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THE IMPORTANT ROLE OF RESEARCH AND PUBLICATION OF SCIENTIFIC WORKS IN THE WORLD OF EDUCATION

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Abstract

Research and publication of scientific papers are inseparable because research will be in vain if it is only stored in archives or libraries and not published in journals or presented in seminars. Educators, especially teachers, and lecturers, must be more professional and competent in carrying out their duties, so they must conduct research to find new things in the fields of science they are engaged in. The purpose of writing this article is to see the important role of research and publication of scientific papers in education. We all know that the field of education has changed a lot since the Covid-19 pandemic. The learning process has become more flexible, where it is no longer limited to classrooms or rooms but can be done anywhere and anytime. However, several things must be considered in the development of this world of education, namely how research and publication of scientific papers need special attention from the government. By using qualitative research methods and a phenomenological approach, this article tries to analyze how the government views this research and publication as important so that regulations or laws need to be made to develop this field of research. The science that continues to develop needs to be followed by ongoing research and publication so that education does not stop at one point but continues to move following the progress of science.

Keywords: Science, Research, Education, Publication.

1 INTRODUCTION

Research is a creative and systematic work undertaken to increase knowledge (OECD, 2015). Research involves the collection, organization, and analysis of evidence to increase understanding of a topic, characterized by special attention to controlling sources of bias and error. This activity is characterized by accounting for and controlling bias. A research project may be an extension of previous work in the field. To test the validity of an instrument, procedure, or experiment, research may replicate elements of a previous project or the project as a whole. According to Article 1 of the Regulation of the Minister of Research, Technology, and Higher Education Number 20 of 2018 concerning Research, it is stated that Research is an activity carried out according to scientific principles and methods systematically to obtain information, data, and statements related to understanding and proving the truth or falsity of an

assumption and/or hypothesis in the field of science and technology and drawing scientific conclusions to advance science and/or technology.

Scientific research plays an important role in the development of science. Research activities must be based on a methodology that is appropriate to the characteristics of the problems and data being studied (Muslih, 2007). The philosophy of science contributes to providing a theoretical and paradigmatic foundation for research, as well as helping researchers test and criticize scientific assumptions and methods (Muslim et al., 2023). Ethics is also an important aspect in the development of science so that the knowledge produced is useful for humanity. In the context of Indonesia, the development of science needs to pay attention to the character and religious dimensions of the nation (Maftukhin, 2015). Islam views science as a system built on three pillars: ontological, axiological, and epistemological. Alignment between scientific and religious aspects is needed to apply science properly and foster the scientific spirit of Muslims (Kumara et al., 2020).

Research and publication of scientific papers are essential to advance science and develop human civilization. Universities and educators are increasingly focusing on improving research and publication capabilities to meet government requirements and enhance professional development (Mahmudati et al., 2022; Retnowati et al., 2018). Studies have shown that there is a positive trend in research performance and publication scores across academic positions, with professors leading in this area. However, teachers and lecturers often face challenges in conducting research and publishing their work due to time constraints and lack of experience (Setiawan & Trisnawati, 2018). To address these issues, various training programs and workshops are being implemented to improve research and publication skills among educators, focusing on research design, implementation, and publication processes. These initiatives aim to motivate and equip educators with the knowledge needed to contribute to scientific progress through their research and publications.

2 METHODOLOGY

The method used in writing this article is a qualitative research method. This method is based on the philosophy of post positivism to examine social phenomena holistically and naturally. The researcher acts as a key instrument, using purposive sampling and triangulation techniques in data collection. Data analysis is inductive and emphasizes meaning rather than generalization (Abdussamad, 2021; Fadli, 2021). Its strength lies in the ability to provide complex textual descriptions of individual experiences. Meanwhile, the approach used is an analytical

descriptive approach, namely an approach that emphasizes an in-depth understanding of social phenomena. Data analysis in this article includes data reduction, data presentation, and concluding. Although this method is flexible and respects diverse perspectives, the researcher still acts as a key instrument in data collection and interpretation. This approach is suitable for research that aims to reveal phenomena holistically-contextually in natural settings.

Qualitative data analysis includes a variety of traditional and new approaches, including ethnography, grounded theory, phenomenology, and postmodern influences, as well as analytical methods for existing documentation and data management using computer programs (Grbich, 2013). Descriptive analysis is used to describe the characteristics of the population or phenomenon being studied. This study does not answer questions about how/when/why these characteristics occur. The characteristics used to describe a situation or population are usually in the form of a kind of categorical scheme also known as descriptive categories. Therefore, descriptive research cannot describe what causes a situation. Thus, descriptive research cannot be used as a basis for causal relationships, where one variable affects another variable. In other words, descriptive research can be said to have low internal validity requirements.

3 FINDINGS AND DISCUSSION

3.1 Research

Indonesia has implemented laws governing research and innovation. Law No. 18/2002 on the National System for Research, Development, and Application of Science and Technology was replaced by Law No. 11/2019 on the National System for Science and Technology (Sofanudin, 2020; Telaumbanua, 2020). This new law led to the establishment of the National Research and Innovation Agency to oversee research across ministries and institutions. Researchers must adhere to ethical and legal guidelines, particularly in high-risk studies, with potential legal consequences for violations (Adi, 2014). The law also addresses the protection of traditional knowledge and cultural expressions, with the state holding copyright and responsible for their preservation. Proper management and legal protection of traditional knowledge and cultural expressions have the potential to improve the lives of indigenous peoples by securing their intellectual property rights (Atsar, 2017).

Law Number 11 of 2019 has nine main points, namely first, the National Science and Technology System which is used as a basis for formulating development policies in order to strengthen the carrying capacity of Science and Technology in order to achieve national goals, as well as increase the competitiveness and independence of the nation. Second, the master plan

for the advancement of Science and Technology which is used as a reference for the national long-term development plan and is the basis for preparing the national medium-term development plan. Third, technology clearing, Technology Audit, and technology transfer in Research, Development, and Assessment of Technology that is strategic and/or whose funding sources come from the Central Government and Regional Government. Fourth, Affirmation regarding the implementation of the National Science and Technology System through a process approach that includes Research, Development, Assessment, and Application and a product approach that includes Invention and Innovation. Fifth, mandatory submission and mandatory storage of primary data and output of Research, Development, Assessment, and Application results for funders, human resources of Science and Technology, and Science and Technology Institutions.

Sixth, institutions, human resources, facilities and infrastructure, funding, and networks of Science and Technology as an important part in the implementation of the National System of Science and Technology. Seventh, guidance and supervision, as well as the responsibility and role of the community in the implementation of Science and Technology to ensure the interests of the community, nation, and state and the balance of human life with the sustainability of environmental functions. Eighth, partnerships in Science and Technology with foreign countries are carried out by referring to an active free foreign policy. Ninth, for the sake of protecting biodiversity, local Indonesian specimens, both physical and digital, as well as Indonesian culture and local wisdom, arrangements are made for the transfer of materials for foreign Science and Technology institutions and/or foreigners and Indonesians with the world that are sourced from foreign funding in conducting research, development, assessment, and application as well as inventions and innovations in Indonesia.

Research plays an important role in advancing science and addressing human challenges. There are various approaches, including scientific research and development, which aim to create innovative products or models through systematic procedures. Although scientific publication is a demand, productivity in writing scientific papers is still low (Rahyasih et al., 2020). To overcome this, various efforts have been made such as training and mentoring in writing scientific papers. This training covers aspects such as article writing, journal selection, and the process of submitting manuscripts online (Gunawan et al., 2021).

Table 1. Laws or regulations related to research

No.	Types of Rules	About
1	Law Number 11 of 2019	National System of Science and Technology
2	Law No.18 of 2022	National System for Research, Development, and Application of Science and Technology
3	Presidential Regulation No. 13 of 2015	Ministry of Research, Technology and Higher Education
4	Presidential Regulation No. 38 of 2018	National Research Master Plan
5	Regulation of the Minister of Research, Technology and Higher Education No. 20 of 2018	Organization and Work Procedures of the Ministry of Research, Technology, and Higher Education
6	Regulation of the Minister of Research, Technology and Higher Education No. 27 of 2019	changes to the regulation of the Minister of Research, Technology and Higher Education Number 69 of 2016 concerning guidelines for the formation of assessment and/or review committees and procedures for implementing research assessments using output cost standards
7	Regulation of the Minister of Research, Technology, and Higher Education No. 36 of 2019	Research Information System

Source: Data Collection

The government certainly understands the role of research in the development of science by issuing various laws and regulations. Problems related to research capacity, publication, and teaching in higher education institutions in Indonesia are common and have been identified in previous studies. The study showed that Indonesia produced only 13,047 published scientific documents during the period 1996-2010, far below its neighbors such as Thailand, Malaysia, and Singapore, and below countries with lower gross domestic product (GDP) per capita and Human Development Index, such as Bangladesh, Kenya, and Nigeria (Guggenheim, 2012). Especially for social sciences and humanities, the condition is even worse. Almost 90 percent of articles about Indonesia published in international journals are written by those who do not live in Indonesia, making Indonesia one of the least effective countries in explaining itself to the world (Reid, 2011).

Although the government and international donors have invested in developing research capacity by providing scholarships for Indonesian academics to study abroad, these efforts have not been enough to erase the impact of past policies. Policies resulting from post-democratization have attempted to address these issues. In 2008, the Directorate General of Higher Education (Dikti), Ministry of Education and Culture, the regulatory body for higher education in Indonesia, allocated Rp150 billion or around US$13.7 million for research. A significant portion of this budget, namely 20 percent, was allocated for disaster management research, in collaboration with the Ministry of Research and Technology at that time (Kompas.com, 2008), indicating that this budget allocation was still intended for a technocratic agenda (Siregar, 2016).

In 2014, the new cabinet under President Joko Widodo integrated Dikti with the Ministry of Research and Technology, where Dikti functions were combined with the national research agenda. The findings and arguments in this study suggest that the reorganization will not result in significant changes to fundamental issues related to the culture of critical thinking and increasing the number of international publications. This study provides empirical evidence that the problem lies not in the allocation of the budget, but in how the budget is managed through the higher education bureaucracy which is directed to support national economic competitiveness (Rosser, 2015).

3.2 Publication of Scientific Works

The Indonesian government plays an important role in encouraging scientific research and publication. Regulations from the Ministry of Research, Technology, and Higher Education mandate that students publish scientific papers. This policy aims to improve the quality and quantity of research and publications by lecturers (Retnowati et al., 2018). Universities have responded by increasing research activities and forming consortia to organize national seminars. Institutional repositories are being implemented to ensure the originality and accountability of scientific communication. These initiatives have motivated lecturers to write scientific papers, publish in open journals, and secure research grants. The government's publication policy is expected to foster talented young writers and help Indonesia catch up in international publications (Nuriana, 2019). Overall, these efforts reflect the government's commitment to advancing scientific knowledge and developing human civilization through academic publication.

Indonesia's scientific publication output has shown an increase in recent years. As of 2022, Indonesia is ranked 40th globally and 9th in Asia for scientific publications (Gunarto & Haddy, 2023). Incentives have been found to have a positive impact on publication rates and career development for lecturers. Inter-institutional collaboration plays an important role in improving research quality, with the Indonesian Scientific Journal Database (ISJD) serving as a valuable resource for analyzing institutional collaboration (Tupan et al., 2022). Scientific publications in internationally reputable journals serve as a medium for self-actualization of scientists and researchers in the development of science internationally. Furthermore, the number of international publications also plays a role in increasing a country's self-esteem in the form of quality education and science diplomacy. Countries that have good quality education and science tend to have a high number of international publications.

Publication is also a means of conveying information that is expected to be able to provide a positive contribution to the development of scientific insight for someone. In universities, scientific publications can be in the form of magazines, journals, or digital collections in the form of e-journals and e-books which are currently an undeniable need to be used to support the teaching and learning process or as a creative process activity for all academics to generate fresh ideas as research support. So it is not surprising that the library as a research library provides scientific publications that provide a variety of information. In further developments, a repository collection emerged that specializes in managing documents produced by an institution in this case a university with the term gray literature which can be in the form of unique documents, and books that are rarely found in the book market and also documents that are often called local content. This local content publication is currently one of the benchmarks for university accreditation, thus further strengthening scientific publications as one of the instruments for assessing university accreditation.

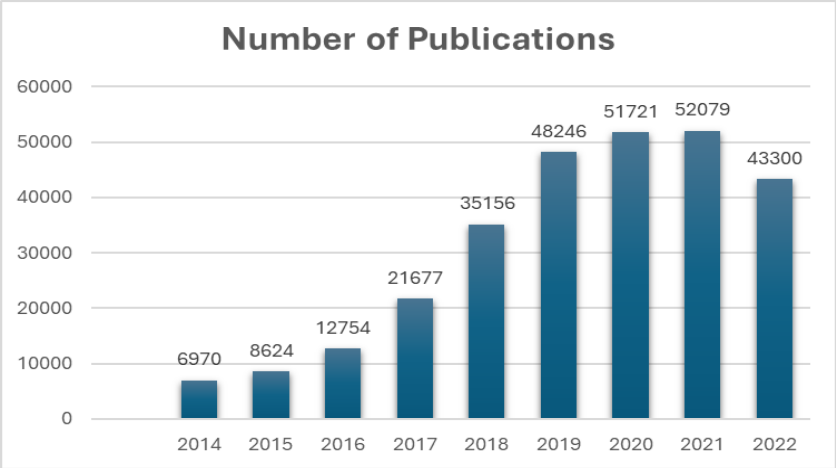

Figure 1. Number of Publication 2014-2022

Scientific publication is essential to disseminate research results and contribute to the development of science. Scientific publication is also beneficial for students and educators because it can improve academic skills and professional development (Setiawan & Trisnawati, 2018). Universities often require their students to publish as a graduation requirement, so they need guidance and support (Listiana et al., 2021). For teachers, publishing scientific papers is an important aspect of professional growth, although many find it difficult due to limited time and energy. To overcome these challenges, institutions provide training and mentoring programs to improve understanding of the publication process and its benefits (Islamiyah et al., 2023). The initiative has shown positive results, with several students successfully publishing their papers in accredited journals and teachers showing increased knowledge about article publication.

4 CONCLUSION

Research and publication of scientific papers are important components that can advance science and cannot be separated. Research if not followed up with a publication of a scientific article in a journal, then the research is only a report and stored in an archive or library. The opposite also applies, if a scientific paper is written without being preceded by research, then the work is only a summary of many other articles that have the same object so that no novelty is produced. This is what researchers and writers of scientific papers must pay attention to, that the level of novelty in science is needed so that the science continues to develop and does not stagnate. In the world of education, updates must be made both in terms of teaching methods,

ways to interact in class, and other activities so that in the future it is hoped that the learning system and education system will be better and the quality produced will also be better.

Although the education system in general has advanced in a series of adjustments and updates, but until now the challenges of education renewal are at least in three major aspects. First, the geographical aspect where the diverse geographical conditions, and the distance that separates the islands in Indonesia. Second, social poverty wherever there has been a drastic decline in illiteracy and dropout rates over the past few decades, but there is still a disparity in the quality of education between urban, rural and remote areas. Third, the teaching culture that is more oriented towards the assumption of knowledge targets that should be mastered by students. This challenge must be faced by conducting research and publishing scientific works as well as possible so that the problems that are challenges can be overcome.

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