Awareness and Use of Anti-Plagiarism and Reference Management Software among Postgraduate Students in selected Science and Technology Universities of Haryana: A Comprehensive Study

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Abstract

In the rapidly evolving digital academic landscape, the maintenance of citation precision and the prevention of plagiarism have become paramount concerns for higher education institutions. The proliferation of digital resources and online content has simultaneously created new

opportunities for academic misconduct and innovative solutions for its prevention.This comprehensive study examines the awareness, usage patterns, motivations, barriers, and effectiveness of reference management software (RMS) and anti-plagiarism tools among postgraduate students at two prominent science and technology universities in Haryana, India.A cross-sectional survey was conducted among 161 postgraduate students from Guru Jambheshwar University of Science & Technology (GJUS&T), Hisar, and Deenbandhu Chhotu Ram University of Science & Technology (DCRUST), Murthal. Data collection utilized a structured questionnaire distributed through Google Forms, achieving a response rate of 91.5%.The study revealed substantial awareness levels, with 74.5% of respondents familiar with anti-plagiarism software and 57.1% aware of reference management systems. Among aware students, 80% actively utilize anti-plagiarism tools, while 56.5% regularly employ RMS. Primary usage motivations include ensuring originality (56.25%), preventing academic fraud (43.75%), organizing citations (88.46%), and supporting collaborative research endeavors. Approximately one-third of respondents rated these tools as “very important” for academic success. However, significant barriers persist, including inadequate curricular integration, insufficient expert guidance, and limited institutional support, despite 80% of students having received some form of training.While awareness and usage rates demonstrate positive trends, substantial gaps remain in systematic implementation and consistent utilization. Students strongly advocate for enhanced workshops, comprehensive curricular integration, and robust peer support mechanisms to optimize effective adoption and utilization of these essential academic tools.

Keywords: Reference Management Software, Anti-Plagiarism Software, Academic Integrity, Postgraduate Education, Mendeley, Turnitin, Zotero, Urkund, Citation Management, Research Ethics

1. Introduction

1.1 Background and Rationale

The digital transformation of higher education has fundamentally altered the landscape of academic research and scholarly communication. This paradigm shift has brought both unprecedented opportunities and significant challenges to the fore. While students and researchers now have access to vast repositories of information, the ease of accessing and manipulating digital content has simultaneously created new avenues for academic misconduct, particularly plagiarism.

Reference management has emerged as a critical component of academic integrity, serving as the cornerstone for preserving accuracy, ensuring proper attribution, and maintaining the ethical standards that underpin scholarly work. The evolution from manual bibliographic management to sophisticated digital solutions represents a significant advancement in academic technology, offering researchers powerful tools to manage increasingly complex information landscapes.
Contemporary reference management software, encompassing platforms such as Mendeley, EndNote, Zotero, and others, has revolutionized the way scholars organize, cite, and share academic resources. These sophisticated systems enable users to efficiently collect, organize, and cite references from diverse sources including peer-reviewed journals, books, websites, conference proceedings, and multimedia content. The integration of these tools with popular

word processors like Microsoft Word and Google Docs has streamlined the citation process, reducing errors and saving substantial time for researchers.

1.2 The Plagiarism Challenge in Higher Education

Academic plagiarism represents one of the most pressing challenges facing higher education institutions globally. The ease of copying and pasting digital content, combined with the vast amount of information available online, has created an environment where unintentional and deliberate plagiarism can occur more frequently than ever before. This phenomenon is particularly concerning in postgraduate education, where research integrity forms the foundation of academic and professional development.

Anti-plagiarism software has emerged as a crucial technological solution to address this challenge. These sophisticated systems, including Turnitin, Urkund, Copyscape, and others, utilize advanced algorithms and extensive databases to compare submitted content against billions of web pages, academic publications, and previously submitted papers. By generating detailed similarity reports and highlighting potentially problematic passages, these tools serve as both deterrents and educational resources for students and educators.

1.3 Theoretical Framework

This study is grounded in the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB), which provide theoretical foundations for understanding user adoption and utilization of academic technology tools. The integration of these frameworks allows for a comprehensive examination of factors influencing student behavior toward RMS and anti-plagiarism software.

The conceptual framework encompasses several key dimensions:
Awareness Dimension: Understanding the extent to which students are cognizant of available tools and their capabilities.
Accessibility Dimension: Examining institutional support, infrastructure, and resource availability.
Usability Dimension: Assessing the user experience, interface design, and technical barriers.
Utility Dimension: Evaluating the perceived value and effectiveness of these tools in academic contexts.
Behavioral Intention Dimension: Analyzing factors that influence continued usage and recommendation to peers.

1.4 Significance of the Study

This research addresses several critical gaps in the existing literature:

1. **Geographic Specificity:** Limited research has been conducted on RMS and anti-plagiarism software usage in the Indian higher education context, particularly in Haryana state universities.

2. **Disciplinary Focus:** Science and technology students may have different usage patterns and requirements compared to humanities and social science students.

3. **Comprehensive Analysis:** Few studies have simultaneously examined both RMS and anti-plagiarism tools, missing potential synergies and complementary usage patterns.

4. **Practical Implications:** The findings will inform policy development, curriculum design, and institutional support strategies for enhancing academic integrity.

2. Literature Review

2.1 Global Perspectives on Reference Management Software

The adoption and utilization of reference management software have been extensively studied across various educational contexts worldwide. These studies provide valuable insights into usage patterns, preferences, and the effectiveness of different platforms.

Nitsos et al. (2021) conducted a comprehensive survey of 545 postgraduate students at Aristotle University of Thessaloniki, Greece, revealing that Mendeley was the most widely used platform among respondents, with over two-thirds indicating regular usage. EndNote followed as the second most popular choice, highlighting the dominance of these two platforms in academic settings. The study emphasized the importance of institutional support and training in driving adoption rates.

Farag (2019) examined reference management software usage across 18 Library & Information Science departments in Egyptian universities, discovering that more than 75% of respondents were familiar with RMS tools, with EndNote being the most commonly used platform. The research highlighted significant variations in usage patterns between different academic disciplines and career stages, suggesting the need for targeted training programs.

Parabhoi et al. (2018) investigated citation management software awareness and usage among library and information science professionals, finding that 59.39% were aware of and actively used these tools. Mendeley emerged as the leading platform at 28.75%, followed by Zotero at 22%, indicating a shift toward open-source and collaborative platforms among younger researchers.

Lonergan (2017) explored reference management software preferences among 51 faculty members at Dickinson College in the United States, revealing that 57% of respondents used RMS, with Zotero being the most popular choice. The study emphasized the importance of institutional support, peer recommendations, and ease of use in driving adoption decisions.

Melles and Unsworth (2015) studied postgraduate students and academics from Monash University, finding that 71.4% of respondents used EndNote regularly, while Zotero was the second most popular program. Interestingly, Mendeley was rarely utilized, suggesting temporal and cultural variations in platform preferences.

2.2 Anti-Plagiarism Software: Awareness and Perceptions

The literature on anti-plagiarism software reveals complex patterns of awareness, usage, and perceptions among students and educators. These studies highlight both the potential benefits and challenges associated with plagiarism detection tools.

Uplaonkar (2018) conducted a significant study among students at the University of Agricultural Sciences, Dharwad, finding that 97.18% of postgraduate students and 84.31% of research scholars were aware of plagiarism as a concept. However, the study revealed concerning misconceptions about what constitutes plagiarism, with many students disagreeing with the statement that "cutting and pasting paragraphs word for word" constitutes plagiarism.
Oyewole et al. (2018) examined plagiarism perceptions among distance learners at the University of Ibadan, Nigeria, finding that 50% of respondents strongly agreed that plagiarism constitutes an academic crime and represents a lack of integrity. The study revealed that 56.9% of respondents pledged not to plagiarize, while 51% assured timely acknowledgment of sources, indicating positive attitudes toward academic integrity.
Tayan (2017) investigated academic misconduct among undergraduate male students in Saudi Arabia, discovering that 64.5% were aware of plagiarism and cheating issues. However, concerningly, 80% were unaware of plagiarism detection software, highlighting significant gaps in technological awareness. The study found that 81.9% of respondents believed that achieving high grades was the primary motivation for cheating.
Zarfsaz and Ahmadi (2017) explored plagiarism issues among English and Foreign Language learners at Iranian universities, finding that plagiarism was a significant concern across both state and private institutions. The majority of respondents correctly identified plagiarism as using someone else's words or ideas without attribution, but many were unaware of available detection tools and institutional policies.
Meera and Singh (2017) conducted a comparative study of anti-plagiarism tool usage among 130 research scholars from Jawaharlal Nehru University (JNU) and the University of Delhi (DU). The research revealed that 100% of respondents from both universities were aware of plagiarism as a concept. Notably, 34.2% of DU respondents and 53.62% of JNU respondents became aware of plagiarism through library staff, emphasizing the crucial role of academic librarians in promoting awareness.
Singh (2017) examined plagiarism awareness among 147 veterinary students at Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Ludhiana, finding that 87.7% correctly identified various forms of plagiarism. The study revealed that 44.2% of respondents attributed plagiarism to inexperience in research writing, highlighting the importance of academic writing training.

2.3 Theoretical Foundations and Models

Several theoretical frameworks have been employed to understand the adoption and utilization of academic technology tools:

Technology Acceptance Model (TAM): This model, developed by Davis (1989), suggests that user acceptance of technology is primarily determined by perceived usefulness and perceived ease of use. In the context of RMS and anti-plagiarism software, this model helps explain why

some students readily adopt these tools while others resist.

Theory of Planned Behavior (TPB): Ajzen's (1991) theory provides insight into the behavioral intentions and actual usage patterns of academic software. The theory considers attitudes, subjective norms, and perceived behavioral control as key determinants of behavioral intention.

Unified Theory of Acceptance and Use of Technology (UTAUT): Venkatesh et al. (2003) developed this comprehensive model that integrates elements from multiple theories to explain technology adoption in organizational contexts, including educational institutions.

2.4 Gaps in Existing Literature

Despite the extensive research on RMS and anti-plagiarism software, several significant gaps remain:

Limited Geographic Diversity: Most studies have been conducted in Western contexts, with limited representation from developing countries, particularly India.

Disciplinary Variations: Few studies have specifically examined usage patterns among science and technology students, who may have different requirements and preferences.

Longitudinal Analysis: Most research employs cross-sectional designs, limiting understanding of how usage patterns evolve over time.

Integration Analysis: Limited research has examined how RMS and anti-plagiarism tools work together to support academic integrity.

Institutional Factors: Insufficient attention has been paid to how institutional policies, training programs, and support structures influence adoption and usage.

3. Research Methodology

3.1 Research Design

This study employs a quantitative, cross-sectional survey design to examine the awareness, usage, and perceptions of RMS and anti-plagiarism software among postgraduate students. The descriptive research approach was chosen to provide a comprehensive snapshot of current practices and attitudes within the target population.

3.2 Population and Sample

Target Population: The study population comprised all postgraduate students enrolled in various science and technology programs at two prominent universities in Haryana:

1. **Guru Jambheshwar University of Science & Technology (GJUS&T), Hisar**
2. **Deenbandhu Chhotu Ram University of Science & Technology (DCRUST), Murthal**

Sample Size and Sampling Technique: A convenience sampling approach was employed due to accessibility constraints and time limitations. A total of 176 questionnaires were distributed through Google Forms, with 161 valid responses received, yielding a response rate of 91.5%. This response rate exceeds the generally accepted threshold of 60% for survey research, ensuring statistical reliability.

Sample Characteristics:

- **Gender Distribution:** 85 male respondents (52.79%) and 76 female respondents (47.20%)
- **Academic Programs:** Students from various postgraduate programs in science and technology disciplines
- **Academic Level:** All participants were currently enrolled postgraduate students

3.3 Data Collection Instrument

A structured questionnaire was developed based on extensive literature review and validated through pilot testing. The instrument comprised several sections:

Section A: Demographic Information

- Gender, age, academic program, year of study

Section B: Anti-Plagiarism Software Awareness and Usage

- Awareness levels, specific software familiarity, usage frequency, purposes, importance perceptions

Section C: Reference Management Software Awareness and Usage

- Awareness levels, specific software familiarity, usage patterns, preferred features, importance perceptions

Section D: Institutional Support and Training

- University-provided access, training experiences, and difficulty levels

Section E: Barriers and Recommendations

- Reasons for non-usage, suggested improvements, future intentions

3.4 Data Collection Process

Data collection was conducted over four weeks during the academic year 2023-2024. The Google Forms platform was chosen to facilitate widespread distribution and efficient data collection. The questionnaire was distributed through multiple channels:

1. **Email Distribution:** Direct emails to registered student addresses
2. **Social Media Platforms:** University WhatsApp groups
3. **Faculty Coordination:** Collaboration with department heads and course coordinators
4. **Library Networks:** Distribution through university library systems

3.5 Data Analysis Techniques

The collected data were compiled and analyzed using Microsoft Excel. The analysis focused primarily on descriptive statistics, including frequencies and percentages, to summarize participant demographics and response patterns related to the awareness, access, and use of anti-plagiarism and reference management software.Data were organized into tabular formats for clarity. The results were interpreted in the context of the study's objectives, highlighting trends, dominant software tools, training exposure, and user perceptions.

3.6 Ethical Considerations

This research adhered to ethical guidelines established by the participating institutions:

1. **Informed Consent:** All participants provided informed consent before completing the questionnaire
2. **Anonymity:** No personally identifiable information was collected
3. **Confidentiality:** All data was stored securely and used solely for research purposes
4. **Voluntary Participation:** Respondents were informed of their right to withdraw at any time

3.7 Limitations

Several limitations should be acknowledged:

1. **Geographic Scope:** The study was limited to two universities in Haryana, potentially limiting generalizability
2. **Self-Report Bias:** Reliance on self-reported data may introduce response bias
3. **Convenience Sampling:** The non-probability sampling approach may limit representativeness

3.8 Objectives of the study

This study aims to investigate the awareness and use of anti-plagiarism software and reference management software (RMS) among postgraduate students of Guru Jambheshwar University of Science & Technology (GJUS&T), Hisar, and Deenbandhu Chhotu Ram University of Science & Technology (DCRUST), Murthal. The specific objectives are:

a) To assess the level of awareness regarding key anti-plagiarism tools (e.g., Turnitin, Urkund, Grammarly) and reference management software (e.g., Zotero, Mendeley, EndNote).
b) To examine the actual usage patterns of these tools, including frequency, purpose, and preferred platforms.
c) To identify the motivations behind students' use of these tools in academic research and writing.

d) To evaluate the perceived effectiveness and relevance of anti-plagiarism and reference management software in maintaining academic integrity and supporting scholarly work.
e) To explore the barriers—technical, institutional, instructional, or attitudinal—that hinder effective usage of these tools.
f) To analyze the extent and quality of institutional support, including training programs, software access, and faculty or library guidance.
g) To offer actionable recommendations for enhancing the integration, adoption, and educational use of these academic tools in postgraduate curricula.

4. Data Analysis and Interpretation

This section presents a comprehensive analysis of data collected from 161 respondents. The responses have been systematically analyzed and presented in tabular format with detailed interpretation.

4.1 Demographic Profile

Table 1

Gender-wise Distribution of Respondents (N=161)

S.No.	**Gender**	**n(%)**
1.	Male	85 (52.79)
2.	Female	76 (47.21)
Total		**161 (100.00)**

The demographic analysis reveals a relatively balanced gender distribution with a slight male majority (52.79%) compared to female respondents (47.21%). This distribution is representative of the typical gender composition in science and technology universities in Haryana, where male enrollment traditionally exceeds female enrollment but the gap is narrowing.

4.2 Anti-Plagiarism Software Analysis

4.2.1 Awareness of Anti-Plagiarism Software

Table 2
Awareness of Anti-Plagiarism Software (N=161)

S.No.	**Awareness**	**n(%)**
1.	Yes	120 (74.53)
2.	No	41 (25.47)
Total		**161 (100.00)**

The analysis demonstrates a high level of awareness regarding anti-plagiarism software among respondents, with nearly three-quarters (74.53%) being familiar with such tools. This substantial awareness level indicates that academic institutions have been relatively successful in disseminating information about plagiarism detection tools, though there remains a significant minority (25.47%) who lack awareness.

4.2.2 Specific Software Preferences

Table 3

Specific Anti-Plagiarism Software Awareness (N=120)

S.No.	Anti-plagiarism Software	n(%)
1.	Turnitin	46 (38.33)
2.	Grammarly	28 (23.33)
3.	Urkund	21 (17.50)
4.	Check for Plagiarism	19 (15.83)
5.	Copyscape	15 (12.50)
6.	Copy Leak	6 (5.00)
7.	Paper Rater	6 (5.00)
8.	Plag Scan	5 (4.17)
9.	Plag Tracker	5 (4.17)

Turnitin emerges as the dominant anti-plagiarism tool, recognized by 38.33% of aware respondents, followed by Grammarly at 23.33%. This pattern reflects institutional preferences and licensing agreements, with Turnitin being widely adopted by universities globally. The diversity of tools mentioned indicates that users are exploring various options, though institutional tools like Turnitin and Urkund maintain higher recognition rates.

4.2.3 Institutional Access and Support

Table 4

University Access to Anti-Plagiarism Software (N=120)

S.No.	Access	n(%)
1.	Yes	76 (63.33)
2.	No	24 (20.00)
3.	I don’t know	20 (16.67)
Total		**120 (100.00)**

While institutional access is available to a majority (63.33%) of aware users, a concerning 20% lack access and 16.67% are uncertain about availability. This suggests communication gaps between institutions and users regarding available resources, indicating a need for better information dissemination about institutional software licenses.

4.2.4 Usage Patterns and Frequency

Table 5

Usage of Anti-Plagiarism Software (N=120)

S.No.	Usage	n(%)
1.	Yes	96 (80.00)
2.	No	24 (20.00)
Total		**120 (100.00)**

The high usage rate (80%) among aware users demonstrates strong adoption, indicating that awareness generally translates into actual usage. However, the 20% who remain non-users despite awareness suggests barriers beyond simple knowledge gaps.

Table 6
Frequency of Anti-Plagiarism Software Usage (N=96)

S.No.	Frequency	n(%)
1.	Always	20 (20.83)
2.	Often	10 (10.42)
3.	Sometimes	24 (25.00)
4.	Rarely	12 (12.50)
5.	Never	30 (31.25)
Total		**96 (100.00)**

The frequency analysis reveals concerning patterns: only 20.83% use the software consistently ("Always"), while 31.25% marked "Never" despite having access. This inconsistent usage pattern suggests barriers to regular implementation, possibly related to workflow integration, training, or perceived necessity.

4.2.5 Purpose and Perceived Value

Table 7

Purpose of Using Anti-Plagiarism Software (N=96)

S.No.	Purpose	n(%)
1.	Ensure originality	54 (56.25)
2.	Prevent fraud	42 (43.75)

3.	Enhance quality	40 (41.67)
4.	Academic integrity	32 (33.33)
5.	Protect intellectual property	30 (31.25)
6.	Improve citation practices	25 (26.04)
7.	Educate user	16 (16.67)
8.	Compliance	12 (12.50)

The primary motivation for using anti-plagiarism software is ensuring originality (56.25%), followed by fraud prevention (43.75%). This indicates that users primarily view these tools as verification mechanisms rather than educational resources, with relatively few using them for citation improvement or learning purposes.

Table 8
Importance of Anti-Plagiarism Software in Academic Writing (N=96)

S.No.	**Importance Level**	**n(%)**
1.	Very important	58 (60.42)
2.	Important	30 (31.25)
3.	Neutral	5 (5.21)
4.	Not very important	3 (3.12)
5.	Not important at all	0 (0.00)
Total		**96 (100.00)**

Users demonstrate strong appreciation for anti-plagiarism software, with 91.67% considering it important or very important. This high perceived value contrasts with the inconsistent usage patterns, suggesting that barriers to use may be practical rather than attitudinal.

4.3 Reference Management Software Analysis

4.3.1 Awareness and Familiarity

Table 9

Familiarity with Reference Management Software (N=161)

S.No.	**Familiarity**	**n(%)**
1.	Yes	92 (57.14)
2.	No	69 (42.86)
Total		**161 (100.00)**

Reference management software awareness is notably lower than anti-plagiarism tools, with only 57.14% of respondents being familiar with such systems. This represents a significant knowledge

gap that may impact research efficiency and citation quality across the academic community.

4.3.2 Software Preferences and Recognition

Table 10

Specific Reference Management Software Awareness (N=92)

S.No.	RMS Software	n(%)
1.	Zotero	40 (43.48)
2.	Mendeley	30 (32.61)
3.	EndNote	22 (23.91)
4.	EasyBib.com	12 (13.04)
5.	RefWorks	12 (13.04)
6.	CiteULike	8 (8.70)
7.	JabRef	6 (6.52)
8.	ProCite	5 (5.43)

Zotero leads recognition at 43.48%, followed by Mendeley (32.61%) and EndNote (23.91%). This distribution reflects the popularity of free, open-source solutions (Zotero) and institutionally supported tools (Mendeley, EndNote) among academic users.

4.3.3 Usage Patterns and Institutional Support

Table 11

Usage of Reference Management Software (N=92)

S.No.	Usage	n(%)
1.	Yes	52 (56.52)
2.	No	40 (43.48)
Total		**92 (100.00)**

The conversion rate from awareness to usage (56.52%) is lower than anti-plagiarism software, indicating higher barriers to adoption for reference management tools, possibly due to complexity.

Table 12

Frequency of Reference Management Software Usage (N=52)

S.No.	Frequency	n(%)
1.	Always	19 (36.54)
2.	Often	11 (21.15)
3.	Sometimes	13 (25.00)
4.	Rarely	7 (13.46)

5.	Never	2 (3.85)
Total		**52 (100.00)**

Usage frequency patterns show better consistency than anti-plagiarism tools, with 57.69% using the software "Always" or "Often". This suggests that once users overcome initial barriers, reference management tools become more integrated into their workflow.

Table 13
University Access to Reference Management Software (N=92)

S.No.	Access	n(%)
1.	Yes	51 (55.43)
2.	No	30 (32.61)
3.	I don't know	11 (11.96)
Total		**92 (100.00)**

Institutional access is available to 55.43% of aware users, with 32.61% lacking access and 11.96% uncertain. This lower access rate compared to anti-plagiarism software may reflect different institutional priorities or licensing costs.

4.3.4 Perceived Importance and Purpose

Table 14

Importance of Reference Management Software in Academic Writing (N=52)

S.No.	Importance Level	n(%)
1.	Very important	19 (36.54)
2.	Important	16 (30.77)
3.	Neutral	14 (26.92)
4.	Not very important	2 (3.85)
5.	Not important at all	1 (1.92)
Total		**52 (100.00)**

Users show moderate appreciation for reference management software, with 67.31% considering it important or very important. However, the substantial neutral response (26.92%) suggests that many users haven't fully recognized the potential benefits.

Table 15
Purpose of Using Reference Management Software (N=52)

S.No.	Purpose	n(%)
1.	Organize citations	46 (88.46)
2.	For research	45 (86.54)
3.	Maintain bibliography	45 (86.54)
4.	Creating own library	42 (80.77)

5.	Cite while you write	42 (80.77)
6.	Time saving	38 (73.08)
7.	Error reduction	35 (67.31)
8.	Collaborative work	32 (61.54)
9.	Literature review	30 (57.69)

Users demonstrate comprehensive understanding of reference management capabilities, with organization (88.46%), research support (86.54%), and bibliography maintenance (86.54%) being primary purposes. The high recognition of diverse functionalities suggests that trained users leverage these tools effectively.

4.3.5 Feature Preferences

Table 16

Preferred Features in Reference Management Software (N=52)

S.No.	Features	n(%)
1.	Organizing references for easy retrieval	26 (50.00)
2.	Importing references from databases	25 (48.08)
3.	Cloud synchronization	22 (42.31)
4.	Creating formatted bibliography	20 (38.46)
5.	PDF annotation	18 (34.62)
6.	Collaboration with others	16 (30.77)
7.	Plugin for Microsoft Word	15 (28.85)
8.	Editing reference styles	14 (26.92)
9.	Automatic file renaming	14 (26.92)
10.	Highlighting documents	12 (23.08)

Users prioritize organizational features (50%) and database integration (48.08%), followed by cloud synchronization (42.31%). This preference pattern indicates that users value efficiency and accessibility over advanced features like collaboration or annotation.

4.4 Barriers and Challenges Analysis

Table 17

Reasons for Unawareness of Software Tools

S.No.	Reasons	RMS (N=69) n(%)	Anti-Plagiarism (N=41) n(%)
1.	Not included in syllabus	31 (44.93)	15 (36.59)
2.	Lack of software availability	29 (42.03)	18 (43.90)

3.	Lack of subject experts	28 (40.58)	14 (34.15)
4.	Lack of information	26 (37.68)	16 (39.02)
5.	Technical difficulties	15 (21.74)	10 (24.39)
6.	Teaching was inadequate	12 (17.39)	6 (14.63)
7.	Insufficient computer/ICT facilities	9 (13.04)	6 (14.63)
8.	Language barriers	8 (11.59)	5 (12.20)
9.	Lack of interest	3 (4.35)	5 (12.20)
10.	Time constraints	2 (2.90)	4 (9.76)
11.	No access to devices	1 (1.45)	1 (2.44)

The primary barriers to awareness are systemic rather than individual: curriculum exclusion (44.93% for RMS, 36.59% for anti-plagiarism), software unavailability (42.03% for RMS, 43.90% for anti-plagiarism), and lack of subject experts (40.58% for RMS, 34.15% for anti-plagiarism). These institutional factors significantly outweigh individual barriers like lack of interest or technical difficulties.

4.5 Training and Support Analysis

4.5.1 Training Availability and Participation

Table 18

Training Received on Software Tools

S.No.	Training	RMS (N=92) n(%)	Anti-Plagiarism (N=120) n(%)
1.	Yes	73 (79.35)	98 (81.67)
2.	No	19 (20.65)	22 (18.33)
Total		**92 (100.00)**	**120 (100.00)**

Training participation is high for both software types, with over 79% of aware users receiving training. This indicates that institutions are investing in user education, though the remaining 20% represent missed opportunities for skill development.

4.5.2 Training Sources and Methods

Table 19

Training Sources and Methods

S.No.	Training Source	RMS (N=73) n(%)	Anti-Plagiarism (N=98) n(%)
1.	University workshops	45 (61.64)	62 (63.27)
2.	Faculty members	32 (43.84)	48 (48.98)
3.	Library staff	28 (38.36)	35 (35.71)

4.	Online tutorials	25 (34.25)	30 (30.61)
5.	Self-learning	22 (30.14)	28 (28.57)
6.	Peer learning	18 (24.66)	22 (22.45)
7.	Vendor demonstrations	12 (16.44)	15 (15.31)

University workshops dominate training delivery (61.64% for RMS, 63.27% for anti-plagiarism), followed by faculty member instruction. This institutional approach ensures standardized training but may limit personalized learning approaches.

4.5.3 Training Effectiveness

Table 20

Training Effectiveness Evaluation

S.No.	Effectiveness Level	RMS (N=73) n(%)	Anti-Plagiarism (N=98) n(%)
1.	Very effective	25 (34.25)	38 (38.78)
2.	Effective	28 (38.36)	35 (35.71)
3.	Moderately effective	15 (20.55)	20 (20.41)
4.	Ineffective	4 (5.48)	4 (4.08)
5.	Very ineffective	1 (1.37)	1 (1.02)
Total		**73 (100.00)**	**98 (100.00)**

Training effectiveness is generally positive, with over 70% rating it as effective or very effective for both software types. However, the 20% rating it as only moderately effective suggests room for improvement in training methodologies.

4.6 Difficulty Assessment

Table 21

Level of Difficulty Experienced

S.No.	Difficulty Level	RMS Users (N=52) n(%)	Anti-Plagiarism Users (N=96) n(%)
1.	Not difficult at all	12 (23.08)	25 (26.04)
2.	Slight difficulty	8 (15.38)	15 (15.63)
3.	Moderate difficulty	14 (26.92)	23 (23.96)
4.	Significant difficulty	13 (25.00)	24 (25.00)
5.	Extreme difficulty	5 (9.62)	9 (9.38)
Total		**52 (100.00)**	**96 (100.00)**

Difficulty levels are similar for both software types, with roughly equal proportions finding them easy (38.46% for RMS, 41.67% for anti-plagiarism) versus difficult (34.62% for RMS, 34.38%

for anti-plagiarism). This suggests that user experience challenges are consistent across different software categories.

4.7 Implementation Barriers and User Satisfaction

4.7.1 Barriers to Effective Use

Table 22

Barriers to Effective Use of Software (N=161)

S.No.	Barriers	RMS (N=92) n(%)	Anti-Plagiarism (N=120) n(%)
1.	Limited awareness of features	46 (50.00)	56 (46.67)
2.	Time constraints	41 (44.57)	52 (43.33)
3.	Inadequate training	38 (41.30)	45 (37.50)
4.	Technical complexity	34 (36.96)	28 (23.33)
5.	Lack of institutional support	29 (31.52)	35 (29.17)
6.	Cost of premium features	22 (23.91)	18 (15.00)
7.	Language barriers	15 (16.30)	19 (15.83)
8.	Resistance to technology adoption	12 (13.04)	16 (13.33)

Limited feature awareness (50% for RMS, 46.67% for anti-plagiarism) and time constraints (44.57% for RMS, 43.33% for anti-plagiarism) emerge as primary barriers. These findings suggest that current training approaches may not be comprehensive enough to demonstrate full software capabilities.

4.7.2 Learning Sources and Discovery

Table 23

Sources of Learning about Software

S.No.	Learning Source	RMS (N=92) n(%)	Anti-Plagiarism (N=120) n(%)
1.	Workshops/seminars	49 (53.26)	71 (59.17)
2.	University library staff	52 (56.52)	68 (56.67)
3.	Faculty members	45 (48.91)	62 (51.67)
4.	Online resources	41 (44.57)	58 (48.33)
5.	Peer recommendations	38 (41.30)	49 (40.83)
6.	Research supervisor	36 (39.13)	44 (36.67)
7.	Self-discovery	29 (31.52)	35 (29.17)
8.	Social media	18 (19.57)	26 (21.67)

Library staff (56.52% for RMS, 56.67% for anti-plagiarism) and workshops (53.26% for RMS,

59.17% for anti-plagiarism) are primary learning sources, highlighting the importance of institutional support infrastructure in software adoption.

4.7.3 User Satisfaction Levels

Table 24

Satisfaction Level with Current Software

S.No.	Satisfaction Level	RMS Users (N=52) n(%)	Anti-Plagiarism Users (N=96) n(%)
1.	Highly satisfied	18 (34.62)	32 (33.33)
2.	Satisfied	24 (46.15)	45 (46.88)
3.	Neutral	8 (15.38)	15 (15.63)
4.	Dissatisfied	2 (3.85)	4 (4.17)
5.	Highly dissatisfied	0 (0.00)	0 (0.00)
Total		**52 (100.00)**	**96 (100.00)**

User satisfaction is high for both software types, with over 80% expressing satisfaction or high satisfaction. The low dissatisfaction rates (3.85% for RMS, 4.17% for anti-plagiarism) suggest that the software tools meet user expectations when properly implemented.

4.7.4 Future Training Needs

Table 25

Future Training Needs and Preferences

S.No.	Training Needs	RMS (N=92) n(%)	Anti-Plagiarism (N=120) n(%)
1.	Best practices guidance	71 (77.17)	91 (75.83)
2.	Advanced features training	67 (72.83)	84 (70.00)
3.	Integration with other tools	54 (58.70)	72 (60.00)
4.	Regular refresher courses	48 (52.17)	63 (52.50)
5.	Troubleshooting and support	43 (46.74)	58 (48.33)
6.	Customization training	35 (38.04)	41 (34.17)
7.	Mobile app usage	29 (31.52)	39 (32.50)

The high demand for best practices guidance (77.17% for RMS, 75.83% for anti-plagiarism) and advanced features training (72.83% for RMS, 70% for anti-plagiarism) indicates that current training approaches focus on basic functionality rather than optimization and advanced capabilities.

5. Discussion

This study on postgraduate students at GJU S&T, Hisar, and DCRUST, Murthal highlights key patterns in the awareness and use of anti-plagiarism and reference management software, with important implications for institutional strategies and digital academic practices.

5.1 Awareness and Adoption

The majority of students are aware of anti-plagiarism (74.53%) and reference management software (57.14%), reflecting institutional progress in promoting digital literacy. However, usage lags behind awareness—especially for reference management tools, indicating barriers beyond lack of information. Popular tools like Turnitin (38.33%) and Zotero (43.48%) dominate, influenced by institutional preference and user-friendly features. Students are exploring diverse tools, showing a growing sophistication in selecting resources that best suit their research needs.

5.2 Institutional Access and Support

Institutions play a critical role in enabling software use, with over 60% of students reporting access to anti-plagiarism tools and 55% to reference managers. However, gaps remain: 20% lack access to anti-plagiarism software and 32.61% to reference tools. Additionally, many students are unaware of access provisions, pointing to communication gaps. The relatively lower priority given to reference tools suggests institutions may view them as optional, unlike anti-plagiarism tools, which are treated as compliance necessities.

5.3 Usage Patterns

Anti-plagiarism software is inconsistently used—31.25% report "never" using it regularly, while only 20.83% use it consistently. This may reflect minimal integration into academic routines or over-reliance on institutional checks. Conversely, reference managers show stronger adoption; once students begin using them, they integrate them effectively, appreciating their organizational benefits and time-saving functions.

5.4 Motivation for Use

Students use anti-plagiarism tools mainly to ensure originality (56.25%) and prevent fraud (43.75%), while reference managers are valued for citation organization (88.46%) and research support (86.54%). Practical benefits like time-saving (73.08%) and error reduction (67.31%) drive sustained usage, particularly for reference tools. However, the limited view of anti-plagiarism software as a learning aid suggests a missed opportunity for deeper engagement.

5.5 Barriers

Key barriers include lack of curriculum integration, limited expert guidance, and inadequate access. Many students cite lack of formal instruction (44.93% for RMS, 36.59% for plagiarism tools) and a shortage of skilled trainers. Access limitations and insufficient knowledge about

software features further hinder usage. Technical difficulties, though less common, also affect adoption—especially among less tech-savvy users.

5.6 Training and Support

While training participation is high (over 79%), many students still face challenges. Only about 26% report no difficulty using the tools, indicating current training may be too basic or impractical. Preferences for workshops and faculty-led sessions suggest that students value structured, face-to-face guidance, though such models may limit broader reach. The training's moderate effectiveness calls for more advanced, skill-oriented programs.

5.7 Feature Use and Satisfaction

Students prioritize core features like organization and database integration, with high satisfaction reported for both tool types (around 80%). Yet, many users remain neutral—indicating underutilization or unrealized potential. The strong demand for advanced training and best practice guidance reflects a readiness among students to deepen their skills and maximize tool benefits.

6. Implications for Academic Institutions

This study highlights several strategic priorities for institutions aiming to strengthen digital academic support:

- **Curriculum Integration:** The exclusion of software training from formal curricula is a major barrier. Institutions must embed both technical instruction and conceptual understanding of these tools within academic programs to promote research integrity and efficiency.
- **Enhanced Training Programs:** A disconnect between training participation and effective usage signals the need for more comprehensive training—focused not just on tool basics, but on workflow integration, advanced features, and real-world applications.
- **Equitable Access:** Gaps in access to licensed software tools raise equity concerns. Institutions should ensure all students have equal access to essential digital tools and are well-informed about their availability.
- **Support Systems:** The lack of expert guidance and ongoing support underscores the need for dedicated technical and pedagogical staff. Such infrastructure can help students use tools more effectively and confidently.

7. Conclusion

This study reveals that while awareness of anti-plagiarism and reference management tools is high, consistent usage is hindered by barriers such as limited access, inadequate training, and lack of curriculum integration. Institutional efforts, though substantial, often fall short in addressing these systemic challenges. Students demonstrate readiness to adopt these tools when

supported appropriately. High satisfaction and sophisticated use among active users show the clear benefits of investing in better support systems. However, realizing these benefits requires institutions to go beyond basic tool provision and commit to integrated, inclusive, and sustained strategies. The findings offer a practical roadmap: integrate software training into curricula, provide equitable access, enhance training quality, and invest in long-term support. Such coordinated action will not only improve academic performance and research quality but also reinforce institutional commitments to academic integrity and digital competency in higher education.

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