



Perceptions of Science Undergraduates Towards Online English Learning at a Sri Lankan State University: The Influence of Gender, Age, Academic Major, and Year of Study

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RESEARCH ABSTRACT

This study explored science undergraduates' perceptions of online English instruction within Sri Lankan higher education. A mixed-methods approach was used to gather data, with 529 students receiving a questionnaire and 10 participants undergoing in-depth interviews. Exploring the effects of age, gender, and academic year as well as student perceptions were the objectives. The findings demonstrated that the majority had favorable opinions on online education, particularly when referring to the enhanced flexibility and language proficiency. Nonetheless, several emphasized the need for interactive components, particularly for speaking and pronunciation. A significant inclination towards conventional educational environments was also seen. The study’s significance lies in identifying key areas for improvement in online ESL delivery, offering insights to inform future strategies in Sri Lankan university contexts.

RESEARCH KEYWORDS

Online English Learning, Student Perceptions, Mixed-Methods, Sri Lankan Higher Education

RESEARCH INTRODUCTION

The term "online learning" has been used in general education since the 1990s, with distance learning undergoing modifications over the years and encompassing terms like online learning, e-learning, open learning, and blended or hybrid learning, according to Blake (2009). Hettiarachchi et al. (2021) further emphasize that while these terms are often used interchangeably, they denote important distinctions that may not be readily apparent to individuals outside the educational technology discipline. The term "online learning" in the present study refers to any kind of digitally delivered language instruction that prioritizes using the internet for learning and facilitating interaction

with peers and teachers from any location. Universities in Sri Lanka and other educational institutions throughout the world had to immediately switch to online learning due to the COVID-19 outbreak, which caused an unexpected pause in in-person classes. The conventional learning platforms have been greatly impacted by this shift, which contributed to a focus on methods for distance learning to prevent the virus from spreading. The global importance of English and its integration into university curriculum led Sri Lankan educational institutions, especially in ESL fields, to adopt online learning. At this state university, the Faculty of Science

implemented English language online instruction using tools like "Google Classroom" to ensure academic continuity. English proficiency is a minimal requirement for science undergraduates, with mandatory English courses during the undergraduate years to support English medium teaching. These courses are essential because English proficiency is fundamental for any undergraduate pursuing a degree in an English medium program.

RESEARCH PROBLEM

Despite the deliberate efforts made by administrators and policymakers in higher education to promote the ongoing progress of teaching and learning during the pandemic-induced education crisis, it is evident that these measures do not completely satisfy the requirements and anticipations of university students and other relevant parties in all circumstances. Studies by Herath et al. (2021) and Chandrasiri and Weerakoon (2022) point to misaligned instructional strategies and inadequate infrastructure. University data sources indicate that, in comparison to in-person teaching, online English class attendance and test results were lower. For example, there was a sharp decline in the number of students taking online English courses between 2020 and 2022. Their overall score likewise dropped to an inferior level. As stated by York et al. (2015), academic performance, such as grades and overall marks, may be used to evaluate and predict a student's performance and prospects of success in a program of study. Hence, science undergraduates' reduced engagement in online English courses has resulted in lower academic achievement. Cellini and Grueso (2021) also discovered that students in online courses tend to get worse grades and perform worse on their coursework than students in person classrooms. Their research shows that pupils are not getting satisfactory outcomes or learning, which shows that we need more effective methods to help them learn online.

Therefore, finding effective methods to improve students' academic performance and interest in online English language instruction is the primary objective of this study, which aims to provide a thorough understanding of the factors impacting students' perceptions. Their positive or negative perceptions may be shown by the results. A more successful online learning environment for undergraduate students might result from the research's conclusions, which could potentially affect the English Language Teaching Department's curriculum, rules, and instructional methods. To determine the impact of online English learning, this research intends to investigate the perceptions of (science) students. Therefore, the primary research problem associated with the study is open-ended: What are the perceptions of undergraduate science students towards online English learning?

RESEARCH OBJECTIVES

1. To investigate the perceptions of science undergraduates towards English online learning at a Sri Lankan state university.
2. To Examine how demographic variables (gender, age, academic major, and year of study) influence perceptions of online English learning.
3. To identify key factors influencing the themes emerging from qualitative data.

RESEARCH QUESTIONS

- 1.What are science undergraduate students' perceptions of English online learning?
- 2.How do gender, age, academic major, and year of study influence these perceptions?

SIGNIFICANCE OF THE STUDY

Kaballa and Crowley (1985), stated in Weinburgh (1998), have pointed out that student perception is an important aspect of language learning, affecting behaviors including reading, speaking, and choosing books. Furthermore, studies demonstrated that students' perceptions and academic success or achievement were strongly correlated, with good perceptions frequently linked to greater success (Weinburgh, 1998; Schibeci & Riley, 1986).This correlation implies that attitudes towards learning have a greater impact on results than the other way around.Students' internal mood, behavior, and, ultimately, their educational experiences are all influenced by their perceptions. As assessments and the effectiveness of the learning process are greatly impacted by student perceptions, it is imperative to comprehend these perceptions, especially in the context of online education (Mally, 1999).

This study's inclusion in the literature is of vital importance due to the increasing popularity of online English learning in higher education institutions, there are not numerous empirical investigations that concentrate on the views of learners of this teaching method. In order to enhance current teaching strategies and instructional design in accordance with the needs and perceptions of diverse student populations, it is imperative to gain insights into students' perceptions.

This study has significance in its implications that go beyond its immediate setting. To begin with, it will make a significant contribution to the body of knowledge that exists on online education, particularly with regard to university-level English language instruction. Through offering insight into the effectiveness as well as practical application of online English education, this investigation will help educators and curriculum designers and pave the way for future research. Also, the study will help us better understand how undergraduates engage in and experience online English learning by identifying important factors that promote efficient use. Future online learning initiatives can be developed using this information to better suit the needs and expectations of students.

Additionally, factors affecting students' attendance, academic performance, and involvement in online English lessons will be revealed by the study's findings. Improving the integration of online learning platforms within the State University and enhancing educational experiences are two areas in which this information is especially helpful. In the end, this study seeks to establish the foundation for further research and the creation of specialized approaches to resolve noted issues and improve online English language learning experiences in the larger framework of ESL instruction in Sri Lankan campuses. This approach helps teachers understand how important it is to provide students happy experiences and enhances the general quality and integration of online learning platforms in ESL classes, both of which benefit the educational sector.

LITERATURE REVIEW

Overview of Previous Research on Online Education

In the modern highly technological world, online learning has become a mandatory aspect with reference to education especially to adult students who have to manage their responsibilities about a professional, academic, and personal commitment. Hussein et al. (2020) highlighted that online education can be an excellent alternative to uniquely positioned people who should not attend classes in real life because of the lack of time or geographical barriers. Digital platforms are extensively used in technologically advanced settings and transformed the dimensions of delivering education introducing new ways to communicate, interact, and to test their knowledge. The COVID-19 pandemic further increased this shift because it forced educational institutions across the globe to switch to distant learning as their major teaching method. According to Dhawan (2020), this worldwide change was a turning point in education which demonstrated the potential of technology to develop flexible and scalable learning options on an emergency. And online learning increasingly going from being seen as a supplement to now allowing an institution to be able to continue its academic programs.

Another critical factor identified in the research by Dhawan is the importance of digital technologies, which allow such virtual communication, namely discussion forums, tools of video conferencing, and collaborative writing locations. These tools did not only ensure the possibility of academic communication but allowed even emotional and psychological support at the time when there is global uncertainty. They did not completely overcome the negative impact of the closing of universities, but they diminished it nevertheless. The increased use of online learning in the world has encouraged academic researchers to probe the pedagogical facets of online learning in particular, and the issues of digital fatigue, an obstacle in technology, and poor student interaction have emerged to the forefront. Still, the possibilities of online platforms to provide tailored, multimodal learning still receive interest, because such solutions may be adjusted to fit the needs of different learner cohorts. Incorporation of multimedia, such as text, images, and sound, can be more engaging to the learner and imitate some of the interactivity exhibited in traditional classroom learning (Dhawan, 2020).

The concept of personalization is very important in the field of language education especially in the English Second Language education (ESL) and English Foreign Language (EFL). In her study, Tzirides (2022) continues to claim that English teaching online should be adjusted to the linguistic, interests and desire to learn profile of learners. This degree of customization is crucial in keeping interaction and resulting in effective learning experiences, particularly in multilingual learners. The use of interactive digital tools will help in the provision of personalization of instruction, lessen the rate of learners and also react to individual desires, creating a more dynamic and person-centred ESL setting.

Building on this line of thought, before even concluding by saying that all that is needed today is the friendly and productive language learning environment (FPLE), Masaazi (2015) presented a concept of FPLE as appealing, low-anxiety digital learning environment. This model espouses the need in providing regular and positive feedback and abstaining severe corrective actions hence establishing confidence and raising performance by the learners.

One of the focal points in the research of online education is the influence of perceptions per se. Muflih et al. (2021) argue that student attitudes are major factors that define their involvement, motivation, and intent to use digital learning tools. Scholars tend to positively rate their experience and show higher satisfaction along with success in the virtual learning conditions. Despite the lovesick and freedom that online learning classes often receive, issues that reduce online learning capabilities are still prevalent in terms of spotty internet connectivity, a lack of teacher guidance and a lack of motivation.

These problems are especially relevant to the Sri Lankan environment, where serious resources and structural concerns in addition to pedagogical issues impede the efficiency of online ESL studies. Although there is an increasing literature base of international research, there is limited literature based in Sri Lanka especially when it comes to general research and it is mostly focused on the specific fields of medicine and allied health. According to studies by Yapa et al. (2013) and Chandrasiri and Weerakoon (2021, 2022) the major barriers encompass poor engagement among students, domestic disturbances, lack of equality in terms of access to devices, and failing to utilize the available digital tools. These results highlight the gap in digital preparedness and technology access that have long been present and have been further accentuated by turning to online learning.

To the students of Sri Lanka universities, online study of English language poses more challenges. According to Herath et al. (2021), students usually have difficulties with lack of availability of instructional resources, issues and challenges of using novel teaching techniques, and handling online evaluation. Budgetary issues connected to digital devices and digital access also entail the lack of consistency in signal quality, which is another problem that leads to the preference of face-to-face learning by most learners. Such infrastructural constraints severely affect academic performance as well as the motivation of learners with regard to digital ESL settings.

The second common problem is the absence of the learner autonomy and confidence online. Lack of instant feedback and direct interaction in the classroom can easily hinder ability of students to undertake assignments and boost their knowledge of language. Narrow scope of communication practice to develop his or her speaking, listening, and writing skills is one of the common issues in ESL settings. The use of asynchronous materials decreases the chance to perform spontaneous communication and language use and consequently, worsen the skill acquisition.

Besides the constraints that are related to infrastructure development, there are also pedagogical deficiencies manifested. Online learning is not seen as effective by many students as it is not compatible with their choice of learning styles. In line with Sudusinghe and Kumara (2020), the perception of online ESL education among the students in Sri Lanka can be neutral and even negative in terms of feedbacks, teacher-student interaction, and course presentation. These perceptions exemplify the larger issue of recreating an immediacy and responsiveness of a traditional classroom instruction in the virtual space.

Although such international digital pedagogy frameworks as the ones suggested by Dhawan (2020) and Masaazi (2015) may prove informative, they are not extensively applied within the Sri Lankan ESL settings. The

challenges to effective integration include systemic factors such as lack of data-driven learning analytics, institutional support of learning and insufficient teacher training. This has seen the increased access of Sri Lankan ESL learners in learning environments comprised of digital platforms that are not responsive to their learning needs fully.

Finally, as far as literature on ESL learning online is investigated in the global context, the themes of learner involvement, and using digital resources, it can be determined that the body of research on the topic of undergraduate science students in Sri Lanka is lacking. Since their academic curriculums are rather pragmatic, and the online English language learning opportunities are not widely individual hard to find, it is essential to discuss the attitude to online ESL learning opportunities in these students. The line of investigation is required to specify context-specific pedagogical approaches and improve language acquisition results among members of this population.

Theoretical Framework: Technology Acceptance Model (TAM)

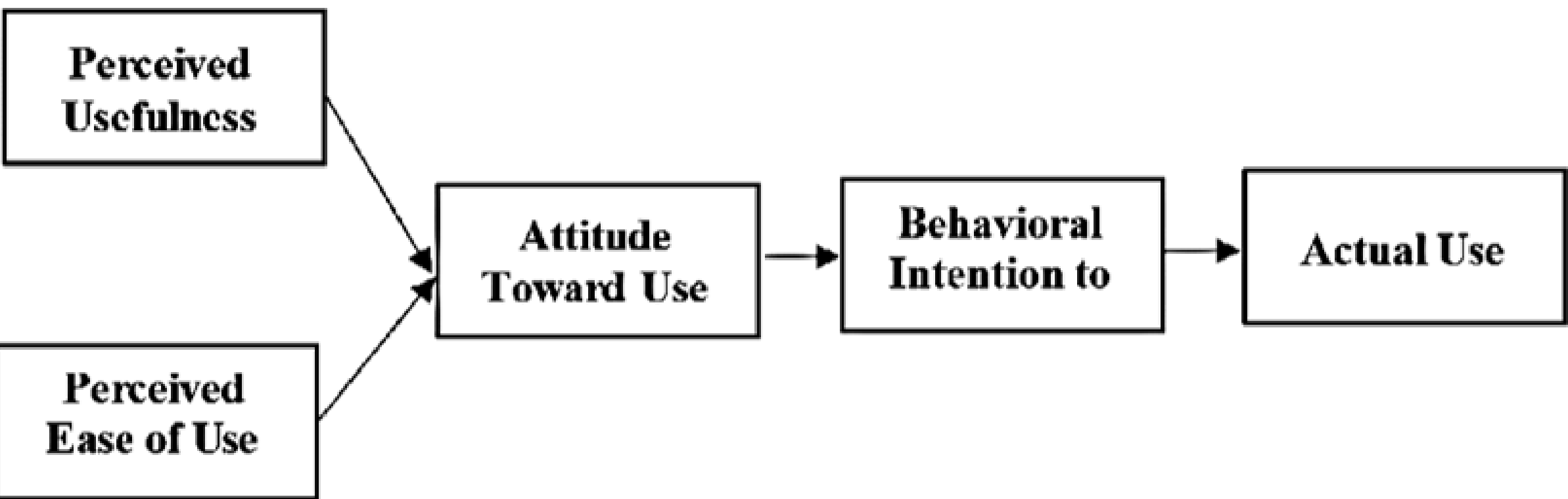


Figure 1: Technology Acceptance Model-TAM (adopted from Davies, 1989)

The Technology Adoption Model (TAM) developed by Davis in 1989 in accordance with the Theory of Reasoned Action by Fishbein and Ajzen in 1975 forms a guiding framework in comprehending technology acceptance by a user. Two of the aspects that are highlighted are perceived usefulness (the fact that

employing a technology should have a positive effect on the performance) and perceived ease of use (the fact that employing a technology should be associated with minimum efforts). The following variables have impact on their attitudes, intentions and real behavior related to use. The Technology Acceptance Model (TAM) has been extensively utilized and enhanced in educational contexts by researchers including Venkatesh et al. (2003) and Teo et al. (2007), who have improved the model by integrating variables such as social influence, user satisfaction, and system experience to enhance its applicability across various user populations and environments.

This research used the Technology Acceptance Model (TAM) to examine the perceptions of science students on online English language learning in a Sri Lankan state university. The model investigates the extent to which students' acceptance of online platforms is influenced by their perceived usefulness and ease of use, while also accounting for the impact of demographic factors, including gender, age, academic major, and year of study, on these views. This study uses the Technology Acceptance Model (TAM) to discern the fundamental behavioral patterns and motivational factors influencing student participation in online English learning. This method facilitates a systematic examination of learner attitudes and provides actionable insights for customizing technology-enhanced language training to effectively address the varied requirements of science undergraduates in Sri Lanka.

RESEARCH GAP

As is evident from the existing literature on students' perceptions of online English learning in higher education, it is prominently observable in the global context. At the same time, there is a limited number of research in the Sri Lankan context. The existing literature also suggests that no research has been conducted in the Sri Lankan science ESL undergraduate domain using the TAM model and mixed methodology approaches, where online learning initiatives are further limited due to the heightened emphasis on practical learning components within the curriculum. Filling the existing gaps, the current research develops a conceptual inquiry that focuses on English as a Second Language (ESL) science undergraduate courses online learning. Its synthesis of the relevant literature narrows the study to the group of science students within the ESL environment, explains the conceptual framework, and adds to the pedagogical discussion of online learning integration into the context of teaching students with ESL as their background. The paper proves that with the proper design of online ESL lectures, the positive effect of the online ESL programs could be maximized on both the instructor and the learner levels, thus enhancing the overall effectiveness of the university online ESL programs.

RESEARCH METHODOLOGY

Quantitative Phase

This research examined the perceptions of science undergraduates on online English learning at a state university in Sri Lanka's Central Province. A total of 529 students, enrolled in English language courses including English for Academic Purposes (EN 1002), English for Professional Purposes (EN 2002), and English for Special Purposes (EN 300), were chosen by systematic random sampling from a target population of 643. Systematic sampling was used for its practicality and capacity to guarantee both internal and external validity (Acharya et al., 2013). Participation in the research was optional, and answers were gathered using an online Google Form. The current quantitative study established the relationship between demographic factors and the perceptions of university students towards online English instructions. The dimension of demographics, i.e. gender, age, academic major and year of study were explored. In SPSS the statistical analysis had been performed to reveal patterns and show statistically significant relationships. The theoretical framework that has been used in the study was the Technology Acceptance Model (TAM). TAM was developed by Davis in 1989 as a further development of the Theory of Reasoned Action developed by Fishbein and Ajzen in 1975 that postulates that user attitudes are influenced by a combination of perceived usefulness and perceived ease of use and it is these attitudes that influence corresponding behavioral intentions and actual use of the technology. There were the following five constructs examined: perceived usefulness, perceived ease of use, attitude toward use, behavioral intention to use, the actual usage.

The data-collection tool is a systematic exercise of a questionnaire based on the research by Davis (1993). It had 32 items containing two sections. In Section A, demographic information was collected, & Section B touch on the five components of TAM. The rating scale of the response was five point Likert which ranged between 1 describing strong disagreement to other end of scale at 5 indicating strong agreement. This was before the actual distribution and a pilot study involving 10 students of each academic year was undertaken to ascertain reliability & validity. Outcomes of the pilot informed the revision to be done on the questionnaire.

- Descriptive statistics to summarize participant characteristics and general trends.
- Correlation analysis to explore relationships between TAM constructs and demographic variables.
- Exploratory factor analysis to validate the internal consistency of the measurement constructs.

This phase enabled identification of general patterns in students' acceptance and use of online English learning platforms.

Qualitative Phase

The qualitative part was identified by means of a purposive sample where eight respondents participated in the study after the quantitative survey phase. The criteria of selection included analytic variability in connection to gender, age, academic major, year of study and reported levels of perception. Each participant was interviewed semi-structured and in a rather comprehensive way (lasting on average 35-40 minutes). The interview guide covered the qualitative areas that had already been identified during the questionnaire stage, and these were ease of use (perceived) about the use of online learning, actual use of online learning, and other motivational issues that related to the use of online learning. The process of the digital recording and the informed consent were adopted in all the interviews before being transcribed verbatim to ensure data fidelity.

The theme analysis as dictated by the three Cs of Lichtman (2012) Coding, Categorizing and Conceptualizing formed the analytic process. In first coding phase, remarkable phrases and repetitive topics were identified in the transcripts. These codes then were then further categorized into bigger categories in the categorization process. The last conceptualization stage involved narrowing-down of these categories into thematic and subthemes that precisely captured the experience of the participants. In such an iterative process, both general trends and minor details were reproduced in a systematic manner.

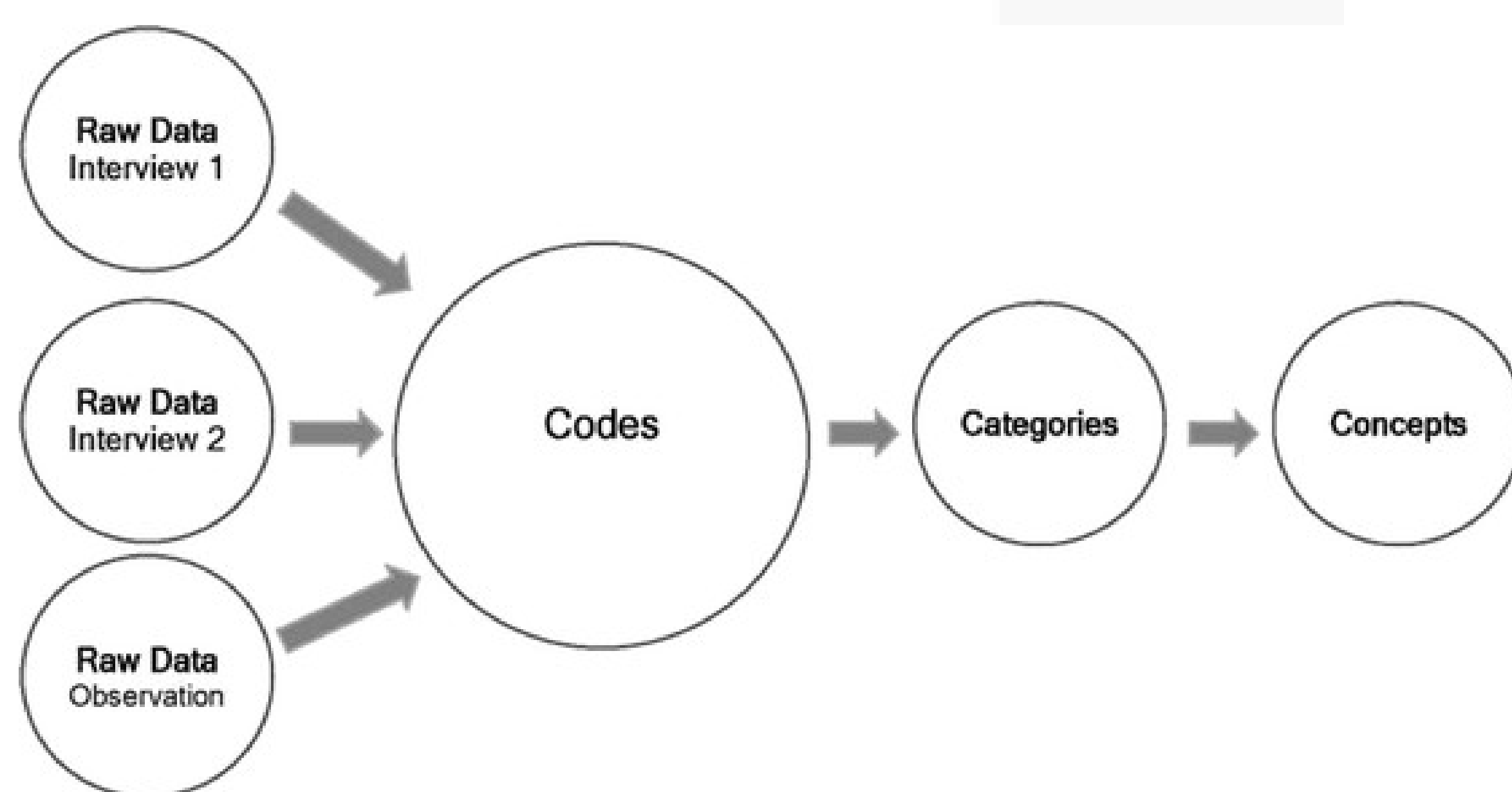


Figure 2.. Three C's of Data Analysis: Codes, Categories, Concepts by Lichtman (2012)

This thematic analysis revealed six major themes, each representing essential facets of students' opinions and experiences about online English instruction.

- Effectiveness of Online English Learning
- Challenges in Understanding Difficult Parts
- Multitasking and Interaction
- Skill Enhancement and Engaging Activities
- Motivation and Continuation
- Knowledge Updates and Recommendations

Collectively, these themes provide a thorough comprehension of how science undergraduates perceive and interact with online English learning, yielding insights for educators and policymakers seeking to enhance digital language training in higher education environments.

Quantitative Data Analysis

Demographic Characteristics

The study surveyed 529 science undergraduates at a Sri Lankan state university to investigate their perceptions of online English learning. The demographic profile showed a predominance of female participants (66%), with the majority aged between 20 and 24 years (75%). In terms of academic background, Biology was the most common major (44%), followed by Physical Sciences (33%). First-year students made up 40% of the sample, and second-years comprised 37%.

Reliability of the Measurement Instrument

The internal consistency of the questionnaire components based on the Technology Acceptance Model (TAM) was evaluated using Cronbach's Alpha. With coefficient values ranging from 0.805 to 0.856, the study demonstrated strong dependability across all important dimensions: perceived usefulness, perceived ease of use, attitude towards use, behavioral intention to use, and actual use. These findings support the validity and usefulness of the instrument for capturing students' perceptions in further studies demonstrating that it exhibited strong internal consistency.

Students' Perceptions of Online English Learning

The study's results indicated that science students mostly had favorable attitudes of online English learning, while the degree of positivity differed across many characteristics assessed by the Technology Acceptance Model (TAM). The dimensions included Perceived Usefulness, Perceived Ease of Use, Attitude Towards Use, Behavioral Intention to Use, and Actual Use. The research used descriptive statistics, including mean scores and standard deviations, to evaluate patterns in students' responses, so offering a thorough comprehension of their perceptions.

The majority of pupils concurred that online learning platforms were advantageous for enhancing their English language abilities. Significant consensus was noted about the effectiveness of online platforms for multitasking and enhancing work completion efficiency. The mean ratings for many items exceeded 3.5, including "online English learning is good and convenient" (3.64), indicating consensus. Standard deviations over 1 for all categories suggested a broad spectrum of attitudes among respondents, demonstrating that although many students valued the usefulness, others remained indifferent or unclear.

Concerning Perceived Ease of Use, students often regarded the online platforms as user-friendly and controllable. Statements like "learning English using the online platform is simpler than anticipated" (mean = 3.67) and "activities are interesting and stimulating" (mean = 3.75) garnered substantial agreement. This indicates that most participants were at ease with exploring and using internet resources for language acquisition. Nonetheless, similar to perceived utility, a variety of answers was seen, suggesting that ease of use may still be contingent upon individual digital competence or access to dependable equipment.

The students' attitude towards use was mostly positive. A significant number of respondents indicated motivation and pleasure with online English study. Most participants believed that studying English online was an excellent notion. The majority of students were emotionally and cognitively involved in the online English learning process, as shown by the participants' statements that the platform was exciting and engaging (mean = 3.64) and that it assisted them in learning the language (mean = 3.86).

In evaluating Behavioral Intention to Use, students expressed a general readiness to persist in using online platforms for English language acquisition. Mean ratings varied from 3.40 to 3.60 for items like "I feel inclined to continue using the platform after starting it" and "online learning enhances technical computing skills." Nonetheless, several replies were neutral, indicating that not all students exhibited equal commitment to the ongoing use of such platforms.

Ultimately, in the realm of Actual Use, students indicated enhanced confidence and efficacy in learning English using online platforms. Responses such as "I acquired confidence in utilizing technology" (mean = 3.71) and "I want to utilize online learning as a free learning tool in the future" (mean = 3.68) indicated robust agreement. The recommendation statement's lower mean score (2.82) indicates a more hesitant acceptance, indicating reluctance to recommend the platform to others. The lower mean score (2.82) for the recommendation statement suggests a more hesitant acceptance, showing an unwillingness to suggest the platform to others.

Overall, the research discovered that science undergraduates acknowledged differences in student readiness and confidence while also seeing online English instruction as beneficial, accessible, and motivating. These results highlight the need for ongoing enhancement of online teaching platforms and the requirement for support measures that address diverse degrees of student participation and digital proficiency.

Exploring the Influence of Demographic Variables on Science Undergraduate Students' Perceptions of English Online Learning

The research concerning the impact of demographic characteristics on science students' opinions of online English instruction identified many statistically significant correlations. The research used Pearson's correlation test to analyse the influence of gender, age, field of study, and academic year on students' actual utilization of online English learning platforms.

A weak but statistically significant positive relationship was identified between gender and actual usage, indicating that gender influences perceptions regarding online learning. Likewise, age exhibited a slight positive relationship, suggesting that as age grew, students' impression of the efficient utilization of online English learning resources also improved. These data suggest that both gender and age may marginally affect involvement or level of satisfaction with online platforms.

The academic year received a weak although statistically significant negative relationship to actual use. This indicates that students in advanced academic years may exhibit less motivation to actively participate

in online English learning, either attributable to academic pressure or a decreased focus on language acquisition at higher levels of study. Similarly, the area of investigation had a markedly weak negative relationship to actual use, indicating a negligible impact. This might suggest that different scientific sub-disciplines have different levels of English integration.

In conclusion, the results show that demographic factors such gender, age, academic year, and field of study do affect learners' perceptions and use of online English learning platforms, even if all significant relationships were of weak strength. In order to increase effectiveness and engagement, these data highlight the need of tailoring online learning methodologies for many different kinds of student groups.

Qualitative Data Analysis

Eight participants were purposively chosen from the survey sample to represent a cross-section of demographics and divergent experiences. Ten open-ended questions were used in semi-structured interviews, each lasting 35 to 40 minutes, in order to comprehend students' perceptions on online English instruction.

The six major themes identified were:

Theme 1: Effectiveness of Online English Learning – Participants expressed different views. Some individuals deemed online platforms effective for flexible access and self-directed learning, whilst others favored in-person education for its clarity, immediate response, and engaging setting. This aligns with other work, including Blake (2009), indicating that online techniques may not entirely duplicate the advantages of face-to-face interaction.

Theme 2: Challenges in Understanding Difficult Parts – Many students indicated challenges in comprehending intricate lectures, attributing this to insufficient rapid teacher response, technological issues, and the lack of contextual signals. This corroborates the results of Herath et al. (2021), who highlighted that understanding obstacles substantially influence student happiness and performance in online English courses.

Theme 3: Multitasking and Interaction – Students appreciated the ability to acquire resources from many sources and engage in multitasking. They voiced apprehension over diminished peer connection and restricted speaking practice, reflecting concerns highlighted in research from Turkey and Indonesia concerning online ESL settings hindering oral communication development.

Theme 4: Skill Enhancement and Engaging Activities – Participants acknowledged the advantages of digital tools, including quizzes and multimedia information, in improving vocabulary and listening abilities. Nevertheless, they indicated inadequate assistance for developing speaking and writing skills. These results correspond with the research conducted by Sudusinghe and Kumara (2020), indicating that some talents thrive in digital media, whilst others stay inadequately developed.

Theme 5: Motivation and Continuation – Motivation was intricately linked to educator support and accessible platforms. Students observed that the absence of physical connection sometimes resulted in less concentration; yet, increased familiarity with platforms over time enhanced their self-discipline. This discovery aligns with motivational theories in online learning literature, emphasising the need of ongoing teacher assistance for sustained engagement (Mally, 1999).

Theme 6: Knowledge Updates and Recommendations – Participants had mixed views on recommending online platforms for English learning. Some individuals enthusiastically recommended them, saying how convenient they are, how easy it is to get information, and how they can help keep up with language trends. Others, however, were more cautious, stressing the importance of real-world experience and the fact that online learning can not cannot fully replicate the authentic use of language in real-life contexts.

The discussion illustrates the diverse and at times conflicting perceptions held by science undergraduates at Sri Lankan universities regarding online English instruction. Participants expressed concern about the lack of opportunities to practice speaking English and the loss of personal interaction and even if they knew that online platforms were more flexible, provided them access to actual resources, and contributed to making them better at using technology. Azli et al. (2018) and Dhawan (2020) found similar findings. They claimed that students recognize the freedom of online learning, yet they frequently doubt that it can help them improve their communication abilities.

Due to its impact on cognitive engagement and lack of real-time feedback, several respondents identified traditional training as their preferred approach (Muflih et al., 2021; Tzirides, 2022). Participants in the research experienced difficulties receiving timely responses, especially when they were having difficulty grasping complex linguistic concepts. This is consistent with the criticism of asynchronous learning settings in the literature that fails to foster natural conversation (Vitoria et al., 2018). The idea that online resources may successfully help certain parts of language learning when appropriately integrated is supported by the fact that a number of participants reported increases in their reading and writing abilities in spite of these reservations (Alhumsi et al., 2021).

The quantitative section of the study discovered that demographic parameters including age and gender were somewhat but statistically significantly associated to how respondents felt about studying online. On the same accord, Alhumsi et al. (2021) and Muflih et al. (2021) also identified that academic year and gender also affected acceptance of e-learning among students. These results indicate that in creating distance learning, one should keep in mind a variety of learner types who would benefit in using distance learning.

Qualitative data provided further insight, demonstrating a general discomfort with the restricted oral engagement chances. Van Deusen-Scholl (2015) and Masaazi (2015) both underline the value of live speaking practice in improving pronunciation and fluency, which is a common topic in the literature. MRI (2020) and Vitoria et al. (2018) have shown that interactive elements like quizzes, virtual presentations, and live discussions may boost motivation and engagement. Participants also indicated excitement for these features. These findings support how gamified and performance-based activities may sustain student engagement and enhance skill development.

It is interesting to note that several participants spoke about how their attitudes shifted from early discomfort to ultimate acceptance of online learning styles, especially when the platforms were organized and easy to use. The findings of Gumede and Badriparsad (2022), who highlighted the value of user

experience design and customized content in encouraging learner perseverance, are reflected in this. The case for mixed learning put out by Herath et al. (2021) and Tzirides (2022) was reinforced by the repeated warning against an excessive dependence on digital techniques in the absence of exposure to real-world language use.

When considered together, the results highlight that while online learning environments provide unique pedagogical advantages, their effectiveness depends on flexibility, personalization, and commitment to the requirements of learners. The aforementioned research bolsters the increasing need for hybrid models that strike a balance between the social and communicative richness of in-person teaching and technological efficiency. This approach is especially pertinent to English language training in Sri Lankan higher education (Martin et al., 2020; Dhawan, 2020).

RESEARCH CONCLUSION

The research, which was carried out at a state university in Sri Lanka, provides complex evidence of the perceptions of science undergraduates towards online platforms of learning English and combines both quantitative and qualitative results. The quantitative analysis has shown that an online learning experience was rated mostly positive, especially with regards to the improvement of resources or the acquirement of computer skills. However, there is a negative response by students on its effectiveness in understanding complex issues especially when the attendance is based on face-to-face lectures. These findings show that, despite the overall positive attitude towards online learning, there is an objective need to make strategic improvements, in particular, to match the challenges concerning complex concept comprehension.

Demographic factors- these were gender, age and school year which were discovered to have a strong influence on the perception of students when it comes to online classes. This result concurs with past literature that focuses on the need to measure online education based on close demographic considerations. Although demographic variables are influential, there are other variables which can as well have extensive influence thus making it more difficult to interpret student preferences within the education context.

Qualitative data also allows having a deeper insight into the perceptions of the students as it reveals their concerns about social interactions conditioning critical thinking and their inclination towards the traditional studying in a classroom because of the worries. The data present controversial views: some students note that online learning has helped them be more proficient and convenient, others single out the difficulties in the practice of spoken language and the inability to receive the feedback in real time. This study thus highlights a need to have more interaction and especially interpersonal communication especially face-to-face conversation to sharpen speaking and pronunciation skills in online learning environment.

The study confirms the need of online English teaching, particularly, at the higher education level, during the COVID-19 era. Though the research studies the effectiveness of online education in the time of the crisis, it still emphasizes that the further improvement and adjustment of online platforms to the needs of the different learners and to the technological drawbacks must be applied and continued.

The research will contribute descendants to the literature by exploring attitudes held by science undergraduates toward online English learning and develops a different vibe of dichotomous views regarding the same among the students. The ability to show a strong preference in online resources due to their availability and interactivity, many students combine this new phenomenon with flexibility and real-world applicability of the online platform, focusing on the interactivity of the material. However, the problems like supervising improvement of listening skills and demographic factors were also identified and therefore, the necessity of multifaceted strategies in teaching languages online is claimed. These reflections underline the need of using real-time feedback and supporting diverse learning styles to ensure positive and effective learning experience of all learners.

To sum up, the results of the study can be used in the discussion about online learning and language acquisition, stating that online platforms must be continuously developed and adjusted to the changes to achieve better outcomes in educative settings at universities. The knowledge gained through this research provides sound advice to the educators and the policymakers in the face of adverse events, e.g., the COVID-19 pandemic, without neglecting the need and preferences of various students in educational facilities. This explains why online learning plans continue to change in order to serve the new changes in student needs and to improve their educational experience.

RESEARCH RECOMMENDATIONS

In the current report, it is important to note that a learner-centered orientation in online English language teaching is needed following the approach to the heterogeneous learning preferences and learning styles of students. Thus, educators are encouraged to use various instructional materials: visual, oral, interventional, and promote social interaction to promote communicative competence and learners enthusiasm. Setting an agenda, keeping track and maintaining a continuous teacher student communication is crucial to the learning process. Effects of gamified and interactive methods have been pointed out, emphasizing that they are methods of enhancing motivation and pleasure. It further implies that institutions should customize virtual learning environments to capture perceptions of undergraduates, an aspect that enhances student satisfaction and performance. In addition, it emphasizes the strategic capability of the online platforms to foster digital literacy, motivation, and adaptability either locally or globally. To ensure effective ESL teaching, incorporating the online instructional process into traditional instructions and being responsive to the changes in technology will be of essence. Overall, the report promotes the further development of English teaching and learning in online environment, and serves as one of the grounds of potential studies and innovations in the field of Sri Lankan higher education.

LIMITATIONS

It was completely based on self-report impressions of the respondents as to the conclusions regarding the research that may not be accurate of what the respondents actually behave or even what they actually achieve academically. This could cause biasness, and fail to represent the divergent nature of the experiences of the learners. Although the study is rather successful in terms of combining both qualitatively and quantitatively based methods, it has some faults to be examined further. The generalization of this study to a wider pool of participants is however limited by the consideration that only the undergraduates of

science at the Sri Lankan state university were surveyed. There were also limited numbers of the sample and variation among the participants, which also added to the limitation of generalizability of the findings to some extent. It is of paramount importance to note that the research has become a bottom on the further studies that should be carried out in the sphere of English language learning online as it should be conducted more thoroughly in a similar field. Also, the research targeted the population of undergraduate students only, which might imply missed angles and opinions of students of other age groups and learners of other education levels.

FUTURE RESEARCH DIRECTIONS

In the future, creativity and flexibility should be given high priority as this field of English teaching on the Internet evolves to meet the different needs and wants of students. It should aim at assessing of the long-term outcomes using multiple methods, the application of knowledge to practice, and keeping students engaged. To improve the learning environment, it would be necessary to study the importance of socialization, the sense of belonging, and utilizing the latest technological tools such as gamification and, virtual reality. The comparison of platforms and institutions is needed to determine the best practices and eliminate existing problems. The expansion of the numbers of respondents and combining more comprehensive data collection methodology will enable more comprehensive understanding of the students views. Future researches should then evaluate the extent to which students accept and benefit in online English learning, which will offer relevant information to educators and policymakers.

PLAGIARISM **4%** According to the Turnitin report, the paper shows a 4% similarity index: 3% from internet sources, 4% from publications, and 1% from student papers.

The research paper titled "**Perceptions of Science Undergraduates Towards Online English Learning at a Sri Lankan State University: The Influence of Gender, Age, Academic Major, and Year of Study**" investigates the perceptions of science undergraduates toward online English language instruction within the context of Sri Lankan higher education. Utilizing a mixed-methods design, data were collected through questionnaires administered to 529 students and in-depth interviews conducted with 10 selected participants. The study examined the impact of variables such as age, gender, academic major, and year of study on students' attitudes and experiences. Findings revealed generally positive perceptions of online English learning, with many students appreciating the flexibility and opportunities for language development it offers. However, participants also expressed concerns regarding the lack of interactive elements—particularly in relation to speaking and pronunciation skills. A notable preference for traditional, face-to-face learning environments was also observed. The study highlights critical areas for improvement in online ESL instruction and provides valuable insights for enhancing the effectiveness of English language delivery in Sri Lankan universities. This paper has been approved by the Jadetimes Editor-in-Chief for publication in the Jadetimes Journal of Universal Studies (E-ISSN 3066-9421), Volume 1, Issue 1, January–June 2025.

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