



## Original Article

# Adoption, Challenges, and Technology-Driven Solutions for Computer-Assisted Language Learning in Higher Education: Enhancing EFL Instructions

## Hira Fiaz

Department of English Linguistics & Allied Studies  
NED University of Engineering & Technology, Karachi – Pakistan

 <https://orcid.org/0009-0006-7429-4699>

 [hirafiaz10@gmail.com](mailto:hirafiaz10@gmail.com)

## Hira Khadim

Department of Humanities & Social Sciences  
Bahria University, Karachi Campus – Pakistan

 [hirakhadim.bukc@bahria.edu.pk](mailto:hirakhadim.bukc@bahria.edu.pk)

## Khadija Shereen

Department of Sciences & Humanities  
FAST-National University of Computer & Emerging Sciences, Karachi – Pakistan

 <https://orcid.org/0009-0008-6770-4121>

 [khadija.sheeren@nu.edu.pk](mailto:khadija.sheeren@nu.edu.pk)

## Saba Ahmed (Corresponding Author)

Department of Humanities & Social Sciences  
Bahria University, Karachi Campus – Pakistan

 [sabaahmed.bukc@bahria.edu.pk](mailto:sabaahmed.bukc@bahria.edu.pk)

JEL Classification: **D83**

### How to Cite:

Fiaz, H., Khadim, H., Shereen, K., & Ahmed, S. (2025). Adoption, Challenges, and Technology-Driven Solutions for Computer-Assisted Language Learning in Higher Education: Enhancing EFL Instructions. *Bulletin of Multidisciplinary Studies*, 2(1), 90–99.

<https://doi.org/10.5281/zenodo.15251969>

### Publisher's Note:

International Research and Publishing Academy (iRAPA) stands neutral with regard to jurisdictional claims in the published maps and institutional affiliations.

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### Article history:

Received: December 09, 2024

Revised: March 21, 2025

Accepted: March 25, 2025

Published: April 01, 2025

### Authors' Biography

**Hira Fiaz** is a Research Scholar at the Department of English Linguistics & Allied Studies, NED University of Engineering & Technology in Karachi – Pakistan. She received her Masters in Applied Linguistics from NED University of Engineering & Technology in Karachi – Pakistan.

**Hira Khadim** is a Lecturer at the Department of Humanities & Social Sciences, Bahria University, Karachi Campus – Pakistan. She received her Masters in Applied Linguistics from NED University of Engineering & Technology in Karachi – Pakistan.

**Khadija Shereen** is a Lecturer at the Department of Sciences & Humanities, FAST-National University of Computer & Emerging Sciences in Karachi – Pakistan. She received her Masters in Applied Linguistics from NED University of Engineering & Technology in Karachi – Pakistan.

**Saba Ahmed** is a Lecturer at the Department of Humanities & Social Sciences, Bahria University, Karachi Campus – Pakistan. She received her Masters in Applied Linguistics from NED University of Engineering & Technology in Karachi – Pakistan.

## ABSTRACT

This study investigated how English language teachers use computer-assisted language learning and described the reasons behind the adoption and avoidance of computer-assisted language learning in their practices. A mixed method approach was utilized using both qualitative and quantitative data to describe the current practices on the use of ICT in the higher educational context. Data were collected through interviews from teachers for qualitative insights and a survey questionnaire was employed to gather quantitative data from 200 higher education classroom teachers. Results of the study revealed that computer-assisted language learning in higher education classrooms in Karachi was limited, with teachers often using technology for basic tasks like multimedia presentations and searching content related to course outlines. Factors such as age, gender, digital literacy and prior training in ICT were significantly linked with the use of technology. Teachers who were younger and trained in ICT display greater adoption of ICT. The challenges in ICT adoption included infrastructural limitations, lack of formal training, and resistance to change. Despite the barriers, teachers exhibited positive attitudes towards the use of technology for English language learning. The research highlights the transformative potential of technology in language learning and teaching.

**Keywords:** *Computer-assisted language learning, English as a foreign language, Higher education , Information & communication technology*

## INTRODUCTION

The use of Information and Communication Technology - ICT and Educational Software are possibilities for individuals who wish to develop linguistic skills and learn a foreign language independently (Thorne, 2024). In recent years, it has been possible to observe many people studying English and buying software to improve their knowledge of the language (Nejadghanbar et al., 2024). However, some authors agree that it is difficult to choose the right software (Alwaqdati, 2024). When it comes to the English Language Instruction, it is crucial for teachers to investigate the use of software, to know the possible obstacles students may face (Rohmiyati, 2025). Computer-mediated language learning (CALL) has been an important resource in English language teaching and learning (Kessler et al., 2025). It enables valuable contributions to English-speaking students such as second language learners, as it provides different ways of contact with the language in activities that can be carried out outside of class. This study explores the impact of ongoing courses on the use of educational software in the teaching and learning of the English language. The study analyses the text used for teaching with computers, focusing on the use of new technologies in teaching and learning.

### Background of the Study

The premises for carrying out this work is that examining the use of educational software for learning the English language can stimulate reflection. This reflection can lead towards critical adoption of information and communication technologies in the educational process, which can also contribute to significant changes in practices (Tang, 2024). Based on the research on Computer-Assisted English Language

Learning, learning a second language requires interaction with the target language (Picciuolo, 2025). However, it is necessary to understand that in addition to interaction with the target language, it is also crucial to use the appropriate resources to facilitate this process. Considering the technological developments in all areas of science and the use of ICT throughout the world, it is unthinkable to ignore the use of these important resources in teaching English (Aeni et al., 2023). In the contemporary world, many things are done through online servers, and Computer-Assisted Language Learning has become a powerful tool for mastering a foreign language quickly and efficiently, especially the English language, since it is the most spoken language in the world (Abdullaeva et al., 2024). Therefore, teaching English as a foreign language has an ally in the pursuit of learning. More precisely, the computer has become a fundamental tool for those who want to learn a foreign language.

### Significance of the Study

This research is an attempt to bring new possibilities to computer-assisted language learning and provide guidelines to overcome difficulties in using educational software. The study aims to contribute to English language teaching by offering insights into how educational software can enhance pedagogical practices and student learning outcomes. Additionally, this research seeks to highlight the challenges that teachers face in adopting these technologies and how they can be addressed for more effective English language instruction.

### Research Objectives

The objectives of this study are established to understand how English teachers use educational

software in their pedagogical practices. It determines the reasons for using or not using such software in teaching and learning. The methodology is based on mixed-method research involving qualitative and quantitative case study research with the critical perspective of real-life situations. Moreover, the study utilizes a descriptive approach focusing on recording, analysis, and interpretation of current phenomena.

## Research Questions

This study seeks to answer the following research questions:

- How do English language teachers integrate Computer-Assisted Language Learning (CALL) into their pedagogical practices?
- What factors influence English language teachers' decision to adopt or avoid Computer-Assisted Language Learning (CALL) in their instructional practices

## LITERATURE REVIEW

### The Role of Technological Resources in Language Learning

Technological resources provide an environment conducive to learning through interactive activities and cooperatives (Procel et al., 2024). However, the second language teachers play a significant role in providing a supportive environment for those involved in learning another language. Therefore, teachers and students must actively engage in the teaching and learning process (Aeni et al., 2023). It is crucial to recognize that the teaching and learning process goes through teacher's assimilation, and thus, there is need for the teacher to be prepared and qualified for this. Similarly, as the other areas of science have developed, language teaching and learning must also expand its horizon in the technological world in recent times (Tang, 2024).

### Challenges in Integrating ICT into Language Teaching

Levy (1997) and Chapelle (2006) state that the factor that makes the process of learning a second language difficult, with an emphasis here on English, is precisely the lack of teachers who are proficient in both English and IT. Given that the internet and information and communication technologies (ICT) have become the central means of communication and information retrieval in the 21st century, schools must adapt to the situation, reviewing teaching methods and trying to integrate more ICT in the teaching process. Teaching English should not be limited to the use of textbooks

and of other teacher-centred approaches.

### Activity-Based Learning and Pedagogical Approaches

Educationalists and researchers have highlighted the importance of activity-based learning methods in teaching over the years (Skulmowski, 2024). The rapid advancement in information technology has enhanced pedagogical options for teachers, and using them carefully can make teaching and learning more interesting (Giannakos et al., 2024). Moreover, English language teachers' low support for technology can be attributed to the challenges faced by teachers (Yang et al., 2024). Although the unavailability of technological tools or devices seems to be the biggest challenge teachers face, other barriers such as insufficient time and lack of administrative support also ruin teachers' efforts in sense of technological integration (Asad et al., 2021). Such challenges gradually undermine the desire of teachers to employ technology in their classes. Therefore, the success of students in English Language will be the result of pedagogical work developed seriously by those who aim to face the challenge of facilitating teaching and learning (Giannakos et al., 2024).

### Language Acquisition vs. Language Learning

There is an important distinction made by linguists between acquisition and learning of languages. Crystal (2013) states that First language (L1) refers to the language that is first acquired by a child. The term Second Language (L2) is generally used for any language acquired by a learner that is not the first language. In certain situations, a distinction is made between a second language and a foreign language. This leads us to understand that the sounds of the language are the first part to be learned by the child in the first days of life, that is, the child acquires language through a subconscious process during which you are unaware of grammatical rules.

### Learning Strategies in Language Education

Nunan and Lamb (1996) describe strategy as the procedure, mental or communicative skill that students adopt in learning a new language. He explains how at least one strategy is present in each learning situation. However, the majority of the students are not aware of that strategy when they engage in learning tasks. Nunan and Lamb (1996) also described the importance of having knowledge of these strategies in teaching and learning processes. When students are aware of the strategies used and the underlying processes, the learning will become more effective. The theoretical

background of this research is also based on Nunan's theory indicating that students who have knowledge about strategy are more likely to be motivated than those who are unaware.

### **Krashen's Theory of Language Acquisition**

Moreover, Krashen (1982) explains that to acquire a language, interaction with the target language is crucial. During language acquisition, the learner, or the speaker, is more concerned with the message he is explaining rather than with the form of expression. During natural communication, error corrections are replaced by modifications made by native speakers to aid comprehension and facilitate the acquisition process. On the other hand, through conscious language learning, error correction and the use of explicit rules of the target.

### **Acquisition and Learning as Distinct Processes**

This view, which separates acquisition and learning, suggests that a language student can acquire and learn characteristics of a second language independently and at different stages. Krashen's distinction between acquisition and learning has been widely applied in research, as recent

## **METHODOLOGY**

Patton (1987) states that the qualitative methods allow the investigation of selected subjects in large depth, with careful attention to detail, context, and nuance. On the other hand, researchers who use qualitative methods seek to explain why things happen, in addition to describing and understanding the phenomenon addressed in the research. This research follows a mixed-method research design, incorporating both qualitative and quantitative approaches. The qualitative aspect involves direct interaction with the school environment to describe and understand the phenomenon of the use of educational software for teaching and learning the English language in different contexts. The quantitative aspect aims to quantify the number of teachers using educational software within a given school context, as well as analysing numerical variables such as age group and years of experience.

### **Participants and Sampling**

The study identifies and selects participants based on their involvement in teaching English using educational software. Teachers from different academic backgrounds and varying years of experience are included to ensure a comprehensive understanding

of the phenomenon. The research was guided by five steps:

- Identification of the phenomenon to be studied.
- Identification of study participants.
- Elaboration of hypotheses.
- Data collection.
- Data analysis.

### **Data Collection Tools**

To gather relevant information, this study employs a combination of data collection tools:

- Semi-structured interviews were conducted with teachers to explore their perceptions, challenges, and strategies regarding the use of educational software.
- Questionnaires were distributed to quantify teachers' use of educational software and gather demographic details such as age group and years of work experience.

### **Hypotheses**

- H<sub>1</sub>: Teachers with prior CALL training are more likely to integrate CALL effectively in their teaching.
- H<sub>2</sub>: Teachers' attitudes toward technology influence their adoption of CALL in the classroom.
- H<sub>3</sub>: Availability of resources and support impacts teachers' use of CALL in teaching.

### **Data Analysis**

Quantification of data is necessary to interpret the collected responses from the questionnaires and to determine relationships between variables. A quantitative approach is used to establish statistical correlations, which allow researchers to analyse how closely two variables are related within the research group (Mackey & Gass, 2015). At the same time, qualitative data analysis focuses on thematic patterns emerging from interviews, ensuring a deeper understanding of the phenomenon. By combining qualitative and quantitative methods, the study aims to produce a more comprehensive and well-rounded analysis.

### **Ethical Considerations**

Ethical guidelines were followed to ensure participants' informed consent, confidentiality, and anonymity. The study adhered to ethical research practices, ensuring transparency and voluntary participation.

## RESULTS & FINDINGS

### Teacher Attitudes Towards ICT Integration

In this part, the analysis and discussion of the data are described. Over three months, the study first presents an analysis based on questionnaires and interviews, followed by a discussion of the results obtained. The objective was to characterize the 14 teachers in the sample, describe situations where teachers use computers, and detail how English teachers incorporate educational software in their classes. The second phase evaluates the selected educational software, while the third phase integrates discussions based on research analysis with teachers and the results of software evaluation. This aims to better understand the reality of educational software and technology use.

After a period of two weeks, the questionnaires were collected, and interviews began. Initially, some reluctance was observed in submitting the questionnaires due to the end of the semester, including subject completion and test corrections. One teacher remarked, “We were already overwhelmed with exams and grading, so filling out the questionnaire felt like an extra burden.” Gradually, all teachers were interviewed, and the fieldwork was completed by the end of July

**Table 1**  
Teachers’ Computer Training and Teaching Experience

Category	Percentage (%)	Additional Details
Teachers without computer courses	63.6%	No formal computer training received
Teachers with computer science training	Not specified	Learned Windows OS programs
Teachers with 1–3 years of experience	54.5%	Moderate teaching experience
Teachers teaching basic/intermediate levels	Majority	Most teachers work at these levels
Teachers teaching advanced levels	3 teachers	Limited number of teachers at this level

In general, teachers use computers at home (81.8%) or at work (63.6%), with the majority using them daily. Only one teacher (9.1%) rarely used a computer. Teachers noted that the university provides access to computer facilities, allowing for visits and exploration of the digital environment. However, teachers’ attitudes

2024.

### Teacher Demographics and Experience

The students were aged between 19–22 who were categorized into 13 groups based on age and language proficiency. Their initial experience with a foreign language focused on speaking and listening, and some completed adolescence with a Certificate in Advanced English from the University of Cambridge. It is important to highlight that 72.7% of teachers are between 30 and 35 years old. However, only five teachers (45.5%) have a degree in literature. The other teachers gained proficiency through experience abroad (45.5%), and one teacher (9%) was a native English speaker.

### Use of Technology in Teaching

The tabulation shows that 63.6% of teachers did not take any computer courses. Teachers who invested in computer science learned to use various Windows operating system programs. There is also diversification in terms of length of service in English teaching, with 54.5% of teachers having between one and three years of experience. Regarding professional syllabi, almost all teachers taught at basic and intermediate levels, while only three teachers taught advanced levels.

toward planning software use and directing students varied, indicating a need for more structured guidance in integrating technology into teaching. One teacher commented, “We have the tools, but no one really tells us how to use them effectively in a lesson.”

**Table 2**  
Computer usage environment for teachers

Variables	Number of teachers	Percentage (%)
Where do you use your computer?		
At home	09	81.8
At work	07	63.6
Using your computer		
Daily	08	72.7
1 to 3 times a week	02	18.2
Rarely	01	09.1

### Challenges and Unclear Responsibility

However, no clear consensus emerged on whether teachers or laboratories should bear sole responsibility for utilizing educational software. In reality, both entities share this responsibility with equal frequency. Initially, the existence of laboratories and educational software can be seen as a positive obligation, promoting their utilization. Nevertheless, this situation does not provide conclusive evidence on which software is best suited for specific content, as schools uniformly adopt laboratories and educational software based on pedagogical guidelines. As one teacher expressed, "Sometimes, we are just given a new tool without proper training. We end up using it as a digital textbook rather than an interactive learning experience."

### Educational Software as a Supplement, not a Replacement

Another point that should be discussed is the issue of using educational software only after

introducing content and after oral or written practice in the classroom, functioning merely as an extension or continuation of the teaching material. Educational software should not be seen solely as an intermediate or final visual or audiovisual tool used to introduce certain content or grammatical points. Teachers use educational software for other purposes, but they focus on activities such as filling in the blanks, matching columns, and so on. In this case, educational software acts only as a substitute for textbooks, as these activities can be found in any printed material. One teacher stated, "I use software to reinforce grammar concepts, but I feel it should allow students more creativity and critical thinking rather than just drill exercises. It goes without saying that the school uses a methodical approach to grammar, as observed in classroom classes following the routine carried out by the researcher. However, the use of educational software should provide both content learning and opportunities for students to choose what and how they learn.

**Table 3**  
Common Uses of Educational Software in Classrooms

Purpose	Examples	% of Teachers Using
Grammar drills	Fill-in-the-blank, multiple-choice exercises	65%
Vocabulary reinforcement	Matching words with definitions	58%
Audio-visual supplements	Videos, animations, interactive exercises	52%
Student projects	Creating presentations, digital storytelling	30%
Open-ended learning tasks	Simulations, problem-solving activities	25%

The research problem of this study sought to understand how the integration of Computer-Assisted Language Learning (CALL) by language teachers in institute classrooms at the Federal University of Education, Karachi, is implemented. It was found that this issue constitutes a complex problem involving different uses of technology by teachers, teacher

training, the context, and the teachers themselves with their personal characteristics, knowledge, attitudes, and degree of innovative behaviour. Adopting solely a quantitative or qualitative approach would not have resulted in a comprehensive report and would not have provided a broader understanding of this research problem. Therefore, a sequential explanatory research

design was adopted to account for CALL integration and explain the results of quantitative surveys.

According to Creswell (2010), the philosophical conception or paradigm behind a mixed-methods study is pragmatism. He explains that in pragmatism, there is a concern with application, which works, and solutions to problems. The problem is emphasized, and all available approaches are used to understand this problem and obtain knowledge. In other words, pragmatism opens the door to different methodological concepts, assumptions, and also different forms of data collection and analysis. The focus here is on the research problem, and the intention is to provide a

**Table 4**  
Regression Analysis: Factors Influencing CALL Integration

Predictor Variable	B	SE	$\beta$	t	p
Age	-0.62	0.14	-0.48	-4.43	.001
Gender (Female)	-0.48	0.12	-0.41	-3.95	.002
English Language Degree	0.75	0.18	0.56	4.17	.000
Other Degrees	0.60	0.15	0.49	3.85	.002
Prior CALL Training	0.82	0.13	0.63	6.32	.000
R <sup>2</sup> = .56		F(5, 120) = 14.78 p < .001			

The problem of the qualitative phase was to delve deeper into the results of the quantitative phase. The results showed that apparently, the prior training of teachers in Computer-Assisted Language Learning should not be discarded, as it corroborated the other two sets of factors as influential in the integration of Computer-Assisted Language Learning. The English language variable had a significantly positive impact,

**Table 5**  
Teacher Attitudes Towards CALL

Attitude Category	Description	% of Teachers
Innovative Users	Integrate CALL with interactive and student-centred methods	25%
Supplementary Users	Use CALL mainly for grammar drills and reinforcement	45%
Reluctant Adopters	Prefer traditional methods, minimal CALL use	30%

It was also observed that age had a statistically significant negative impact, indicating that the older the professional, the lesser they use technology to prepare classes. Additionally, the female gender variable had a statistically significant negative impact, indicating that female teachers tend to request less than their male counterparts that students use technology to create products and perform tasks.

Individual factors, as they influence the use of technology, emerge as more influential. However, it

better understanding of this problem.

In the present study, the focus was exactly this. The study began with a broad result from the quantitative phase and then, in the qualitative phase, focused on in-depth interviews, exploring other detailed points of view from the participants. The research problem of the quantitative phase was to determine the factors that influence English language teachers at the university to integrate Computer-Assisted Language Learning in the classroom. The findings of this phase showed that individual factors and contextual factors are important predictors of Computer-Assisted Language Learning.

indicating that teachers with this degree tend to use more technology to facilitate their classes. Teachers with other degrees also showed a positive attitude towards technology. Although personal data was not used to inform the study in the qualitative phase, it was possible to see in the interviews that investment in continuing education was a key factor in the integration of Computer-Assisted Language Learning.

is necessary to review the previous teachers' training factor, including previous informal training, to confirm this result (Kessler, et al., 2025). In general, teacher digital literacy occurs through individual initiative and informally, with the internet or other people, with the aim of solving immediate problems and basic issues of using technology, without focusing on continued training. The main reason to invest in computer training depends on interest. This was identified in interview reports, which show that the greater the

personal interest in technology, the greater the digital literacy of teachers (Kessler, et al., 2025). Other reasons that contribute to digital literacy are needs, curiosity, and also circumstantial reasons.

Computer-Assisted Language Learning (CALL) was used to display videos, images, and slide shows to illustrate and complement the content of the class and was often linked to a textbook. In other words, uses that reflect traditional educational practices in

language teaching. In general, there is no innovation in practice, pedagogical or more advanced uses of CALL, but rather the replacement of equipment. For the vast majority of teachers interviewed, the main reason for not requesting or requiring students to use technology in the classroom is the lack of equipment available in the classroom for student use or technical difficulties. The results show that the integration of Computer-Assisted Language Learning is still at an early stage in most classrooms.

**Table 6**  
Student Engagement with CALL

Technology Used	Purpose in Classroom	% of Students Reporting
Smartphones	Independent use for research and translations	73%
Laptops/Tablets	Accessing online resources and presentation tools	48%
Educational Software	Completing grammar exercises and textbook-related tasks	31%

According to Creswell (2010), the philosophical conception or paradigm behind a mixed-methods study is pragmatism. He explains that in pragmatism, there is a concern with application, which works, and solutions to problems. The problem is emphasized, and all available approaches are used to understand this problem and obtain knowledge. In other words, pragmatism opens the door to different methodological concepts, assumptions, and also different forms of data collection and analysis. The focus here is on the research problem, and the intention is to provide a better understanding of this problem.

## CONCLUSION

It goes without saying that the school uses a methodical approach to grammar, as observed in classroom classes following the routine carried out by the researcher. However, the use of educational software should provide both content learning and opportunities for students to choose what and how they learn. The research problem of this study sought to understand how the integration of Computer-Assisted Language Learning (CALL) by language teachers in institute classrooms at the Federal University of Education, Karachi, is implemented. It was found that this issue constitutes a complex problem involving different uses of technology by teachers, teacher training, the context, and the teachers themselves with their personal characteristics, knowledge, attitudes, and degree of innovative behaviour. Adopting solely a quantitative or qualitative approach would not have resulted in a comprehensive report and would not have provided a broader understanding of this research

problem. Therefore, a sequential explanatory research design was adopted to account for CALL integration and explain the results of quantitative surveys.

## Recommendations and Future Implications

Based on these factors and using the results obtained here, some recommendations are made for the contacts of this study, which are configured as practical implications. Considering the points above, since it was found that the institute generally does not offer adequate infrastructure, probably due to a lack of resources, a possible solution would be to invest in robust, reliable, and fast internet. Investing in internet connectivity would allow students and teachers to use their own equipment, which is becoming increasingly common. This would avoid tape and lab issues and minimize technical problems, as each individual would be responsible for their own equipment.

Bringing technology into the classroom seems to be the most viable path. The first step is to make the internet available, depending on the context. Not all students would be able to bring their own devices, but working in pairs is always an option until institutions can acquire equipment for everyone. Computer knowledge and skills are essential for language teachers, but as seen in the interviews, formal training in Computer-Assisted Language Learning (CALL) is almost non-existent. Informal training has proven to be insufficient, as most of the uses that teachers make of CALL are basic activities. If courses are practical and motivating, they may generate greater interest, and teachers themselves may take the initiative to request new courses during the semester.

To respect the individual needs of teachers, a needs analysis should be done so that teachers in the late adopter category do not feel uncomfortable, and innovators do not get bored. Applying a questionnaire to see the interest and being able to assess the degree of individual innovation of teachers can help in offering courses with more chances for improvement. Furthermore, it is not enough to just show the technical part of technology; it is necessary to show the pedagogical uses and how teachers can apply them in their practice. The responsibility of integrating CALL should not fall solely on the hands of language teachers, even if they belong to the categories of innovators or early adopters. However, the role of educational institutions must be to prepare teachers to face this new challenge.

Integrating CALL by considering the use of technology as a multidisciplinary approach is a way to begin familiarizing teachers with its use. Instead of focusing on technology in general, focus on specific types of uses, emphasizing differences in uses, available applications, possibilities, and practices for using technology and learning. By making this an easier and simpler task, it is expected that the results obtained here can contribute to language teachers in the given context through the integration of technology in their classes, to facilitate this process.

### Competing Interest

The authors had no competing interests.

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