

Transforming in the Digital Era: Uncovering the Potential of Self-Reliance and Technology for the Success of New UT Students in Distance Learning

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Abstract: This study aims to analyze the influence of self-directed learning skills and technology use on the academic success of new students at Universitas Terbuka (UT). A quantitative research method was employed, using an online survey distributed to new students across various study programs. Data analysis was conducted using SPSS statistical software to obtain descriptive and inferential results. The findings indicate that both self-directed learning skills and technology use positively and significantly impact students' academic success. Among these factors, technology use has a greater influence. The combination of high self-directed learning skills and effective technology use significantly enhances learning outcomes. This study is limited to a sample of new students and utilizes a survey method. The implications of these findings suggest the need for developing more effective learning programs, educational policies supporting technology use, and additional academic support for new students. Recommendations for future research include providing specialized technology training, developing comprehensive orientation programs, and conducting studies with larger samples and qualitative approaches for deeper insights.

Keywords: Academic success; Digital transformation; Distance education; Self-directed learning; Technology

Introduction

The development of digital technology has brought significant changes to various aspects of human life, including education. Information and Communication Technology (ICT) has enabled the creation of more flexible, interactive (Tresnawati et al., 2024), and accessible learning methods, unrestricted by space and time. One of the most significant transformations has occurred in distance education, where digital technology plays a central role in delivering course materials, interacting with instructors, and collaborating with fellow students. Prior to the digital era, distance

education in Indonesia was limited to conventional methods such as correspondence courses and the use of educational radio or television. However, with the advent of the internet and digital devices, distance education has evolved to become more dynamic and effective. E-learning platforms, video conferencing, and online educational applications have opened new opportunities for inclusive and quality education, allowing students from various regions, including remote areas, to access higher education without leaving their homes (Lee & Hidayat, 2019).

Universitas Terbuka (UT) is one of the higher education institutions in Indonesia that plays a significant role in providing distance education.

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Established in 1984, UT's vision is to provide higher education access to all segments of society, including those in remote areas, full-time workers, and individuals with physical limitations. Utilizing an open and distance learning model, UT has developed various study programs accessible to students through various media, both print and digital (Belawati et al., 2002).

UT has optimally utilized the development of digital technology to enhance the quality and accessibility of distance education. Through the online portal e-learning and Learning Management System (LMS), students can access learning materials, attend virtual lectures, complete assignments, and interact with instructors and peers online. This technology not only facilitates the teaching and learning process but also enables UT to reach more students across Indonesia, including those in the 3T regions (disadvantaged, frontier, and outermost areas) (Simamora & Gunawan, 2001). In this context, digital transformation is seen not only as an auxiliary tool but also as a catalyst that enables more inclusive, equitable, and quality education. UT continues to innovate in leveraging technology to provide a better learning experience for students, support their self-reliance in learning, and prepare them to face challenges in the digital era (Avisena & Fathurrahman, 2024; Rayuwati, 2020; Wulandari et al., 2024).

The primary aim of this research is to identify and explore the potential of digital technology in supporting self-directed learning among new students at Universitas Terbuka (UT). Self-directed learning refers to students' ability to manage and direct their own learning processes without heavy reliance on direct instructor intervention. In the context of distance education, digital technology plays a crucial role in facilitating this independence. This study will investigate various technologies and digital platforms available and how they can be utilized to enhance students' self-directed learning abilities (Astuti et al., 2021; Dewi & Tyas, 2024).

Additionally, this research aims to discuss the impact of digital transformation on the student learning experience. By understanding how technology has altered student interactions with learning content, instructors, and peers, this study will provide a comprehensive overview of technology's role in distance education (Haryanto et al., 2023; Ristiyono, 2020, 2023).

This understanding is expected to help identify key factors that support successful self-directed learning in the digital era (Amalia et al., 2024). The research will also offer practical insights and recommendations for students and educators at UT. For students, the study presents practical strategies and tips on leveraging digital technology to support self-directed learning, including recommendations on useful applications and

platforms and effective time and resource (Supendra & Amilia, 2021). Meanwhile, for educators, the research provides guidance on how they can support and encourage self-directed learning among their students. This includes teaching strategies that utilize digital technology, creating interactive and collaborative learning environments, and approaches to motivate and guide students in distance learning (Sugilar, 2017).

By achieving these objectives, this research is expected to make a significant contribution to improving the quality and effectiveness of distance education at UT. It will serve as a valuable source of information for new students seeking to optimize their learning experiences and for educators aiming to implement best practices in supporting self-directed learning through digital technology (Erlina et al., 2022).

Previous research has extensively discussed the benefits of digital technology in distance education, but these studies often tend to focus narrowly on technical aspects or specific platforms, without delving deeply into how technology can holistically support students' self-directed learning. These studies frequently segregate the technology used from the pedagogical aspects necessary to promote self-directed learning (Beldarrain, 2006). Furthermore, research specifically targeting new students in the context of distance education remains limited. New students often encounter unique challenges, such as adapting to a new learning environment and acclimating to distance learning methods. Existing research has not specifically highlighted the needs and challenges faced by new students in utilizing digital technology to support their self-directed learning.

Furthermore, despite the availability of various educational technologies, there is a lack of systematic research that integrates the use of these technologies with strategies to enhance self-directed learning. There is a need to identify ways in which technology can not only serve as a tool but also as an integral part of learning strategies that support the development of students' self-directed learning skills (Rozinaj et al., 2018). This research offers a holistic approach by integrating various existing digital technologies and linking them with theories of self-directed learning. It provides a more comprehensive view of how technology can be effectively used to support students' self-directed learning, not merely as an add-on but as a central component in distance learning strategies.

This study specifically focuses on new students at UT, providing insights into the unique challenges they face and how digital technology can assist them in overcoming these challenges. It addresses their adaptation to a new learning environment and the development of self-directed learning skills early in their academic journey (Bosch & Laubscher, 2019). In addition

to analyzing the potential of digital technology, this research also offers practical, specific recommendations for both students and educators. For students, these include practical strategies to leverage technology for self-directed learning, while for educators, it provides guidance on supporting students through technology use. Thus, this study not only presents theoretical analysis but also actionable solutions that can be implemented directly in practice (Agustian & Setiawan, 2024; Fauziyah & Mulyani, 2024; Thongkoo et al., 2020).

Furthermore, this research has the potential to significantly contribute to the development of educational policies at UT and similar institutions. By highlighting the importance of integrating technology to support self-directed learning, this study can serve as a foundation for the development of more effective programs and policies in distance education. By addressing existing gaps and offering innovative contributions, this research is expected to provide significant and applicable insights for the development of more effective distance education and support for student self-directed learning in the digital era (Rashid & Asghar, 2016).

Digital Transformation

Digital transformation in education refers to the process of integrating digital technology into all aspects of life, including education. This process involves the use of Information and Communication Technology (ICT) to change how education is delivered and accessed. In the educational context, digital transformation encompasses the use of hardware and software, the internet, learning applications, and online platforms that enable more dynamic interaction between educators and learners (Katyeyudo & de Souza, 2022; Oliveira & Souza, 2022).

One significant impact of digital transformation in the education system is increased accessibility and flexibility. Digital technology enables distance learning, overcoming geographical and time constraints. Students can access learning materials from anywhere and anytime, allowing them to learn at their own pace and schedule. Moreover, digital technology facilitates personalized learning, where content and teaching methods can be tailored to individual needs and abilities (Mishra et al., 2023).

Digital transformation has also introduced more interactive and collaborative learning concepts. Through tools such as video conferencing, online discussion forums, and collaborative applications, students can interact directly with teachers and peers, even when they are in different locations. This not only enhances student engagement and participation but also supports the development of communication and teamwork skills (Balyer & Öz, 2018).

In the theory of distance learning, a relevant model is the Community of Inquiry (CoI) framework developed by Garrison, Anderson, and Archer. This model emphasizes three essential elements in online learning: cognitive presence, social presence, and teaching presence. Cognitive presence refers to learners' ability to construct and confirm meaning through reflection and discussion. Social presence involves learners' ability to project themselves socially and emotionally in the learning community. Teaching presence includes the design, facilitation, and direction from educators to create meaningful learning experiences (Rabinovich et al., 2020).

Additionally, the theory of Connectivism introduced by Siemens and Downes is also relevant in the context of digital transformation. Connectivism views learning as the process of connecting information nodes in a network, where technology plays a crucial role in facilitating connections and information flow. In this paradigm, knowledge is distributed throughout the network, and learning is the ability to navigate and effectively utilize this network (Abad-Segura et al., 2020).

Understanding these concepts and theories allows us to see how digital transformation has and continues to reshape the educational landscape. The use of digital technology is not just as a tool but as the core of educational strategies that support more flexible, personalized, and collaborative learning. This transformation not only enhances the quality of education but also prepares learners to face challenges and opportunities in the digital (Gillpatrick, 2020; Quaicoe et al., 2023; Wang et al., 2023).

Self-Directed Learning

Self-directed learning, also known as SDL, refers to an individual's ability to organize and direct their own learning process. This involves taking initiative in diagnosing learning needs, formulating learning goals, identifying learning sources, selecting and applying learning strategies, and evaluating learning outcomes. In the context of distance education, self-directed learning is particularly crucial as students may not always have direct and continuous access to guidance from instructors (Laine et al., 2022). Self-directed learning enables students to overcome various challenges commonly encountered in distance education, such as time constraints and limited direct instructor support. Students with high levels of self-directed learning are typically better at managing their time, self-motivating, and seeking additional resources when facing difficulties. Therefore, self-directed learning is a key factor for success in distance education, where students are expected to learn independently and take full

responsibility for their learning process (Alanoglu et al., 2021).

Several factors support self-directed learning in distance education. Firstly, intrinsic motivation is a primary driver. Students with intrinsic motivation tend to be more enthusiastic and committed to their learning process. Secondly, time management skills are crucial as distance education often requires students to manage their own study schedules. Thirdly, metacognitive skills, such as the ability to plan, monitor, and evaluate the learning process, help students stay on track and make necessary adjustments. Fourthly, social support from peers, family, or online learning communities also plays a significant role in motivating and encouraging students (Chao, 2023).

Digital technology can significantly support self-directed learning. Online learning platforms, such as Learning Management Systems (LMS), provide various tools and resources that students can use to manage and monitor their learning processes. For example, features like calendars, assignment reminders, and self-assessment tools help students organize their time and evaluate their learning progress. Additionally, digital technology provides access to a wide range of learning resources, such as e-books, instructional videos, discussion forums, and online courses, which can help students deepen their understanding of course materials (Bosch & Laubscher, 2019).

The interactivity offered by digital technology also supports the development of self-directed learning. Through online discussion forums and collaboration tools, students can interact and share knowledge with peers, as well as receive real-time feedback from instructors. This creates a more dynamic learning environment and supports the development of communication and collaboration skills (Gupta, 2018). Overall, digital technology not only provides tools and resources that support self-directed learning but also creates an interactive and flexible learning environment. Thus, technology serves as an enabler that allows students to develop essential self-directed learning skills in distance education (Fellows et al., 2002).

Method

Research Design

This study employs a quantitative research design aimed at measuring and analyzing numerical data (Subagyo, 2020; Sugiyono, 2016) related to the use of digital technology and self-directed learning among new students at Universitas Terbuka (UT). The quantitative approach was chosen because it allows researchers to collect objectively measurable data and analyze the relationships between the variables statistically (Unaradjan, 2019). For data collection, the method used

is a survey. This survey is designed to gather information on the level of digital technology use, students' perceptions of self-directed learning, and factors that support or hinder their self-directed learning. The survey questionnaire is structured using a Likert scale to measure respondents' agreement or disagreement with various statements related to the research topic. The questionnaire is distributed online through a digital survey platform easily accessible to students, such as Google Forms. The software used for data analysis is the SPSS (Statistical Package for the Social Sciences). Data collected through the survey will be input into this software for analysis. The analysis will include descriptive analysis to depict the demographic characteristics of the respondents and the distribution of their responses, as well as inferential analysis such as correlation and regression tests to identify significant relationships between the variables under study. This analysis will help identify patterns and significant relationships between the use of digital technology and the level of self-directed learning among students.

Research Subjects

Participants in this study are new students at Universitas Terbuka (UT) from various study programs. The selection of new students as research subjects assumes that they face unique challenges in adapting to a new learning environment and distance learning methods. Participants are drawn from various study programs to obtain a comprehensive overview of the use of digital technology and self-directed learning at UT. New students from diverse backgrounds and study programs will provide variation in the collected data, enabling researchers to explore differences and similarities in their experiences and perceptions regarding self-directed learning and the use of digital technology. By involving students from various study programs, this research is expected to yield findings that are more representative and relevant for application across UT. Overall, the quantitative research design using survey methods and statistical analysis employed in this study will enable the collection and in-depth analysis of objective data, providing valuable insights into how digital technology can support self-directed learning among new students at UT.

Research Variables

Table 1 contain the operational definitions, indicators, and measurement tools used in this analysis. This study aims to analyse the influence of self-directed learning skills and technology use on students' learning success at Universitas Terbuka (UT). In this context, self-directed learning skills (x1) are defined as students' ability to manage time, seek information, and complete tasks independently without much external guidance.

The indicators used to measure self-directed learning skills include effective reading ability, habit of note taking or recording learning outcomes, ability to search for relevant information, active participation in academic discussions, ability to complete tasks on time,

and ability to handle administrative issues related to learning. Each indicator is assessed using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 1. Operating Definitions

Variable	Operational definition	Indicators	Measurement tool
Total Self-Directed Learning Skills (x1)	Students' ability to manage time, seek information, and complete tasks independently.	Effective reading. Note-taking or recording learning outcomes. Searching for relevant information. Participation in discussions. Task completion. Solving administrative issues	Likert Scale (1-5)
Total Technology Use (x2)	Level of technology use by students in the learning process.	Ability to use the internet. Proficiency in basic technology skills. Active search and utilization of tech resources. Skills in managing technology devices	Likert Scale (1-5)
Total Learning Success (Y)	Academic achievement resulting from students' use of self-directed learning skills and technology use.	Ability to use technology in learning. Confidence in communicating through technology. Use of technology to complete academic tasks	Likert Scale (1-5)

Additionally, technology use (x2) is defined as the level of skill and frequency of technology use by students to support the learning process. The indicators used to measure technology use include the ability to use the internet for learning purposes, proficiency in basic technology skills, active search and utilization of technology resources, and skills in managing technology devices. Measurement is also conducted using a 5-point Likert scale. The dependent variable in this study is students' learning success (Y), measured through the mastery and application of technology in academic tasks. Indicators for this variable include the ability to use technology in learning, confidence in communicating through technology, and ability to use technology to complete academic tasks, measured on a 5-point Likert scale. This framework establishes a comprehensive approach to understanding how self-directed learning skills and technology use impact students' academic achievement at UT.

These hypotheses are expected to be tested through multiple linear regression analysis designed in this study to identify the relationship between self-directed learning skills, technology use, and academic success of new students at Universitas Terbuka. Based on these hypotheses, the research model can be constructed as.

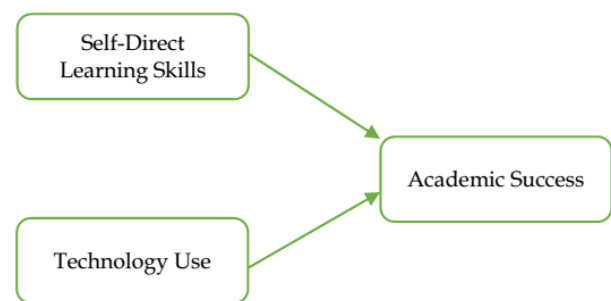


Figure 1. Research model

Research Hypotheses

Based on the background, objectives, and methodology described, the research hypotheses are as follows.

Hypothesis 1 (H1): There is a positive and significant influence of self-directed learning skills (x1) on academic success (Y) of new students at Universitas Terbuka.

Hypothesis 2 (H2): There is a positive and significant influence of technology use (x2) on academic success (Y) of new students at Universitas Terbuka.

Result and Discussion

Respondent Characteristics

This study involved a total of 1,284 respondents, comprising 578 males (45%) and 706 females (55%). Based on employment status, 1,218 respondents (95%) indicated they were employed, while 66 respondents (5%) stated they were not employed. Respondents were also categorized by age as follows: 795 respondents (62%) aged 17-25 years, 352 respondents (27%) aged 26-35 years, 51 respondents (4%) aged 36-40 years, and 86

respondents (7%) aged over 40 years. This distribution indicates that most respondents are female, employed, and in the 17-25 years age range. This reflects the typical population of Universitas Terbuka students, who are generally working adults continuing their education. Most respondents are in the productive age range and likely starting their careers. However, there is also a significant proportion of respondents over 25 years old, indicating that Universitas Terbuka attracts students from various age groups. This demographic distribution is important to consider when interpreting the research results, as these demographic characteristics may influence how self-directed learning skills and technology use impact their academic success.

Table 2. Respondent Characteristics

Category	Number
Age 17-25 years	795
Age 26-35 years	352
Age 36-40 years	51
Age 40+ years	86
Working	1218
Not Working	66
Male	578
Female	706
Total	1284

Table 3. Independent Variables and Their R-squared Contributions to Total Academic Success

Variable	Coefficient	Standard Error	t-Statistic	P-value	R-squared
Intercept	2.7296	0.262	10.419	0	N/A
Total Self-Directed Learning Skills (x1)	0.2135	0.02	10.453	0	0.254
Total Technology Use (x2)	0.2794	0.029	9.662	0	0.25
Total Model					0.504

Table 4 is a table containing the results of the R-squared and F-statistics analysis from multiple regression.

Table 4. R-squared and F-statistics

Statistics	Value
R-squared	0.504
Adjusted R-squared	0.504
F-statistic	651.9
Prob (F-statistic)	5.35E-196

Interpretation of Coefficients

Intercept: The coefficient is 2.7296, indicating that when all independent variables (x1 and x2) are zero, the predicted value for the dependent variable (Y) is 2.7296. **Total Self-Directed Learning Skills (x1):** The coefficient is 0.2135, meaning that a one-unit increase in x1 will increase Y by 0.2135, assuming other variables are constant. **Total Technology Use (x2):** The coefficient is 0.2794, indicating that a one-unit increase in x2 will increase Y by 0.2794, assuming other variables are constant.

Multiple Linear Regression Analysis

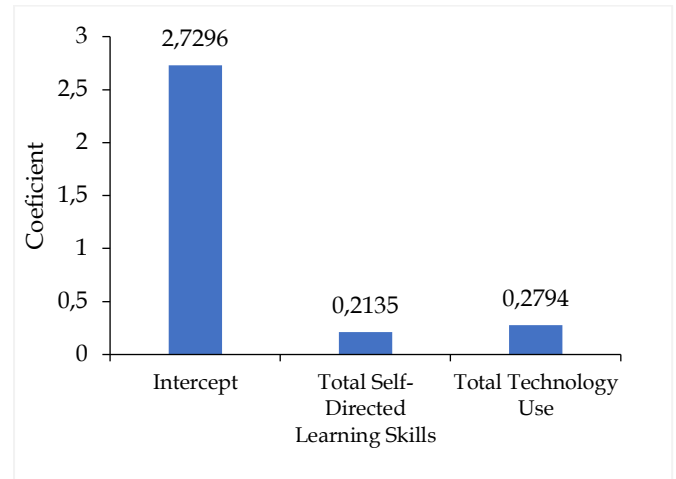


Figure 2. Regression coefficients

Results of Multiple Linear Regression

Table 3 is the table linking independent variables with R-squared, providing an overview of how much each variable contributes to explaining the variation in the dependent variable (Total Academic Success).

Statistical Significance (P-value)

The P-value for all coefficients (Intercept, x1, and x2) is very small (0.000 or close to 0), indicating statistical significance. This means there is strong evidence that the observed relationships between independent variables and the dependent variable are not occurring by chance.

R-squared

The R-squared value is 0.504, indicating that 50.4% of the variation in the dependent variable (Total Academic Success) can be explained by the independent variables (Total Self-Directed Learning Skills and Total Technology Use).

F-statistic:

The F-statistic value is 651.9 with a very small Prob (F-statistic) (5.35e-196), indicating that the regression model is significant. This means that at least one of the regression coefficients of the independent variables is statistically different from zero.

Summary of Analysis

This model shows that both Total Self-Directed Learning Skills (x_1) and Total Technology Use (x_2) significantly influence Total Academic Success (Y) the statistical significance of the coefficients indicates that both independent variables are important in explaining the variation in the dependent variable. The R-squared value suggests that half of the variation in academic success can be explained by self-directed learning skills and technology use.

These results indicate that both self-directed learning skills and technology use have a significant impact on students' academic success. The influence of technology use is slightly greater than that of self-directed learning skills, indicating that technology use plays a more dominant role in enhancing student academic success at Universitas Terbuka.

Therefore, enhancing students' self-directed learning skills and technology use is highly recommended to improve their academic outcomes. This can be achieved through training programs focusing on the development of self-directed learning skills and technology use in the context of learning. Implementation of these strategies is expected to assist students in achieving higher academic success at Universitas Terbuka.

Discussion

Based on the multiple linear regression analysis conducted, here are the results for each hypothesis proposed.

Hypothesis 1 (H1): There is a positive and significant influence of self-directed learning skills (x_1) on academic success (Y) of new students at Universitas Terbuka

The analysis results indicate that the coefficient for self-directed learning skills (x_1) is 0.2135 with a p-value of $1.35E-24$, demonstrating its statistically significant influence. This means that self-directed learning skills indeed have a positive and significant impact on students' academic success. Previous research by Laine et al. (2022) also supports these findings, where self-directed learning readiness (SDLR) was found to be associated with success in distance education. The study shows that students with high levels of self-directed learning readiness are more capable of dealing with challenges inherent in distance learning, such as limited direct interaction with instructors and classmates. Students with these skills can better organize themselves, seek assistance when needed, and remain motivated despite learning in a more isolated environment.

Furthermore, self-directed learning skills not only impact academic success but also contribute to the development of other personal abilities such as critical

thinking, time management, and the ability to adapt to new technologies. These skills are highly valuable in today's dynamic and digital workplace. Therefore, universities and other educational institutions should consider incorporating self-directed learning skill training into their curricula to prepare students not only for academic success but also to become competent and adaptive professionals in the future.

Hypothesis 2 (H2): There is a positive and significant influence of technology usage (x_2) on the academic success (Y) of new students at Universitas Terbuka

The coefficient for technology usage (x_2) is 0.2794 with a p-value of $2.29E-21$, indicating a statistically significant influence. This means that technology usage also has a positive and significant impact on students' academic success. Research by Bosch et al. (2019) highlights the crucial role of technology in supporting self-directed learning through enhanced interaction and collaboration in distance learning environments. Technology facilitates access to various learning resources, enables effective communication between students and educators, and supports collaboration through digital platforms. Tools such as video conferencing, online discussion forums, and interactive learning applications allow active participation and flexibility in learning, which are critical in distance education. Moreover, technology usage helps students develop essential digital skills highly valued in today's workforce. Educational institutions need to continue investing in technological infrastructure and provide adequate training to optimize the benefits of technology in learning. This will better prepare students to tackle academic and professional challenges in the future.

Conclusion

This study found that self-directed learning skills and technology usage have a positive and significant impact on the academic success of new students at Universitas Terbuka (UT). Among the two variables, technology usage was found to have a greater influence compared to self-directed learning skills. The combination of strong self-directed learning skills and effective technology utilization can significantly enhance students' academic outcomes. The study is limited to new students at UT, which means the results may not fully represent the experiences of all UT students or those at other institutions. The survey method and use of Likert scales may not fully capture the complexities of students' experiences. Additionally, the quantitative approach used does not provide a deep understanding of the reasons behind the relationships between the variables. It is recommended that UT provide specialized technology training, expand

orientation programs to include self-directed learning skills and technology, and conduct further research involving respondents from various academic levels. Qualitative research is also suggested to gain deeper insights into students' experiences. The curriculum should be designed to better integrate technology and include assignments that support self-directed learning. The findings can be utilized to develop more effective learning programs at UT and to support educational policies that promote the use of technology in distance learning. Educational institutions can also leverage these results to offer additional support to new students, helping them adapt to new learning environments and achieve academic success.

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Author Contributions

Conceptualization, E.K. P.S., and L.L.G.; methodology, L.L.G.; validation, S.S., and A. R.; formal analysis, L.L.G.; investigation, P.S. and L.L.G.; resources, E.K. and A.R.; data curation, L.L.G.; writing—original draft preparation, P.S. and L.L.G.; writing—review and editing, E.K.: visualization, L.L.G. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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