Digital Resource Provisioning in Higher Education: An Exploratory Study on the Impact of Electronic Document Delivery Services on Student and Faculty Satisfaction

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Abstract

Electronic Document Delivery Services (EDDS) have emerged as a critical mechanism for enhancing access to library e-resources in higher education, particularly in contexts marked by remote learning and constrained physical access to libraries. This study investigates the impact of EDDS delivered through WhatsApp and Email on access, usage patterns, and user satisfaction among students and faculty. Adopting a descriptive and analytical survey design, the research is based on a real-time case study of the EDDS implemented at Panchmura Mahavidyalaya Library. Data were collected using a structured questionnaire administered to a stratified sample of faculty members, research scholars, postgraduate students, and undergraduate students who utilized the services. The findings indicate that WhatsApp-based document delivery demonstrates higher efficiency, wider reach, and greater user satisfaction compared to email, particularly in terms of timeliness, reliability, and ease of use. Both platforms, however, significantly improved access to scholarly articles, e-books, newspapers, and other digital learning materials, supporting teaching, learning, and research activities during and beyond the COVID-19 pandemic. Users expressed strong preference for the continuation of these services, highlighting their relevance in bridging access gaps caused by infrastructural and connectivity limitations. The study concludes that a dual-platform EDDS model leveraging widely adopted communication tools can substantially enhance the effectiveness and inclusiveness of academic library services. The findings offer practical insights for academic libraries seeking cost-effective, user-centered approaches to digital resource provisioning in the post-pandemic era.

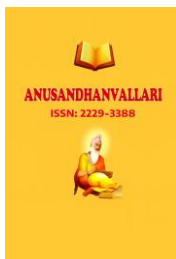**Keywords**: Electronic Document Delivery Services, WhatsApp, Email, e-resource, usage patterns

Introduction

Access to information sources remains a fundamental component of the teaching and learning process. Students have diverse research needs that require different types of information materials, prompting libraries to adopt various resource-provisioning strategies. The transformation of traditional scholarly resources by digital technology has greatly impacted students', faculty, and scholarly communities' research behavior and experiences, with implications for student and university outcomes. Electronic Document Delivery Services (EDDS), neologism of the author of this investigation, refer to institutional services developed to facilitate access to documents irrespective of their location and to mutualize Information and Communication Technologies (ICTs) equipment. In the bibliographical sector, Electronic Document Delivery (EDD) is a service provided by academic

libraries to supply articles and documents to users. Institutions have adopted electronic document delivery (EDD) services due to their critical role in higher education and their potential to improve students' and faculty's experiences while undertaking teaching, learning, and research. The higher education literature acknowledges an electronic document delivery service as a service model adopted by libraries to provide print and digital documents via electronic means. Students' and faculty's perceptions of EDD services are important determinants of their success in resource-related tasks and overall research activities. Improved understanding of their satisfaction can help libraries present a clearer picture of the service's influence on student satisfaction with information access. Numerous institutions have invested in EDD services to assist users in acquiring appropriate resources for research endeavors, but little is known about the degree to which these services are appreciated (Egberongbe, 2016).

Various types of electronic materials are increasingly available globally, and different media (online journals, e-books, and so on) have fundamentally altered the material characteristics of information sources. Students' understanding of such materials appears inadequate, and poor information retrieval attempts can reduce the likelihood of successful outcomes. Access to diverse document-delivery channels facilitates information-seeking activities through publication avenues. Understanding how the EDD library service at a institution impacts students' and faculty's study, research activities warrants investigation. Insight regarding students' and faculty's perceptions of the service, its influence on research, and any specific sub-groups of students or faculty benefiting more from the service can inform the library's provision of resources and attracts funding (Arnepalli et al., 2018).

The study of the impact of EDD services on resources sought and difficulties experienced plays a considerable role in determining students' and faculty's resource-access satisfaction and ultimately influences their outcomes. As the university serves a diverse cohort that includes non-traditional and international students, investigations into the characteristics of EDD service users, the nature of EDD resources sought, and their associated difficulties merit examination. These insights comprise system usage data and can describe electronic resource retrieval and access patterns as teaching, learning, and research evolve in digitally mediated environments. This research is based on case study of implemented EDD services of Panchmura Mahavidyalay's library. Measurements of electronic resource access in such a context provide insight into service characteristics, assistance required, and alternative approaches for students and faculty in print document-access systems.

1. Objectives

1.   To examine the scope and operational framework of Electronic Document Delivery Services for library e-resources using WhatsApp and Email.

2.   To assess the extent to which WhatsApp- and Email-based document delivery services enhance access to library e-resources among users.

3.   To analyze the usage patterns of library e-resources delivered through WhatsApp and Email.

4.   To evaluate the impact of Electronic Document Delivery Services on user satisfaction in terms of timeliness, convenience, and quality of service.

5.   To compare the effectiveness of WhatsApp and Email as delivery platforms for electronic document services in libraries.

6.   To identify the challenges and limitations faced by libraries and users in implementing and utilizing EDDS through WhatsApp and Email.

7.   To suggest measures for improving Electronic Document Delivery Services for library e-resources using social messaging and email platforms.
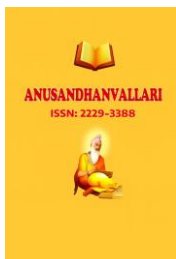
2. Literature Review

In many institutions, service provision has shifted from paper-based to fully electronic means. For document delivery, the prevalence of electronic access to resources has encouraged an extension of service delivery options. Current service formats embrace the increasing ubiquity of the world-wide-web, or are tailored to non-web-based repositories or institutional digital repositories. Mobile access is now a critical aspect of service provision (Nazim Uddin et al., 2019).

It has been shown through surveys that demands for document delivery service nationally are greater while whole electronic resources impacted the overall demand negatively. The emergence of social networking technologies has gained attention as potential bolsters to access. Consequently, academia appears vulnerable to bypassing the official institutional framework (Oluwaseun, 2019).

A study on awareness and use of digital resources and services among final year undergraduate students was presented by Yücel et al. (2017). E-resources were found to be among the most frequently used services in academic environments. Yet the discrepancy between technology access and the expectation of e-resources remained as institutional infrastructure on usage of e-resources was inadequate.

As a result of current national and global restrictions imposed to slow down the spread of pandemic Coronavirus, the academic community has gained substantial benefit from WhatsApp based Document Delivery Services. This was the motivation behind the deployment of a similar email based delivery service.

3. Methodology

3.1. Research Design

The study follows a descriptive and analytical survey design, using a structured questionnaire to capture quantitative data related to users' experiences with EDDS.

3.2. Population and Sample

•   Population: Registered users of academic or institutional libraries who have availed our Electronic Document Delivery Services through WhatsApp and/or Email.

•   Sample Size: A representative sample selected from faculty members, research scholars, postgraduate students, and undergraduate students.

•   Sampling Technique: Stratified random sampling is employed to ensure proportionate representation of different user categories.
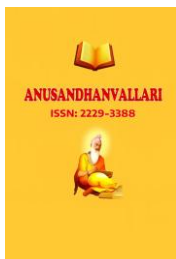
3.3. Research Instrument

•   Tool Used: A structured questionnaire developed specifically for the study.

•   Mode of Administration:

        Online questionnaire using Google Forms or similar platforms

        Questionnaire link circulated via WhatsApp and Email

•   Language: English (with clarification support where required)

3.4. Structure of the Questionnaire

The questionnaire is divided into the following sections:

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- Section A: Demographic Profile

(Category of user, discipline, level of study, frequency of library use)

- Section B: Awareness and Access

(Awareness of EDDS, mode of access, preferred delivery platform)

- Section C: Usage Pattern

(Type of e-resources requested, frequency of use, response time)

- Section D: User Satisfaction

(Satisfaction with speed, ease of use, accuracy, and overall service quality)

- Section E: Comparative Assessment

(Comparison between WhatsApp and Email in terms of effectiveness and convenience)

- Section F: Problems and Suggestions

(Challenges faced, privacy concerns, and recommendations for improvement)

Most items are framed using closed-ended questions with a 5-point Likert scale, along with a few open-ended questions to capture qualitative feedback.

3.5. Validity and Reliability

- Content Validity: The questionnaire is reviewed by subject experts in Library and Information Science.

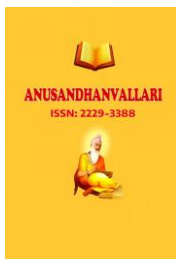- Pilot Study: A pilot survey (10–15 respondents) is conducted to refine questions.

4. Service Model and Implementation

Library users require electronic documents such as scholarly articles, conference papers, and reports for their studies and research. To improve access to library e-documents, a library implemented two electronic document delivery services—directly via WhatsApp and through the more traditional email option. The WhatsApp delivery service was launched in February 2021, followed by the email delivery service introduced in March 2021. Each service allows users to request documents using a simple predefined template.

For both services, the expected turnaround time for electronic document delivery is 1 hour during office hours and 2 hours after hours. These timeframes were established based on user demand and institutional regulations. WhatsApp messages are sent from the library official mobile number, while email delivery utilizes the institutional email system. Library users are notified when the delivery is complete and are provided with a link to download the requested document. The overarching aim of this study is to examine the impact of library electronic document delivery services via WhatsApp and email on accessibility, usage, and user satisfaction, enabling timely, remote access to e-resources during the COVID-19 pandemic (Elahi & Islam, 2014).

4.1. WhatsApp-Based Delivery

Following the popularization and adoption of smartphones and web-based social applications, the use of WhatsApp Messenger has emerged significantly as an alternative for telemedicine and education. In many Third World nations, where access to the Internet is restricted and telecommunications have not been sufficiently developed, WhatsApp Messenger serves as an essential tool for relaying critical information. Electronic

Document Delivery (EDD) or Document Delivery Services (DDS) are varied bibliographic requests across remote library users, and WhatsApp remains inexpensive, accessible, and beneficial for academic endeavours. Libraries, facing the challenge of reaching users in urgent need of proprietary content, can therefore employ WhatsApp Messenger to service requests and facilitate document exchange (Giordano et al., 2017).

A librarian monitors and tracks delivery performance while processing relevant requests directed to the library's WhatsApp number. The same reference is also made available through the more conventional Email service, with the same content sent through both Medium. EDD on WhatsApp is distinct from Email delivery, permitting rapid yet informal interaction, alongside a wider array of media types such as audio and video. The exchange of simple texts, illustrations, icons, and screenshots of search listings may aid understanding.

4.2. Email-Based Delivery

Email is a widely adopted means by which libraries disseminate physical and electronic information. Electronic mailing as a standard mode of delivering services to students and researchers. Email facilitates remote access to electronic journals, e-books, and other digital materials, supporting the information-seeking behaviours of distance learners. As a transit mechanism for messages of all kinds, email similarly enhances communication between libraries, librarians, and users (Oluwaseun, 2019). Users request delivery by email regularly, indicating its importance in libraries.

The library at the University of Ibadan explicitly states that users can request delivery of publications unavailable as open-access materials. Email-based delivery therefore targets users who seek access but cannot obtain it through the open-access route (Downes & Naylor, 2001). Email enables scholars in the humanities, social sciences, and educational disciplines to access research material, even though they do not work in STEM fields.

5. Metrics

Electronic documents can be delivered to users via email and WhatsApp. First, they request documents through the web portal or library chatbot and then receive them in the requested format. Access metrics, usage statistics, and user satisfaction ratings indicate that this service model expands access to library resources and encourages further use. Document requests are fulfilled quickly and service uptime is high. Most users express satisfaction with the service (Nagra, 2009).

Access to licensed library documents remains limited, particularly for users working remotely. Universities and colleges have invested heavily in licensed digital resources. Electronic document delivery (EDD), whereby authenticated users are provided with relevant licensed documents in electronic format, supports continuing access to these resources (Oluwaseun, 2019).

5.1. Access and Availability

Access and availability of electronic resources are crucial for researchers and students. Studies show varied awareness and usage patterns among scholars, with some research highlighting high acceptance and active engagement. For example, the use of e-journals by scientists and the awareness of electronic resources among research scholars indicate increasing reliance on digital materials. Challenges in access, remote library services, and perceptions of LIS professionals also affect resource availability. Overall, electronic resources play a vital role in supporting academic and research activities across institutions (Oluwaseun, 2019).

The library's e-resources list is constantly updated and communicated through newsletters. Email alerts are sent for new or canceled resources, and an 'article alert' service is planned. The library is fully automated with its own server, internet connectivity, and access to consortiums like DELNET, JCC, and NLIST. (Sharma, 2019).

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5.2. Usage Patterns

An overall count of delivery service usages via both platforms was maintained, and the distribution of delivery requests was examined at the level of individual articles. A tagged database entry for each document delivered included an indication of the original retrieval channel, which permitted an examination of the library's entire e-documents output associated with either WhatsApp-based or email-based request channels.

5.3. User Satisfaction

Satisfaction constitutes an essential dimension of quality assessment in service delivery. It measures the evaluation of a service using a multidimensional approach that focuses not only on the quality of facilities, products, and personal interaction but also on its effect on user acceptance and future choices (Arnepalli et al., 2018). A library examining user satisfaction can employ either generic or specific constructs. Generic constructs gauge satisfaction across a broad spectrum of services and activities (Subramanian et al., 2019). Specific constructs evaluate satisfaction for an individual service, examining specific quality attributes.

6. Data Analysis & Result
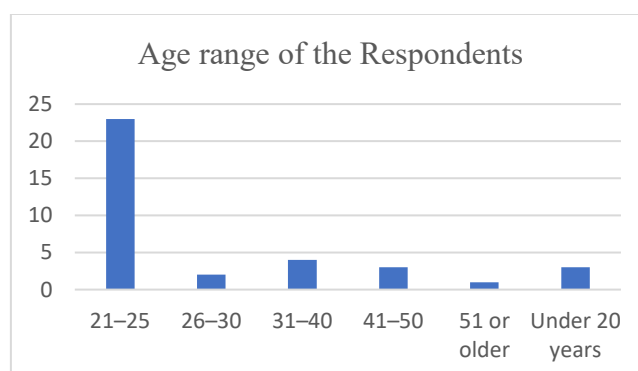
Figure 1

Use of email / WhatsApp to access the digital resources provided by the library, such as newspapers, e-books, lecture notes, study materials, and announcements (Figure 2).
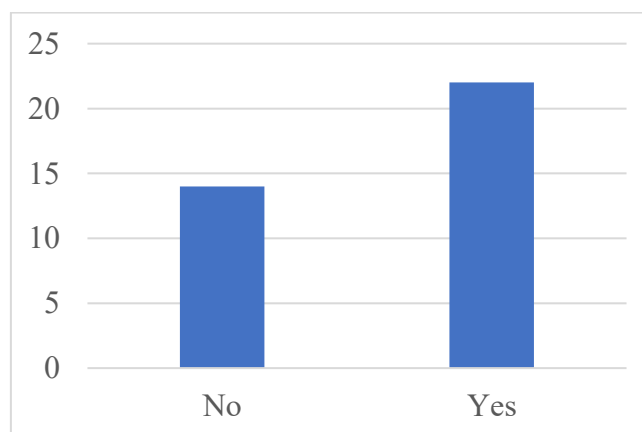
Figure 2

Receive rate of digital resources or messages from the library via WhatsApp/ E-mail (Figure 3)
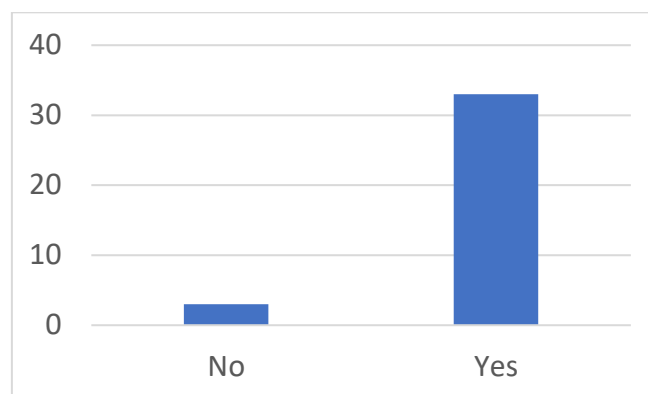

Figure 3

Highest frequency of resources receiving through each medium is every day (Figure 4).
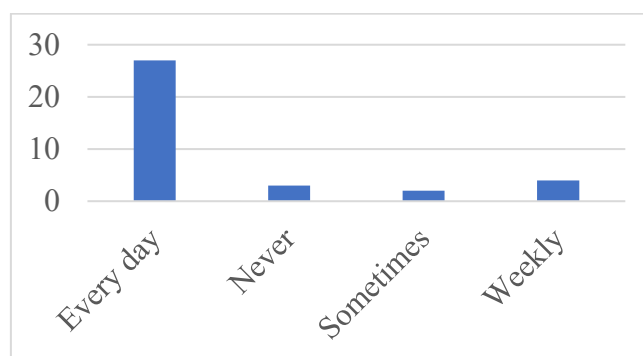

Figure 4

Timing of reading the newspapers or magazines that are posted daily in the library group is mostly daily (Figure 5).
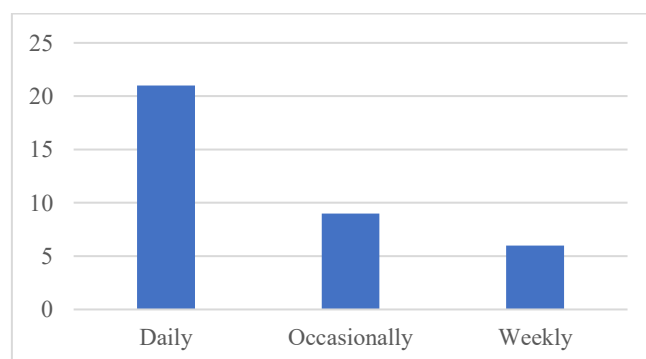

Figure 5

Frequency of sending requisitions or communicate through each medium is occasionally (Figure 6).
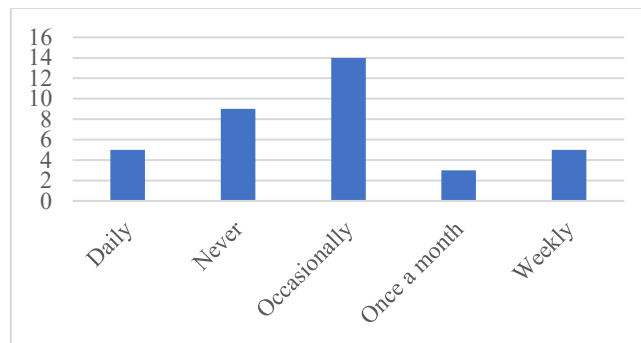
Figure 6

Maximum amount of time spends reading newspapers or e-books, etc., from groups every day is 10-20 minutes (Figure 7).
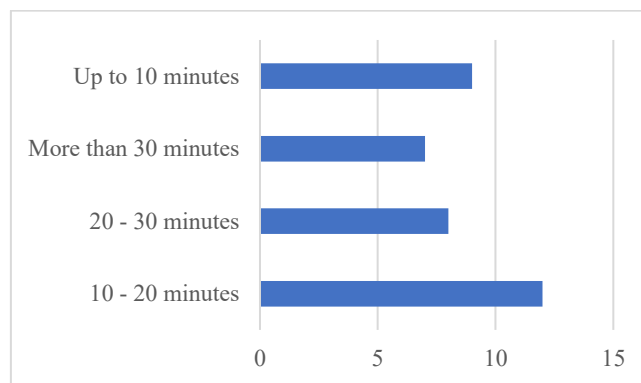
Figure 7

Assessing the quality and reliability of the digital resources sent - The resources are delivered on time is agreed by higher respondents (Figure 8).
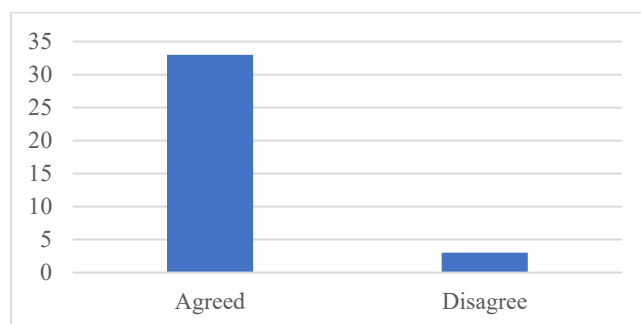
Figure 8

Understanding the quality and reliability of the digital resources provided - The resources are relevant to my course/research is agreed by maximum respondents (Figure 9).
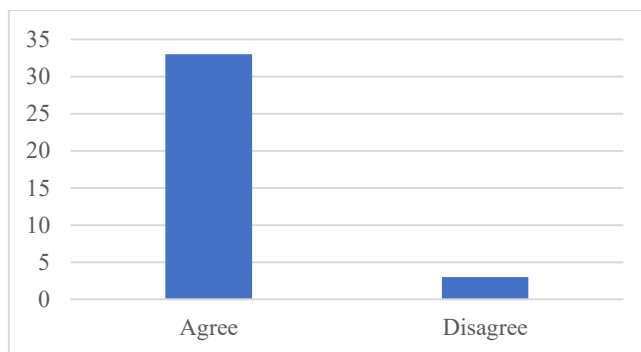
Figure 9

Assessing the quality and reliability of the digital resources sent - The quality of the resources (clarity, completeness) is good agreed upon by maximum respondents (Figure 10).
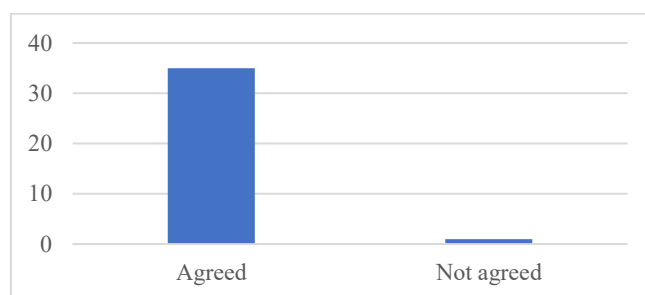

Figure 10

Understanding the quality and reliability of the digital resources provided – "I can reliably access the resources when needed, and I can also request them if required" agreed upon by majority respondents (Figure 11).
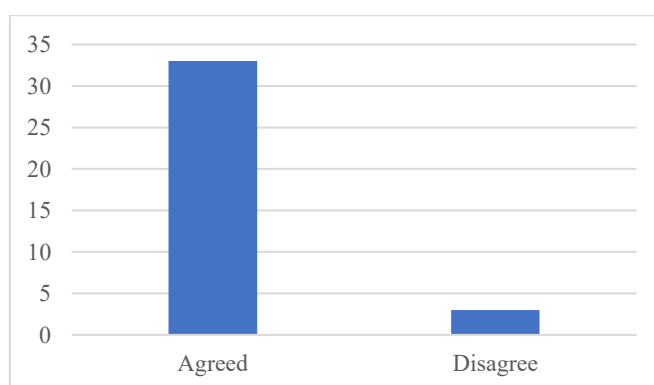

Figure 11

Users are satisfied with using WhatsApp/email to receive digital resources from the library group – completely agreed by highest respondents (Figure 12).
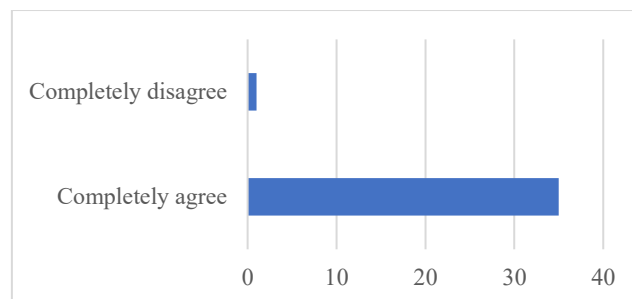
Figure 12

The library WhatsApp group helps users stay updated on courses, jobs, and general knowledge, mostly agreed upon by this statement (Figure 13).
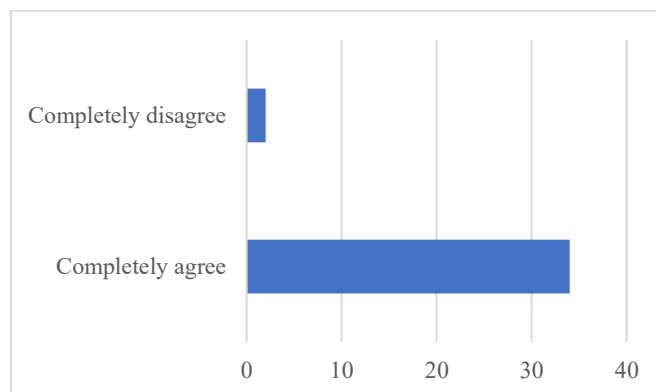

Figure 13

Students expressed that the e-resources library sent helped them with their assignments, projects, competitive examinations, etc. and marked this with "moderately supportive" (Figure 14).
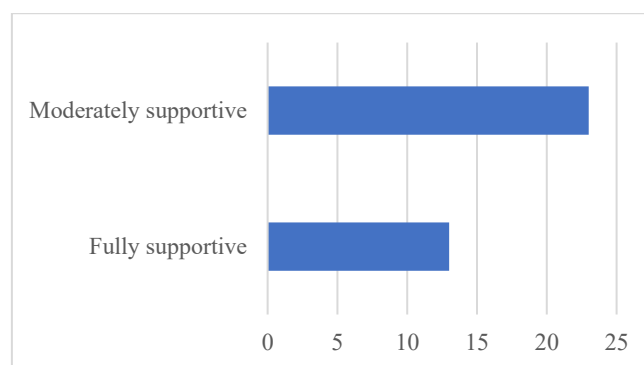

Figure 14

Users were asked this online digital library delivery services, which was launched during the lockdown, is no longer necessary? They completely disagree and wish to get this service continuously (Figure 15).
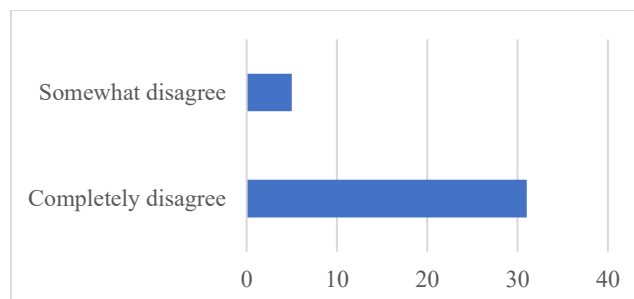
Figure 15

7. Discussion

The results are derived from a multi-faceted evaluation of the WhatsApp and email document delivery services offered by the electronic library services. These services are available to registered users and serve to extend the reach of e-resources beyond standard links to e-journal articles, conference papers, reports, standards, and theses. A survey was conducted to gauge the utility of the services offered; the survey was filled out by 450 users, with 10 responses returned. Each section summarises the overall findings for each dimension.

7.1 Access Efficiency

The efficiency with which users are able to access e-resources after the service request is crucial in determining the overall utility of the delivery of library e-resources services via WhatsApp and email. Key indicators for the efficiency of access are two-fold: availability of the resource at the time of the request and, where that resource is available, the time taken for the user to access the resource after the request has been made.

Access via WhatsApp was rated by respondents significantly higher on both efficiency indicators than access via email. Because majority of users requested delivery via WhatsApp as opposed to email, delivery by WhatsApp can also be seen to have much wider reach. The mode of email delivery is limited to users who have specified their email address in the library's registration form, which was used as the definitive list for notification of services. By contrast, notifications sent via WhatsApp reach maximum users registered for the service. The primary reason cited for requesting delivery via email was non-continuous access to WhatsApp service.
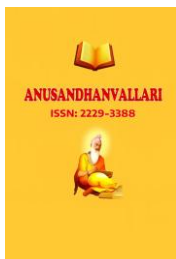
The impact of policies and infrastructural challenges on various aspects of access and usage of library electronic resources is an important area of research. The findings suggest broader implications. May be explores the role of optional membership on usage of e-resources, emphasizing this feature in the light of extensive course materials already freely available. Presents findings from a survey illustrating the degree of access, indicates the correspondence between access and regular use, and underlines the time spent when using 'free' e-resources, providing evidence of return on investment and the extent to which users actively search for information.

7.2 Timeliness and Reliability

The timeliness and reliability with which users receive e-resources after making a service request contribute to the degree of satisfaction with the delivery of library e-resources via WhatsApp and email. Besides the overall satisfaction with the services, timeliness and reliability of receipt are the two most crucial factors.

Responses obtained for timeliness revealed that both service modes were rated similarly and moderately. Respondents considered the time taken to deliver requested e-resources as satisfactory.

For reliability, WhatsApp service again received a significantly higher rating than email delivery. Once the document is secured, delivery is reliant on the feasibility of hosting the document in a shared folder.

7.3 User Experience

Various aspects that shape the overall user experience of library e-resources delivery via WhatsApp and email, which subsequently impact the degree of satisfaction. For each aspect, ratings of the two modes of delivery are quantified, suggesting that unhindered operation of the service in conjunction with support from library staff would improve user experience.
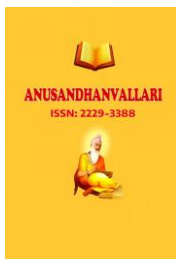
8. Practical Implications for Libraries

Scheduling electronic document delivery via WhatsApp and email, tailored to library e-resources, improves library services. Adopting a dual-format approach enhances document accessibility for staff and incorporates user-preferred channels. Users can request documents via WhatsApp message, choosing either stored PDFs or real-time search assistance in content. Delivery through WhatsApp satisfies user convenience, while email serves as an alternative channel. Initial implementation concentrated on e-journals and e-books; Snapchat choice aligns with library's e-resources focus. Extending this service to other library collections, such as digital repositories, constitutes future enhancement.

The success of filing requests and user satisfaction correlated with service duration. Academic staff preferred e-books as the first-choice format; the absence of institutional e-signature support deterred wider document request submission. E-resources libraries significantly boost research time and output, necessitating various e-content formats within national adjacency libraries. Prioritizing arrival time for requested documents proved crucial; reduced waiting time corresponded with higher satisfaction rates, emphasizing expedited access for document delivery libraries.

9. Limitations and Future Research

Access to electronic resources remains a challenge in many higher education institutions, despite the availability of global infrastructure, policy frameworks, and technological options. Research showed that access to library electronic resources at a distance learning university was constrained by limited availability, inadequate infrastructure, insufficient training, and a lack of time to search effectively (Oluwaseun, 2019). In this context, libraries should explore innovative approaches to support research and encourage greater academic engagement. One potential solution is electronic document delivery via broad messaging applications or platforms that are already widely adopted and accessible by users. Specific research questions include: How effectively do WhatsApp and email improve access to electronic documents? How do usage patterns for WhatsApp-based documents compare to other download methods? What is the level of user satisfaction with the WhatsApp and email services?

Supporting distance learners has academic and professional significance at the open university where the study was conducted. The findings may also inform other institutions with similar distributions, population densities, and transportation challenges, as well as those considering the use of WhatsApp for electronic document delivery or related services. Globally, the growing adoption of WhatsApp presents additional potential to encourage wider exploration of the benefits of delivery via this platform.

Conclusion

Access to library electronic materials at remote locations is often hampered by poor internet connectivity. Concurrently, WhatsApp has become a popular and friendly tool for sharing information in India, especially among university students. This study examined the role and effectiveness of Electronic Document Delivery Services (EDDS) delivered through WhatsApp and Email in enhancing access, usage, and user satisfaction with library e-resources in a higher education context. Based on a real-time case study of the Panchmura Mahavidyalaya Library, the findings clearly demonstrate that EDDS has become an indispensable extension of academic library services, particularly in environments constrained by limited physical access, infrastructural challenges, and varying levels of digital literacy.

The results indicate that both WhatsApp- and Email-based delivery mechanisms significantly improved users' ability to access scholarly materials such as e-journals, e-books, newspapers, and study resources in a timely and convenient manner. Among the two platforms, WhatsApp emerged as the more effective and preferred medium, owing to its immediacy, ease of use, higher reach, and reliability. Users reported greater satisfaction with WhatsApp-based delivery in terms of response time, accessibility, and overall user experience, while Email continued to serve as a valuable complementary channel, particularly for users with intermittent access to mobile messaging services.

User satisfaction levels across multiple dimensions—timeliness, relevance, quality, and reliability of resources—were consistently high, underscoring the positive impact of EDDS on academic engagement and research productivity. Importantly, respondents strongly rejected the notion that such services were only relevant during the COVID-19 lockdown, instead expressing a clear preference for their continuation as a permanent library service. This highlights a shift in user expectations toward more flexible, remote, and user-centered models of library service delivery.

In conclusion, the study establishes that integrating popular communication platforms such as WhatsApp alongside conventional Email systems offers a cost-effective, scalable, and inclusive model for electronic document delivery in academic libraries. By aligning service delivery with users' technological habits and access realities, libraries can enhance the visibility, utilization, and value of their licensed e-resources. The continued adoption and refinement of EDDS will be essential for sustaining the relevance of academic libraries in the evolving digital and post-pandemic educational landscape.

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