

Students' Technological Literacy to Improve Academic Writing and Publication Quality

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Abstract Writing is an academic culture to be developed in higher education environment. Along with its development, the distribution of the academic works goes beyond geographic barriers, hence, making it easier for researchers to explore and obtain material for literature review. However, these conveniences are not in line with the students' ability to publish their academic writing. Thus, this research aims at identifying ways to improve students' technological literacy to increase the number of academic papers in reputable publications and reporting the collaboration results in increasing the number of student publications. Action Research was chosen as the research design, which was done by involving 63 students of a university in Sumedang Regency, consisting of 23 female students and 40 male students coming from various regions in West Java, Indonesia. The findings showed that the students' weaknesses in writing were in its originality, cited references that were not representative and credible, and the inconsistency between in-text citation and reference list. Then, this research employed seven critical steps to publish academic writing: (1) Introduce and use of technological literacy, (2) search of journals for publication, (3) writing assistance, (4) article editing, (5) similarity check, (6) journal submission, and (7) final revision assistance. These steps were found to increase the number of student publications by 84.12%. Hence, higher education institutions in Indonesia are suggested to

increase the publication numbers to enhance technology information-based academic culture.

Keywords Academic Publication, Academic Writing, Technological Literacy

1. Introduction

The higher education industry cannot be separated from the academic writing skills of the lecturers and the students [1]. Aside from being a form of academic moral responsibility in spreading knowledge, academic writing is also part of the assignments given by the lecturers to their students, whether in the form of essays, reviews, scientific articles, papers, or as one of the prerequisites to get an academic degree [2]–[4]. Therefore, academic writing is a necessity for university students. Moreover, the demand to write and publish academic papers is inevitable in higher education environment [5]. In Indonesia, this demand is outlined in a circular letter from the Director General of Higher Education No. 152/E/T/2012 concerning academic publication obligations for bachelor, master, and doctoral education. This further confirms that academic writing is important in measuring one's academic competence.

A survey conducted from 2017 to 2019 in a university in

West Java, Indonesia, found that the numbers of academic writing published by undergraduate students in reputable journals were still low. Based on an observation on the academic writing of 20 students, there are a number of notes indicating the lack of quality of their writing: 1) The references they used were rarely sourced from reputable journals of national and international scale. The majority of the references chosen were from less credible and rather outdated sources; 2) The citing technique was still manual, so there were many inconsistent citations where some citations that appeared in the text could not be found in the bibliography; and 3) The results of a plagiarism check using Turnitin showed that there was an average of 45%–70% of plagiarism in their writing. This indicates that the originality of the students' work was questionable.

In addition to their lack of writing ability, we have assumed that the phenomenon above also shows the students' lack of technological literacy. The logical consequence of this is that the work produced will not meet the requirements of reputable publications. Therefore, this research aims at identifying ways to improve students' technological literacy to increase the number of academic papers in reputable publications. This research puts more emphasis on the students' knowledge and skill improvement on technology literacy. Thus, the students should possess other fundamental skills in academic writing, such as reflection, critical thinking, and imaginative thinking. The improvement of students' skills is expected to enhance these other skills, since they do not merely have a strong relationship with reading-writing skills, but also the need to comprehend information in critical and analytical ways [6-8].

The emphasis on increasing technological literacy is important considering today's digital world of publication. The lack of technological literacy can result in a poor quality of students' academic writing, which would not be able to be published in reputable academic publications. This is because the parameters of good writing are when the writing can be published by reputable journals [9]. Therefore, critical and practical steps are needed to improve students' technological literacy so they can produce quality academic writing that meets the publishing requirements of reputable journals.

2. Literature Review

Conceptually, writing is considered inseparable from the academic life of a student, especially writing academic work [2], [3], [10]. In addition, the ability to write becomes important for a student because it can be used as a means of discovery, coming up with new ideas, organizing and clarifying concepts or ideas, and practicing objectivity as academics who are required to be able to conduct and publish research [11], [12].

The act of academic writing cannot be separated from

the act of reading academic writing, which is why literacy is closely related to aspects of reading and writing [13]. To write good academic writing, it is necessary to read good academic writing beforehand. Generally, the parameter of good academic writing is its publishing in credible and reputable publications. To explore the publications in today's internet era, information literacy and mastery of information technology related to academic writing are needed [9].

Cumming, Lai, & Cho [14] state that a major challenge for students in learning to write for academic purpose is developing the ability to effectively and appropriately integrate source material into written compositions. In their study, they found that (1) students experienced difficulties with, but develop certain strategies to deal with, the complex processes of writing from sources; (2) prior knowledge and experience influenced students' performance in writing from sources; (3) differences may appear between L1 and L2 students in their understanding and uses of sources in writing; (4) performance in tasks that involve writing from sources varied by task conditions and types of texts written and read; and (5) instruction could help students improve their uses of sources in their writing.

Furthermore, Guzmán-Simón, García-Jiménez, and López-Cobo, [15] state that students' digital competence is part of a process of academic literacy that requires the development of information and ICT literacies. In their study, they analyzed the development of information and ICT literacies in relation to academic literacy practices in the learning process in undergraduate studies at universities in Spain. Their findings indicate a wide gap between digital competence developed in informal learning contexts and its scarcity in university literacy practices (formal learning settings). In general, Spanish University academic practices did not incorporate ICT and information literacies processes as a part of students' academic literacy. Deficient ICT and informational literacies may lead to difficulties in the professional development of teachers. Therefore, it can be concluded information and ICT literacies are important in writing to identify or assess the credibility of the writer.

In relation to this, Choudhri et al. [16] conducted a study on bibliometric parameters. They state that bibliometric parameters have become an important part of modern assessment of academic productivity. These parameters exist for the purpose of evaluating authors (publication count, citation count, h-index, m-quotient, hc-index, e-index, g-index, i-10 [i-n] index) and journals (impact factor, Eigenfactor, article influence score, SC Imago journal rank, and source-normalized impact per paper). Effective use of existing and emerging bibliometric tools can aid in assessment of academic productivity, including readiness for promotions and other awards. However, if not properly understood, the data can be misinterpreted and may be subject to manipulation. Familiarity with bibliometric parameters will aid in their effective

implementation in the review of authors—whether individuals or groups—and journals, as well as their possible use in the promotions review process, maximizing the effectiveness of bibliometric analysis.

Based on the discussion above, this research is motivated by the low level of information technology literacy in academic writing, which causes the low level of student publication. Thus, the aim of this research is to identify ways to improve students' technological literacy to produce quality academic writing and meet the requirements of reputable academic publications. On a national scale, reputable journals are the journals indexed by the Science and Technology Index (SINTA), an official portal made by the Indonesian government to assess journal performances based on accreditation and citation standards by indexing all national journals that have been accredited by the National Journal Accreditation (ARJUNA–*Akreditasi Jurnal Nasional*) [17], [18]. In addition, SINTA contains performance measure of Science and Technology, which includes the performance of researchers, authors, journals, and science and technology institutions [19]. SINTA is different from existing indexing tools, such as Google Scholar, Garuda Portal, Indonesia Science and Technology Index (InaSTI), and Indonesian Publication Index (IPI). SINTA leads to global (International) indexing portals like Scopus, which have more features, such as Citation, Networking, Research, and Score [20], [21]. The criteria for reputable international journals are journals indexed by indexing institutions, including ScienceDirect, Proquest, Ebscho, Web of Science, Scopus, and the like [22]–[24].

3. Methods

3.1. Design

To support the results, action research (AR) was chosen as the design of this research. Given its theoretical and political roots, AR is often used to explore critical pedagogical issues [25]. This is in line with the problem of the lack of technological literacy. Therefore, AR aims at exploring the problems in this research to find the solutions [26]. In addition, this research design can be used as an effort to understand self-practice so as to enable improvements in every action taken [27]–[29]. Through AR, the planning, implementation, and reflection on every step could take place [30].

3.2. Collaborative Aspect

In AR, there is a collaborative process between researchers and practitioners as a collaborative team [26], [31]–[35]. To initiate the collaboration, the researcher used the method from Heil (2005), which was to announce what was needed in the project. At the time the project was

announced, one colleague who had a language qualification was interested to be involved because the project dealt with increasing technological literacy requiring a language expert. In addition, the experience and strategy to publish scientific papers needed in this research were met by another colleague who had research methods qualifications and had published many international publications in reputable journals. Studies that employ collaborative action research processes in education involve collaboration between teachers, or between teachers and researchers [37], [38]. Together, we designed the requirements for the research, such as a solution-based learning plan; developed digital technology literacy indicators for academic writing; and determine what students must master at the end of the project. We decided that the students should be able to have information technology literacy and produce an article submitted to a journal of accredited national scale or reputable international scale.

3.3. Research Procedure

Three steps were taken in this research. The first was the pre-action analysis. This step aimed at identifying the problems faced by the students in academic writing. After the problems were identified, the researchers compiled a number of learning plans in an effort to provide solutions and compile indicators of success to set the expected change, so that the planned solutions were problem-based and have clear objectives.

Then, the second step was the implementation of the action. This step was the actualization of the plan. Each stage in the implementation of action was accompanied by a reflection to allow for improvement in each stage.

Lastly, the third step was the post-action analysis. This step was an evaluation of all actions given in the research. The data in this step was interpreted to identify the extent of the success achieved.

3.4. Location and Description of Participants

This research was conducted in a quite popular university that focused on education in West Java, Indonesia. The campus has been intensively encouraging their students to make academic publications. This is implemented in the university's policy that requires publication as a prerequisite to finishing the study. There were 63 participants, which comprised of 23 female participants and 40 male participants. They were final year students who were completing their studies so they already have research material. They were also categorized as digital natives.

3.5. Data Collection

Data were collected using survey, observation, and

semi-structured interview to get a realistic picture of the participants' behavior in academic writing. The survey was conducted through Google Documents and using the Likert and Guttman scales [39], [40]. In today's digital era, Google Docs has become an advantageous and easy-to-use survey tool [39]–[44]. Therefore, the research instrument used consisted of observation guidelines, interview guidelines, and questionnaires.

3.6. Indicator Development

To support the expected outcome of this research, we developed an information technology literacy rubric to identify the success achieved in this action research. This research seeks to compare the students' academic writing development in pre-action, implementation, and post-action stages. The rubric is presented in Table 1 below:

Table 1. Rubric of Information Technology Literacy for Academic Writing

No	Skill	Indicator
1	Mastery of tools that support practicality in academic writing in Microsoft Word application	a. Utilizing the headings feature in writing articles
		b. Utilizing the insert caption feature in writing articles
2	The ability to reference sources on information technology-based academic publications	a. The references used are sourced from accredited national and/or reputable international journals
		b. The references used are published in the past 10 years
3	The ability to use one of the reference manager applications	a. Citation and reference lists are consistent
		b. Citation is done using the system and not manually
4	The ability to write quality articles	a. Plagiarism check results below 24%
		b. Received and published in one journal

4. Result

4.1. Pre-action Analysis

In this step, we explored the issues of the lack of student publications in reputable journals. To support these results, we collected information on the participants' experience in writing and publishing as well as their knowledge and

skills in utilizing technology. This is important to map their initial skills and formulate strategic steps to achieve the research objectives.

To obtain the information above, we surveyed 63 students who were the participants of this research on their experience in writing and publishing. To conveniently collect and process the data, the survey was conducted via Google Forms [41], [43]. The results of the survey are presented in Table 2 below.

Table 2. Academic Writing and Publishing Experience

No	Questions	Yes	No
1	Have you ever taken an academic writing training?	63	
2	Do you have written material to publish?	63	
3	Have you ever tried submitting your academic writing to a journal?	36	27
	Have you ever successfully published your work in academic publications such as journals or proceedings?		
4			63

Table 2 above shows that 63 (100%) participants have received scientific writing training. Then, all of them (100%) claimed to have written materials to be published. Furthermore, of the 63 participants who had written their academic writing, 36 (57.14%) of them had tried submitting their work in a journal and 27 (48.86%) of them had never done so. However, of all the participants who claimed to have written materials, none had succeeded in publishing their work, including the 36 people who tried to submit them.

From the survey results above, it can be concluded that all participants have had academic writing experience, received some training, and attempted to publish their work. However, their efforts have not yet paid off. This indicates that the experience they gained in the training was not enough to publish their academic writings. This was allegedly because the training they received has not covered strategic steps to publish their work in reputable academic publications. This is proven by the fact that none of their works has been published.

With regards to the unsuccessful attempt of the 36 participants in submitting their work on journals, we explored the underlying reasons behind it. This exploration was done by conducting semi-structured interviews with the participants. The interview data were processed and classified based on factors that cause their writing not to be published or rejected by the publishers. The results of the interview data processing are depicted in Figure 1 below:

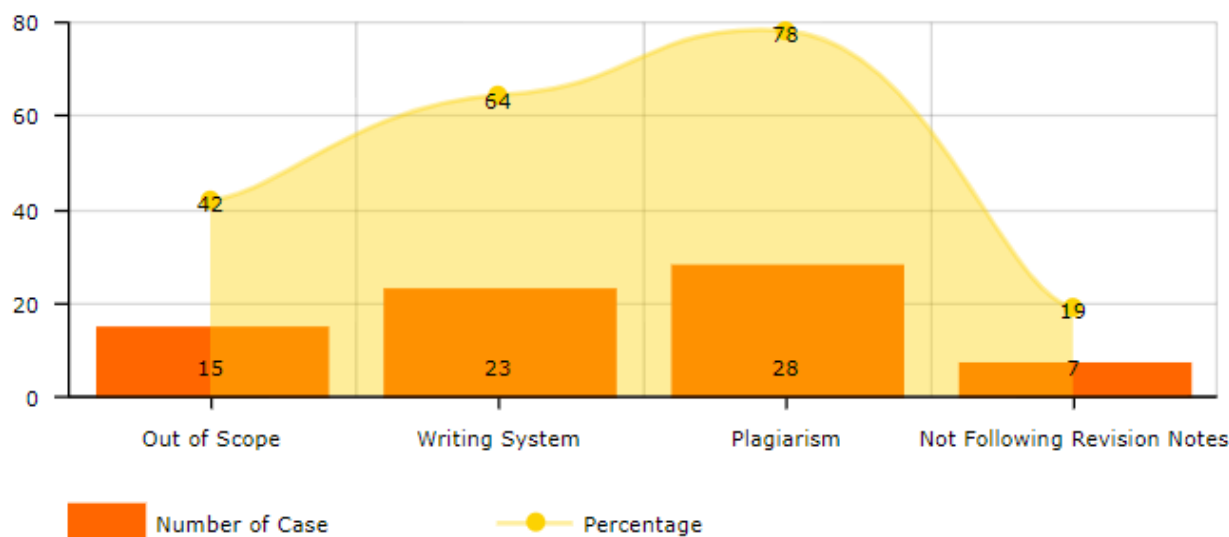


Figure 1. Factors Causing Unsuccessful Publications

Figure 1 above shows that, out of 36 (100%) participants who submitted their work, 15 (42%) cases were rejected because their topics were out of the scope of the journal. This indicates that the participants did not read the scope of the journal they were aiming for. In addition, from the results of the interviews, some participants showed a lack of knowledge in finding journals that match the research topic.

Furthermore, 23 (64%) cases were rejected because the writing style was incompatible with the journals. This also indicates that they did not read the guideline of the journals. For example, they did not meet the IMRAD pattern (Introduction, Method, Result, and Discussion) a general writing style in academic writing and they did not follow the procedures for citing and referencing, tables and pictures presentation, and tables or figures captioning.

Moreover, 28 (78%) cases were rejected because the similarity check results exceeded the limit, which was 24%. This indicates that the participants' works in citing and referencing still used the "copy-paste" method. In addition, we also found seven students' works that were not immediately rejected by the publishers but were given revision notes. However, the feedbacks from the publisher were not followed up until they passed the submission deadline.

To follow up the last results, we explored the reasons why these participants did not follow the revision notes. We found that three of them had difficulty meeting the requirements to cite reputable international journals. Then, three others had difficulty finding relevant journals published in the last five years. Lastly, one participant did not follow the revision notes because s/he did not know revisions had to be done. This indicates that the participants' journal literacy was very minimal.

Based on their experience and cases that caused their academic writings to be rejected by publishers, we

assumed that the 63 participants of this research had low technological literacy that needed to be improved. To prove this assumption, we conducted a survey to explore how technologically literate were the participants. The survey results are presented in Table 3 below:

Table 3. Technological Literacy in Academic Writing

No	Question	Yes	No
1	Do you know the use of the Headings, Insert Caption, and Track Changes features in Microsoft Word?	9	54
2	Do you know of applications such as Google Scholar, e-Resource, Taylor and Francis, and Publish or Paris?	2	61
3	Do you know one of these reference manager applications (Mendeley, EndNote, or Zotero)?	6	57
4	Do you know how to obtain information about cluster/ranking in journals as a publication media?	4	59

Table 3 above further strengthens the assumption about the lack of knowledge related to technological literacy. This can be inferred from the answers to the survey questions. Only 9 (14.28%) participants knew about the headings, insert caption, and track changes features in Microsoft Word. Meanwhile, the remaining 54 (85.72%) participants did not know the benefits of these features for academic writing even though these features are quite helpful in academic writing. For instance, the headings feature makes it easier to manage chapters and sub-chapters. It also allows for creating automatic table of contents creation, maintains writing consistency, and makes for neater writing. Moreover, the insert caption feature functions to provide information about illustrations, figures, or tables that are usually present in academic writing. Finally, the track changes feature helps make the editing process easier.

Based on question number 2 in Table 3 above, only 2 (3.17%) participants knew the applications for searching or obtaining information in the context of searching books, journals, academic work, and the likes for research purposes. The other 61 (96.83%) participants did not know about the applications such as Google Scholar, e-Resource, Tailor and Francis, or Publish or Perish. This is why they often complained about difficulties in finding journal literature.

With regards to the participants' knowledge of the reference manager applications, 6 (9.53%) of them knew about Zotero, Mendeley, and EndNote, while the other 57 (90.47%) did not know any reference manager applications. As a result of not using reference manager applications, there are often cases where the participants wrote citations in their academic writing but the citations were not listed in the reference list because they did it manually. In addition, some participants became reluctant or found it difficult to follow the feedback from publishers regarding changes in reference styles. For example, there are cases where the participants cited APA 6th style, but the publishers are required to use Vancouver style. Since the participants did the citation process manually one by one, this reference

style change became burdensome.

Furthermore, 4 (6.35%) of participants knew how to obtain information about journal clusters or rankings, while 59 (93.65%) participants did not. It is important for authors to understand journals clusters or journal if they want to publish their writings or to use source as a reference. This is because, basically, good academic writing is only published in good publications; good academic writing also must refer to good articles [9]. The indicator of whether or not a publication media is good can be inferred from whether or not the publisher is certified. For example, some Indonesian journals are accredited and some are not. In accredited journals, there are ranks in the range 1–6. Likewise, the quality of international journals can be inferred from its indexing institutions, for example indexed Scopus or web of science [9], [17]–[20], [23].

To further strengthen our assumptions about the lack of participants' technological literacy, we examined the article drafts that they wrote. Our examination was carried out by referring to the rubric in Table 1. We instructed the participants to submit their articles through Google Classroom. The results of our examinations showed their initial technological literacy is presented in Table 4 below.

Table 4. Initial Technological Literacy

No	Skill	Indicator	Total	Percentage
1	Mastery of tools that support practicality in academic writing in Microsoft Word application	a. Utilizing the headings feature in writing articles	8	12.7%
		b. Utilizing the insert caption feature in writing articles	7	11.1%
2	The ability to reference sources on information technology-based academic publications	a. The references used are sourced from accredited national and/or reputable international journals	1	1.59%
		b. 70% of the references used are published in the past 10 years	0	0%
3	The ability to use one of the reference manager applications	a. Citation and reference lists are consistent	9	14.29%
		b. Citation is done using the system and not manually	6	9.52%
4	The ability to write quality articles	a. Plagiarism check results below 24%	5	7.9%
		b. Received and published in one journal	0	0%

Although the participants were lacking in technological literacy, their motivation in writing and publishing was very high. This can be inferred from the results of the survey that addressed their motivation in writing and publishing their academic writing, as presented in Table 5 below:

Table 5. Participants' Motivation in Writing and Publishing

No	Question	SD	D	N	A	SA
1	Academic writing is merely to fulfill college assignments	30	21	1	5	
2	Academic writing is a demand and challenge as an academic		5	4	49	5
3	Publishing academic writing is important in disseminating knowledge				56	7

The table above shows that the majority of the participants disagreed with the statement that academic writing is merely to fulfill college assignments and only 5 (7.94%) participants agreed with the statement. Furthermore, most participants agreed that academic writing is a demand and challenge as an academic even though 4 (6.35%) participants were neutral and 5 (7.94%) participants disagreed. In terms of motivation, most participants agreed that publishing academic writing is important in disseminating knowledge. In conclusion, the motivation of the participants in writing and publishing academic writings can be considered quite good. However, this motivation needs to be balanced with good technological literacy so that they can produce quality academic writing.

4.2. Pre-action Evaluation Results

From the results of the analysis above, it can be concluded that there are several factors that caused the lack of academic publications in reputable journals. The factors are as follows:

1. Inattentiveness in reading the scope and author guidelines in journals. This can be inferred from the fact that many academic writings were rejected because they were outside the scope, had poor writing

style, had improper citation techniques, and had inconsistencies between citation and bibliography.

2. Lack of commitment in meeting the demands of reviewers in making improvements, such as the demand to use referred literature sources. This is also the impact of the lack of knowledge on how to find and obtain good literature sources.

The two factors above are the impact of participants' lack of knowledge about publications, especially in their ability to use technology. Therefore, the technological literacy of the participants needs to be improved so that their academic writing can be published in reputable scientific publications.

4.3. Implementation of Actions

Based on the results of the analysis above, there are seven stages carried out to improve student technology literacy. The stages are as follow.

- 1) Stage 1. Introduction to Tools for Academic Writing

At this stage, all participants were introduced to the tools that can facilitate them in academic writing. The tools introduced include features in Microsoft Word, applications for searching reference sources, and reference manager applications.

In Microsoft Word, they were introduced to several features. The first is headings for the mapping process in writing. This feature makes it easy for them to move from one point to another, as well as to maintain the consistency of those points. The next feature is insert caption, which is needed to caption tables or figures and to maintain the consistency of their numbering. This feature is important to avoid mistakes in numbering the tables and figures.

For applications for searching reference sources, they were introduced to Publish or Perish (POP), which is an application used to map and evaluate a literature, identify potential research gaps, and search for literature within a certain timeframe based on keywords. The preview of Publish or Perish application is presented in the following figure:

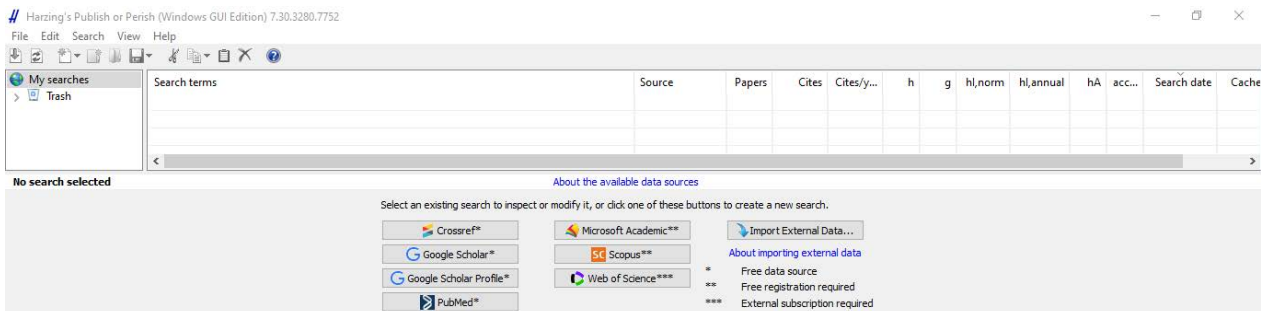


Figure 2. Publish or Perish Application Preview

For the reference manager application, the participants were introduced to Mendeley. This application was chosen because it is quite accurate compared to other reference manager applications such as EndNote, Zotero, and RefWorks [45]. Mendeley is reference management software and academic social network that can help the participants organize research, collaborate with other researchers online, and find recent research publications. Mendeley is open source software that can be obtained for free. In addition, Mendeley is a combination of a desktop application and a website that can be used to manage, share, and find references [46]–[48].

The introduction of the tools was done in two face-to-face classroom sessions. The participants were introduced to the features in Microsoft Word and POP in the first session and to Mendeley in the second session. During the sessions, the participants were instructed to study the manual books of the applications that we had previously prepared. Additionally, we prepared tutorial videos on how to use the applications for them to watch.

After the sessions, we evaluated the participants using a survey. The results of this survey are presented in Table 6 below.

Table 6. Participant Technology Literacy Level

Category	Total	Percentage
Completely Understand	15	23.81 %
Understand	46	73.01 %
Not Really Understand	2	3.18 %
Do Not Understand	0	0
Completely Do Not Understand	0	0

Table 6 above shows that the majority of the participants understood the materials about the applications that are closely related to technological literacy. However, the results of this evaluation need to be proven further because they are the participants' perceived results.

2) Stage 2. Selection of Publication

At this stage, the participants were instructed to choose the journal they want to use to publish their academic writing. They were asked to choose according to their research topics. To help find and determine the journal, they were given two journal indexing links. Specifically, they were given a link to SINTA (<http://sinta.ristekbrin.go.id>) as an Indonesian national journal indexer and a link to Scopus (<https://www.scopus.com>) as an indexing agency for reputable international journals.

Through the two links, the participants can get information on various types of journals that can be searched based on their research topic. In the SINTA indexing portal, there is information on journal rankings on a scale of 1–6. The ranking of Scopus indexed journals can be checked via the <https://www.scimagojr.com> page by entering the journal title, ISSN, or the publisher's name

after which the journal ranking information from quartile 4 to quartile 1 will be obtained.

At this stage, all the 63 participants found 63 targeted journals where they want to publish their academic writing. The journal categorization is presented in Table 7 below:

Table 7. Categorization of Targeted Journal

Category	Total	Percentage
National - SINTA 4 Indexed	28	44.44 %
National - SINTA 3 Indexed	25	39.68 %
National - SINTA 2 Indexed	7	11.11 %
International - Scopus Q4 Indexed	2	3.17 %
International - Scopus Q3 Indexed	1	1.58 %

Table 7 above shows that the majority of participants have targeted to publish in accredited national journals; 28 (44.44%) participants targeted the SINTA indexed rank 4 journals, 25 (39.68%) participants targeted the SINTA indexed rank 3 journals, and 7 (11.11%) participants targeted the SINTA indexed rank 2 journals. In addition, 3 participants targeted reputable international journals with 2 (3.17%) of them targeting Scopus indexed journals in quartile 2 and 1 (1.58%) participants targeting Scopus indexed journals in quartile 3.

From the information obtained, we then investigated the reasons for the participants in selecting national journals. For this, we asked three participants with semi-structured interviews. The question was “Why are you targeting national journals instead of international journals to publish your academic writings?” From this question, Participant 1 stated that s/he has limited English skills and will need a translator in the writing process as she/he targets international journals, which require longer process and additional cost. Then, Participant 2 stated s/he wanted her/his academic writings to be read, utilized, and developed by Indonesians. Lastly, Participant 3 stated s/he wants to learn gradually before making international publications.

Similarly, we asked the reasons of three participants who targeted international journals. The question given to them was “What is your motivation in targeting international journals?” Participant 1 stated that s/he wanted to test her/his abilities and see if s/he was able to publish in international journals with her/his English skills. Moreover, Participant 2 stated that s/he wanted to get feedback from international reviewers, and if the feedback received was difficult to fulfill, s/he will target other journals below the initial target rank.” Lastly, Participant 3 stated that s/he wanted to fulfill her/his supervisor's advice.” The participants' answers reflected a high motivation in publishing their academic writing. However, an important point in this stage was that they knew how to get the information needed and were able to choose appropriate publication media.

At this stage, we also crosschecked the suitability between the scope of the targeted journals and the topics of

the participants' writing. The results of the crosscheck showed that the scope of the journals they selected were journals in the field of education. This can be considered suitable because the participants were students of education major.

3) Stage 3. Guided Article Draft Revision

After setting the target publications, the participants were instructed to revise their article drafts. The improvement process is carried out with assistance. In this stage, there were three improvement steps to be taken. The first step was to improve the writing procedures and style so to fit the style guide of the intended journal, such as the type of font, font size, how to present images, tables, and so on. In this step, the participants were instructed to utilize the headings and insert caption features in Microsoft Word. After that, the next step was the enrichment and selection of updated reference sources. In this second step, the participants were instructed to utilize Publish or Perish from harzing.com by looking for relevant articles published in the last 10 years. Finally, the last step was to improve how to cite and to compile a bibliography list. In this step, the participants were instructed to utilize Mendeley. These three steps were the implementation of the materials they got in Stage 1.

Following that, we examined the participants' articles based on the three improvement steps. The results showed that all of the participants' articles were in accordance with the template of the target journal. In addition, from 56 articles written by the participants, 72% of the citations were sourced from reputable national and international journals published in the last 10 years. Furthermore, the citation and bibliography compilation methods were no longer manual but based on the system because they utilized Mendeley. This showed that the participants have mastered the tools that can be used in academic writing. In other words, all participants have integrated technological literacy in their writing process.

4) Stage 4. Editing

After Stage 3, we conducted initial editing of the article drafts. The editing process was done to provide input and correction on the article content. Through Google Classroom, we provided notes on the articles in the comment feature in Microsoft Word. After that, the participants were instructed to improve their articles according to the notes and within a specified timeframe. To

track the improvements made, we instructed the participants to activate the track changes feature in Microsoft Word when editing. The results of the editing reflected the given notes, both in terms of dictions and material substance.

5) Stage 5. Plagiarism Check in Turnitin

In this stage, we instructed the participants to create a Turnitin account and upload their articles there based on the class id and enrolment key that we provided. The first Turnitin check results showed that 23 (36.50%) articles had a similarity level of 30–40%, which was exceeding the reasonable limit (24%). However, the remaining 40 (63.50%) articles had a similarity level of 10%–20%. Basically, the results of the first check had shown improvement from the previous condition, i.e. there were only five articles with reasonable similarity levels. This can be interpreted that the previous stages resulted in an increase in originality of 35 (55.55%) articles.

As a follow-up step, we instructed the 23 participants whose article had similarity rates above 24% to make improvements by paraphrasing the texts that were detected to be similar with without changing the substance. Afterward, we instructed them to re-upload their articles to Turnitin. The results of the second plagiarism check showed that all levels of similarity in the 23 (36.50%) articles were below 24%.

6) Stage 6. Submission

Upon checking for similarity, we instructed and guided the participants to submit their writings to their chosen publication media. The submission guidance included the use of the OJS system, from registration to data input and file uploads. The results of this stage showed that 63 (100%) participants had succeeded in submitting their articles in their chosen journals.

Within a period of two to three months after the submission process, all participants received a decision from the publisher. The feedback from the publisher is presented in Table 8 below.

Table 8 shows that the submitted articles were accepted and can be published by the publishers. There were three different decisions from the publishers. First, 19 articles were accepted without revision. Second, 34 articles were accepted with minor revisions. Third, 12 articles were accepted with major revisions.

Table 8. Feedback from Publishers

Category	Rejected	Accepted		
		No Revision	Minor Revision	Major Revision
National - SINTA 4 Indexed	-	17	10	1
National - SINTA 3 Indexed		2	17	8
National - SINTA 2 Indexed			6	1
International - Scopus Q4 Indexed			1	1
International - Scopus Q3 Indexed				1

7) Stage 7. Guided Final Revision

At this stage, we provided assistance to 46 participants in revising their articles in accordance with the feedback from reviewers. In the minor revision category, most improvement feedback is concerned with typos and incomplete reference information, such as DOI. Since the participants who got minor revisions can carry out the revision process independently, the revision assistance was focused more on the participants who got major revisions. In the major revision category, most improvements were substantial, such as diction organizations, data validation, and the like. However, participants can follow all feedback eventually.

As a final result of this stage, the number of articles published was 52 articles in national journals and 1 article in international journals. The remaining 10 articles were not published due to other factors. For instance, two articles were not published in international journals due to high publication costs and eight articles were not published in national journals due to late submission.

4.4. Post-action Evaluation

Upon evaluation, it can be stated that the seven stages take in this action research can improve the technological

literacy of the research participants and increase the number of publications in reputable journals. These improvements are illustrated in Figure 4 below.

Based on Figure 3 above, it can be inferred that there were significant improvements in the 2 indicators of each skill. For instance, in the mastery of Microsoft Word applications, the first indicator increased by 87.30% and the second indicator increased by 88.89%. On average, the improvement in the mastery of tools in Microsoft Word increased by 88.09%.

On the ability to reference sources on information technology-based academic publication, the first indicator increased by 98.41% and the second indicator increased by 88.89%. This means that the ability increased by 93.65% on average.

Furthermore, on the ability to use one of the reference manager applications, the first indicator increased by 85.71% and the second indicator increased by 90.47%. This means that the ability increased by 88.09% on average.

Lastly, on the ability to write quality articles, the first indicator increased by 85.71% and the second indicator increased by 84.12%. This means that the ability increased by 84.92% on average.

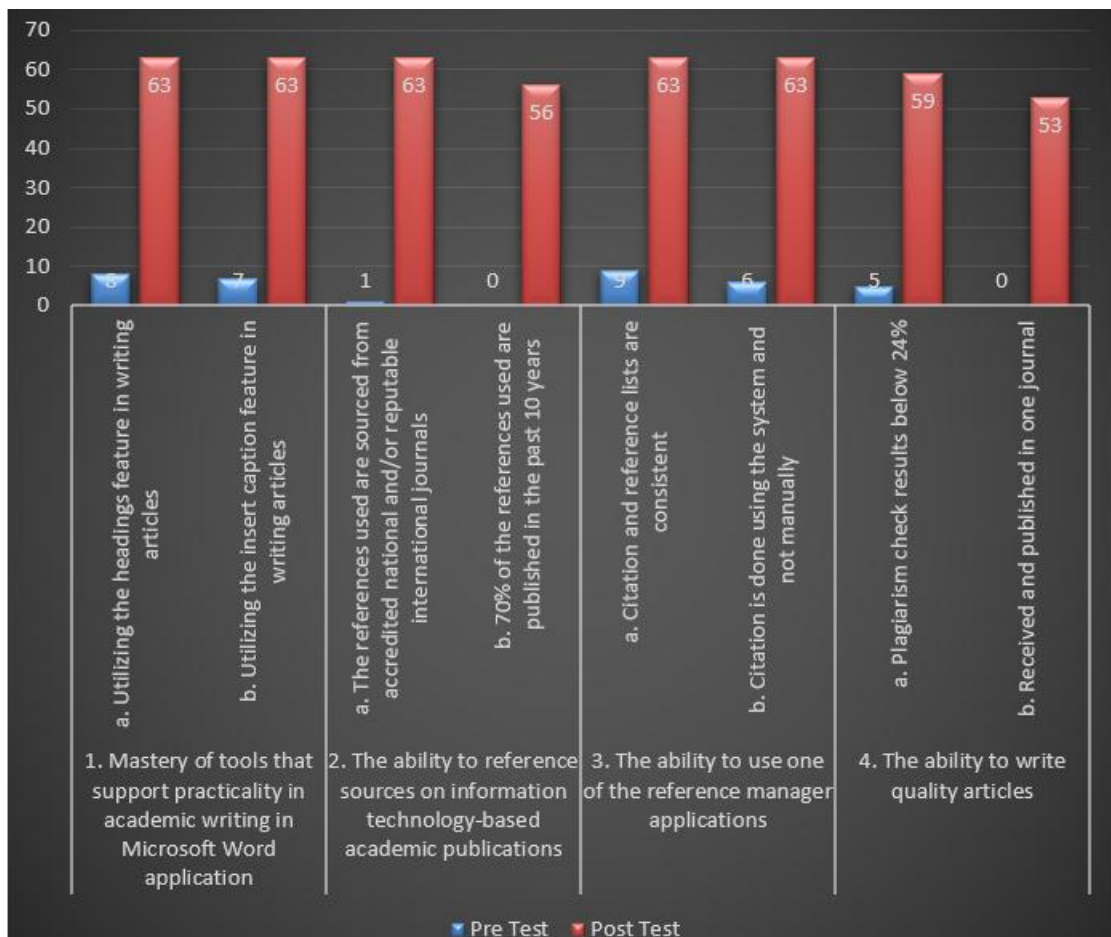


Figure 3. Action Evaluation Results

5. Discussion

Along with the development of internet-based information technology, the media to publish academic writings in the form of digital journals has been very widespread and is easily accessible to all people around the world [49]–[51]. This applies both to national and international journals. Aside from being a publication media, academic journals are also a media of information for academics in exploring and reading the results of other people's research [52]. This creates intellectual dialectical processes among scientists, especially in developing the research results of others or filling research gaps that have not been filled by others. The existence of internet-based publication media should ideally be meaningful learning for academics, especially higher education students, in expressing ideas or thoughts to the public. In other words, publishing academic writing can foster a positive and creative mindset in academic writing [53], [54]. Therefore, academic writing becomes a tradition that is learned by students in every learning activity in higher education [2].

Conducting research then publishing academic writings has a vital role in higher education and research institutions because they are key indicators of both institutions. The progress of higher education and research institutions is measured by how many (quantity) academic writings they publish. The more academic writing they have, the better their image [55]. Aside from quantity, academic writing is also measured in terms of quality, which is how much direct and indirect impact is generated by it. In addition to being measured from the impact of the academic writing, which can be inferred from the number of citations, its quality is also measured from the journals that publish them [56], [57].

Current trends show that good quality journals are those indexed by journal indexing institutions such as ScienceDirect, Proquest, Ebscho, Web of Science, Scopus, and the like [22]–[24]. In Indonesia, Scopus indexed journals are used as good quality parameters for academic writing. Therefore, many researchers in Indonesia make Scopus indexed journals as references in their studies. However, this research found cases where undergraduate students who had received intensive guidance to publish their academic writing, gone through a review process from publishers, and were declared accepted for publication, but could not publish their work due to high costs. Although publishing academic writing in international journals can be an achievement for undergraduate students, they often cannot do so because they do not have financial support. Therefore, such factors need to be considered by institutions such as universities.

In the context of learning, success in increasing the number of student publications as described in this action research is closely related to one's ability to develop and provide breakthroughs in learning as well as the ability to adapt and integrate technological developments in learning.

In other words, an educator needs to continue to develop their learning. The ability of educators in developing learning implies that an educator must have good literacy by exploring studies that can improve their abilities, for example how teacher learning is researched and propose or discuss models of teacher professional learning [58]–[62]. It is important to pay attention to how teachers learn and change by developing theory or applying theory to the discussion of teacher change [63]–[65]. Therefore, in line with the results of this research, an educator needs to practice the action research approach in an effort to improve the quality of learning.

6. Conclusions

This research has found that to increase the number of student publications in higher education, seven stages of activities as outlined in the previous chapters are needed, starting from introduction of tools for academic writing to advocacy of revisions. An important and fundamental thing in academic writing is a strong motivation and understanding of basic writing techniques. However, to increase the number of publications, students need to be equipped with understanding and mastery of information technology in academic writing such as mastery of features in Microsoft Word, the Publish or Perish application to search for sources of information from journal indexing institutions, and reference manager applications to collect references digitally and cite and compile bibliography.

The seven steps taken in this action research show there are improvements in four aspects. First, there is an 88.09% increase in the ability to use features on Microsoft Word. Second, there is a 93.65% increase in the ability to trace references from journal indexing institutions. Third, there is an 88.09% increase in the ability to use the reference manager application. Fourth, there is an 84.92% increase in the ability to produce quality academic writing. The fourth increase is the impact of three previous ones.

The limitation in this action research is the participants that only consists of undergraduate students. The seven stages to increase the number of publications that are developed in this research can provide further insight if the participants in the research also include graduate students who have the obligation to publish in reputable international publications.

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