for audio editing, combining sounds, and recording audio.

Mcmix Software: Useful for creating English language tests. It helps build a question bank for multiple-choice and essay questions and can mix multiple-choice test questions.

Hotpotato Software: Supports teachers in creating slide presentations with various types of exercises, including multiple-choice, short-answer, and cloze tests. (For multiple-choice exercises, Hotpotato allows teachers to change the order of questions and answers).

Google Drive Application: A tool for composing documents, creating presentations, storing, and sharing data.

## **6.2 For learners**

The initial objective of educational innovation was to help students access knowledge, stimulate their interest in learning, foster comprehensive development in both thinking and skills, and establish a solid foundation for their future. To achieve this objective, teachers can implement the following ICT (Information and Communication Technology) solutions:

Engaging in Hands-On Activities with ICT Applications When integrating information technology into foreign language teaching, instead of performing tasks themselves, teachers should create opportunities for students to directly interact with electronic lessons. This makes students much more enthusiastic compared to simply staring at changing slides on the screen.

To enhance this activity, teachers can incorporate various types of questions and exercises into the lesson and encourage students to boldly engage in practical exercises on the computer.

For example, to reinforce vocabulary lessons, the teacher can ask students to identify misspelled words in a jumbled list of words. Under the guidance of the teacher, students will click on the misspelled word and identify the error's location. By dividing the class into two teams and creating a competitive activity to find the winning team, the lesson will undoubtedly become more engaging and enjoyable.

Teachers should create conditions for students to operate on technology devices. Additionally, educators should encourage students to participate in the preparation of electronic lessons. For instance, teachers can request students to independently search for information and study materials on the internet. Alternatively, teachers can divide the class into suitable groups to design PowerPoint presentations and compete in delivering them. This helps students become more proactive in their learning and improve their skills every day.

Duolingo Duolingo is an effective self-learning app for English, suitable for students at various educational levels. This app works well on many current smartphone platforms. It offers a rich resource library, actively supporting students in learning English. Duolingo nurtures various skills in students, including listening and pronunciation, grammar structure, translation, and vocabulary acquisition.

Hello English Hello English is designed with a user-friendly interface and simple, easy-to-use features. This application provides better support for students in speaking skills, grammar, and vocabulary learning. Moreover, it is a highly effective vocabulary learning tool for students.

Students should utilize software applications to enhance their English language self-study.

BBC Learning English BBC Learning English is an excellent self-learning English language application widely used today. This app is suitable for learners at various proficiency levels. BBC Learning English helps learners develop fundamental English language skills such as accurate pronunciation, conversational skills, listening comprehension, vocabulary, and grammar. Afterward, learners can further enhance advanced skills such as using idiomatic expressions and slang.

English Learning Websites The variety and richness of English language learning websites available today are invaluable resources for finding study materials and electronic lessons for students. Through well-known website channels, students can easily and quickly access a wealth of essential learning materials, aiding in the cultivation and mastery of various skills and knowledge.

## VII. 7. CONCLUSION

In conclusion, the outcomes of semi-structured interviews conducted with Nha Trang high school students unveil a notable evolution in their perceptions of Computer-Assisted Language Learning (CALL) before and after the Covid-19 pandemic. Initially, most students possessed limited awareness of CALL's role in English classes. However, the pandemic instigated a transformative shift, enhancing students' proficiency in leveraging computer aids for language learning. This transformation presents a unique opportunity for educators to innovate within the Nha Trang educational context, enhancing pedagogical methods.

The integration of hybrid teaching models, the incorporation of interactive whiteboards and language learning applications, and the augmentation of traditional teaching approaches are promising avenues to cultivate more engaging and interactive language learning experiences. By capitalizing on these innovations, educators can foster improved language proficiency and academic achievement among students. Thus, embracing these new approaches is imperative to ensure effective language learning and equip students for success in the modern era.

Furthermore, this study underscores the broader implications of students' shifting attitudes toward CALL, especially in the context of the ongoing pandemic and the rising prominence of technology in education. These insights can guide educators in designing effective online learning experiences that cater to the unique needs of contemporary learners.

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