

E-Learning Accessibility in Remote Alternative Learning System Contexts

Sherdelle M. Iyana*, Roselyn G. Malong

North Eastern Mindanao State University, Tandag City, Surigao del Sur, Philippines

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ABSTRACT

The integration of e-learning has emerged as a key strategy for expanding educational access among marginalized learners, particularly within the Alternative Learning System (ALS) serving geographically isolated communities. However, disparities in technological resources and socioeconomic conditions continue to shape learners' participation in digital instruction. This study examined the level of accessibility of e-learning platforms among ALS learners in remote areas of Tago, Surigao del Sur, Philippines. Using a quantitative research design, data were collected from 48 respondents composed of ALS facilitators and Grade 11 learners selected through purposive sampling. A validated survey instrument measured accessibility across three dimensions: availability of devices and internet connection, affordability of e-learning tools, and platform compatibility with local technological infrastructure. Findings revealed that overall e-learning accessibility was perceived as accessible, with device and internet availability receiving the highest ratings. However, affordability emerged as the most significant constraint, as recurring expenses related to mobile data and device maintenance limited sustained participation in online learning. Although facilitators demonstrated greater confidence in platform compatibility, statistical analysis showed no significant difference between learners' and facilitators' perceptions of accessibility, indicating shared structural barriers within remote ALS contexts. The study highlights that improving e-learning accessibility requires coordinated policy interventions, infrastructure investment, and context-responsive instructional strategies. Without sustained financial and institutional support, the expansion of e-learning in remote learning environments may reinforce existing educational inequalities rather than mitigate them.

Keywords: Alternative Learning System (ALS), e-learning accessibility, digital divide, remote education, educational equity

INTRODUCTION

The rapid integration of digital technologies into education has transformed learning delivery worldwide, enabling flexible and inclusive instructional opportunities beyond traditional classrooms. In the Philippines, the implementation of technology-mediated learning has become increasingly significant, particularly within the Alternative Learning System (ALS), which serves out-of-school youth and adult learners across geographically isolated and disadvantaged areas. The expansion of e-learning platforms offers potential solutions to long-standing barriers in access to education; however, disparities in technological resources and infrastructure continue to influence learners' participation and engagement. This study examined the accessibility of e-learning platforms in supporting ALS learners in remote areas as an essential component of equitable and inclusive education.

Recent scholarly works emphasize that accessibility to e-learning extends beyond platform availability and must consider technological readiness, affordability, and contextual adaptability. According to Dhawan (2020), digital learning environments can enhance educational continuity only when supported by adequate infrastructure and learner access to devices and connectivity. Similarly, Adedoyin and Soykan (2020) highlighted that unequal access to digital resources remains a primary limitation of online learning implementation worldwide. In the Philippine context, Barrot et al. (2021) found that students' engagement in online learning is strongly influenced

by internet reliability, economic capacity, and digital literacy, reinforcing the importance of examining multiple dimensions of accessibility rather than technology adoption alone.

Empirical evidence further demonstrates persistent challenges faced by learners in remote and rural communities. Rotas and Cahapay (2020) reported that unstable internet connection, limited gadget ownership, and financial constraints significantly hinder participation in online learning among Filipino learners. Likewise, Toquero (2021) emphasized that socioeconomic conditions continue to shape educational access despite nationwide digitalization efforts, particularly among marginalized groups such as ALS learners. Studies conducted in developing regions also reveal that teachers may adapt technologically faster than learners due to training opportunities, creating a digital gap between instructional readiness and learner capacity (Trust & Whalen, 2020). These findings highlight the continuing need to assess accessibility conditions within localized ALS contexts where infrastructure and economic limitations remain evident.

Despite the increasing integration of digital learning in formal education, empirical evidence on e-learning accessibility within remote ALS contexts remains limited. Existing studies often focus on higher education or urban learning environments, leaving a gap in understanding the digital realities of marginalized ALS learners in geographically isolated communities.

This study contributes to the frontier of knowledge by providing localized empirical evidence on e-learning accessibility within the ALS framework, an area that remains underexplored despite increasing national emphasis on flexible learning modalities. By examining accessibility through the interconnected dimensions of device and internet availability, affordability of e-learning tools, and compatibility with local technological infrastructure, the research strengthens discussions on digital inclusion and equity in nonformal education settings.

Moreover, this study aimed to determine the level of accessibility of e-learning platforms in supporting ALS learners in remote areas in terms of:

- (1) availability of devices and internet connection,
- (2) affordability of e-learning tools, and
- (3) platform compatibility with local technological infrastructure.

It also sought to examine whether there is a significant difference in the perceived level of accessibility of e-learning platforms between ALS learners and facilitators.

MATERIALS AND METHODS

This study employed a quantitative research design to examine key variables related to the accessibility of e-learning platforms in Alternative Learning System (ALS) Social Science education. The study was conducted in the municipality of Tago, Surigao del Sur, Philippines—an area characterized by geographically dispersed communities and limited digital infrastructure, reflecting the contextual realities faced by many ALS programs in remote settings.

A total of 48 respondents participated in the study, consisting of 13 ALS facilitators and 35 Grade 11 ALS learners. These participants represent key stakeholders in the ALS program within remote communities in Tago, Surigao del Sur, where learners commonly face challenges related to unstable internet connectivity, limited access to digital devices, and varying levels of technological literacy. ALS facilitators were purposively selected as key informants based on specific criteria, including their length of service in the ALS program, familiarity with e-learning tools, and active involvement in delivering digital instruction. Grade 11 ALS learners were selected because they were currently enrolled in Social Science subjects and had direct exposure to the e-learning modules used in the study.

Purposive sampling was employed to ensure that respondents possessed relevant experience with the implementation and use of e-learning within the ALS context. This approach was appropriate because the study required participants who are directly engaged in ALS teaching and learning in geographically remote settings. By intentionally selecting facilitators and learners with firsthand experience in utilizing digital learning resources, the study was able to gather informed perspectives that reflect the practical realities and accessibility challenges of e-learning in ALS environments.

Two research instruments—one for learner respondents and another for facilitator respondents—were developed in alignment with the study’s objectives and statements of the problem. The instruments demonstrated strong internal consistency, as reflected in satisfactory Cronbach’s alpha values, and were validated by a panel of experts to ensure clarity, reliability, and alignment prior to implementation.

Following approval from NEMSU and authorization from the Department of Education (DepEd) Surigao del Sur and local school authorities, coordination with ALS coordinators was conducted to identify and invite qualified respondents. Prior to participation, respondents were informed about the purpose of the study, the voluntary nature of their participation, and the confidentiality of their responses. Written informed consent was obtained from all participants, ensuring that they fully understood their rights and the procedures involved in the study.

Before answering the survey, respondents were provided with five e-learning modules addressing the least-mastered competencies in Disciplines and Ideas in the Social Sciences to ensure that their evaluations were grounded in actual learning experience. Adequate time was allotted for respondents to review and engage with the modules prior to completing the questionnaire.

Data collection was carried out through a structured and flexible process: surveys were administered in person whenever possible to allow clarification and assistance, while an online version was provided for respondents facing geographical or logistical constraints. This systematic approach ensured that data gathering remained organized, inclusive, and responsive to the contextual realities of ALS implementation in remote and resource-limited settings.

RESULTS AND DISCUSSION

Level of Accessibility of E-learning Platforms in Supporting ALS Learners in Remote Areas

This section presents an assessment of the level of accessibility of e-learning platforms as perceived by ALS learners and facilitators in remote areas. The analysis considers three essential dimensions that influence learners’ capacity to engage with digital instruction: the availability of devices and internet connectivity, the affordability of e-learning tools and resources, and the compatibility of platforms with the technological infrastructure present in their communities. These dimensions are examined to determine the extent to which e-learning platforms can support inclusive and effective Social Science education for ALS learners across geographically disadvantaged settings.

Table 1. Level of Accessibility of E-Learning Platforms in Terms of Availability, Affordability, and Compatibility

Indicators	Learners		Facilitators		Overall	
	Mean	Adjectival Description	Mean	Adjectival Description	Mean	Adjectival Description
1. Availability of Devices and Internet Connection	3.47	Accessible	3.79	Accessible	3.63	Accessible
2. Affordability of e-learning tools	3.23	Moderately Accessible	3.65	Accessible	3.44	Accessible

3. Platform compatibility with local technological infrastructure	3.31	Moderately Accessible	3.88	Accessible	3.60	Accessible
Overall	3.34	Moderately Accessible	3.77	Accessible	3.55	Accessible

The results revealed that among the three indicators, the availability of devices and internet connection obtained the highest mean score among learners, followed by platform compatibility with local technological infrastructure. This indicates that many ALS learners already have access to at least one digital device, commonly a smartphone, and have occasional access to the internet through mobile data or shared Wi-Fi. However, this accessibility does not always translate to stability or quality of connection. Many respondents shared that they experience weak signals, sudden disconnections, and dependence on borrowed or shared gadgets. This finding mirrors what Baccal and Ormilla (2021) found: while the growing availability of low-cost smartphones and community Wi-Fi has expanded access to e-learning, consistent connectivity remains a struggle in remote areas. Chavez et al. (2021) also supported this observation, explaining that reliance on shared or borrowed devices limits learners' ability to engage fully in online activities and often interrupts their learning continuity.

Meanwhile, the affordability of e-learning tools was rated lowest by learners, emphasizing their ongoing difficulty in sustaining the financial requirements of online participation. The cost of mobile data, gadget repairs, and other incidental expenses adds pressure to families that already face financial hardship. Labarrete (2021) highlighted that the recurring cost of mobile data is one of the primary barriers to sustained participation in e-learning, especially among out-of-school youth from low-income and rural households. The results of this study reinforce that financial constraints, rather than lack of motivation, remain the main factor behind inconsistent participation or dropout in digital learning sessions.

Among facilitators, platform compatibility with local technological infrastructure received the highest mean. This suggests that ALS facilitators perceive that existing e-learning platforms, such as Kahoot!, Google Classroom, and Messenger, are generally functional and compatible with the devices and connectivity available in their areas. Their higher confidence can be attributed to the professional development and DepEd-supported training they received in recent years. Paez (2024) explained that facilitators gain greater digital competence through repeated use of these tools, allowing them to adapt materials, troubleshoot technical problems, and guide learners effectively. However, although facilitators have become more comfortable with technology, many learners remain constrained by unstable internet connectivity and limited device ownership, resulting in a subtle but clear digital divide within the ALS community.

Another important factor influencing the effectiveness of e-learning implementation is the level of digital literacy among ALS learners. While many learners possess smartphones or have intermittent internet access, the ability to navigate online platforms, access digital learning materials, and troubleshoot basic technological issues varies widely. Limited technological skills may hinder learners' capacity to fully engage with e-learning activities even when devices and connectivity are available. Previous studies emphasize that digital literacy plays a critical role in determining how effectively learners utilize online learning environments, particularly in marginalized and nonformal education contexts (Barrot et al., 2021). In the ALS setting, where learners often come from diverse educational and socioeconomic backgrounds, strengthening digital literacy through guided orientation, hands-on training, and continuous technical support may significantly enhance learners' confidence and participation in e-learning platforms.

Even facilitators identified affordability as a challenge, with the lowest mean rating underlining that sustaining e-learning is also costly for teachers. Many of them use their own resources to pay for mobile data or upgrade their devices since community learning centers have limited ICT funding. Baccal and Ormilla (2021) noted a similar situation where ALS implementers often use personal funds for connectivity and instructional materials due to the lack of institutional support. This suggests that both learners and facilitators bear financial burdens that hinder the sustainability of e-learning implementation in remote areas.

These results imply that while e-learning in the ALS context is now technically possible, it remains financially and structurally fragile. The positive scores in availability and compatibility reflect encouraging progress that digital devices and platforms have reached, even in far-flung areas. This development is aligned with the goals of the ALS Act (RA 11510), which promotes flexible and technology-supported learning opportunities for marginalized learners. However, the low score in affordability reveals that access remains unequal and heavily dependent on learners' and facilitators' economic capacities. Without addressing these financial challenges, e-learning may unintentionally deepen educational inequities between those who can afford stable connectivity and those who cannot.

These findings point to the need for coordinated action at multiple levels. On the policy side, the Department of Education and local governments should consider partnerships with telecommunications companies to provide data subsidies or free access to learning platforms, and to ensure that community learning centers are equipped with reliable internet connections. This aligns with Denajeba and Ducot's (2025) recommendation that infrastructure and digital training should be complemented by socioeconomic assistance to ensure sustainability. At the program level, ALS implementers can reduce barriers by creating offline or low-data versions of learning materials, as proposed by Macasarte et al. (2023), so that learners can still access lessons even with minimal connectivity. Teachers should also continue adopting blended and mobile-based learning methods that adapt to the learners' local realities and connectivity conditions.

Beyond infrastructure concerns, the difference between learners' and facilitators' perceptions also highlights the need for closer coordination in digital planning. Facilitators' generally positive assessment of platform compatibility should not overshadow learners' actual struggles in accessing and navigating these tools. Espejon et al. (2024) emphasized that successful ALS programs depend on aligning teachers' strategies with learners' real capacities and local contexts. For this reason, ongoing communication about learners' available devices, signal strength, and preferred learning modes should become an integral part of teaching and planning in ALS.

The results further indicate that accessibility in e-learning extends beyond physical access to technology and must also include financial sustainability, digital literacy, and contextual adaptability. When these elements are addressed together, e-learning becomes more than a substitute for face-to-face classes and becomes a bridge for inclusion and empowerment for those who are often left behind by the formal education system.

The high rating for device and internet availability in this study supports global trends of increasing mobile connectivity but also confirms local disparities between urban and rural settings. Ormilla and Baccal (2021) and Ratilla (2022) both observed that although device ownership has become more common, rural learners still face intermittent internet connections that disrupt consistent learning. This study strengthens those findings by showing that availability alone does not ensure active and sustained participation. Likewise, the low mean for affordability reinforces Labarrete's (2021) conclusion that economic factors are the most significant obstacle to e-learning access. This is consistent with Catacutan's (2025) finding that home-related and financial factors influence ALS learners' motivation and continuity of learning.

In contrast, the facilitators' high rating on platform compatibility slightly challenges Mangao's (2023) earlier finding that ALS teachers in Cavite were hesitant to adopt digital learning systems due to low technical confidence. The discrepancy can be explained by the increased digital literacy and familiarity that teachers developed after the pandemic, as also noted by Paez (2024). The results further align with the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasizes that effective technology integration occurs when teachers are able to combine technological, pedagogical, and content knowledge in instructional practice (Kholid et al., 2023). The facilitators' higher confidence therefore suggests a growing mastery of these integrated competencies within the ALS community.

Overall, the results affirm that progress has been made in making e-learning accessible, but challenges in affordability and infrastructure remain. These findings echo Denajeba and Ducot (2025), who argued that technology alone cannot achieve inclusion without financial and structural support. Bridging these persistent gaps requires more than devices and platforms; rather, it requires sustained government investment, community partnerships, and adaptive teaching strategies to make e-learning in the Alternative Learning System not only accessible but also equitable and empowering for all.

Significant Difference in the Level of Accessibility of E-Learning Platforms as Perceived by ALS Learners and Facilitators

This section presents the results of the statistical analysis conducted to determine whether there is a significant difference in the level of accessibility of e-learning platforms in supporting ALS learners in remote areas as perceived by the two groups of respondents. A multivariate analysis of variance (MANOVA) was applied to compare perceptions across the three dimensions of accessibility: availability of devices and internet connection, affordability of e-learning tools, and platform compatibility with local technological infrastructure. The univariate tests were utilized to further examine specific differences in each dependent variable.

Table 2. Multivariate Analysis of Variance on the Level of Accessibility of E-Learning Platforms in Supporting ALS Learners in Remote Areas Using Univariate Tests

	Dependent Variable	SS	df	MS	F	p – value	Interpretation
Groups	Availability of devices and Internet connection	1.011	1	1.011	1.624	0.210	Not Significant
	Affordability of e-learning tools	1.412	1	1.412	1.674	0.203	Not Significant
	Platform compatibility with local technological infrastructure	2.793	1	2.793	3.824	0.058	Not Significant

Note: Significant at $p < 0.05$ level

The statistical results in Table 2 reveal that there is no significant difference between the perceptions of ALS learners and facilitators regarding the accessibility of e-learning platforms in remote areas. The MANOVA results showed that all three dimensions—availability of devices and internet connection, affordability of e-learning tools, and platform compatibility with local technological infrastructure—did not reach the level of statistical significance. While the value for platform compatibility approached statistical significance ($p = 0.058$), it was not strong enough to indicate a meaningful difference. This suggests that both groups share similar experiences and views regarding access-related challenges in e-learning.

The lack of a significant difference carries an important implication: both learners and facilitators experience the same systemic barriers that hinder effective e-learning integration. Regardless of their roles, both groups face similar limitations in connectivity, affordability, and access to digital devices. These findings reflect the reality that e-learning challenges in ALS are not isolated to one group but are community-wide issues affecting everyone in the program. Francisco and Buri (2024) highlighted that infrastructural limitations and the high cost of connectivity are among the most enduring barriers to e-learning, especially in geographically isolated and disadvantaged areas. This reinforces the idea that ALS operates in an environment where both facilitators and learners navigate similar digital constraints that reduce the efficiency and sustainability of online instruction.

From an analytical standpoint, the results reveal what can be described as shared digital vulnerability between facilitators and learners. Even though facilitators are assumed to have more institutional support and access to training, the data suggest that they do not enjoy a significant advantage in terms of e-learning access. This aligns with Ormilla and Bacal (2021), who observed that many ALS facilitators, particularly in rural areas, rely on personal gadgets, prepaid mobile data, and unstable signals—conditions that closely mirror those experienced by their learners. Such similarities in challenges limit facilitators’ capacity to model or guide the effective use of technology in learning. The slightly higher, though still non-significant, F-value for platform compatibility may be linked to facilitators’ occasional access to DepEd training or exposure to online platforms, as discussed by Paez (2024). However, these benefits are not sufficient to create meaningful differences in accessibility. When

infrastructure and support systems are weak, both facilitators and learners remain equally constrained by the same technological limitations.

This convergence in perceptions underscores a deeper issue within the ALS ecosystem. The fact that both groups face nearly identical access limitations suggests that existing interventions, such as occasional device distribution or one-time digital literacy training, may be insufficient. The problem lies not with individual motivation or capacity but with the systemic conditions surrounding e-learning delivery. Batuampar and Basmayor (2023) argued that isolated initiatives cannot fully resolve digital barriers; rather, sustained policy reforms and community-based infrastructure improvements are necessary. The results of this study support that position by demonstrating that technological access in ALS requires collective solutions that benefit both learners and facilitators simultaneously.

Furthermore, the findings point to the need for a shift in perspective regarding digital access. Accessibility should not be understood simply as owning a device or connecting to the internet but as having reliable, affordable, and continuous access that allows meaningful participation in digital learning. Denajeba and Ducot (2025) emphasized that true accessibility involves stability of connection, usability of platforms, and sustained technical support—factors that extend beyond the mere presence of technology. The similar perceptions of learners and facilitators suggest that these conditions remain largely unmet. Both groups continue to experience interrupted connectivity and limited digital support, which affects learning outcomes and the overall success of e-learning in ALS.

The results also highlight an important dimension of equity in digital education. Even though facilitators hold professional roles while learners are students, the absence of significant differences suggests that both groups are affected by the same inequitable systems. This indicates that digital inequality is not solely a learner issue but also an institutional one. Labarrete (2021) found that affordability and maintenance costs for devices and data plans cut across income and professional lines, especially in public education settings where teachers often shoulder personal expenses to sustain e-learning delivery. This finding is consistent with the current study's results, which show that facilitators' advantage in digital access is minimal. Consequently, both groups require equal attention in future digital education programs and policy interventions.

Looking at the broader implications, the findings demonstrate that improving e-learning in ALS requires a system-wide approach rather than segmented solutions. Since no significant difference exists between the two groups, interventions should focus on strengthening the digital ecosystem. This includes expanding community connectivity zones, ensuring the affordability of mobile data, and providing continuous technical and pedagogical support. As recommended by Batuampar and Basmayor (2023), solutions must be localized, sustainable, and developed through partnerships among DepEd, local government units, and telecommunications providers to improve infrastructure and accessibility for entire communities.

The results also point to the need for ongoing professional development that benefits both learners and facilitators. Paez (2024) emphasized that digital equity is not achieved through access alone but through empowerment—helping users develop confidence and competence in navigating online platforms. Facilitators therefore need continuous training not only to use e-learning tools but also to contextualize them in ways that align with learners' environments and realities. Similarly, learners require digital literacy programs that promote self-directed and responsible use of technology. When both groups are empowered simultaneously, e-learning can transition from being a temporary solution to becoming a sustainable mode of education.

Thus, the absence of significant differences between learners and facilitators reinforces a central theme found in several studies: access to technology in education is only as strong as the systems supporting it. The shared struggles of both groups reflect a collective need for reform that prioritizes equity, infrastructure, and sustainability. Ormilla and Bacal (2021) and Francisco and Buri (2024) both asserted that digital inclusion cannot be achieved without coordinated action across all levels of the education system, from national policy to local implementation. Therefore, the results of this study imply that the future of e-learning in ALS depends on a whole-of-community effort that strengthens connectivity, provides inclusive resources, and ensures equitable access for all stakeholders.

CONCLUSION

The findings of this study reveal that e-learning platforms in remote Alternative Learning System (ALS) settings are generally accessible, with positive ratings in terms of device availability and platform compatibility with existing technological infrastructure. These results indicate that meaningful progress has been made in extending digital learning opportunities to geographically disadvantaged communities. The increasing presence of smartphones and the adaptability of commonly used platforms suggest that technological integration in ALS is becoming more feasible even in remote areas. However, the accessibility of e-learning remains conditional rather than fully equitable.

Among the three dimensions examined, affordability emerged as the most significant constraint. Although many learners possess or can access digital devices, the recurring costs of mobile data, connectivity, and device maintenance continue to hinder consistent participation in online learning activities. These financial pressures are particularly pronounced among ALS learners from low-income households and even affect facilitators who often rely on personal resources to sustain digital instruction. This finding indicates that access to technology alone does not guarantee meaningful engagement in e-learning; rather, sustainable participation depends on the economic capacity to maintain connectivity and digital tools.

Furthermore, the statistical analysis revealed no significant difference between the perceptions of ALS learners and facilitators regarding the accessibility of e-learning platforms. This convergence of perceptions suggests that both groups experience similar barriers related to connectivity, affordability, and device access. The absence of significant differences indicates that digital access challenges in ALS are not confined to learners alone but are systemic issues affecting the entire learning community. Both facilitators and learners operate within the same technological and infrastructural limitations, reinforcing the notion that digital inequality in remote ALS contexts is largely structural rather than individual.

These findings emphasize that improving e-learning accessibility in ALS requires a comprehensive and system-wide approach. Accessibility must be understood not merely as the presence of digital devices or platforms but as the availability of stable, affordable, and sustainable technological support that enables meaningful participation in learning. In this regard, several practical interventions may be considered. The government, through the Department of Education and in partnership with local government units and telecommunications providers, may implement government-supported connectivity programs, such as subsidized mobile data packages or zero-rated access to official learning platforms used in ALS. Establishing community ICT hubs or digital learning centers equipped with reliable internet connectivity and shared devices can also provide learners with safe and accessible spaces for online learning, particularly in geographically isolated communities.

In addition, subsidized or loan-based device programs may be introduced to support ALS learners who do not have reliable personal gadgets. These initiatives could include the distribution of low-cost tablets or refurbished devices specifically allocated for educational use. Strengthening ICT funding for community learning centers would also allow facilitators to access institutional resources rather than relying on personal devices and connectivity. Furthermore, the development of low-bandwidth, offline, or mobile-friendly learning materials should be prioritized to accommodate learners who experience unstable internet connections.

Ultimately, the study affirms that while e-learning in remote ALS contexts is technologically possible, its sustainability depends on coordinated institutional support and inclusive policy interventions. Bridging digital gaps requires collaborative efforts among the Department of Education, local government units, telecommunications companies, and community stakeholders to expand connectivity infrastructure and ensure equitable access to digital learning resources. By addressing both technological and socioeconomic barriers through targeted interventions and long-term investment, e-learning can move beyond being a temporary alternative and become a sustainable pathway toward inclusive and equitable education for marginalized learners. Without sustained financial and infrastructural investment, the expansion of e-learning in remote ALS settings risks reinforcing existing educational inequalities rather than resolving them.

Compliance with Ethical Standards

The authors affirm that no conflicts of interest influenced the conduct of this study. The research was undertaken with transparency and integrity, adhering strictly to anti-plagiarism standards and maintaining objectivity in the analysis and interpretation of the results. Furthermore, the findings were utilized exclusively for scholarly and research-related purposes.

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