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Exploring the Needs for OrCam Learn Assistive Technology among Library Users with Reading Difficulties

Abubakar Sadiq Abdullahi
Bayero University Library, Kano
asabdullahi.lib@buk.edu.ng

Aliyyah Siddiqah Hassan
Department of Library and Information Sciences,
Northwest University, Kano
ashassan@yumsuk.edu.ng

Abstract

Reading difficulties is a specific form of Dyslexia, which is a learning disability characterised by visual processing difficulties where text may appear to "move," blur, or "jump." It also leads to increased reading fatigue, which can hinder academic progress and personal development. Ensuring effective reading support is a shared responsibility of libraries, and innovative assistive technologies can significantly improve it. Despite the availability of advanced assistive technologies, there is a lack of research specifically exploring the needs for OrCam Learn assistive technology among library users with reading difficulty/dyslexia. This gap hinders the informed adoption of tailored reading solutions that could enhance learning outcomes and independence for affected individuals. This paper explores the reasons for the needs for OrCam Learn emerging technology among library users with dyslexia. The paper therefore set out to identify the potential benefits of OrCam Learn technology through its definition, purpose, evolutionary trend, the key components and functions, the types and the unique features; and identify gaps in current research studies and recommend way forward. The paper outlines OrCam Learn as a wireless, AI-powered assistive reading device featuring read aloud, translation, adaptive reading modes, and comprehension testing. It is available in three models: OrCam Learn, OrCam Learn Basic, and OrCam Learn Standard. It examined that OrCam Learn meets various assistive needs, such as addressing cognitive and navigational challenges, improving reading comprehension, and promoting user autonomy. The paper recommended that Targeted research, diverse user inclusion, and cost-benefit analyses are proposed to ensure effective adoption of OrCam Learn in libraries.

Keywords: Dyslexia, OrCam Learn, Assistive technology, Library users, Needs assessment

Introduction

In today's rapidly evolving digital landscape, emerging technologies offer numerous benefits in educational and informational services, as they foster interactive and engaging learning experiences, which increase motivation and knowledge retention. In addition, these technologies enhance personalised learning by adapting content to individual needs and learning styles, while also improving accessibility, promoting equal access to resources, and streamlining information retrieval and management, thereby making the learning process more efficient and effective for students with disabilities. Therefore, the integration of emerging technologies into educational and informational services has become increasingly vital, particularly for individuals with learning differences such as dyslexia.

Dyslexia is a specific learning disorder characterised by persistent difficulties in reading, writing,

and spelling, despite adequate intelligence and educational opportunities (American Psychiatric Association, 2013). As a result, learners with dyslexia often struggle with reading comprehension, vocabulary development, and written expression, which can significantly impact their academic performance across subjects (Snowling, 2013). Therefore, dyslexia is a reading disability and a common learning challenge affecting reading and comprehension, which often creates barriers for individuals striving to access information and achieve academic success.

Ensuring effective reading support is a shared responsibility of libraries. In this digital era, achieving effective reading among people with dyslexia is easier with emerging assistive information technologies. This is largely due to the increased availability and sophistication of tools specifically designed to address the unique challenges the dyslexic individuals face with decoding, fluency, and comprehension. Such tools include OrCam Learn technology.

Recognising the similar barriers faced by individuals with dyslexia and other learning difficulties, the OrCam Technologies Company in the year (2022) introduced OrCam Learn as a tailored solution, leveraging artificial intelligence (AI) and optical character recognition (OCR) to provide dynamic, real-time support for reading and learning. The technology uses advanced OCR and artificial intelligence to instantly convert printed or digital text into spoken words. This allows users to hear the content read aloud in real time, helping them understand and retain information more effectively, even if they struggle to read visually.

Therefore, the need for OrCam Learn technology among library users with dyslexia cannot be overemphasised. But, despite the availability and benefits of advanced emerging assistive technologies for people with disabilities, there is a lack of research specifically assessing the need for OrCam Learn technology among the said affected individuals. As libraries strive to create more inclusive environments, assessing the need for tools like OrCam Learn among dyslexic users is crucial to ensuring equitable access to information and learning resources. This study seeks to explore the demand, relevance, and potential impact of OrCam Learn technology within library settings, with the goal of informing policy and enhancing support for neurodiversity populations.

Library Users with Dyslexia

Dyslexia, as a condition, has been variously described across disciplines, including education, by Snowling (2013); psychology, by Peterson and Pennington (2015); psychiatry, by American Psychiatric Association (2013); and, neuroscience, by Lyon et al. (2003), with each perspective contributing critical nuances to our understanding. Current consensus according to World Health Organization (2022) views dyslexia as a specific learning disorder with a neurobiological origin, often associated with a typical functioning of the language-related brain areas. It is distinct from broader intellectual disabilities and may co-occur with other conditions like ADHD. Major diagnostic systems—DSM-5 and ICD-11— according to Peterson and Pennington (2015) and World Health Organization (2022) recognise dyslexia under broader categories of specific learning disorders, but both underscore its distinct linguistic and phonological basis.

Dyslexia is widely recognised in educational and clinical fields according to Shaywitz (2020) as a specific learning disability that primarily affects reading. It is neurologically based, often genetic, and manifests through difficulties with accurate and/or fluent word recognition, spelling, and decoding abilities. Despite normal intelligence and adequate instruction, individuals with dyslexia struggle with connecting letters to sounds and reading fluently, which makes it the most common reading-related learning disability. Dyslexia, can therefore be described as a complex neurodevelopmental condition that primarily affects a person’s ability to read, spell, and decode words, which is broadly characterised by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities.

Dyslexia, therefore, significantly impairs a person's ability to read fluently and accurately, posing unique challenges in a library context where accessing, interpreting, and navigating text-based information is essential. For library users with dyslexia, the dense textual environment can result in cognitive overload, anxiety, and disengagement. For instance, locating books using traditional catalogue systems—which require accurate spelling, sequencing, and fast visual scanning—can be particularly frustrating. A dyslexic user may misread author names or book titles, leading to incorrect searches or

giving up entirely. Additionally, reading signage or instructions posted in small fonts or unfamiliar layouts may hinder orientation within the library space. When engaging with materials, dyslexic patrons often struggle with comprehension due to slow decoding and reduced working memory, especially in academic texts filled with jargon or long paragraphs.

For example, a college student with dyslexia might find it difficult to keep track of arguments in a lengthy journal article, needing multiple re-readings and support tools like OrCam Learn technology. Without such dyslexia-friendly technology these users may experience exclusion, underutilisation of library services, and a reduced sense of belonging in learning communities. Hence, in libraries, dyslexia manifests as challenges with navigation, understanding textual content, and engaging with traditional resources. Therefore, library users with dyslexia form a unique demographic requiring specialised supports, emerging technologies and accessible services.

Concept and Benefits of OrCam Learn Technology

OrCam Learn, according OrCam Technologies Company (2023), is an advanced AI-powered assistive technology developed to support individuals with learning challenges such as dyslexia, ADHD, and reading comprehension difficulties. OrCam Learn was developed by Professor AmnonShashua and Mr. ZivAviram, in the year 2021, in Jerusalem, Israel. The technology was invented and launched by OrCam Technologies – the company which was founded in 2010, by the OrCam Learn developers. This evolution harnesses OrCam's core strengths in Computer Vision and Machine Learning. OrCam Learn, is therefore an emerging technology that represents a new educational frontier—bringing advanced assistive functionality to dyslexic learners, enabling them to read full pages of text, printed or digital, independently, securely, and offline.

The device, as further describes by OrCam Technologies Company, resembles a small pen or smart reader and comprises several key components: (1) Smart Camera – located at the front, it captures printed or digital text from books, worksheets, or screens in real time; (2) Text-to-Speech Processor – converts the captured text into spoken words using built-in neural networks, enabling users to listen to any material instantly; (3) Built-in Speaker and 3.5mm Audio Jack – allows private or public audio playback depending on user preference; (4) Interactive Reading Feedback System – analyses reading fluency, speed, and word accuracy during guided reading sessions, giving performance insights; (5) Voice Control Interface – enables hands-free operation and voice-command functionality for students with motor or visual difficulties; (6) Touch Buttons – allow users to navigate the device manually when needed; (7) Bluetooth & Wi-Fi Connectivity – used for syncing with the OrCam App, available on iOS and Android, where users and educators can track progress and configure device settings; and (8) Rechargeable Battery – provides hours of portable use, supporting study sessions in libraries or classrooms. The intuitive, screen-free interface ensures it's non-distracting and user-friendly, particularly in quiet, focussed environments like libraries.

OrCam Learn is available in three models: OrCam Learn, OrCam Learn Basic, and OrCam Learn Standard. The OrCam Learn Basic is tailored for people facing reading and learning challenges, including dyslexia and ADHD. It also offers personalised reading support for students in the classroom and at home. OrCam Learn Standard unleashes the full potential of students with learning differences. It converts any text to speech and improves reading fluency. It also boosts academic success with AI-powered reading support.

However, variations may exist in software versions, regional language packs, and educational integration features through the OrCam App. These software upgrades, available through iOS and Android platforms, are pushed seamlessly to users, ensuring consistent enhancement of functionality without manual installation. Thus, while OrCam Learn remains a unified hardware product, its evolving capabilities reflect a modular approach through software and app-based personalisation.

From the foregoing, the benefits of OrCam Learn technology to users are understood to be numerous – which includes its portability as a compact device and handheld tool that uses an intelligent camera to read printed and digital text aloud in real time, allowing users to follow along visually or listen for improved understanding. It benefit also include featuring interactive reading tools that assess reading

fluency, track progress, and provide personalised feedback—making it a powerful educational aid for both independent and guided learning environments.

Moreover, with the integration of the OrCam App (available on iOS and Android), users' benefits from regular, seamless software updates, ensuring the device stays current without requiring manual installation. Designed especially for educational settings, the benefit of OrCam Learn also include promoting reading independence, reduces frustration in decoding text, and fosters greater engagement in academic activities. It is particularly transformative for students with dyslexia, enabling them to participate more fully in classroom and library contexts by removing literacy-related barriers.

However, despite the identified functions and benefits of OrCam Learn emerging technology to students and library users with dyslexia, the current available research landscape indicates the paucity of researches about OrCam Learn technology and library users with dyslexia. Such available studies include those of Darbyshire and Mason (2023), which explored structural and perceptual barriers dyslexic users face in libraries. It emphasises accessibility in catalogue systems and signage, highlighting the role of staff training; Gross and Latham (2022), which discussed how Universal Design for Learning (UDL) principles can improve usability for patrons with dyslexia. Others were those of Thomas (2021), which investigated how dyslexic students perceive academic libraries, including digital vs. physical resources and proposes personalised resource guides and targeted user education; and that of Becker (2020), which is a qualitative analysis of how users with dyslexia seek and retrieve information in both public and academic libraries.

Library users with dyslexia face significant barriers in accessing and engaging with textual resources, necessitating inclusive practices and assistive technologies to ensure equitable access. While tools like OrCam Learn, an AI-powered text-to-speech device, hold potential for supporting dyslexic users, the literature primarily focusses on broader assistive technologies, environmental adaptations, and policy frameworks for inclusive library services. This review synthesises six key studies—Williams and Jameson (2019), Olsson (2023), Petri (2022), O'Connell and Morris (2022), Fleming (2021), and Yen (2023)—to explore current approaches to accommodating dyslexic users in libraries. These studies address speech-to-text interfaces, physical and digital redesigns, and policy frameworks but do not specifically investigate the need for OrCam Learn among library users with dyslexia, highlighting a critical research gap.

The literature reveals a significant gap in empirical research exploring the need for OrCam Learn among library users with dyslexia, as none of the reviewed studies (Williams & Jameson, 2019; Olsson, 2023; Petri, 2022; O'Connell & Morris, 2022; Fleming, 2021; Yen, 2023) specifically investigate its applicability, user demand, or integration into library services, despite its potential as a text-to-speech tool; furthermore, these studies lack user-centred needs assessments to capture dyslexic patrons' preferences for such devices, focus predominantly on institutional perspectives rather than direct user input, overlook barriers like cost and training specific to OrCamLearn's adoption in libraries, and fail to examine how this technology could be integrated into library services, such as through lending programmes or digital literacy initiatives.

Need for OrCam Learn Emerging Technology among Library Users with Dyslexia

The term "need" signifies a critical requirement shaped by context, purpose, and activity (Bhasin, 2023). For library users with dyslexia, this translates into the necessity for assistive technologies like OrCam Learn, which offers AI-driven text-to-speech and reading support to overcome barriers in accessing library resources.

Library users with dyslexia face significant obstacles when engaging with the vast array of textual materials in libraries, including physical books, journals, digital databases, and navigational signage, which can hinder their ability to engage fully with library services.

OrCamLearn's advanced features, such as real-time text-to-speech conversion, enable these users to access printed and digital content independently, transforming books, e-journals, and web-based resources into audible formats that bypass decoding difficulties. This functionality is crucial for ensuring dyslexic users can utilise core library resources like research databases, periodicals, and archives without

relying on external assistance. Additionally, OrCam Learn supports information literacy by aiding users in understanding library instructions, completing forms, and interpreting research guides during reference interactions. Its discreet audio output, compatible with headphones, allows users to maintain focus in quiet study areas, reducing cognitive overload and enhancing engagement with complex texts. The device's integration with the OrCam app ensures continuous updates, aligning with the dynamic digital services of modern libraries. By providing fluency feedback and progress tracking, OrCam Learn also supports literacy development within library programmes, empowering users to improve their reading skills autonomously. Ultimately, OrCam Learn fosters inclusion by enabling dyslexic users to navigate library spaces, access non-traditional materials like archival documents, and participate fully in learning environments, ensuring equitable access to all library offerings. The specific Needs Addressed by OrCam Learn include:

Overcoming Barriers in Text-Heavy Environments: Libraries house extensive collections of printed materials, such as textbooks, journals, and newspapers, which pose challenges for dyslexic users due to difficulties with text decoding and line tracking. OrCamLearn's real-time text-to-speech feature converts these materials into audio, alleviating visual strain and making resources accessible without assistance.

Accessing Digital Content Seamlessly: Modern libraries rely heavily on digital platforms, including e-books, databases, and online catalogues. OrCamLearn's ability to read digital screens ensures dyslexic users can independently navigate these interfaces, accessing e-resources and catalogue entries with ease.

Navigating Library Systems Independently: Dyslexia can complicate tasks like searching online public access catalogues (OPACs) or interpreting signage. OrCam Learn reads instructions, labels, and catalogue interfaces aloud, enabling users to orient themselves and locate resources without excessive reliance on library staff.

Enhancing Focus and Reducing Cognitive Load: Reading dense texts can be mentally exhausting for dyslexic users. By providing audio playback, OrCam Learn minimises cognitive fatigue, allowing users to engage with library materials for longer periods in quiet study zones.

Supporting Diverse Library Services: Whether participating in research consultations, reading groups, or workshops, dyslexic users benefit from OrCamLearn's ability to deliver quick audio access to relevant texts, enhancing their interaction with library services.

Promoting Equitable Access to Learning Spaces: Libraries often feature learning commons and maker spaces with instructional texts or guidelines. OrCam Learn ensures dyslexic users can engage with these materials, keeping pace with peers and fostering inclusion.

Facilitating Personalised Learning: With built-in reading analysis tools, OrCam Learn provides feedback on fluency and tracks progress, supporting dyslexic users in library literacy programmes and enabling self-directed improvement.

Accessing Non-Traditional Resources: Libraries offer unique materials like exhibit texts, archival documents, and government publications, which are often difficult to digitise. OrCamLearn's ability to read these texts instantly grants dyslexic users access to otherwise inaccessible resources.

Enabling Independent Learning in Quiet Zones: In silent reading rooms or study booths, OrCamLearn's discreet design and headphone compatibility allow users to engage with texts privately, respecting library environments while enhancing accessibility.

Empirical Research on OrCam Learn and Assistive Technology for Library Users with Reading Difficulties

Library users with dyslexia face unique challenges in accessing and engaging with textual resources, necessitating tailored assistive technologies and services. This review examines the current research landscape, focussing on studies addressing assistive technologies for dyslexic readers, and identifies the gap in research specifically targeting the need for OrCam Learn in library settings.

In Saudi Arabia, Almutairi, Al-Ruwaili, andAlghamdi (2025) conducted a study to examine the impact of assistive devices, including optical character recognition (OCR)-based tools, on reading fluency

and comprehension among dyslexic university students. The key findings is that: OCR-based assistive technologies significantly improved reading fluency and comprehension for dyslexic students in academic settings. Participants reported increased confidence and reduced reading fatigue when using these tools.

Though specific devices like OrCam Learn were not explicitly mentioned. While the study highlights the efficacy of OCR-based tools for dyslexic students, it focusses on university classrooms rather than library settings, limiting its applicability to library users.

In United Kingdom, Beaton, Singleton, and Hargreaves (2024) conduct a systematic review of assistive reading technologies for dyslexic learners in educational and public library settings. The review identified various assistive technologies, such as text-to-speech software and e-readers, which enhance reading accessibility for dyslexic learners. It emphasised the role of libraries as potential hubs for providing such technologies but noted a lack of empirical data on user-specific needs in public library contexts.

This study is one of the few to address assistive technologies in library settings, but it does not specifically evaluate OrCam Learn or conduct a needs assessment for library users with dyslexia.

In Israel, Klein and Gozali (2022) investigated the implementation of OrCam Learn in classroom settings for students with dyslexia and other learning disabilities. The key findings is that: OrCam Learn improved reading independence and comprehension among students with dyslexia, with teachers reporting positive feedback on its portability and ease of use. The device's analytics feature also supported personalised learning interventions.

While directly addressing OrCam Learn, the study focusses on classroom environments and does not explore its application or need among library users, particularly in public or academic libraries.

In Japan, Tanaka and Sakamoto (2025) piloted the impact of assistive technologies in university libraries for students with learning disabilities, including dyslexia. The key findings demonstrated that assistive technologies, such as text-to-speech devices, enhanced access to library resources for students with learning disabilities. However, the high cost and lack of training for library staff were identified as barriers to widespread adoption.

Although conducted in a library context, the study does not specifically address OrCam Learn or focus on a needs assessment for dyslexic users, limiting its relevance to the specific research question.

In United States, Dixon and Polman (2019) investigated technological empowerment for individuals with dyslexia in public learning spaces, including libraries. The study highlighted the potential of assistive technologies to empower dyslexic users in public learning environments by improving access to information. It suggested that libraries could play a critical role in providing such technologies but noted a lack of user-centred studies to guide implementation. Relevance: While the study acknowledges libraries as key spaces for assistive technology deployment, it does not specifically address OrCam Learn or conduct a targeted needs assessment for library users with dyslexia.

Despite the growing body of research on assistive technologies for dyslexic readers, there is a significant gap in empirical studies specifically exploring the need for OrCam Learn among library users with dyslexia. The following gaps are evident:

Lack of Library-Specific Needs Assessments: Existing studies focus primarily on educational settings (Almutairi et al., 2025; Klein &Gozali, 2022) or general accessibility in public spaces (Dixon &Polman, 2019), with limited attention to the unique needs of library users with dyslexia. Even studies addressing libraries (Beaton et al., 2024; Tanaka & Sakamoto, 2025) do not specifically investigate OrCam Learn or conduct user-centred needs assessments. Focus on General Assistive Technologies: While OCR-based tools and text-to-speech devices are studied (Almutairi et al., 2025; Beaton et al., 2024), there is no direct exploration of OrCamLearn's applicability or demand among library users with dyslexia, limiting insights into its specific benefits or barriers in this context.

Limited User-Centred Research: Current literature often relies on teacher or institutional perspectives (Klein &Gozali, 2022; Tanaka & Sakamoto, 2025) rather than directly assessing the preferences, challenges, and needs of library users with dyslexia, who may include diverse groups such as non-students or older adults.

Barriers to Implementation: Studies note barriers such as cost and lack of training (Tanaka &

Sakamoto, 2025), but there is no research exploring how these barriers affect the potential adoption of OrCam Learn in libraries or whether library users would prioritise access to this technology.

Technology Integration with Library Services: No studies examine how OrCam Learn could be integrated into library services, such as through lending programmes, training for users, or compatibility with library resources, to meet the needs of dyslexic patrons.

Research Gap:

Current research reveals a significant gap in empirical studies exploring the need for OrCam Learn among library users with dyslexia, as none of the reviewed studies (Almutairi et al., 2025; Beaton et al., 2024; Klein &Gozali, 2022; Tanaka & Sakamoto, 2025; Dixon &Polman, 2019) specifically investigate its applicability, user demand, or integration into library services; furthermore, these studies lack user-centred needs assessments, rely heavily on institutional perspectives, overlook implementation barriers like cost and training specific to OrCam Learn, and fail to explore its integration into library programmes, such as lending or digital literacy initiatives.

Conclusion

This study underscores the critical need for assistive technologies like OrCam Learn to support library users with dyslexia, who face significant barriers in accessing and engaging with textual resources. OrCamLearn's real-time text-to-speech, fluency feedback, and discreet design address navigational, cognitive, and accessibility challenges, promoting independence and inclusion in library settings. However, the absence of research specifically examining its demand among dyslexic library users highlights a significant gap. By synthesising current literature, this paper demonstrates the potential of OrCam Learn to transform library experiences for dyslexic patrons while emphasising the need for targeted studies to inform effective implementation. Addressing this gap will ensure libraries fulfil their role as inclusive hubs, empowering dyslexic users to fully participate in learning communities.

Recommendations:

Libraries should prioritise the adoption of assistive technologies like OrCam Learn to enhance accessibility for dyslexic users, supported by empirical research to assess user needs, feasibility, and integration strategies, ensuring equitable access to resources and fostering inclusivity. More specifically, it is recommended that libraries should base on:

1. Navigational and Comprehension Barriers: Conduct user-centred needs assessments to evaluate how OrCam Learn can address dyslexic users' challenges with text-heavy environments, focussing on catalogue navigation and signage comprehension.

2. Dependence on Staff Assistance: Pilot OrCam Learn lending programmes in libraries to enable independent navigation, reducing reliance on staff and assessing user satisfaction and effectiveness.

3. Cognitive Overload in Academic Texts: Implement OrCam Learn in library literacy programmes to support comprehension of dense texts, using its fluency feedback to track progress and tailor interventions.

4. Limited Library-Specific Research: Fund studies specifically exploring OrCamLearn's demand among diverse library users (e.g., students, non-students, older adults) to identify unique needs and preferences.

5. Cost and Training Barriers: Conduct cost-benefit analyses to evaluate OrCamLearn's viability in libraries, alongside staff training programmes to ensure effective device support and user education.

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AUTHORS' PROFILES



Abubakar Sadiq Abdullahi is a seasoned information worker, with over a decade of professional experience in academic librarianship in Bayero University, Kano - Nigeria. He holds advanced degrees in Library and Information Science and currently pursuing and about to finish his Ph.D. in the same field. His expertise spans Information Management and Services for people with special needs, including technological competencies, assistive technologies, user education, program design, and training facilitation. He has contributed significantly to scholarly literature with multiple peer-reviewed publications focused on inclusive information access. He is currently the Head of the College of Education and Allied Studies Library, Bayero University, Kano. He is actively involved in university and professional committee work. Currently, he is a reviewer and the Assistant Secretary for the Bayero Journal of Information Management (BJIM). A Certified Librarian of Nigeria, Graduate member of NIM, and a member the National Association for Exceptional Child (NAEC). He has also participated and still participating in national educational projects and community health initiatives. His academic and professional contributions reflect a commitment to advancing inclusive and technology-driven information work and library services. He is known for his leadership, research facilitation, and dedication to capacity building in the information sector. He can be reached at: asabdullahi.lib@buk.edu.ng



Aliyyah Siddiqah Hassan is a lecturer and researcher in the Department of Library and Information Science, Faculty of Education, Northwest University, Kano. With nearly a decade of academic and administrative experience, she holds a B.A. in Library and Information Science/Political Science, an MLIS, and is currently pursuing a Ph.D. in Library and Information Science at Bayero University, Kano. Her teaching, supervision, and research focus on information accessibility, ICT integration, electronic resources, and user satisfaction in Nigerian university libraries. A committed professional and a member of the Nigerian Library Association, she is passionate about advancing information literacy, supporting learners with special needs, and promoting the role of ICT in academic and entrepreneurial development. She can be reached via: ashassan@yumsuk.edu.ng