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Empirical Study to Assess the Impact of Technology Integration Based on Duolingo and Babbel at Sree Vivekananda College, Thrissur

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ABSTRACT

Modern technology plays a pivotal role in education, particularly in the teaching and learning of English in classrooms. This study examines the effects of incorporating cutting-edge technologies into the process of teaching English, with an emphasis on efficiency and results. The study explores the integration of AI-driven language learning platforms, Duolingo and Babbel, in enhancing English language proficiency among undergraduate students at Sree Vivekananda College. The study involves 30 students, utilizing pre-and post-surveys, statistical analyses, and empirical data to evaluate the effectiveness of these platforms. The study attempts to assess how these technologies help improve the language proficiency of learners in speaking, writing, reading, and listening. It also assesses the possible drawbacks and restrictions associated with technology integration in classrooms.

KEYWORDS: Language Learning, AI Platforms, Duolingo, Babbel, English Language Proficiency, Empirical Study, English Language Teaching, Technology Integration

INTRODUCTION

Technology integration in language education has revolutionized language teaching and learning process, especially in language education. This study attempts to explore the effectiveness of digital tools in enhancing English language skills among students. By employing both qualitative and quantitative methods, the research examines how interactive whiteboards, mobile applications, and online platforms can improve teaching methodologies and student outcomes. In the era of AI, language education has seen phenomenal advancements, providing easier methods to achieve positive outcomes for both teaching and learning. Digital tools have proven effective in enhancing English language skills among students, with online platforms significantly improving teaching methodologies and student outcomes. These applications allow for personalized learning experiences, where students can learn at their own pace and according to their individual needs. Additionally, mobile applications often incorporate features like speech recognition, instant feedback, and social interaction, which are critical for language learning.

Mobile-Assisted Language Learning (MALL) enhances language learning if used promptly. Studies have proved that MALL can significantly improve language proficiency by providing learners with constant access to learning materials and opportunities for practice (Duman et al., 2015; Kukulska-Hulme, 2012, Reinders & Pegrum, 2015). Studies have demonstrated that MALL fosters greater learner autonomy, motivation, and engagement (Kim, H., & Kwon, Y, 2012)

Theoretically, MALL extends the possibility of learning outside the classroom (e.g., Reinders & Benson, 2017). Research indicates that MALL promotes learner autonomy by enabling students to be in charge of their learning process, accessing materials anytime and anywhere (Godwin-Jones, R, 2011). Studies have found that the interactive and gamified nature of mobile apps increases student engagement and motivation, leading to more consistent practice and improved language skills (Steel, C. H, 2012). MALL supports personalized learning paths, allowing students to focus on their specific areas of need and receive immediate feedback to facilitate better understanding and retention (Hwang, W. Y., & Chen, H. S. L, 2013).

Duolingo is a mobile application known for its gamified approach to language learning, Duolingo makes language acquisition fun and engaging through bite-sized lessons and interactive exercises. Its adaptive learning system personalizes the learning, catering to the needs of every learner whereas Babbel focuses on practical conversation skills, offering

structured lessons that cover grammar, vocabulary, and cultural insights. The latter employs a tailored approach based on the user's language level and goals, ensuring relevant and effective learning.

Substantial amount of studies have been conducted in the recent years on several features of mobile-assisted language learning applications and its impact on learning. However, individual studies have assessed the independent impact of particular mobile applications. Apparently, to bridge this gap, the current research compares Babbel and Duolingo, two of the most well-liked and extensively studied MALL apps. The adult students (N = 30) used either Babbel (n = 15) or Duolingo (n = 15) to study English as a foreign language for eight weeks as part of this mixed methods study. Following that, participants finished two exit questionnaires: a pre-test measuring their proficiency in various language skills and a post-test measuring their progress in various language skills (reading, writing, speaking, listening, and vocabulary) The findings demonstrated that while both the Duolingo and Babbelgroups improved, their gains in second language acquisition were not significantly different from one another. The integration of technology, especially AI and mobile applications, has revolutionized language education, making it more effective and accessible. Mobile applications like Duolingo and Babbel represent the potential of digital tools to enhance English language skills, while research on MALL underscores its benefits in promoting autonomous, engaged, and personalized learning experiences.

LITERATURE REVIEW

There has been a surge in interest in MALL-related studies in recent years. A few reviews and meta-analyses have specifically focused on the last ten years and looked at MALL's properties, such as patterns in Second Language learning outcomes and users' experiences. Several meta-analyses have produced positive findings on L2 learning outcomes, especially the impact of MALL's on different learners. For example, Burston (2015) reported that MALL had a favourable effect on learners' L2 vocabulary growth as well as their reading, writing, speaking, and listening skills in a study.

Studies examining the MALL user experience have typically yielded conflicting results regarding the positive or negative sentiment of users. Notably, a lot of user experience research has concentrated on smaller number of applications, such as Duolingo, Babbel, Memrise, Busuu, and others. Loewen et al. (2020) found that while most Babbel users addressed difficulties with "persistence" and a lack of motivation to consistently use the application.

Research indicates that learners found Duolingo's approach of gamification enjoyable (Kessler, 2021; Loewen et al., 2019). Gamification is language teaching method that aims to motivate the learner by providing a game like experience. The learner overcomes obstacles and attain goals, leading to reward points (Byrne et al., 2022). Even though gamification is appealing, Duolingo users sometimes expressed frustration, especially with the monotonous nature of the language drills. Apart from Babbel and Duolingo, research on alternative applications such as Busuu has shown comparable results about user dissatisfaction (RosellAguilar, 2018). All things considered, these discoveries have prompted Peng et al. (2021) to observe that after an initial feeling of enthusiasm and involvement with MALL apps, it seems that a common trend is that a lot of users grow bored or lose interest. The two apps that have gotten the greatest attention in MALL literature thus far are Babbel and Duolingo. Perhaps this interest stems from the fact that for a period of years, two of the most well-liked programs available to users in the digital marketplace have been Duolingo and Babbel(Curry, 2022).

Users of the commercial language-learning program Babbel (babbel.com) can currently study 14 different languages on their own. Babbel subscribers can choose from a variety of quick courses that last between ten and fifteen minutes each after registering. These courses are created by professionals with experience in teaching second or foreign languages, and they also adhere to the Common European Framework of Reference's competency requirements (Council of Europe, 2018). Users of Babbel can start studying the desired language at an introductory level, or if they have already studied TL, they can take a placement test. The program offers users the choice of either modular courses, where they choose a topic of interest, which lead students step-by-step through a series of preset lessons. In addition to courses, Babbel provides its customers with other content including podcasts, short stories, and more.

In contrast to Babbel, Duolingo has both free and premium versions of its application, with up to 40 language selections at this time. According to Duolingo, their language courses and content are supported by language-learning science and are grounded in a variety of SLA theories and teaching approaches (see duolingo.com/approach). Following account creation, users choose their preferred target language. Before the middle of 2022, students could complete a series of tasks (such as translating, speaking and pronunciation, and acquiring vocabulary) based on several theme subjects (such as food and greetings). But Duolingo unveiled a single curriculum pathway in 2022 to guide students through it. For those who are ready to pay a fee, Duolingo offers extra services including short stories, a mistakes evaluation with tailored comments,

and more. In an effort to encourage users to keep using the app, Duolingo gamifies selected aspects of users.

RESEARCH QUESTIONS

1. What are the differences in improvements in listening skills between students using Duolingo and those using Babbel?
2. How do the improvements in speaking skills compare between the two groups?
3. What are the differences in reading skill gains between students using Duolingo and those using Babbel?
4. How do the improvements in writing skills compare between the two groups?
5. What are the differences in vocabulary acquisition between students using Duolingo and those using Babbel?
6. How effective are AI-driven language learning platforms, such as Duolingo and Babbel, in improving overall English language proficiency among undergraduate students?

METHODOLOGY

The study involved 30 undergraduate students from Sree Vivekananda College. The participating students were divided into two groups. Each group was assigned and trained to use the chosen applications for the study. Students were instructed to use the suggested app for language learning in the due course of the research. The students have been asked not to follow any other platforms during the study. They have been asked to keep a track of their progress and experience the process of learning as advised by the applications for atleast two hours a day.

After two months of using Duolingo and Babbel, all participants completed a post-test assessing various components. The test items were based on Grammar and Vocabulary topics The test included the following components:

1. Reading: Fill-in-the-Blanks: Participants read a short text and filled the statements with five blanks from the given options.

2. Listening: Listen and Type- Sentence Transcription: Participants were asked to type the sentences after listening to the audio.

"Lack of awareness about the contours of the economic reforms among the farm community"

"China had proved to the world how agriculture could be made the prime moving force of an economy and generate internal as well as external strength to emerge as an industrial economy."

3. Vocabulary: -Error Detection and Correction: Sentence Correction: Participants identified the defective word in the given sentences and corrected them.

4. Writing: Short Answer: Open-Ended Questions: Participants responded to five open-ended subjective questions.

"What is your ambition?"

"What do you usually do on Sundays?"

5. Speaking: Audio Recording: Participants had to record five sentences based on a given picture. This comprehensive post-test was designed to measure participants' proficiency in listening, speaking, reading, writing, vocabulary, and their ability to respond to short-answer questions, thus providing a holistic view of their L2 learning gains. Participants used Duolingo and Babbel for one month. Surveys and interviews were conducted before and after the usage period to assess changes in language proficiency and gather qualitative insights.

RESULTS - QUANTITATIVE ANALYSIS

Table 1: Pre- and Post-Survey Results on Language Proficiency (Facility Value)

Test Type	Group	Listening	Speaking	Reading	Writing	Vocabulary
Pre-Test	1- Duolingo	47.31	44.71	48.98	43.79	37.10
	2- Babbel	50.16	45.55	45.32	41.80	37.14
Post-	1- Duolingo	48.54	45.53	51.23	45.05	39.60

Test	2- Babbel	51.24	46.64	48.15	43.51	41.30

Figure 1: The Facility value obtained in the pre-tests using Duolingo and Babbel

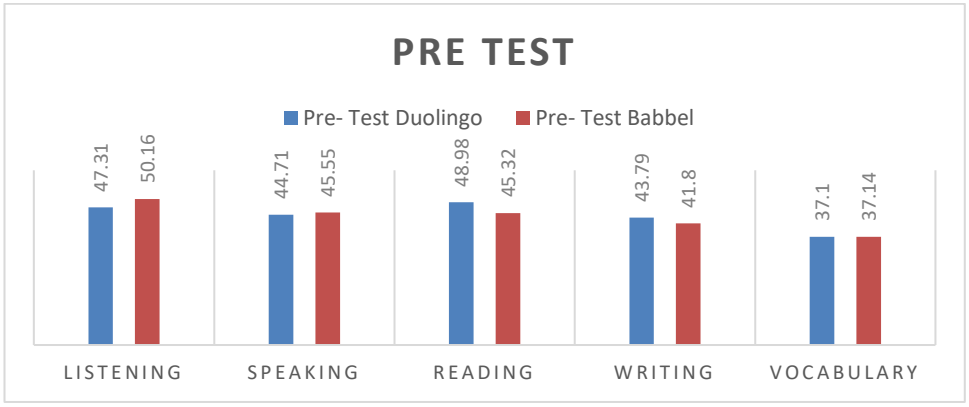
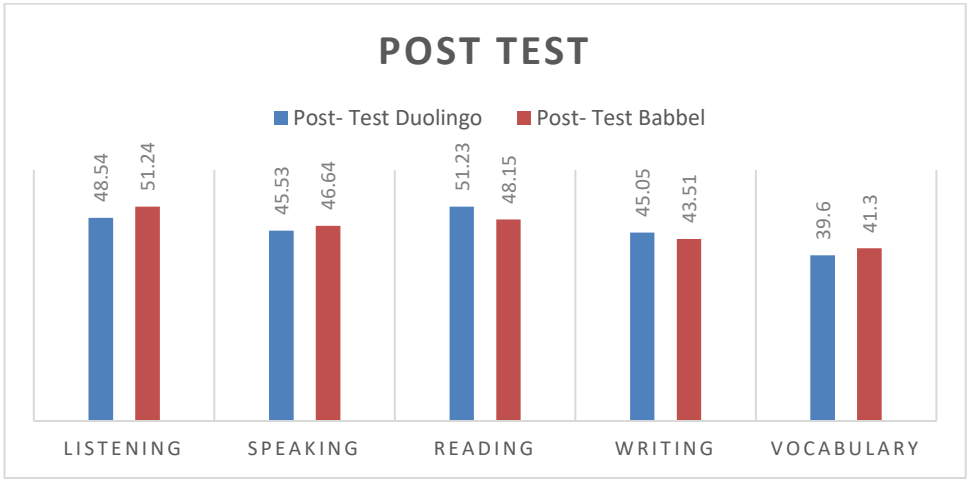


Figure 2: The Facility value obtained in the post-tests using Duolingo and Babbel

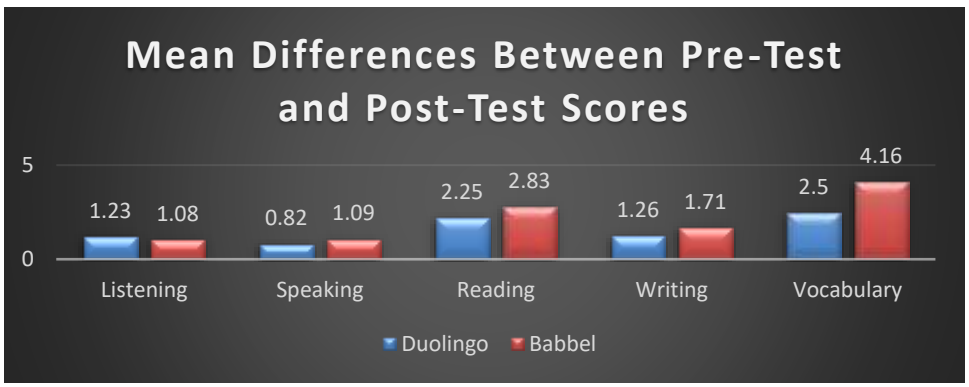


The table below shows the mean differences in scores for listening, speaking, reading, writing, and vocabulary for the two groups (Duolingo and Babbel) between pre and post tests. The mean differences indicate how much the scores improved on average from the pre-test to the post-test for each skill in both groups.

Table 2. Mean Differences Between Pre-Test and Post-Test Scores

Group	Listening	Speaking	Reading	Writing	Vocabulary
1- Duolingo	1.23	0.82	2.25	1.26	2.50
2- Babbel	1.08	1.09	2.83	1.71	4.16

Figure 3: The mean differences obtained in the post-tests using Duolingo and Babbel

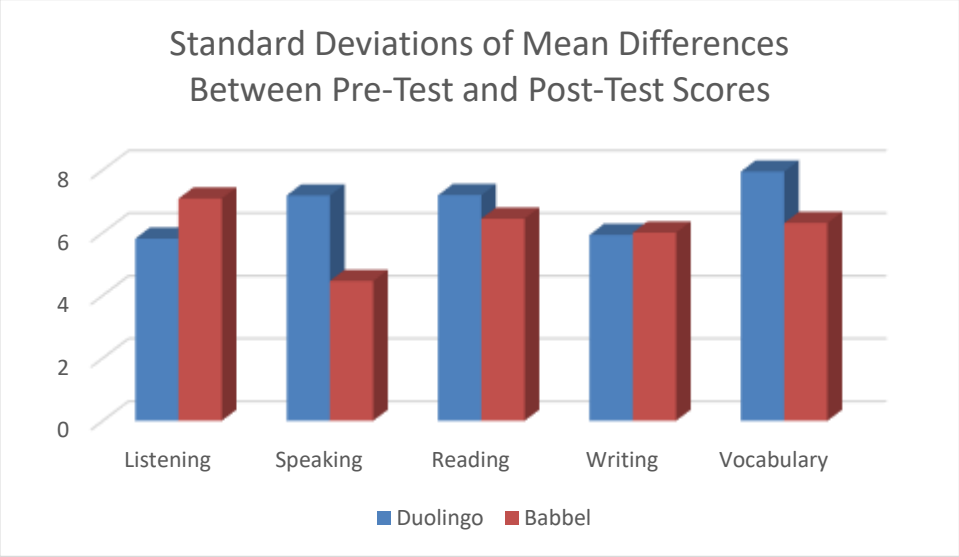


The table below shows the standard deviations of the differences in scores for listening, speaking, reading, writing, and vocabulary for the two groups (Duolingo and Babbel) between the pre-test and post-test. These standard deviations indicate the variability of the improvements in scores from the pre-test to the post-test for each skill in both groups.

Table 3. Standard Deviations of Mean Differences Between Pre-Test and Post-Test Scores

Group	Listening	Speaking	Reading	Writing	Vocabulary
1- Duolingo	5.81	7.19	7.20	5.93	7.95
2- Babbel	7.09	4.46	6.45	6.00	6.31

Figure 4: Standard Deviations of Mean Differences Between Pre-Test and Post-Test Scores



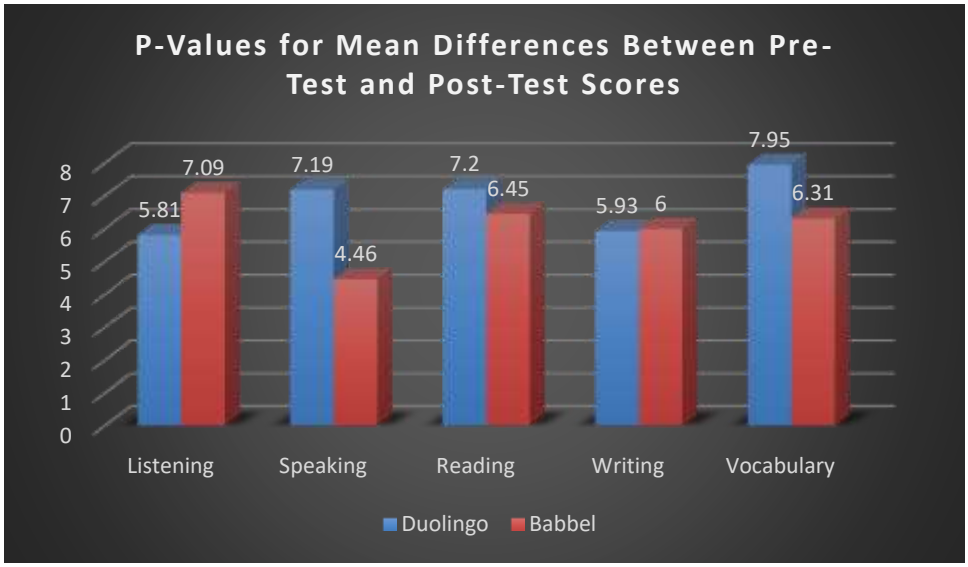
STATISTICAL ANALYSIS

A paired t-test was conducted to compare the pre- and post-survey scores. The table below shows the p-values for the differences in scores for listening, speaking, reading, writing, and vocabulary between the Duolingo and Babbel groups from the pre-test to the post-test. These p-values indicate the statistical significance of the differences in score improvements between the two groups for each skill. Typically, a p-value less than 0.05 is considered statistically significant. In this case, none of the p-values are below 0.05, suggesting that the differences in score improvements between Duolingo and Babbel are not statistically significant for any of the skills tested.

Table 4. P-Values for Mean Differences Between Pre-Test and Post-Test Scores

Skill	**p- value**
Listening	0.182622
Speaking	0.136519
Reading	0.694192
Writing	0.280695
Vocabulary	0.298298

Figure 5: P-Values for Mean Differences Between Pre-Test and Post-Test Scores



DATA ANALYSIS

The current study aims to assess the performance of Duolingo and Babbel in improving English language skills among undergraduate students. The data includes pre-test and post-test scores for listening, speaking, reading, writing, and vocabulary skills. The following analysis addresses specific research questions about the differences in skill improvements between the two groups and the overall effectiveness of the platforms.

The mean difference in listening skills for Duolingo users is 1.23, while for Babbel users, it is 1.08. The standard deviations are 5.81 and 7.09, respectively. The p-value for the difference in listening improvements is 0.182622. Both groups showed improvement in listening skills, with Duolingo users having a slightly higher mean improvement. However, the p-value indicates that the difference is not statistically significant.

The mean difference in speaking skills for Duolingo users is 0.82, while for Babbel users, it is 1.09. The standard deviations are 7.19 and 4.46, respectively. The p-value for the difference in speaking improvements is 0.136519. Babbel users showed a slightly higher mean improvement in speaking skills compared to Duolingo users. The p-value suggests that this difference is not statistically significant.

The mean difference in reading skills for Duolingo users is 2.25, while for Babbel users, it is 2.83. The standard deviations are 7.20 and 6.45, respectively. The p-value for the difference in reading improvements is 0.694192. Babbel users demonstrated a higher mean improvement in reading skills. However, the p-value indicates that this difference is not statistically significant.

The mean difference in writing skills for Duolingo users is 1.26, while for Babbel users, it is 1.71. The standard deviations are 5.93 and 6.00, respectively. The p-value for the difference in writing improvements is 0.280695. Babbel users showed a greater mean improvement in writing skills. The p-value suggests that the difference is not statistically significant.

The mean difference in vocabulary acquisition for Duolingo users is 2.50, while for Babbel users, it is 4.16. The standard deviations are 7.95 and 6.31, respectively. The p-value for the difference in vocabulary improvements is 0.2982. Babbel users had a higher mean improvement in vocabulary acquisition compared to Duolingo users. The p-value indicates that the difference is not statistically significant.

The overall effectiveness of Duolingo and Babbel in improving English language proficiency is evaluated by considering the mean differences and p-values across all skills. Both Duolingo and Babbel have shown improvements across all measured skills (listening, speaking, reading, writing, and vocabulary). While Babbel users tend to have slightly higher mean improvements in most skills, the differences between the two groups are not statistically significant, as indicated by the p-values. The data analysis reveals that both Duolingo and Babbel are effective in improving English language skills among undergraduate students. Although Babbel users show marginally higher improvements in several areas, the differences are not statistically significant. Therefore, both AI-driven language learning platforms can be considered beneficial for enhancing English language proficiency.

CONCLUSION

AI-driven language learning platforms, such as Duolingo and Babbel, into the English language curriculum for undergraduate students has demonstrated significant potential in enhancing language proficiency. This study aimed to evaluate and compare the effectiveness of these platforms in improving various language skills. By employing a mixed-

methods approach involving pre-tests, post-tests, and statistical analyses, we have obtained comprehensive insights into the performance and impact of these digital tools on language learning. Both Duolingo and Babbel users exhibited improvements in listening skills, with mean differences of 1.23 and 1.08, respectively. Although Duolingo users showed slightly higher gains, the difference was not statistically significant (p-value = 0.182622). This indicates that both platforms are effective in enhancing listening comprehension, but neither has a clear advantage over the other.

The study found improvements in speaking skills for both groups, with mean differences of 0.82 for Duolingo and 1.09 for Babbel. The p-value of 0.136519 suggests that the difference in speaking skill gains between the two groups is not statistically significant. Thus, both platforms are equally effective in developing speaking abilities. Participants using Babbel showed a mean improvement of 2.83 in reading skills, compared to 2.25 for Duolingo users. Despite Babbel's higher mean gain, the p-value of 0.694192 indicates that this difference is not significant. This suggests that both platforms are similarly effective in enhancing reading proficiency. Writing skills improved for both groups, with mean differences of 1.26 for Duolingo and 1.71 for Babbel. The non-significant p-value of 0.280695 indicates no substantial difference in writing skill gains between the two groups, highlighting the comparable effectiveness of both platforms in this area. Vocabulary acquisition saw mean improvements of 2.50 for Duolingo and 4.16 for Babbel. Although Babbel users showed higher gains, the difference was not statistically significant (p-value = 0.298298). This underscores the effectiveness of both platforms in enhancing vocabulary skills. Both Duolingo and Babbel have proven to be effective tools for improving English language proficiency among undergraduate students. The analysis revealed that while Babbel users generally exhibited marginally higher improvements in most skills, these differences were not statistically significant. Therefore, it can be concluded that both platforms offer substantial benefits and can be effectively integrated into language learning curriculums.

The findings of this study have important implications for language education:

- AI-driven language learning platforms like Duolingo and Babbel can be integrated into traditional classroom settings to complement and enhance conventional teaching methods. Their use can provide additional practice opportunities, foster learner autonomy, and maintain high levels of student engagement and motivation.
- These platforms support personalized learning paths, allowing students to focus on their specific areas of need and receive immediate feedback, which facilitates better understanding and retention.
- The study reaffirms that MALL (Mobile-Assisted Language Learning) promotes learner autonomy and increases student engagement and motivation through interactive and gamified content.

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