A Workshop On Writing a Systematic Literature Review Using Artificial Intelligence (AI)- Based Tools

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ABSTRACT

To generate meaningful research, lecturers and investigators have to identify strong, innovative research ideas. However, they often have difficulty with digesting a large number of relevant studies when conducting literature review. The workshop on "Writing a Systematic Literature Review Using New Tools" was intended to provide academics and professors with cutting edge techniques and resources to improve the efficiency and quality of their literature reviews. Participants were provided with tools including Publish or Perish, Mendeley, and Rayyan to help with systematic review processes, reference management, and collecting bibliographic data. The workshop offered information and practical exercises so that attendees could use these tools directly. Participants' comments indicated notable progress in their capacity to organize data, carry out systematic evaluations, and efficiently pinpoint research gaps. Most attendees gave the course high marks for efficacy; most of them scored between 4 and 5. This favorable response highlights how well the workshop improved the participants' research abilities and tool competency, which raised the standard for academic research and publishing. **Keywords:** Academic Writing, Systematic Literature Review, Emerging tools.

INTRODUCTION

Determining robust state-of-the-art research topics is an important stage when lecturers, as researchers, would like to produce research results that bring significant impact to science as well as to the community. In the process of research topic selection (RTS), researchers match their personal interest and area of expertise with the most recent existing literature. To arrive at a well-informed RTS, researchers often face a lot of challenges, including digesting the overwhelming number of related studies, ambiguous research topics, and a plethora of theories and research methodologies (Click, 2018; Mosyjowski et al., 2017). To identify a gap in the existing literature, researchers spend a lot of time reviewing the context of previous research and analyzing the strengths and weaknesses of using certain methodological design.

However, with the advancement of technology, there are several tools researchers can use to help them in the process of RTS. To begin with, Publish or Perish (PoP) software can be used as an instrument to measure the impact of the research and to harvest bibliographic metadata of scientific works. This software allows researchers to gather and select the scientific works relevant with their RTS according to the work's publication year, keywords, and authors (Gillani et al., 2022). In their review of software tools for conducting research analysis, Moral-Muñoz et al. (2020) provided a summarized descriptive review of some tools that can be used by researchers, starting from acquiring data sources, analyzing the performances, to visualizing the analysis (Moral-muñoz et al., 2020). In addition to that, analysis about the development of previous studies can be done using VOSviewer ,a software which can map existing publications according to the researcher's keywords, citations, shared citations, individual publication, or author relationship (Baier-Fuentes et al., 2019).

Determining a research topic considers various aspects including background knowledge, understanding of the phenomenon and the researcher's ability to formulate research objectives and hypotheses to answer the problems raised as the focus of the study (Boote & Beile, 2005). The level of understanding of a phenomenon will be greatly influenced by the scope of background knowledge sourced from the results of reviewing various references. Advances in information technology have become a massive stimulus for the dissemination of information in various media which not only has a positive impact on the dissemination of knowledge, but also becomes a challenge for researchers in formulating research topics that are relevant to current developments.

Easy access to information can accelerate the expansion of researchers' knowledge, but if it does not come with a thorough comprehension of the phenomenon of interest, it can lead to biased selection of research topics. Examining diverse literature is a method that scholars might employ to enhance their comprehension. The purpose of the literature review is to generate a comprehensive analysis of existing literature, demonstrating the relevance of the research issue within the wider academic discipline (Hart, 1998).

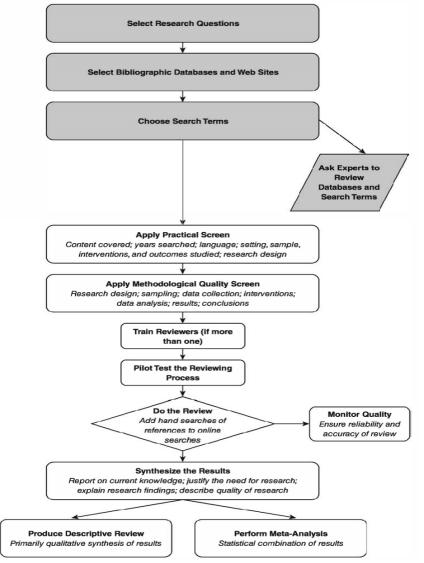
A literature review is a comprehensive examination of relevant references, such as books, scientific articles, and other sources, pertaining to a certain research field or issue. Its purpose is to provide a detailed description, summary, and critical evaluation of the existing literature (Snyder, 2019). Within this framework, the intended literature review goes beyond a mere summary, grouping, or compilation of diverse literature. Instead, it entails a comprehensive study of scientific papers that are particularly related to the specified research problem.

Conducting a literature review in a systematic and focused method can help researchers in developing research contexts, determining the importance and urgency of research topics, illustrating connections between research ideas, and identifying critical gaps that need further exploration. This serves as a foundation for establishing key themes, concepts, and research areas (Kennedy, 2007; Rocco & Plakhotnik, 2009).

Literary studies are conducted to comprehend the contextual aspects of the problem at hand by investigating and explaining relationships, gaps, contradictions, and methods of interpreting prior references to a phenomenon. Various categories of literary studies commonly employed include argumentative, integrative, historical, methodological, systematic, and theoretical studies (Fink, 2014). Argumentative studies seek to establish a viewpoint on a particular problem by presenting the researcher's arguments, which are supported or rejected using a body of literature as a foundation. This literature is used to build arguments that either support or reject the claim or philosophical matter that is the central subject of the study [source]. Integrative studies can be defined as a study approach that examines, evaluates, and combines literature that represents a certain issue in a comprehensive way, resulting in an updated framework of ideas and viewpoints (Torraco, 2005). Historical studies concentrate on conducting research throughout a specific timeframe to observe the progression of knowledge in a specific scientific field. This study methodology enables the observation of advancements and the identification of potential areas for future research. A study not only emphasizes its conclusions and findings, but also places importance on the methods employed to attain the desired outcomes (Balduzzi et al., 2019; Harrer et al., 2022). Methodological studies can generate comprehension at varying levels by examining how researchers employ diverse conceptual and practical background knowledge to interpret and integrate the data of conducted studies. A systematic review is a concise compilation of diverse literature aimed at substantiating a research hypothesis. It employs a transparent and consistent process to identify and critically evaluate the specific topic that is the central focus of the research. This study is centered around particular empirical issues and aims to establish causal links in order to determine the impact of one variable on other variables (Kennedy, 2007). Theoretical investigations are conducted to scrutinize the body of hypotheses that have been amassed concerning a specific subject, concept, theory, or phenomenon. This study methodology can be employed to uncover and examine connections between existing theories with the aim of formulating novel theories and hypotheses (Petticrew & Roberts, 2006).

Cuijpers (2016) categorizes literature review approaches into three primary types: narrative studies (Traditional/Narrative Reviews), systematic reviews (Systematic Reviews), and meta-analysis (Meta-Analysis) (Cuijpers, 2016). Narrative research is a comprehensive method of doing a literature evaluation, typically performed by experts in a certain subject of study. The author's selection of references, determination of the study's scope, and formulation of conclusions lack defined criteria, potentially introducing bias into the study's findings (Baumeister & Leary, 1997; Booth et al., 2016). Unlike systematic reviews, this strategy involves creating study summaries using explicit and transparent criteria, allowing for the replication of the methodology in additional literature reviews. The process begins with the systematic definition of the problem and continues till the development of conclusions. Moreover, the process of conducting a comprehensive evaluation by integrating multiple quantitative studies is referred to as "Systematic Review-Meta Analysis". This approach involves systematically determining the scope, criteria, and validity of the study to generate a quantitative report that is included into a numerical estimate (Chaimani et al., 2014; Cuijpers, 2016).

The literature review requires the researcher's proficiency in choosing suitable sources and accuracy in examining significant points to be used for synthesis and constructing research results. Fink (2014) developed a set of 7 major stages that researchers should take into account while conducting literature investigations, as seen in Figure 1. The processes involved in this procedure are as follows: developing research questions, selecting a reference database, identifying search keywords, establishing search criteria, deciding selection criteria for references, conducting the review process, and synthesizing the outcomes of the review (Fink, 2014). The process of developing a research topic is a crucial step in initiating a literature review as it will establish the direction of the study. Research questions serve as the foundation for identifying search terms in a metadata search database. The relevance of the research subject and the choice of search terms will influence the simplicity of picking references according to predefined criteria. The degree of relevance of these three elements will directly impact the specificity of the findings, hence enhancing the synthesis of the study's results. According to Williams (2018), the stages of literature review may be categorized into three main groups: the exploration phase, interpretation phase, and communication phase (Williams, 2018). The exploratory phase includes activities such as identifying the subject matter, doing comprehensive literature searches, organizing and maintaining references, selecting relevant sources, and broadening the search to include more references. The interpretation step encompasses the examination and combination of data, which is then presented as a full literature review. The conclusion of the literature review is conducted during the communication phase, which is then followed by dissemination efforts in many forms such as written publications, presentations, and other means of spreading information.



Picture 1. Steps in conducting literature review(Fink, 2014)

Not all researchers, however, especially those who work as university lecturers, are aware of these beneficial tools. In the Indonesian context, lecturers are professionals whose main responsibilities are to teach, research, and serve the community. However, lecturers are also given the obligations to handle administrative tasks, e.g. student's admission, institutional accreditation. in terms of publications, the number of published research paper of lecturers in Indonesia is lower than the number of publications produced by lecturers from other Southeast Asian countries (Elfindri et al., 2015). Another study by Affandi et al. (2021) discussed this low research and publication rate and the findings suggested that identifying research gaps and determining research topics were considered as the most challenging step (Affandi Arianto et al., 2021). The tools that the researchers consider relevant for these purposes are Publish or Perish, Mendeley, and Rayyan. Therefore, a workshop for raising the lecturer's awareness of these available tools they can use to navigate the overwhelming process of research topic selection is needed.

This community service aims to: (a) raise lecturer's awareness of Publish or Perish, Mendeley, and Rayyan as tools for research topic selection; (b) train lecturers to be able to use Publish or Perish, Mendeley, and Rayyan to identify research gaps; (c) improve lecturers' opportunity to publish research in a reputable journal.

METHOD

This workshop is designed to equip participants with the skills necessary to conduct a systematic literature review (SLR) using a variety of technological tools. The workshop spans over five hours and includes a mix of presentations and hands-on sessions for the research activities.

The Community Service Activity (PKM) "Writing Systematic Literature Review Using New Tools" was conducted in collaboration between the "English Department" and the President University Elementary School Teacher Education Study program. The event was packaged in the form of a workshop and held in a hybrid manner with the aim of accommodating and reaching more participants both from President University and from outside campus. The following is a detailed schedule of workshop events:

Day/Date	: Wednesday, February 21, 2024
Time	: 11.00-15.00
Location	: Master of Technology Management Room (MMTek) A 429, Building A,
	President University and online via Zoom

The workshop activity "Writing Systematic Literature Review Using New Tools" is particularly aimed at equipping lecturers who teach the "Research Writing" course which in the end is expected to be useful for various parties, including students and researchers. The workshop targeted early-career researchers and academicians with a basic understanding of literature reviews and familiarity with research databases. Participants were recruited through direct emails, university announcements, and various professional networks.

The main users of the workshop were lecturers, to facilitate their research activities as part of implementing the Tridharma of higher education. With this advanced knowledge on research writing, the knowledge from the workshop was able to facilitate them in facilitating their students. Mirroring this, students were also expected to be able to use the knowledge from the workshop both in research activities for final assignments/thesis or certain courses, and their collaborative activities with lecturers in joint research fields. This workshop activity invited expert speakers from the Environmental Engineering Study Program, President University, Dr. Rijal Hakiki. He has experience in applying several research tools in the dissertation writing activities to complete his doctoral studies.

Apart from lecturers from President University, workshop participants from various institutions/campuses in Indonesia were invited. All invitations were sent via email and Whatsapp by including a poster along with a Zoom link for participants who will take part

online (Attachment 1). This event was expected to present approximately 50 participants both from President University and other institutions.

The workshop on "Writing Systematic Literature Review Using New Tools" aims to share additional knowledge with lecturers/educational practitioners regarding the use of new research tools to write a systematic literature review. Prior to the program, participants received pre-reading materials that provided an overview of SLR methodologies, key terms, and an introduction to the technological tools to be used in the workshop. It was expected that the participants were able to develop search strings and manage references using software tools (Gough, Oliver, & Thomas, 2017). Participants were also required to install specific software on their laptops, including reference management software as follows:

- Publish or Perish (<u>https://harzing.com/resources/publish-or-perish</u>)
 Publish or Perish (PoP) is a free application that can be used to harvest bibliographic metadata of scientific works in all fields of science. This application is designed to assist individuals in finding and analyzing the sources of information they need.
- Mendeley (<u>https://www.mendeley.com/</u>) The Mendeley application is a supporting tool for managing references and connecting with other academics. It is available in web-based, desktop, and mobile formats. The Mendeley word processing plugin allows for the swift citation of references and the creation of bibliographies within Word.
- c. Rayyan (<u>https://www.rayyan.ai/</u>) Rayyan is a website that speeds up the process of screening and choosing studies by a huge amount. It is made to help researchers who are working on systematic reviews, scoping reviews, and other knowledge synthesis projects.

The workshop lasted for approximately five hours. The event was divided into several agendas: remarks from the project head, Head of the Study Program, and followed by the main event, namely presentations and workshops. During the workshops, participants are expected to carry out direct practice regarding the use of the three devices discussed. The workshop activities were wrapped up with a question and answer session to give participants the opportunity to deepen their knowledge about the research tools discussed.

Prior and during the workshop, the participants were given access to an online forum for intensive support and discussion. Additional resources, such as tutorial videos and software guides, were also provided to lay foundations on the SLR-related activities. At the end of the workshop, participants were asked to share feedback to evaluate the effectiveness of the sessions and the usefulness of the tools demonstrated. This feedback will be used to improve future workshops.

RESULTS AND DISCUSSION

The community service aimed to improve lecturers' ability in using tools, such as Publish or Perish, Mendeley, and Rayyan for conducting systematic reviews, evaluating research impact, and managing references and publications. It was hoped that the community service would enhance the lecturers' opportunities to publish their manuscript in reputable journals. The implementation of the community service was outlined in the following steps:

1. Registration

The community service started with a registration period that commenced two weeks prior to the event. The flyer of the event was disseminated via WhatsApp to the group of the lecturers in President University lecturers and colleagues from various academic institutions. Ultimately, the event successfully recruited 26 attendees representing multiple universities across Indonesia, including President University, Gunadarma University, Horizon University Indonesia, STIE Tamansiswa Banjarmasin, Universitas Negeri Padang, Universitas Pasundan, Lampung University, Universitas Negeri Jakarta, BRIN, Universitas Multimedia Nusantara, Universitas Abulyatama, and Universitas Muhammadiyah Aceh.

The event was conducted at President University and used a hybrid mode, online and offline modalities, to broaden participant wider accessibility.

2. Installing The Research Tools

On the day of the event, the participants were instructed to install the necessary tools. This step was deemed important as it enabled the participants to familiarize themselves with the tools through practical application. During this phase, the committee team provided guidance to assist the participants in the installation process. In the future, if a similar event is planned, we have found that giving participants a manual on how to install the necessary tools beforehand helps them understand and complete the installation process more efficiently.

3. Opening Speech

Mrs. Ani Pujiastuti, PhD., the head of Elementary Teacher Education, delivered the opening speech. She began by outlining the objectives of the event: 1) to enhance lecturers' awareness of research tools, 2) acquaint them with these tools, and 3) ultimately enable them to publish their manuscripts in reputable journals. Mrs. Ani emphasized that mastering these tools would facilitate the lecturers in exploring current topics in their fields of study, thereby maximizing the impact of their publications.

4. Varied Approaches for Conducting Literature Reviews

Mr. Dr. Rijal Hakiki, the trainer, explained to the participants that there are several approaches conducting literature reviews aimed at assisting in identifying research topics. Each approach possesses distinct strengths and weaknesses. The approaches include: 1) conventional literature review, 2) systematic review, and 3) meta-analysis. Firstly, a conventional literature review involves extensive reading and comprehension of expert research narratives within specific fields. Once comprehended, researchers can start to identify, evaluate and synthesize relevant studies to provide an overview of current state of knowledge. Next, a systematic review aims to collect, evaluate and synthesize an abundance of relevant work on a specific research topic being under investigation. This method follows transparent rules, utilizing a structured and predefined protocol that includes clearly defined criteria for study selection, data extraction, and synthesis. However, the rigorous nature of systematic reviews, requiring extensive scrutiny of abundant resources, may pose challenges for researchers, potentially leading to the oversight of important keywords. Lastly, Dr. Rijal discussed meta-analysis as a distinct approach from the previous two. Meta-analysis serves the purpose of synthesizing literature through statistical synthesis of data to derive quantitative conclusions regarding the current state of knowledge. It is conducted to provide an accurate estimation of the overall effect observed across different studies on a specific research question.

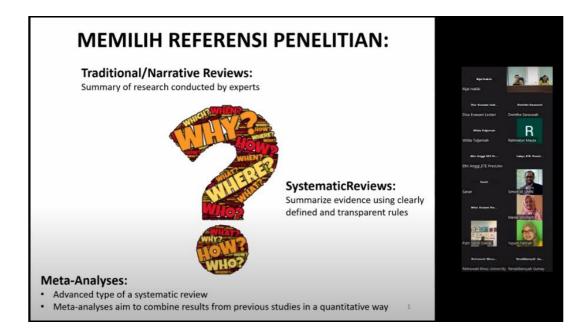


Image 2 : The Trainer Explained the Three Approaches

5. Using Publish or Perish, Mendeley, and Rayyan

In this session, Dr. Rijal explained the benefits of mastering the tools in academic research. He highlighted the crucial roles of each tool, ranging from evaluating research impact (Publish or Perish), managing references (Mendeley) and publications to conducting systematic reviews (Rayyan).

The trainer demonstrated how Publish or Perish can assist researchers to track publication metrics, monitor citation trends, and evaluate research impact through metrics like citations per paper and h-index. He continued with showing the participants how to manage references and organize research papers. Finally, Rayyan was introduced as a web application designed for managing and screening research papers efficiently in systematic and literature reviews.

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Image 3 The Trainer Demonstrated PoP

Image 4 The Trainer Demonstrated Mendeley

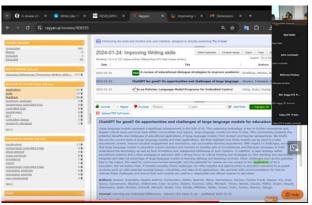


Image 5 Image 5 : The Trainer Demonstrated Rayyan

6. Q&A sessions

At the conclusion of the session, participants were allotted a 30-minute period to ask questions about the materials presented. The active discussion revealed their high level of engagement and interest in the topic. One participant raised an interesting question about his existing knowledge of research methodology and how it aligned with the event's objectives. He mentioned that he understood research to involve three steps: observation, research, and investigation. However, he noticed a difference in methodology compared to what was presented at the event. In response, the trainer clarified that the materials covered, particularly the explanation of meta-analysis, aimed to highlight the current state of knowledge and gaps observed across numerous studies conducted in the field.

7. Evaluation and Certificate of Appreciation

During the post-workshop session, as a follow-up to the event, participants were given the opportunity to complete a survey which aims to summarize their opinions regarding the workshop held, the research tools discussed and the benefits of the activity for them, as well as their hopes for similar activities in the future.

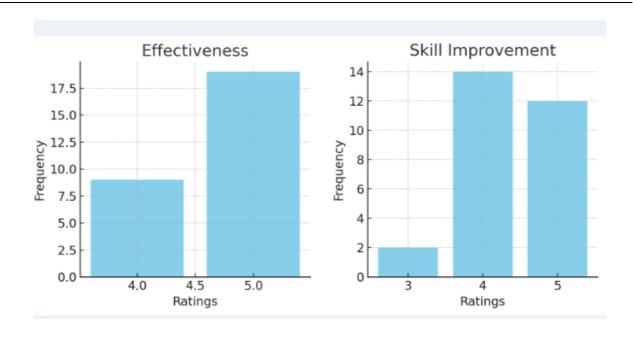
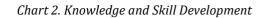
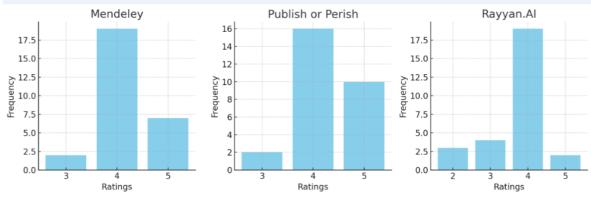


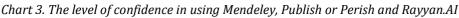
Chart 1. Overall effectiveness of the workshop



The bar chart shows the participants' ratings of the overall effectiveness of the workshop on a scale of 1 to 5. Participants gave the course good marks for the overall effectiveness. About 68 percent of participants rated the workshop as very effective, giving it the maximum grade of 5. Another 32 percent of attendees gave the workshop a four, indicating that they thought it was rather well but maybe could have used some little improvements. Since no participant gave the session a rating lower than a 4, it was generally well received and the content and delivery were highly satisfactory.

About the enhancement of knowledge and abilities related to systematic literature reviews, the majority of participants thought the workshop had a good effect. The ability increase was given a 4 by half of the respondents (50%) suggesting a notable improvement in their abilities. A further 43%, indicating a very high degree of skill development, gave their improvement a 5. Slightly fewer (7%) gave their progress a 3, indicating a moderate improvement. This distribution demonstrates how well the course increased participants' skills; the great majority felt much more capable after attending.





In general, attendees felt confident using Mendeley after the training. The great majority (68%) gave themselves a confidence score of 4, suggesting that they were very capable of using the instrument. Twenty-five percent more said they felt extremely confident using Mendeley, rating their confidence at the highest level of five. Just 7% of respondents, however, gave themselves a confidence score of 3, indicating moderate confidence and maybe a need for more practice or assistance. All things considered, everyone felt ready to utilize Mendeley after the workshop.

Following the training session, the participants also expressed great confidence in their use of Publish or Perish. Most (57%) believed they could use the instrument rather well, as seen by their rating of their confidence at a 4. Another 36% gave themselves a five for confidence, meaning they were quite sure and prepared to use the tool at work. Just a small percentage (7%) gave themselves a moderate confidence rating of 3. Based on these findings, it appears that most participants believed they had learned the skills and information required to use Publish or Perish successfully.

Participants' degrees of confidence in Rayyan.AI varied significantly. The biggest group (68%) gave themselves a 4 for confidence, meaning they were rather sure they could use the instrument. Of those who assessed their confidence, 14% indicated moderate confidence at a 3, while 11% indicated some uncertainty or need for more training at a 2. Less people felt highly confident using Rayyan.AI than they did with other technologies, as seen by the 7% who evaluated their confidence at a 5. Although many participants felt ready to utilize Rayyan.AI, this distribution shows that some users needed more help and there were significant degrees of uncertainty.

As participant comments generated qualitatively made clear, the recent workshop on research tools and procedures offered a wide range of information and useful skills. Among the most useful things that participants mentioned was understanding how to combine and apply different research tools. Particularly welcomed were the sessions on tying Rayyan and Mendeley together and learning about resources like Duck Duck Go, Wayback Machine, and Google Scholar. Furthermore, highly appreciated was the investigation of more AI-based tools. One participant underlined the usefulness of these tools in their research processes by mentioning the "*new experiences with the new tools to accelerate my writing & next research*."

The session included important components of practical use and practical experience with these technologies. The thorough explanations of data management, filtering, and article screening proved to be quite beneficial to the participants. Specifically useful, according to one participant, were "*the explanations on screening the articles*". The seminar was very relevant because of the advice on how to use these methods in completing research and doing systematic literature reviews. Showcasing the instant effect of the tools on their research procedures, another participant said, "*This application facilitates us in writing our study*."

Further important workshop themes were the development of skills and knowledge. Participant and instructor shared experiences enhanced the learning environment; many participants valued the "*shared experience*" and the chance to absorb "*a lot of knowledge*." The format of the session helped participants to learn new technical skills and gain a better grasp of different research instruments. Participants were guaranteed a strong basis to work upon in their future research projects by this all-inclusive learning strategy.

Important advantages of the program were also emphasized like accessibility and resource availability. The information about "*free download open access journals*" and the introduction to additional Mendeley-compatible tools for systematic literature reviews was much appreciated by the participants. Their resource base increased as a result, giving them greater freedom and alternatives while carrying out their studies. A participant referred to the larger toolset that was made accessible to them following the class when she emphasized the advantages of learning about "*other tools, not only Mendeley, for writing systematic literature reviews.*"

The attendees thought the workshop was fully considered, insightful and comprehensive. Positive responses expressing general pleasure with the workshop's substance and delivery included "*Everything*" and "*It's insightful*." One important takeaway was that the participants discovered practical methods to use the tools systematically while producing literature evaluations. "*I have found meaningful ways in writing literature review systematically by using the tools*," said one participant in a very brief statement. This sums up how well the workshop worked in delivering useful, relevant information and abilities that attendees could use right away in their own studies.

At the end of the survey session, participants were given a certificate of appreciation of their participation in the workshop.

CONCLUSION

The workshop on "Writing a Systematic Literature Review Using New Tools" successfully addressed the critical need for advanced research methodologies among lecturers and researchers at President University and beyond. By introducing essential tools like Publish or Perish, Mendeley, and Rayyan, the workshop equipped participants with the skills necessary to improve their research processes, from topic selection to systematic review. The positive feedback and high effectiveness ratings indicate that the workshop not only met but exceeded participants' expectations. This initiative has laid a strong foundation for future workshops and continuous professional development in research methodologies. The implementation of these tools is expected to lead to a significant improvement in the quality and quantity of academic publications, thus contributing to the broader academic and scientific community. Future workshops should continue to focus on practical, hands-on training and expand to include emerging tools and technologies to keep pace with the evolving research landscape.

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