

Effectiveness of the EndNote intervention to improve research competency in citation management among MPhil and PhD scholars in Nepal

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Highlights	Abstract
• The study demonstrates the effectiveness of a targeted EndNote intervention in significantly enhancing citation management competency among MPhil and PhD scholars. • Effective use of EndNote can profoundly impact academic writing by streamlining citation management and increasing overall writing efficiency. • The findings show that providing need-based training leads to substantial improvements in scholars' proficiency in using EndNote for reference management. • This sustained improvement in competency not only contributes to the individual success of researchers but also enhances the credibility and academic rigor of the institutions they represent.	Citation management software plays a critical role in systematic reviews and meta-analyses. EndNote has significantly impacted academic writing by systematizing citation management and improving overall writing efficiency. This study investigates the effectiveness of an EndNote intervention in enhancing citation management competency among MPhil and PhD scholars at the Graduate School of Education, Tribhuvan University, Nepal. A pre-experimental single-group pretest-posttest design was employed with 34 participants. The intervention was implemented through four interlinked phases: needs assessment, action planning, implementation, and evaluation. Data were collected using self-administered structured questionnaires and analyzed using SPSS version 26, with Mann-Whitney and Wilcoxon signed-rank tests applied. The findings revealed that prior to the intervention, more than half of participants (55.9%) did not use any reference management software, whereas all participants adopted EndNote by the end of the study. The mean competency score significantly increased from 2.57 (± 1.158) to 3.06 (± 0.851), with a p-value < 0.05. No significant associations were found between competency gains and demographic variables such as age, gender, workplace, or level of study. These results indicate that targeted EndNote training can effectively improve citation management skills among MPhil and PhD scholars irrespective of their socio-demographic variables, suggesting broader implications for academic capacity building in Nepalese higher education institutions.
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1. Introduction

As tutors and facilitators for MPhil and PhD scholars at the Graduate School of Education (GSE), faculty of Education, Kirtipur, Kathmandu, we have consistently observed significant challenges that scholars face in managing citations in their academic writing, particularly in theses and dissertations. These challenges are evident not only among scholars who manage citations manually but also among those who use citation management software such as EndNote without possessing the necessary skills to ensure accuracy, consistency, and adherence to prescribed citation standards. Common issues include incorrect in-text citations, mismatches between in-text citations and reference lists, inappropriate application of citation styles, and inefficiencies in organizing and retrieving references. These recurring problems, grounded in

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our sustained firsthand experience of supervising and supporting graduate research, provided the immediate incentive for undertaking the present study. Motivated by these observed challenges, this research seeks to explore effective solutions through the use of a citation management software, specifically EndNote, as a structured intervention for improving citation management practices among GSE MPhil and PhD scholars.

Citation management software such as EndNote has revolutionized academic writing by systematizing the processes of storing, organizing, and formatting references, thereby enhancing research efficiency and productivity. Early works, such as Isaacson and Clark (1986), laid the foundation for digital citation management by marking a transition from manual, paper-based systems to computerized approaches. Over the decades, reference management tools have evolved in response to technological advancements and the increasing complexity of academic research, with EndNote emerging as one of the most widely adopted and enduring tools in this domain (Taylor, 2009). EndNote has become a predominant citation management software used by academic staff, medical professionals, researchers, and graduate students worldwide (Agrawal & Rasouli, 2019), primarily due to its ability to efficiently organize large volumes of references and automatically format citations across a wide range of styles.

A substantial body of literature highlights EndNote's role in reshaping academic and research practices. Studies by Agrawal (2009) and Agrawal and Rasouli (2019) emphasize EndNote's intuitive interface and flexibility in accommodating diverse citation styles, positioning it as a cornerstone of contemporary scholarly writing. Comparative studies further underscore its strengths. Gilmour and Cobus-Kuo (2011), for instance, evaluated multiple reference management systems and identified EndNote as particularly strong in terms of database integration and functional capabilities. Similarly, Kratochvíl (2017) examined the accuracy of bibliographic references generated by different tools and reported EndNote's high level of precision, especially in discipline-specific citation styles within the medical field. More recent studies by Brüggmann et al. (2020) and Chawla and Gupta (2024) reaffirm EndNote's status as a preferred choice among researchers, highlighting its advanced features, adaptability, and suitability for a wide range of academic and disciplinary needs.

Apart from the functional aspect of EndNote, it can be significant within the broader field of educational technology, where the digital tools are regarded as the mediational tools that reshape the process of learning and knowledge construction. Digital tools such as EndNote can have scaffolding function engaging the learners with academic writing from the sociocultural learning perspective (Vygotsky, 1978). This implies that EndNote has not only a technical value but is a tool for enhancing academic literacy by facilitating the complex task of source management and citation in academic writing.

In the online and research-based learning environment, the learners are expected to use technological tools to manage cognitive and procedural demand (Barak et al., 2016; Garrison et al., 2000). EndNote contributes to this process by automating and systematizing the task of citation, thereby reducing the cognitive load so that the researchers can focus on other aspects of academic writing. Such technical tools successfully engage the learners in academic work that promotes learner autonomy and efficiency.

EndNote's pedagogical value can also be understood through Koehler et al.'s (2013) framework of technological pedagogical content knowledge (TPACK), which maintain that "Teachers must understand how technology, pedagogy, and content interrelate, and create a form of knowledge that goes beyond the three separate knowledge bases" (p. 2). EndNote-embedded instruction of academic research and writing aligns with this framework.

The importance of citation management software is particularly pronounced in systematic reviews and meta-analyses, where methodological rigour and accurate reference handling are essential. Lorenzetti and Ghali (2013) emphasize the critical role of such tools in maintaining systematic organization and transparency throughout the review process. Bramer et al. (2016) and McKeown and Mir (2021) highlight EndNote's effectiveness in de-duplicating references, a crucial task in systematic reviews involving large datasets. Clarivate (2024) further extends this discussion by outlining criteria for selecting citation managers, consistently positioning EndNote as a leading option due to its comprehensive features, reliability, and user support.

Despite its documented advantages of EndNote, its adoption and effective utilization vary considerably across academic disciplines, institutional contexts, and levels of study. In this context, Lonergan (2017) reports a growing reliance on digital reference management tools among faculty members, yet also notes variability in proficiency levels. Studies focusing on postgraduate students similarly reveal gaps between access to citation management tools and the ability to use them effectively. Motlhake (2021) and Nitsos et al. (2021) identify persistent deficiencies in postgraduate students' skills and stress the need for targeted and structured training programs. Osmani et al. (2016) and Suherman et al. (2022) further argue that without systematic instruction, the full potential of tools such as EndNote in enhancing research productivity and writing quality remains unrealized.

Empirical evidence also demonstrates EndNote's positive impact on academic writing by reducing citation errors, ensuring consistency with referencing standards, and improving overall writing efficiency. Sharma (2023a, 2023b, 2023c, 2024) documents the effectiveness of EndNote in addressing common citation-related problems through technical interventions, such as customizing default citation styles and aligning them with institutional or disciplinary requirements. These studies illustrate the transformative role that EndNote can play in improving the accuracy, reliability, and professionalism of scholarly writing when used appropriately.

At the same time, several studies caution that EndNote is not without limitations. Challenges such as a steep learning curve, limited compatibility with certain database formats, and usability issues have been reported (see Mendes et al., 2019; Sarafe, 2020; Tramullas et al., 2015). To address these challenges, Ale Ebrahim (2017) advocates for the integration of formal training modules into academic curricula, while Tramullas et al. (2015) emphasize the importance of continuous software updates and user-centred design. Eleftheriou et al. (2025) further highlight the need for clear guidelines and structured training to ensure that academic tutors and students can responsibly and effectively incorporate digital tools like EndNote into academic writing support.

In the Nepalese higher education context, the adoption of citation management tools, particularly EndNote, is gradually increasing. Sharma (2023b) discusses the technical intricacies of using EndNote in Nepal and advocates for its systematic integration into graduate-level research programs. However, despite these emerging discussions, empirical research examining the effectiveness of EndNote interventions in Nepalese academia remains limited. Specifically, there is a lack of comprehensive, context-sensitive studies that investigate how structured EndNote training influences citation management skills, writing efficiency, and research productivity among MPhil and PhD scholars, particularly within contexts characterized by resource constraints and varying levels of digital literacy.

This lack of empirical evidence constitutes a clear research gap. While international literature robustly documents the capabilities and advantages of EndNote, its effectiveness as an educational technology intervention within digital and research-based learning environments, particularly among GSE MPhil and PhD scholars in Nepal, remains underexplored. Accordingly, the research problem guiding the present study is articulated as: what is the effectiveness of EndNote as an educational technology intervention in enhancing citation management practices among GSE MPhil and PhD scholars, and how can its adoption and use be explained through Rosers et al.'s (2009) diffusion of innovations theory? By addressing this problem, the present study highlights EndNote not only as a citation tool but as a technology-enhanced learning intervention, contributing to the integration of academic writing with educational technology and online learning.

2. Methodology

2.1. Research Design

The present study employed a pre-experimental single-group pretest-posttest intervention research design (Campbell & Stanley, 1963), where the participants underwent a pre-test to assess their baseline citation management skills, followed by a training intervention using the EndNote tool.

2.2. Participants Selection

This study employed 34 participants, who were MPhil and PhD scholars enrolled at the GSE within the Faculty of Education, Tribhuvan University, who were still completing their MPhil and PhD degrees during the study. The participants were purposively selected, considering the inclusion criteria such as: MPhil and PhD scholars at GSE, having no prior EndNote training before this study, and having voluntary willingness to participate in the study.

2.3. Intervention Strategy

The EndNote citation management (EN-Cite) intervention was implemented considering four inter-linked phases: needs assessment, action plan development for intervention, intervention implementation, and outcomes evaluation (Upreti et al., 2024). The intervention focused on proficient utilization of EndNote for effective citation management in academic writing. The intervention activities were completed within five months after proposal approval from the TU (Fig 1).

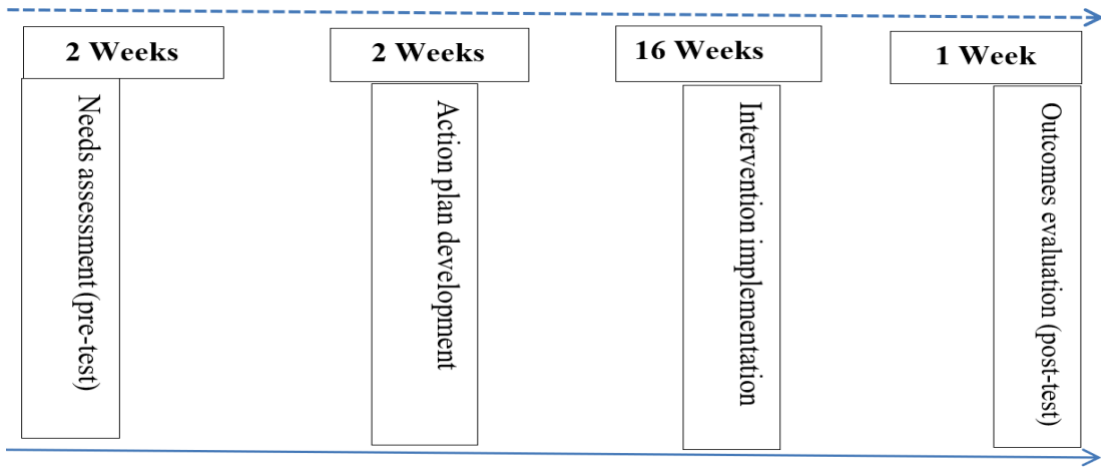


Fig 1. Interlinked phases of the intervention strategies

Phase 1: Needs Assessment. In this phase, the research team, who are co-authors of this paper, involved in conducting needs assessment to identify the participants’ challenges in and requirements for using EndNote to manage citation in academic writing. This phase utilized a pre-test structured survey questionnaire.

Phase 2: Action Plan Development. The needs obtained from the survey questionnaire revealed a wide array of needs. Realizing the limitations of a single group pre-test and post-test study, we prioritized the needs common to the participants. In so doing, we had in-person and online discussions with the participants. The discussions enabled us to select the common needs of the participants to develop the intervention package. To address the prioritized needs and reviewed literature, we mapped out the intervention activities (see Table 1).

Table 1.

The intervention package with time line

Intervention activities	Time line
Introduction to citation, EndNote, and modified Endnote	Second week of April 2024
Installation and creation of Endnote library EndNote	Second week of April 2024
Importing the customized EndNote reference types in the EndNote library (ENL)	Second week of April 2024
Adding the modified output styles in the EndNote library	Second Week of April 2024
Customizing the ENL	
Appropriating the font display	
Adjusting the layout of the ENL	
Creating a default ENL	
Choosing preferences in Word	
Managing fields display	

Populating the Library Importing from Google Scholar Importing from other databases Export of travelling library Manual addition of references Importing PDF(s) from your device Opening PDF with EndNote	May First and Second Week 2024
Grouping References in the ENL Group set Custom group Smart group Combination group	May Third Week 2024
Attachment of Sources Attachment symbol method Drag-and-drop method	May Third Week 2024
Reference Fields Entries Book, book section, edited book, journal article, thesis, ProQuest thesis, unpublished work, report, published interview, newspaper article, magazine article, audiovisual media, webpage, group author work	May Third Week 2024
Using the ENL for Citation One-author work Two-author work Three-or-more-author work Group-author work Citation with page number Citation with prefix and suffix Secondary source citation	May Fourth Week 2024
Configuration of reference list From Word document From the ENL	First to Third Weeks of June 2024

Phase 3: Intervention Implementation. The core phase of the study involved the implementation of the intervention through three stages (see Figure 2). Each stage incorporated specific activities, followed by a one-week gap before commencing the next stage.

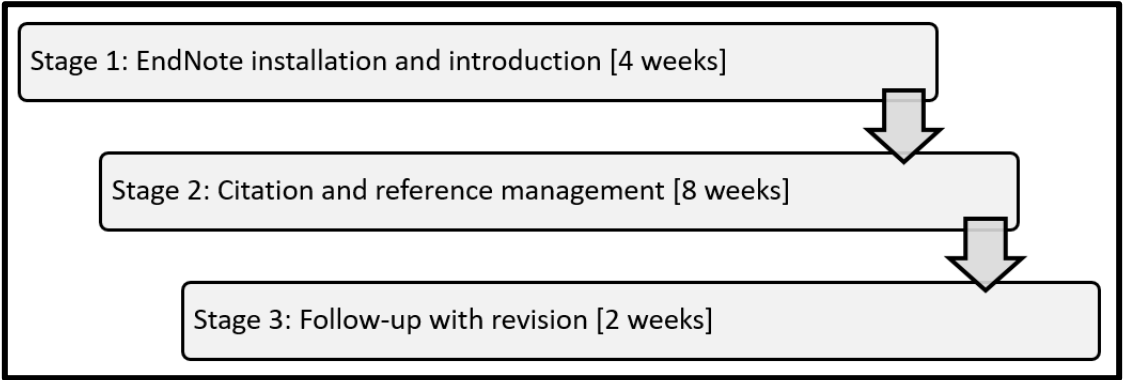


Fig 2. *Intervention stages*

The intervention activities aimed to equip the participants with enhanced citation and reference management skills, thereby improving the overall quality of their scholarly outputs. The participants received intervention workshops across all three stages undergoing both face-to-face and online modes. Stage first and third were handled with face to face mode, whilst intervention activities in the second stage were implemented via both face to face and online modes. The intervention activities included comprehensive materials such as step-by-step guides, video tutorials, and a manual specifically developed for the modified EndNote. These resources were designed to serve as references for the participants even after the intervention sessions.

Regular feedback sessions were integrated throughout the intervention to gather participants’ insights, address concerns, and make necessary adjustments to ensure the intervention’s effectiveness. This phase took approximately three months to complete.

Phase 4: Outcomes Evaluation. In this phase of the study, the research team conducted a post-test using a slightly modified version of the questionnaire from the pre-test. This phase took two weeks to complete.

2.4. Data Collection Tools

A set of self-administered structured questionnaire was used for pre-test and post-test. Though the questionnaires were comprehensive with four sections: background profile of the participants, competency, skills, and achievement scores on citation management with EndNote, the present paper is developed covering only two sections (background profile of the participants and competency level). Before the commencement of the intervention, participants received pre-test questionnaire to assess their existing competency level. Following the intervention activities, the post-test questionnaire was administered. The team of researchers, who are the co-authors of this paper, were involved to collect both pre-test and post-test data along with intervention development and implementation.

2.5. Data Analysis Procedure

The quantitative data collected from the set of questionnaires were exported into Statistical Package for Social Science (SPSS) version 26 software for analysis. Data were checked, edited, and cleaned before processing for further analysis. The results were presented in simple, custom, and cross tables. Descriptive analyses such as central tendency and measure of dispersion were performed.

Before applying the significance test to determine the relationship between the pre- and post-test results of the intervention, we checked the normal distribution of the data using the Shapiro-Wilk normality test. The normality test indicated that the pre-intervention results were normally distributed ($P = 0.120$), while the post-test results were not normally distributed ($P = 0.033$). Therefore, we applied the non-parametric Wilcoxon signed-rank test to assess the significant relationship at 5% confidence level between the pre- and post-test results of the intervention.

2.6. Ethical Considerations

The Dean Office, Faculty of Education, TU approved for the implementation of the study and provided official letter after accepting the proposal of the study. Ethical guidelines endorsed by the Nepal Health Research Council (2022) were followed to ensure ethical conduct of the study. Informed oral and written consent was obtained from each participant, emphasizing voluntary participation and the right to withdraw at any stage of the study. Confidentiality and anonymity were maintained, and no harm was inflicted on participants. The participants' well-being was prioritized during the intervention. They were treated with respect and dignity throughout the study. The research team committed to reporting the results accurately and transparently.

3. Results

The results have been presented under the three subsections: socio-demographic information of the participants, practice of using EndNote for reference management, and developing competency level in using EndNote in citation management.

3.1. Socio-Demographic Information of Participants

Socio-demographic details offer a comprehensive snapshot of the participants, providing insights into their socio-demographics and academic affiliations. Table 2 presents the socio-demographic information of the 34 participants involved in both pre-and-post-tests of the study.

Table 2.

Socio-demographic characteristics of participants

Socio-demographic information	Categories	Frequency	Percentage (%)
Age ($\bar{X} = 45.18 \pm 7.034$)	Below mean age group	18	52.9
	Above mean age group	16	47.1
Gender	Men	28	82.4
	Women	06	17.6
Working organization	University/Campus	33	97.1
	Govt employee	01	2.9
Currently studying level	MPhil	13	38.2
	PhD	21	61.8

Table 2 presents the socio-demographic characteristics of the study participants. The average age of the participants was 45.18 years, with a standard deviation of 7.034. In terms of age distribution, more than half (52.9%) of them were below the mean age group, while 47.1% were in the above mean age group. Regarding gender, the majority of participants were men, comprising 82.4%, whereas women were 17.6%. In terms of employment, most participants (97.1%) worked in a University/Campus, while only 2.9% were employed in a Government position. Academically, 38.2% pursued an MPhil degree, and 61.8% were enrolled in PhD programs at GSE.

3.2. Practice of Using Reference Management Software

Table 3 provides a comparison of participants' pre-test and post-test results concerning the use of reference management software for academic writing, particularly focusing on the installation of EndNote reference management software.

Table 3.

Competency in using reference management software

Use of EndNote	Categories	Pre-test		Post-test	
		Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
Use of reference management software	No	19	55.9	0	0
	Zotero	3	8.8	0	0
	EndNote	12	35.3	34	100
Installation of EndNote	No	20	58.8	0	0
	Yes	14	41.2	34	100

Table 3 reveals that before the intervention, more than half (55.9%) of participants did not use any reference management software, followed by 35.3% and 8.8% used EndNote and Zotero respectively. But after the intervention, cent percent of the participants used EndNote. Similarly, before the intervention, 58.8% of participants did not have installed EndNote, whilst after the intervention, all participants installed the EndNote for academic writing purpose. The data indicates a significant increase in both the installation and use of EndNote among participants after the intervention.

3.3. Competency Level of Using EndNote

During the pre-test, 35.3% of participants installed EndNote for citation management in academic writing. But after the intervention, 100% percent did for citation management in their academic writing (see Table 3). The results demonstrate improved competency level in using EndNote as a reference management software for academic writing (see Table 4).

Table 4.

Competency level of using EndNote

Tests	Mean scores	N	Std. deviation	z-value	p-value
Pre-test	2.57	14 ^a	1.158		
Post-test	3.06	34	0.851	-2.124 ^b	0.034*

Note. ^a During the pre-test, 14 participants installed EndNote for citation management; hence, the mean score of the pre-test represents for only these participants; * significant at 0.05

The data in Table 4 demonstrates a significant improvement in the participants' competency level in using EndNote citation management. The mean score of competency level increased significantly from the pre-test ($\bar{X} = 2.57 \pm 1.158$) to the post-test ($\bar{X} = 3.06 \pm 0.851$), with a p-value less than 0.05. Referring to the p-value of Wilcoxon signed-rank test (Table 4), the calculated p-value was found to be 0.034, which is smaller than 0.05. This indicates that the intervention was effective in enhancing the participants' ability to use EndNote for academic writing purposes.

Further, the Mann Whitney test (non parametric) was calculated to examine the relationship between the socio-demographic information of the participants and their competency level of using EndNote for citation management at post-test (Table 5).

Table 5.

Socio-demographic information and competency level at post-test

Group variables	Categories	N	Mean	Std. deviation	p-value
Age group	Below mean group	18	3.33	.840	.095
	Above mean group	16	2.75	.775	
Gender	Man	28	3.00	.903	.341
	Women	06	3.33	.516	
Working organization	University/Campus	33	3.03	.847	.294
	Govt employee	01	4.00	.000	
Study level	MPhil	13	2.92	.760	.506
	PhD	21	3.14	.910	

Table 5 shows no significant relationship between socio-demographic profiles of the participants (age group, gender, working organization, and study level) and their competency level in using EndNote software for citation management. Referring to the p-value of Mann Whitney test (Table 5), the calculated p-values were found to be 0.095, 0.341, 0.294, and 0.506, which are greater than 0.05. This indicates that the socio-demographic information of the participants had no statistical relationship with developing the competency level in using EndNote for citation management at post-test.

4. Discussion

The results indicate a significant increase in both the installation and use of EndNote among participants after the intervention, demonstrating improved competency level of using EndNote as a reference management software for academic writing, indicating that the intervention was effective in enhancing the participants' ability to use the software for academic writing. This may not be solely as a tool-specific outcome. The findings can be viewed as evidence of a successful educational technology intervention that enhanced the learners' digital academic literacy within a structured learning environment. It suggests that the intervention functioned not only at technical level, but also as a technology-assisted learning process that supported.

The analysis of the results with the Mann-Whitney test shows that the socio-demographic variables of the participants such as age, gender, and academic background did not significantly affect the competency outcomes of the scholars. This finding is significant from the perspective of educational technology suggesting that well-designed digital interventions promote learning outcomes across diverse learner groups. There was no statistical relationship between the participants' socio-demographic information and their post-test scores, consistent with Lorenzetti and Ghali's (2013) finding, arguing that well-structured training can mitigate the impact of individual differences. The effectiveness of the training program likely contributed to this result by offering structured support that leveled outcomes across socio-demographic groups. Additionally, the user-friendly design of EndNote, along with the modified reference types and output styles, may have further contributed to the lack of variation in results based on socio-demographic factors. These features made the software accessible to a diverse range of users, explaining why these variables did not play a significant role. Overall, socio-demographic factors did not influence the development of competency in EndNote citation management at the post-test stage, implying the importance of designing inclusive training programs for citation management tools, ensuring that all learners, regardless of their backgrounds.

A significant improvement in the competency of using reference management software, with all participants installing and using EndNote after the intervention, compared to 55.9% who did not use any software and 58.8% who had not installed EndNote before demonstrates the effectiveness of the intervention. This supports previous studies highlighting the importance of structured, hands-on training for effectively adopting the software in academic writing. For instance, Lorenzetti and Ghali (2013) note that while reference management tools have the potential to improve research efficiency, a key barrier to usage is the lack of adequate training.

Similarly, the pre-test statistic (55.9% not using any software, 58.8% not installing EndNote) aligns with Borgman's (2007) argument that many researchers, especially early-career ones, are unaware of or reluctant to adopt reference management software due to lack of familiarity or perceived complexity. Our results show that targeted training can overcome these barriers. The significant post-intervention success can also be connected with Gilmour and Cobus-Kuo's (2011) suggestion that continuous support and follow-up are necessary for long-term competency. Our result could thus be a steppingstone to future investigations on whether the intervention leads to sustained software use and whether similar results can be replicated in other settings.

The results show that there is significantly improved in participants' competency in using EndNote for citation management, with post-test results showing a marked increase from 35.3% to 100% in installation and a significant rise in competency scores ($p = 0.034$) show that the training intervention was highly effective in enhancing both technical and functional proficiency in citation management among the participants. This aligns with the APA's (2010, 2020) approach to promoting rigorous citation practices in research, Sharma's (2023a, 2023d) focus on the modified EndNote to improve citation accuracy in Nepalese academic contexts, and Ale Ebrahim's (2016, 2017) recognition of EndNote's role in streamlining the citation management process to make scholarly work more accessible.

The result of the present study aligns with Rogers's (1995) innovation theory that adoption of innovation is driven by the relative advantage perceived by users—EndNote offers clear benefits in managing citations efficiently. The success of the intervention reflects the participants' realization of the relative advantage of the EndNote software over traditional methods (manual use) of citation management, which helped the participants to adopt the innovation. The observability of results was another important factor in the effectiveness of the intervention. As participants experienced the EndNote software would be time-saving and organizational benefits, they were more likely to use the software. This observability reinforces Rogers' idea that visible advantages of the innovation accelerate diffusion (Rogers, 1995). It is argued that structured intervention sessions acted as an effective channel for spreading awareness and demonstrating innovation's potential. The trialability of using the software in a low-risk environment during the intervention motivated our participants to use the EndNote software for their academic writing purposes. Once participants were able to apply with EndNote in a guided setting, they became more confident in using it and hence applied in their academic writing. Following Rogers' diffusion of innovation theory, the intervention effectively shifted participants from non-users to active adopters by emphasizing the relative advantage of the software, providing ample opportunities for trialability with ensuring observable benefits.

This finding is also echoed in recent discussions of AI use in academic writing. Ozfidan et al. (2024) found that while students appreciated AI for idea generation, outline construction, and time saving, they also expressed concerns about reliability and ethical use—underscoring the value of structured interventions like ours. In both cases, carefully designed training helps address users' concerns and fosters effective and responsible integration of new digital tools into academic practice.

The study demonstrated a high level of initial adoption of the innovation; the next step is to investigate whether this adoption is sustained over time and whether scholars continue using the software effectively in the long term is challenging for us. The findings open an avenue for future research, particularly regarding the sustainability of the use of EndNote among the scholars. Future research could explore the long-term sustainability of this adoption and whether similar interventions can produce comparable results in other contexts. According to Diffusion of Innovation Theory, innovations may be adopted quickly at first, but their sustained use depends on ongoing support and the perceived continued value (Glanz et al.,

2015). Investigating whether participants continue using EndNote after the intervention and whether similar interventions can yield comparable results in different academic or geographic settings would provide further insight into the diffusion process.

5. Limitation of the Study

Despite the positive outcomes of the study, it is not without limitations. First, the study employed a single-group pretest-posttest design, which lacks a comparison group, making it difficult to determine whether the observed outcomes are attributable to the intervention or external factors. Second, the absence of a control group and the small sample size limit the ability to draw strong causal conclusions. Natural improvements over time, testing effects from the pre-test, and the Hawthorne effect may also have influenced the results. Additionally, the self-selected sample may not be representative of the broader population, limiting the generalizability of the findings. Finally, the 16-week duration of the intervention constrains the ability to assess the long-term impact of using EndNote citation management.

6. Conclusion

The findings of this study imply the crucial importance of bridging the gap in citation management skills among university scholars through intervention activities in reference management. The intervention demonstrates that providing tailored training can significantly improve scholars' competency level of using EndNote. This improvement reflects the effectiveness of a technology-enhanced learning intervention in developing digital academic literacy within higher education. The results also show the neutral influence of socio-demographic factors on the effectiveness of the intervention, suggesting that all researchers, irrespective of their background, benefit equally from such training. This highlights the potential of well-designed educational technology interventions to promote inclusive and equitable learning outcomes, particularly in online and blended learning environments. Universities can, therefore, consider offering these programs widely to strengthen research practices across diverse academic communities.

The interventions through reference management can have lasting effects on research competency. By continuing to use citation management software proficiently, researchers are likely to uphold higher standards of academic integrity, avoiding citation errors and inconsistencies that can undermine the quality of the work. This sustained competency contributes not only to individual researchers' success but also to the credibility and rigor of the academic institutions they represent.

Furthermore, the success of this intervention model offers valuable implications for other institutions. As academic publishing demands increase globally, there is a growing need for standardized technical training in digital research tools. The findings suggest that integrating discipline-specific tools like EndNote into technology-enhanced and online learning designs can significantly improve academic writing outcomes. Institutions can consider such intervention as a strategic investment for their scholars' mobility towards the broader goal of advancing research excellence.

Declarations

Availability of Data and Materials

The data supporting the findings of this study, along with supplementary materials, are available from the corresponding author upon reasonable request.

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